THE OELWEIN METHOD: A STRENGTH-BASED READING INSTRUCTION METHOD FOR INDIVIDUALS WITH SEVERE AUTISM

By

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Abstract

The purpose of this paper is to examine a strength-based reading instruction method for individuals severely affected by autism who do not respond well to typical literacy instruction methods, called the Oelwein Method (OM). Due to the unique learning profile of strengths and weaknesses in individuals with severe autism, they often do not respond well to typical literacy instruction models. This paper examines the unique learning profile of individuals with autism and why the OM is an effective literacy instruction model for this population of learners. Phonics-based and sight word-based approaches are compared, with a focus on the effectiveness of these approaches for individuals with autism. The materials and instructional process of the OM are explained, including empirical evidence that supports the different instructional components used in the OM. The Ontario Ministry of Education's policies are reviewed, along with how the OM satisfies these policies. Methods to improve the OM are explored as well as directions for future research that would need to occur before widespread implementation could take place.

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The Oelwein Method: A Strength-Based Reading Instruction Method for Individuals with Severe Autism

The purpose of this paper is to examine a strength-based reading instruction method for individuals severely affected by autistic disorder, hereafter referred to as autism. Autism spectrum disorders (ASDs) are reviewed, in both the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000*)* and the recently released *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-V; American Psychiatric Association, 2013a). The focus of this paper will be on individuals more severely affected by autism; autism is a particular subtype of ASD. Prevalence rates for ASDs have been increasing across the world and in Ontario (Wingate et al., 2012). Prevalence rates for the specific ASD subtype of autism have also been increasing (Newschaffer et al., 2007). The Government of Ontario has subsequently increased funding to support individuals with autism and other subtypes of ASD (CBC, 2013). Despite this increase in funding, educators continue to experience difficulty in finding evidence-based methods for teaching individuals with ASD in certain areas of academics.

Delays in language or language impairments are a core feature of autism (American Psychiatric Association, 2000). These delays and impairments have a negative effect on reading ability (Scarborough & Dobrich, 1990; Silva, Williams, & McGee, 1987; Catts, 1991; Bishop & Adams, 1991; Nathan, Stackhouse, Goulandris, & Snowling, 2004). The Ontario Ministry of Education (2007a) has provided effective general practices for educating individuals with ASD, as well as more specific guidelines for teaching literacy to individuals with ASD; however, the general practices and literacy-specific guidelines do not include a specific instructional methodology for educators to follow. Educators are expected to combine their own teaching

knowledge with the recommendations from the Ministry of Education to teach literacy to individuals with ASD. While some educators may have the knowledge and training to create an effective literacy program for an individual with ASD, the majority are left to try typical literacy instructional models that may not be effective for these different types of learners.

This paper examines a strength-based and evidence-based method for teaching sight-words to individuals with autism, referred to here as the Oelwein Method (OM; Broun & Oelwein, 2007). A strength-based approach is one that requires a specialized method that incorporates an individual's individual strengths in the learning process (Broun & Oelwein, 2007, p. vii). Chapter 1 explores autism and the reading abilities of individuals with autism. Chapter 2 examines different instructional approaches for teaching reading to individuals with autism. Chapter 3 focuses specifically on the Oelwein Method as an approach for teaching reading to individuals with autism. Chapter 4 examines the policy implications of adopting this method as an accepted approach to reading instruction for individuals with autism.

Autism and Reading

Autism Spectrum Disorder and Autism

Autism Spectrum Disorder (ASD) is a developmental disability that includes the diagnoses of Autistic Disorder, Asperger's Syndrome (AS), Pervasive Developmental Disorder - Not Otherwise Specified (PDD-NOS), Rett's Disorder, and Childhood Disintegrative Disorder, as per the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000). ASDs are also commonly referred to as Pervasive Developmental Disorders (PDD; National Institute of Mental Health, 2012). Autistic Disorder is the specific subtype of ASD that is the focus of this paper, and will be referred to as autism. The diagnostic criteria for autism in the DSM-IV-TR includes: (1) qualitative impairments in social interaction; (2) qualitative impairments in communication; and (3) restricted, repetitive and stereotyped patterns of behaviour, interests, and activities (American Psychiatric Association, 2000). According to the American Psychiatric Association (APA; 2000), "manifestations of the disorder can vary greatly depending on the developmental level and chronological age of the individual" (p. 71). This paper focuses on individuals severely affected by autism who are unable to read and have difficulty learning to read via traditional literacy instruction models.

In May 2013, the APA released the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-V; American Psychiatric Association, 2013a). According to the APA (2013b), one of the most important changes in the DSM-V is to the section on ASD. There are no longer subtypes of ASD, but rather all individuals who meet the criteria will be given the diagnosis of 'Autism Spectrum Disorder'. The diagnostic criteria in the DSM-V include: (1) persistent deficits in social communication and social interaction across multiple contexts; (2)

restricted, repetitive patterns of behaviour, interests, or activities; (3) symptoms must be present in the early developmental period; (4) symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning; and (5) these disturbances are not better explained by intellectual disability or global developmental delay (American Psychiatric Association, 2013a, p. 50). For the first two diagnostic criteria above, the DSM-V provides diagnosticians with illustrative, but not exhaustive examples to help guide their diagnostic evaluations. Also, for each of the first two diagnostic criteria, diagnosticians are required to specify the current severity level. There are three severity levels outlined in the DSM-V for each of the first two diagnostic criteria: Level 1: Requiring support; Level 2: Requiring substantial support; and Level 3: Requiring very substantial support. When a diagnosis of ASD is made, the DSM-V also requires diagnosticians to specify if the ASD is: with or without accompanying intellectual impairment; with or without accompanying language impairment; associated with a known medical or genetic condition or environmental factor; and associated with another neurodevelopmental, mental, or behavioural disorder; or with catatonia. In terms of the new DSM-V diagnostic criteria and guidelines, this paper will focus on individuals diagnosed with an ASD with a Level 3 severity for the social communication diagnostic criterion; these individuals would likely have a Level 3 severity rating for restrictive, repetitive behaviours as well. The diagnosis for an individual severely affected by autism would likely include accompanying intellectual or language impairments. Due to the fact that the DSM-V diagnostic criteria are relatively new, none of the research reviewed in this paper include these new criteria. Therefore, the DSM-IV diagnostic criteria for autism will be used for the purposes of this paper.

Prevalence rates for ASD have steadily increased over the past two decades. The Autism and Developmental Disabilities Monitoring (ADDM) Network documented an increase in prevalence rates from 1 in 150 people in surveillance year 2000, to 1 in 88 people in surveillance year 2008 (Wingate et al., 2012). Prevalence rates for the specific ASD subtype of autism have also been increasing (Newschaffer et al., 2007). In response to the growing prevalence rates, the Government of Ontario has increased provincial funding for individuals with ASD, including autism, from approximately $70 million per year in 2004-2005, to almost $200 million per year in 2012-2013 (CBC, 2013). The reason for the rise in prevalence rates is not certain. Possible causes for the increase in prevalence rates include the improved identification processes and public awareness, broadening of diagnostic boundaries, diagnostic substitution, and better access to services (Simonoff, 2012). Some researchers believe that these explanations for the increase in prevalence rates only account for a small portion of the observed increases and the possibility of a true increase in incidence cannot be ruled out (Ouellette-Kuntz et al., 2013).

Autism and Educational Practices

The qualitative impairments in individuals with autism are often manifested as delays in language or language impairments (Dahlgren & Gillberg, 1989), which can have a negative impact on reading ability (Silva, Williams, & McGee, 1987; Catts, 1991; Bishop & Adams, 1991; Nathan, Stackhouse, Goulandris, & Snowling, 2004). While addressing the three key deficit areas of social interaction, communication, and behaviour are important for individuals with autism, the Ontario Ministry of Education (2003) recognizes that a student's success in school and throughout life is largely dependent on their ability to read. The *Early Reading Strategy: The Report of the Expert Panel on Early Reading in Ontario* (Ontario Ministry of Education, 2003) explores why early reading is important and provides strategies for educators to

deliver effective literacy instruction and how to help individuals with reading difficulties; however, the report does not include explicit methods for teaching individuals with autism how to read. In 2007, the Ontario Ministry of Education published a document titled *Effective Educational Practices for Students with Autism Spectrum Disorders: A Resource Guide*. This guide provides general information about reading instruction for individuals with autism, as well as strategies for teaching reading to individuals with autism. In terms of information about reading instruction, the guide explains that individuals with autism may have more success in learning to read through the whole word sight recognition approach, as opposed to a more traditional phonics program (Ontario Ministry of Education, 2007). The guide also suggests that individuals may be able to better understand and learn the phonetic components of words after learning to read via the whole word approach (Ontario Ministry of Education, 2007). General strategies in the guide include: providing activities in which learned words are used in meaningful contexts; daily practice in constructing sentences; teaching of subject-specific vocabulary; use of vocabulary and storylines that are familiar and meaningful; and using sequencing activities to help individuals develop skills in perceiving, understanding, and creating sequences (Ontario Ministry of Education, 2007). Other than the information and strategies mentioned above, the guide does not recommend a specific program or method for teaching individuals with autism to read. Teachers are expected to use their own training and knowledge to develop effective reading programs for individuals with autism.

Effective general educational practices for teaching individuals with autism include differentiated instruction, the use of visual supports, provision of a structured learning environment, use of appropriate assistive technology, sensory considerations, and using applied behaviour analysis as an instructional approach (Ontario Ministry of Education, 2007). While

some teachers may possess knowledge of these practices, no studies have been conducted to date to assess teachers' ability or confidence in implementing these practices. Nickels (2011) conducted a study that examined parent and teacher perceptions of effective educational practices for individuals with autism. Participants in this study identified all six of the practices mentioned by the Ontario Ministry of Education (2007) in *Effective Educational Practices for Students with Autism Spectrum Disorders: A Resource Guide*. Nickels (2011) did not assess parent or teacher perceptions of ability or confidence in using these practices, but did assess barriers to using these practices, which included: lack of training and knowledge; lack of time; challenges caused by characteristics of ASD; problematic teacher attitudes; problematic parent attitudes; transition issues; and need for additional services.

While some teachers may be aware of effective methods for educating individuals with autism, not all of them possess the training and resources to implement these methods. Budgetary constraints faced by school boards, especially in the area of special education, are a major barrier for providing the required training and resources that teachers need to educate individuals with autism in all areas of the curriculum. In terms of reading, an effective, evidence-based method for teaching sight-words to individuals with autism would likely be a most welcome addition to an educator's toolbox.

Autism and Reading Skills

The ability to read requires the interaction of several cognitive processes, including the ability to recognize each individual word (word reading or decoding), and the ability to understand the intended meaning of the text (reading comprehension) (Nation, Clarke, Wright, & Williams, 2006). Reading comprehension impairments in individuals with autism have been well documented (Nation et al., 2006; Norbury & Nation, 2011; Åsberg, 2010; Huemer & Mann,

2010). In terms of word reading ability or decoding, some research indicates that individuals with autism have intact word reading skills (Frith & Snowling, 1983; Minshew, Goldstein, Taylor, & Siegel, 1994; Huemer & Mann, 2010), while other research suggests deficits in word reading (Turner, 2010; Nation at al., 2006). It should be noted that none of the above research included individuals with severe autism, who for the purposes of this paper, are the target population.

Researchers have identified auditory processing differences in individuals with autism when compared to the normal population. In terms of hearing loss, Rosenhall, Nordon, Sandström, Ahlsén, and Gillberg (1999) found that among a group of 199 children and adolescents with autistic disorder, 3.5% of individuals had permanent pronounced to profound hearing loss in both ears, while 7.9% had permanent mild to moderate hearing loss; these rates are higher than expected in a normal population. In terms of non-permanent hearing loss, 23.5% of individuals showed a presence of serous otitis media, or middle ear fluid, which slows down sound transmission and diminishes hearing (Rosenhall et al., 1999). Among the participants with no permanent hearing loss, Rosenhall et al. (1999) found that 18% had Hyperacusis; this condition is characterized by oversensitivity to certain frequency ranges of sound and can make it difficult to tolerate everyday noise. O'Connor (2012) conducted a review of research over the past 20 years on auditory processing in individuals with ASD. Trends across studies indicated that auditory processing impairments in ASD occur most frequently during processing of complex stimuli and are more pronounced for speech stimuli than for non-speech stimuli. Given the auditory processing difficulties in individuals with autism, especially for speech stimuli, a reading instructional method that requires learners to interpret and group phonemes into words (e.g. phonics) may not be the most effective method.

Individuals with autism have been known to display a reading phenomenon called hyperlexia. This condition is characterized by an unusually superior ability to read single words in individuals with cognitive deficits and behavioural abnormalities, which extends far beyond what is expected based on these individual's comprehension and cognitive skills (Grigorenko et al., 2002). In terms of reading, these individuals are able to decode words at a level that far exceeds their ability to comprehend what is being decoded. Researchers have found a strong comorbidity between hyperlexia and Autism Spectrum Disorders (ASDs; Healy & Aram, 1986; Smith & Bryson, 1988). Research has provided estimates indicating between five and ten percent of individuals with autism display hyperlexia (Burd & Kerbeshian, 1985). Researchers disagree as to whether hyperlexia is a symptom of a more general syndrome such as ASD, or whether it is a phenomenon that occurs across multiple disabilities (Grigorenko, Klin, & Volkmar, 2003). Regardless, the presence of hyperlexia among people with ASD has been suggested as a sign of a positive prognostic indicator (Fisher, Burd, Kerbeshian, 1988). Fisher et al. (1988) examined 59 children and adolescents with pervasive developmental disorders (PDDs), including autism, and found that the presence of hyperlexia was positively associated with IQ, receptive language, and expressive language. The populations of individuals with severe autism, who are the target population for the intervention examined in this paper, are unlikely to exhibit hyperlexia as 70-80% of people diagnosed with autism also have some level of intellectual disability, ranging from mild to profound (Fombonne, 1999; 2003; 2005). Since individuals exhibiting hyperlexia tend to have higher IQ scores, those severely affected by autism are unlikely to show hyperlexia.

Huemer and Mann (2010) compared 384 participants with ASD and a group of 100 participants with dyslexia on nine standardized measures of decoding and comprehension.

Dyslexia is a language-based learning disability characterized by difficulties with reading and other language skills such as spelling, writing, and pronouncing words (International Dyslexia Association, 2007). Huemer and Mann (2010) also compared findings among three subtypes of ASD: autism, Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS), and Asperger's Syndrome (AS). Results showed that individuals with ASD scored lower than individuals with dyslexia on all comprehension measures, while those with ASD scored higher than those with dyslexia on all measures of decoding. ASD subtype analyses indicated some interesting differences. Individuals with autism and PDD-NOS scored significantly lower than those with AS and dyslexia on the Lindamood Auditory Conceptualization Test (LAC-3; Lindamood & Lindamood, 2004). The LAC-3 assesses an individual's ability to perceive and conceptualize speech sounds via a visual medium and can identify individuals who lack phonemic awareness. The lower LAC-3 scores among autism and PDD-NOS groups suggests that their phonemic awareness skills may differ from those with AS and dyslexia. The discrepancy could also be explained by differences in auditory processing between the autism/PDD-NOS and AS/dyslexia groups because the LAC-3 requires individuals to process auditory input (i.e. oral instructions) from the examiner in order to respond to test items. Based on these results, Huemer and Mann (2010) propose that the weaker profile of reading skills in individuals with autism closely resembles the profile of reading skills in those with PDD-NOS, whereas reading skills associated with AS are significantly stronger.

One age-based effect was noted by the Huemer and Mann (2010), in that those with AS showed improvements in reading skills with increased age, whereas those with autism and PDD-NOS fell further behind the normal population as age increased (Huemer & Mann, 2010). Early intervention for reading difficulties is important for all learners, but this age-based effect

suggests an even greater need for early reading intervention for those with autism and PDD-NOS. All of the participants in Huemer and Mann's (2010) study had measurable reading abilities and had observable verbal speech production; however, nearly half the ASD population has little or no speech and functions within the intellectually disabled range of cognition and thus, reading skills in this population cannot be reliably assessed using standardized tests (Nation & Norbury, 2005). Therefore, Huemer and Mann's (2010) inclusion criteria of having verbal language subsequently exclude nearly half of the ASD population. It cannot be assumed that an individual with no ability to produce verbal speech cannot read, but it does make it very difficult to measure their reading ability. In fact, some researchers emphasize that oral language skills should not be a pre-requisite for literacy instruction (Lanter & Watson, 2008). Qualitative and quantitative case study data suggests literacy instruction can actually lead to development of oral language skills (Craig & Telfer, 2005; Broun, 2004; Koppenhaver & Erickson, 2003).

Frith and Snowling (1983) compared participants with autism, participants with dyslexia, and a sample of normal participants on several oral reading measures, and found that the participants with autism possessed intact decoding skills in keeping with their reading age, calculated using the British Ability Scales Word Reading Test (BAS; Elliot, Murray, & Pearson, 1979). Comprehension skills of autistic individuals were significantly below expected levels given their reading age (Frith & Snowling, 1983). All participants in Frith and Snowling's study required 'age-appropriate' reading skills, as determined by standardized testing, which limited the participation in the study to only include individuals with autism to whom could be administered standardized reading tests. Minshew et al. (1994) compared the academic achievement levels of 54 high functioning autistic individuals with 54 normal control participants. Results showed that individuals with ASD did not differ significantly from controls

in terms of decoding, but performed significantly lower on measures of comprehension. The authors defined high-functioning individuals with autism as those having an IQ > 70; the mean Verbal IQ of their sample was 94. These results do not provide any information about the reading skills of the subset of individuals more severely affected with autism with IQ < 70, who are the subject of this paper.

Norbury and Nation (2011) examined word decoding and comprehension in two subtypes within the autism spectrum, those with age-appropriate structural language (autism language normal [ALN]) and those with structural language impairments (autism language impaired [ALI]). Assignment to ALN and ALI groups was made based on history of language delay, diagnosis of a language impairment, and scores of at least -1.25 *SD* on the Recalling Sentences subtest of the Clinical Evaluation of Language Fundamentals (CELF; Semel, Wiig, & Secord, 2006). Results indicated that individuals with ALN scored significantly higher on measures of word reading and non-word reading, compared to those with ALI (Norbury & Nation, 2011). This finding suggests that it is not necessarily the diagnosis of ASD that affects decoding ability, but rather the presence or absence of structural language skills such as phonology, semantics, and syntax. This research sought to understand two subtypes within the autism spectrum, delineated by the presence or absence of structural language impairment. Participants had a mean IQ of 109.89 or greater as measured by the WASI (Wechsler Abbreviated Scale of Intelligence). It is important to note that in most cases of autism, there is an associated diagnosis of intellectual disability in approximately 70-80% of individuals who are diagnosed (American Psychiatric Association, 2000; Fombonne, 1999; 2003; 2005). The results found by Norbury and Nation (2011) cannot be applied confidently to individuals with autism because they employ an

inclusion criterion that excludes those with mild, moderate, severe and profound intellectual disability.

Turner (2010) measured the performance of individuals with autism on selected measures of reading ability and cognitive-linguistic ability. Three hundred and seventy-seven participants with autism were compared to two other groups: (1) 3535 participants who met one of the twelve other United States federal disability categories, (2) 5835 normative peers who did not meet criteria for any of the thirteen United States disability categories. The two groups were compared on three measures of reading achievement and two cognitive-linguistic measures. The reading achievement measures were the Letter-Word Identification and Passage Comprehension subtests from Woodcock-Johnson III – Tests of Achievement (WCJ-II ACH; McGrew & Woodcock, 2001; Woodcock, McGrew & Mather, 2001) and the Oral Reading Fluency Test from Standard Reading Passages (Marston & Deno, 1986). The cognitive-linguistic measures were the Rapid Letter Naming and Segmenting of Words subtests from the Comprehensive Test of Phonological Processing (CTOPP; Wagner, Torgeson, & Rashotte, 1999). Results indicated that the individuals with autism scored significantly lower than their normative peers on all three measures of reading achievement and on both measures of cognitive-linguistic ability (Turner, 2010). When compared to participants in the other twelve disability categories, participants with autism scored significantly lower on Passage Comprehension, Segmenting Words, and Rapid Letter Naming; however, individuals with autism did not differ significantly from their disability counterparts on Letter-Word Identification or Oral Reading Fluency measures. Turner (2010) employed a selection criteria based on the IDEA (Individuals with Disabilities Education Act) definition of autism. According to the United States federal special education law, the IDEA Act of 2004 (IDEA, 2004), all types of ASD are classified under one term, ‘Autism’. By using the

IDEA definition of autism, the results from Turner's (2010) study cannot be applied to individuals severely affected by autism, who are the focus of this paper. Rather, Turner's (2010) results are representative of a combination of the five subtypes that fall under the ASD umbrella. This is important to note because previous researchers have found significant differences in reading ability among those with the AS subtype of ASD versus the autism and PDD-NOS subtypes of autism (see Huemer & Mann, 2010). Turner (2010) also points out that this particular study cannot account for possible confounding issues such as the severity level of autism symptoms.

In a study by Nation et al. (2006), the researchers sought to assess four components of reading skill: word recognition, non-word decoding, text reading accuracy, and text comprehension. Clinicians referred participants based on the presence of a diagnosis of ASD; however, clinicians were given the instruction to only consider participants who have 'measurable language skills, however minimal' (Nation et al., 2006). Of the 41 participants included in this study, only 16 met the diagnostic criteria for autism, while the remaining participants met diagnoses for either Asperger's Syndrome or atypical autism; after applying further inclusion criteria, nine of the 41 participants were excluded from analysis because they were 'completely unable to read'. Results indicated that 65% of participants showed reading comprehension scores at least 1 *SD* below population norms, with 38% scoring more than 2 *SD*s below population norms. In terms of word recognition, 20 of the 32 participants with measurable reading abilities had word-reading levels in the average or above average range; of these 20, half showed reading comprehension skills in the normal range while the other half had impaired reading comprehension. Thirty-five percent of participants obtained a reading comprehension score that was more than 1 *SD* below their reading accuracy scores. As for non-

word decoding, 42% of participants were at least 1 *SD* below the normal population, with 22% scoring at least 2 *SD* below the normal population. Nation et al. (2006) conclude that these results illustrate the heterogeneous pattern of reading skills in individuals with autism.

These research studies demonstrate a trend in reading research on individuals with ASD; that is, the lack of inclusion of those more severely affected by autism. Researchers rely on standardized assessments to allow comparisons to the 'normal' population; however, standardized assessment of individuals with developmental disabilities, such as autism, can be problematic (Simpson, Griswold, & Myles, 1999). For individuals with other disabilities, such as in the sensory or motor domains, accommodations can be made; for example, a child with vision impairment may be accommodated through the use of larger print (Simpson, Griswold, Myles, 1999). While assessment accommodations can be made for some individuals with disabilities, those with autism may have language/communication, social, behavioural, sensory, or cognitive impairments that cannot be easily accommodated while still maintaining the standardized testing conditions (Simpson & Myles, 1998). This is a key factor for why this population has received little attention in terms of reading ability research. Also, research on reading achievement in people with autism has primarily focused on group mean scores, which do not take into account the individual differences among people with autism, whose severity of symptoms may vary greatly (Jones at al., 2009).

Autism Severity

There is no universally accepted definition for autism severity (Bernier, 2012). Levels of impairment, or severity of autism, are currently measured in terms of degree of language delay, degree of cognitive delay, or behavioural issues such as aggression (Gotham, Pickles, & Lord, 2009); however, these variables are not an accurate measurement of the core symptoms of

autism, namely communication impairment, social impairment, and restricted or repetitive patterns of behaviour. Therefore, measurement of language delay, cognitive delay, and challenging behaviours do not give us a true measure of degree of autism severity. Autism professionals have also raised the question of whether severity should be defined in relation to the intensity of symptoms or an individual's ability to function with them (Bernier, 2012).

Currently, there are several methods used for assessing the severity of autism. The Autism Behaviour Checklist (ABC; Krug, Arick, & Almond, 1980), the Childhood Autism Rating Scale (CARS; Schopler, Reichler, & Renner, 1986), and the Gilliam Autism Rating Scale (GARS; Gilliam, 1995) are rating scales used to measure autism severity; however, each of the above rating scales either correlates highly with IQ or does not assess all of the core symptoms of autism (Bernier, 2012). The Autism Spectrum Quotient (AQ; Baren-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001) is a short, self-administered scale for measuring the degree to which an individual adult of normal IQ may have 'autistic traits'. The limitations of this assessment tool are that the individual must be capable of completing a self-administered checklist and must have a normal IQ, which means the AQ cannot be used with nearly half the population of people with autism who are functioning within the intellectually disabled range (Norbury & Nation, 2005).

The Social Responsiveness Scale (SRS; Constantino et al., 2003) assesses one of the core deficits in autism, social impairment; however, it only examines one of the three core impairments and scores are based on parent and teacher report (Gotham et al., 2009). Therefore, the SRS may be able to provide a measure of the severity of social impairment, but not a measure of overall autism severity. The PDD Behavior Inventory (PDDBI; Cohen, Schmidt-Lackner, Romanczyk, & Sudhalter, 2003) assesses social factors, language abilities, and

behaviours, which correspond with the three core autism impairments. The PDDBI is designed to assess responsiveness to intervention in individuals with pervasive developmental disorders (PDDs; autism, Asperger's Syndrome, PDD-NOS, childhood disintegrative disorder, Rett's Disorder) and not autism severity. The PDDBI includes a T-score scoring system that yields an Autism Score; the purpose of the Autism Score is to give users of the inventory an estimate of an individual's overall severity of autism. Nevertheless, the authors of the PDDBI caution that individuals with the same Autism Score may have very different profiles and their severity of autism may be quite different, depending on one's external criterion of severity.

The Autism Diagnostic Interview-Revised (ADI-R; Lord, Rutter, & Le Couteur, 1994) assesses the three core areas of autism impairment. Scores from the ADI-R have been used as severity measures for autism, but the scale was not designed to measure autism severity (Bernier, 2012). Also, scores tend to vary based on IQ and age, and there is a section of the scale that cannot be administered to nonverbal individuals (Bernier, 2012). The Autism Diagnostic Observation Schedule (ADOS; Lord et al., 2000) is an assessment tool that contains four different modules; each module is specifically designed to assess different individuals based on their level of expressive language. In this respect, the ADOS is valuable in that it does account for the differences in language ability across the autism spectrum; however, the fact that there are four different modules being applied to individuals makes it difficult to generalize results across all ASD subtypes (Bernier, 2012). The ADOS uses an algorithm, specific to each module, which leads to a classification of 'autism', 'autism spectrum disorder', or 'non-spectrum' (Gotham et al., 2009). In 2007, the algorithms were revised for three of the modules, resulting in an increased ability to compare individuals across modules one through three (Gotham, Risi, Pickles, & Lord, 2007). The ADOS has been used to research ASD features in large populations,

and raw scores have been used as an informal measure of autism severity, but this was not the original intent behind the design of the ADOS, and scores are still influenced by age and language ability (Gotham et al., 2009). The authors of the ADOS have been working on a new approach for determining autism severity using raw ADOS scores, while controlling for age and language ability (Bernier, 2012); however, this approach still requires extensive testing in clinical settings.

In summary, considerable differences exist in terms how clinicians determine the severity of autism affecting an individual, and each of the approaches for determining severity has limitations. Also, there is scant research on reading achievement in individuals with severe autism. Therefore, reading achievement in this specific autism population will also be examined by considering the relationship between reading achievement and each of the three core symptoms of autism: communication impairment, social impairment, and restricted, repetitive, and stereotyped patterns of behaviour.

Communication Impairment and Reading

Communication impairment, as one of the core diagnostic features of autism, can manifest as, "delay in, or total lack of, the development of spoken language", "in individuals with adequate speech, marked impairment in the ability to initiate or sustain conversation", "stereotyped or repetitive use of language or idiosyncratic language", or "lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental levels" (American Psychiatric Association, 2000, p 75). Communication impairment, including speech sound disorders and/or language impairment, can occur without the presence of other disorders (McCormack, Harrison, McLeod, & McAllister, 2011), but is a core feature of autism and is part of the diagnostic criteria for the disorder (American Psychiatric Association, 2000). McCormack

et al. (2011) found that participants identified as having communication impairment at age 4-5 years showed slower literacy progression at age 7-9 years. This study also included covariance tests that assessed the relationship between communication impairment and literacy outcomes, while controlling for the effects of sex, age, Indigenous status, and socioeconomic status. Covariance test results indicated significant negative relationships between communication impairments and multiple outcomes, including various literacy measures such as the Academic Rating Scale—Language and Literacy (National Center for Education Statistics, 2002) and the Peabody Picture Vocabulary Test—III (Dunn & Dunn, 1997).

When a more specific type of communication impairment, language delay, is considered, the negative effects on reading ability are even more apparent. Language delay itself is defined as not using single words by 2 years of age, and/or phrase speech by 3 years of age (Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001). Language delay and impairments in reading ability have been thoroughly researched and documented (Scarborough & Dobrich, 1990; Silva, Williams, & McGee, 1987; Catts, 1991; Bishop & Adams, 1991; Nathan, Stackhouse, Goulandris, & Snowling, 2004). A delay in, or total lack of, spoken language is one of the diagnostic criteria for autism (American Psychiatric Association, 2000). Based on this diagnostic criterion, individuals with autism are likely to have impairments in reading ability due to their communication impairments and/or language delays.

Social Impairment and Reading

Social impairment, as one of the core diagnostic features for autism, can manifest as, "marked impairment in the use of nonverbal behaviour such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction", "failure to develop peer relationships appropriate to developmental level", "a lack of spontaneous seeking to share

enjoyment, interests, or achievements with other people", or "lack of social or emotional reciprocity" (American Psychiatric Association, 2000, p. 75).

Social cognition or theory of mind refers to having an understanding of people around you, being aware that people can differ in what they want, know, and believe, and that their values can differ from your own (Schick, n.d.). Without having social cognition or theory of mind, social or emotional reciprocity would be difficult given the inability to understand the perspective of others. The theory of mind deficit is well accepted in autism research (Blinkoff, 2010). Social cognition and theory of mind play an important role in reading, whether the text is fiction or non-fiction. For example, social cognition skills help a child understand the perspective of different characters in a fictional text, including why a character might engage in certain behaviours or feel certain emotions (Schick, n.d.). In this case, a deficit in social cognition would have a negative impact on reading comprehension, in that the student would likely have difficulty answering comprehension questions about how people feel or what they believe. Social cognition can also have a negative impact on comprehension of non-fiction text. Social cognition plays an important role in understanding many aspects of art, politics, history, and social and cultural studies (Schick, n.d.). For example, when learning about the concepts of slavery in America, an individual would have to understand the beliefs around concepts of equality, human rights, and forced labour. Social cognition deficits have a negative impact on reading comprehension, but would not have any effect on decoding skills in reading.

Individuals with autism also show deficits in early social communication skills such as joint attention (Baren-Cohen, 1989; Kasari, Freeman, & Paparella, 2006; Leekam, Lopez, & Moore 2000). Joint attention refers to sharing attention with others through pointing, showing, and coordinated looks between objects and people (Kasari et al., 2006) and is essential for

reading (Laz, 2009). Farrant and Zubrick (2012) found that joint attention plays an important role in the early vocabulary development of children. It makes sense that joint attention is also required for reading instruction (Laz, 2009). Students must be able to share attention with other people and the actual text material in order to learn early literacy skills such as decoding. For example, a child must be able to listen to instructions from a literacy teacher while also attending to the written text in order for a literacy lesson to be successful.

Behaviour and Reading

Restrictive, repetitive, and stereotyped patterns of behaviour, as one of the core diagnostic features for autism, can manifest as, "encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus", "apparently inflexible adherence to specific, non-functional routines or rituals", "stereotyped and repetitive motor mannerisms", or "persistent preoccupation with parts of objects" (American Psychiatric Association, 2000, p.75). Abnormally intense or focused patterns of interest and repetitive motor mannerisms can interfere with early literacy instruction in that students exhibiting these behaviours may have difficulty attending to literacy instructors or materials due to the interfering nature of these behaviours. While the behaviours noted above make up one of the core symptoms of autism and can interfere with learning, there is another behaviour factor than can impede reading and reading instruction.

Even though it is not included as a core symptom in the diagnosis of autism, challenging behaviours are a major characteristic of the population affected by autism (Fox, Dunlap, & Buschbacher, 2000). One aspect of behaviour in autism can be referred to as 'behavioural excesses' (Lovaas, Ackerman, & Taubman, 1983). The behavioural excesses commonly observed in individuals with autism include the challenging behaviours of tantrums, self-injury,

and aggression (Maurice, 1996). Individuals with autism may not have had the reading or language opportunities typical students receive because of the behavioural excesses that educators and parents face on a regular basis (Lewis & Tolla, 2003; Downing, 2005; Sundberg, 2008). Problem behaviours have also been shown to decrease access to academic instruction (Wehby, Lane, & Falk, 2003; Levy & Chard, 2001), in that when a student is disruptive in a learning environment, they inherently stop the teaching from occurring, thus impeding their own learning (McIntosh et al., 2008).

Summary

Research on reading in individuals with ASD rarely delineates between the ASD subtypes (i.e. autism, Asperger's Syndrome, PDD-NOS). Therefore, there is little evidence on the reading skills of individuals diagnosed specifically with the autism subtype of ASD. In terms of individuals diagnosed with ASD, some research indicates intact decoding skills, while other research indicates decoding deficits. There is evidence that indicates those with autism and PDD-NOS have deficits in phonemic awareness compared to individuals with AS. Auditory processing difficulties are evident in individuals with autism. The tendency of comorbid diagnoses of intellectual disability with autism has made it difficult for researchers to assess reading ability in individuals severely affected by autism. Further, without an accurate and reliable method for determining autism severity, it is difficult for researchers to use consistent groupings of participants when conducting studies. The core symptoms of autism, as per the DSM-IV, are communication impairment, social impairment, and restrictive and repetitive patterns of behaviours. Each of these core symptoms of autism has a negative impact on reading ability.

Instructional Methods for Teaching Reading to Individuals with Autism

This section focuses on reading instruction for the purposes of word recognition or decoding, rather than for comprehension. The debate around reading instruction for word recognition has focused on two main approaches: phonics instruction and sight-word instruction (also known as whole language or meaning-emphasis approach) (Foorman, 1995). This 'Great Debate', as it is often referred to, has been ongoing since the 1960s, and empirical evidence supports reading instruction in phonics over instruction in sight-words (Foorman, 1995). Does this mean that phonics instruction the best approach for all types of learners? Over the past ten to fifteen years, some reading experts have advocated for a blended approach to reading instruction that incorporates aspects of both the phonics and sight-word instructional methods (Huang, 2008).

The effectiveness of phonics instruction versus sight-word instruction for individuals severely affected with autism will be explored. Phonics instruction involves two processes: decoding the words and understanding the meaning of the words, with decoding of words having to precede the understanding of meaning (Xue & Meisels, 2004). Decoding must precede comprehension because one must know what a collection of letters represents before its meaning can be determined. Decoding of words requires several sub skills. Three of these sub skills are rapid automatized naming (RAN), phonological processing, and orthographic processing (Holland, McIntosh, & Huffman, 2004). RAN is defined as how quickly a person can identify simple, visual stimuli; phonological processing refers to sounding out each individual sound in a word; and orthographic processing is explained as decoding words by letter chunks (Holland et al., 2004). Sight-word instruction refers to teaching people to recognize words as logographs or

as a whole, in the absence of analyzing the relationship between the letters and sounds in the word (Spector, 2011).

As reported in the previous chapter, reading research on people with autism spectrum disorders (ASDs) often does not include those diagnosed with the specific subtype of ASD called autism. In the following sections, phonics instruction and sight-word instruction for individuals with autism will be reviewed. Few research studies exist that examined reading ability and autism severity. One of the reasons for this lack of research is the absence of a universally accepted measure for assessing autism severity, which makes it difficult for researchers to accurately quantify severity. Also, standardized assessments to measure reading ability can be difficult with individuals with developmental disabilities, such as autism, due to the language/communication, social, behavioural, sensory, or cognitive impairments that often accompany these disabilities (Simpson, Griswold, & Myles, 1999). A few studies exist that have examined autism symptom severity and verbal ability. Ben-Yizhak et al. (2010) found that Verbal IQ scores and Full Scale IQ scores were negatively correlated with a higher expression of autistic features in a group of school-age siblings of individuals with autism who were identified as having broad autism phenotype difficulties. Gotham et al. (2009) also found that Verbal IQ was a significant predictor of autism severity as measured by the ADOS. Jones et al. (2009) found that reading ability fell below expected levels given individuals' general intellectual ability as social and communication impairments increased as per the ADOS. Due to the dearth of research examining autism severity and reading instruction or ability, studies on phonics and sight-word instruction for individuals with mild, moderate, and severe intellectual disability will also be reviewed, as individuals more severely affected by autism typically have a comorbid diagnosis of intellectual disability. Reading instruction with the population of learners with

mild, moderate, and severe intellectual disability has been thoroughly researched (see Browder et al., 2006; Browder & Lalli, 1992; Browder & Xin, 1998; Connors, 1992; O'Connor, Jenkins, & Slocum, 1995; O'Connor, Notari-Syverson, & Vadasy, 1996).

Phonics Instruction

The scientifically-based reading instruction model recommended by the National Reading Panel (NRP; National Institute of Child Health and Human Development, 2000) focuses on five components of reading instruction: phonological awareness, phonics, fluency, vocabulary, and reading comprehension. This model of reading instruction falls under the phonics instruction type of reading training, as opposed to the sight word-based type of instruction. While this multi-component model is supported by empirical evidence, it is important to note that most of the research reviewed by the NRP in creating the model excluded participants with IQ scores below 70 (Al Otaiba & Hosp, 2004), which would effectively exclude 70-80% of those participants diagnosed with autism. When examining the population of individuals with IQ scores below 70, there are limited research studies that take into account all five components laid out by the NRP (Al Otaiba & Hosp, 2004). Browder, Ahlgrim-Delzell, Flowers, and Baker (2012) conducted a study to evaluate the effectiveness of the NRP multi-component model of literacy that included phonics and phonemic awareness in comparison to a sight-word literacy approach. The study included 93 participants with severe developmental disabilities; however, it is important to note that only 35 of these participants had a diagnosis of autism, with the remainder having diagnoses of moderate or severe intellectual disability or multiple disabilities. This is important to note because of the language-based deficits that are a core feature of autism. These language-based deficits make the population of those with autism inherently different than the population only diagnosed with moderate to severe intellectual

disabilities in that reading and language are so closely tied to one another. Results indicated that participants in the multi-component phonics treatment had higher mean values for both the Conventions of Reading and Phonics Skills subtests of the *Nonverbal Literacy Assessment* (NVLA; Ahlgrim-Delzell, Browder, Flowers, & Baker, 2008), when compared to participants in the sight-word treatment. Effect sizes were small to moderate. One notable limitation of this study was that the authors did not control for diagnoses of autism, which does not take into account the significant language differences between the autistic and intellectual disability populations.

Gabig (2010) examined phonological awareness and single-word reading in 14 school-aged participants with autism and 10 age-matched, typically developing participants between the ages of five and seven. Mean standard scores for both groups were within the average range for measures of word recognition, including both sight-word recognition and non-word decoding, as measured by subtests of the *Woodcock Reading Mastery Test—Revised*; however, participants with autism scored below average for measure of phonological awareness compared to typically developing peers. It should be noted that two of the inclusion criteria for the study resulted in the exclusion of those more severely affected by autism. Participants with autism were included in the study if they had functional verbal ability at the phrase or sentence level, and had a nonverbal intelligence score greater than or equal to 70. These participants with autism were able to demonstrate word-reading abilities that were on par with their peers; however, their phonological awareness skills were significantly lower than those of their peers. This suggests that intact word reading skills in individuals with autism may not be indicative of intact phonological awareness skills.

Calhoon (2001) sought to assess the degree to which individuals with cognitive disabilities, including Down syndrome and autism, could master phonics rules compared to a control group of typically developing readers. Each participant's understanding of word parts, graphemes and phonemes, onsets and rime, and recognition of high frequency words was assessed. Results indicated that the participants with autism possessed intact phonics skills and were able to attend to word parts such as rimes, when compared to the control group. This led the authors to suggest that phonics instruction may prove beneficial for individuals with autism. While the participants with autism in this study had IQ scores ranging from 60 to 100, the authors did not control for the effects of IQ. Also, all participants in the study were reading, on average, at the second-grade level, which excluded participants with autism who had reading levels below the second-grade level, including those with no measurable reading level.

Whalon, Al Otaiba, and Delano (2009) conducted a literature review of 11 studies that focused on reading instruction for individuals with Autism Spectrum Disorder (ASD) that included one or more of the NRP's five components of reading. Of the eleven studies, four of them focused on the word recognition aspect of reading instruction. Each of the four studies used a computer-based instruction program, with three of the studies delivering phonics-promoting language prompts in either Swedish or Castilian Spanish (Whalon et al., 2009). In the study by Heiman, Nelson, Tjus, and Gillberg (1995), participants with ASD showed an increase in phonological awareness and word reading via this computer-based phonics instruction method, although this effect was not maintained when assessed during a follow-up period 26 weeks later. Tjus, Heimann, and Nelson (1998) used the same computer program as the previous study but provided participants with ASD fewer training sessions over a briefer time frame. Results showed positive increases in reading and phonological awareness, with significant gains

in phonology being maintained at follow-up, although gains in reading were not maintained. The third computer study, conducted by Basil and Reyes (2003), involved six participants, two of who had diagnoses of ASD. Of the two participants with ASD, only one completed the post-test battery, as the other participant did not cooperate when administered the post-test tasks. The participant who completed the full battery showed improvement in phonological awareness and spelling after undergoing the computer-based phonics instruction program. The final study was a single subject design in which three participants were taught phonics skills across three conditions: teacher only, teacher plus computer-assisted instruction, and computer-assisted instruction alone (Coleman-Martin, Heler, Cihak, & Irvine, 2005). One of the three participants who had a diagnosis of ASD was able to acquire all 15 target words, five per condition. Even though the scope of learning was limited to 15 words, the participant with ASD was able to show progress. Each of the previous four studies shows that individuals with Autism Spectrum Disorder (ASD) can develop phonemic awareness and/or phonics skill. It should be noted that these studies did not differentiate between the different subtypes of ASD.

Conners (1992) conducted a review of the research on reading instruction for individuals with moderate intellectual disability. While this study did not include people diagnosed with autism, it did include people with intellectual disabilities. Three groups of studies were identified by Conners (1992), including sight-word instruction, word-analysis (phonics-based) instruction, and oral reading error-correction. A review of the research indicated that among the sight-word instruction methods examined, those that incorporated pictures, used constant delay, and the Edmark errorless discrimination methods were the most effective. In errorless discrimination methods, the teacher instructing the student does not allow the student to make a mistake by intervening and correcting the student before an error can be made (Pierce & Cheney,

2003). Conners (1992) also found that word-analysis (or phonics-based) instruction is a viable option for many individuals with moderate intellectual disability.

While there is little evidence that examines the effectiveness of phonics-based instruction for individuals with severe autism, some of the studies referred to above do lend some support to the method. Despite this support, reasons exist why the phonics-based reading instruction approach may not work well for individuals with severe autism. Phonemic awareness is the ability to identify the smallest units of sound in language, separate them, and manipulate them, which is a key skill required for reading in phonics instruction (Vaughn & Linan-Thompson, 2004). Due to their language difficulties and dependence on visual cues, individuals with autism generally have more difficulty understanding the parts-to-whole concept (Lanter & Watson, 2008). In phonics-based instruction, people are taught the sound parts of a word first, and must then put these sounds together to decode whole words, which requires an understanding of a parts-to-whole concept.

In order to teach an individual using phonics, it is important that the learner can respond back verbally to teacher-directed instruction; for example, repeating a phoneme that a teacher has just presented verbally. Modified strategies must be employed to assist nonverbal learners with autism who are unable to respond verbally, making phonics instruction more complicated for teachers. Without the ability to repeat and practice out loud, nonverbal learners with autism are at a disadvantage in phonics-based reading instruction (Foley & Pollatsek, 1999). Auditory processing difficulties in individuals with autism have been thoroughly researched and confirmed (O'Connor, 2011), which means that using phonological-based methods for teaching decoding may not be successful for some of this population. In order to be effectively instructed in phonics, an individual must be able to accurately hear letter sounds. The auditory processing

difficulties that accompany the autism diagnosis may make it difficult for some individuals with autism to accurately identify letter sounds and letter blend sounds.

The decontextualized nature of traditional phonics instruction makes it very difficult for many individuals with autism to master the sub skills required for phonics instruction (Mirenda, 2003). In order for effective phonics instruction to occur, students must have some understanding of letter sounds and letter blend sounds. It may be difficult for individuals with autism to understand these isolated phonemes out of the context of words. Some researchers have proposed that the processing of context is impaired in people with autism; this phenomenon is known as weak central coherence (Happé & Frith, 2006). This deficit in context processing found in people with autism makes phonics-based reading instruction difficult for individuals with autism, as they cannot use context as effectively to decode words. Another approach that has shown some positive outcomes among individuals with autism and has received much attention in research is the sight-word instruction method.

Sight-Word Instruction

Many individuals with autism have more reading acquisition success via engagement in the whole-word learning approach as opposed to a more traditional phonics program (Ministry of Education, 2007a). Sight-word instruction is an approach that uses whole-word identification to teach word recognition. Sight-word instruction has been used to teach functional language skills to people with intellectual disabilities (Browder & Xin, 1998; Katims, 2000). Researchers have found that 70-80% of individuals with autism also have some degree of intellectual disability (Fombonne, 1999; 2003; 2005); therefore, instructional methods that have been effective for those with intellectual disabilities may also be effective for those with autism. Without direct evidence, the efficacy of sight-word instruction for those with autism cannot be assumed.

In order to explore the efficacy of sight-word instruction for individuals with ASD, Spector (2011) conducted an evaluation of the evidence base using the evaluative method for identifying evidence-based practices in autism, proposed by Reichow, Volkmar, and Cicchetti (2008). In order to be included in Spector's (2011) review of the evidence base, research studies had to meet the following four criteria: (1) participants had to have a diagnosis of ASD, (2) the research had to be published after 1980, (3) the reading intervention had to qualify as a sight-word approach, and (4) studies had to have either a quasi-experimental control group design, a group experimental design, or a single-subject design whereby a functional relationship between independent and dependent variables could be demonstrated. Unfortunately, none of the studies employing quasi-experimental control groups or group experimental designs met the four criteria above (Spector, 2011); however, all of the studies that did meet the four criteria included only those with a diagnosis of autism, meaning none of the participants had other diagnoses of ASD (Spector, 2011). This is noteworthy, as many of the research articles mentioned in Chapter 1 did not include those diagnosed specifically with autism. Nine single-subject designs met Spector's (2011) four criteria. Once these studies had been selected using Spector's (2011) four criteria, Reichow et al.'s (2008) evaluative method was applied. Reichow et al.'s (2008) evaluative method consists of three instruments: (1) rubrics for the evaluation of research study rigor, (2) guidelines for evaluating research study strength, and (3) criteria for determining whether a method is evidence-based. A total of twenty-seven participants were involved when all nine studies were totalled together. All researchers targeted participants with significant verbal and intellectual limitations, and all participants had limited or no reading experience (Spector, 2011). Analysis of all nine studies that met Reichow et al.'s (2008) evaluative method provided support for a massed trials approach to sight-word instruction for individuals with autism (Spector,

2011). Spector (2011) also found that positive reinforcement, use of visual supports, systematic prompting, and student response to a succession of items were all effective instructional components within sight-word instructional methods.

Other reasons related to the strengths and learning profiles of individuals with autism that makes the sight-word instruction approach an effective one. Frith and Snowling (1983) reasoned that individuals with autism tend to rely on rote memorization and recognize words on the basis of shape or pattern recognition, as opposed to phonologically sounding words out. This reasoning suggests that individuals with autism will have more success with a sight-word instruction method over a phonics-based instruction method. Another reason sight-word instruction works well for individuals with autism is that it takes advantage of their well-documented relative strength in perceptual skills (Samson, Mottron, Soilieres, & Zeffiro, 2012), as the sight-word method relies on the person perceiving the word as a whole, as opposed to identifying what sound each individual letter or letter combination represents. Research and specific strengths associated with the diagnosis of autism support the use of sight-word instruction as an effective approach for teaching word recognition or decoding to individuals with autism; however, a body of research proposes that sight-word instruction is not an effective reading instruction method for individuals with autism.

Spector (2011) noted that if students were only taught to recognize words as wholes, without consideration of letter sounds or letter blend sounds, they would only be able to identify words that had been explicitly taught, and would not have a set of skills to try and recognize and read unfamiliar words. Ehri (2005) pointed out that when employing sight-word strategies, unless readers attend to the individual letters within words, they might confuse words with similar orthographic patterns (e.g. crook and creek). There is also the criticism that if focus is

only placed on word recognition (Spector, 2011), other important components of reading, such as those outlined by the NRP, may be neglected. To this end, Koppenhaver and Erickson (2009) pointed out that many classroom programs for students with cognitive impairments have not focused enough on comprehension because too much focus was placed on sight-word instruction.

While much evidence in the research base supports the effectiveness of sight-word instruction for individuals with autism, some researchers have pointed out flaws in this supportive research. Browder et al. (2006) found that many studies on sight-word instruction do not include a measure of comprehension. In this sense, students may learn to name the word, but could have no understanding of what it means. Browder et al. (2006) also suggested that even when comprehension was added as a component in sight-word teaching, it was not likely to result in the student learning to read. Spector (2011) also pointed out some problems with the supportive research on sight-word instruction. Research on sight-word instruction methods has only shown support for one outcome; that is, enabling students to use explicitly taught words to perform functional tasks. No studies have examined the potential benefits of sight-word instruction for other outcomes, such as developing understanding of the communicative nature of text, increasing motivation to learn, or using sight-word knowledge as a basis of instruction for alphabetic concepts and principles such as phonics (Spector, 2011).

Considerable research exists regarding a problematic effect that can occur when using pictures to support a sight-word instruction program. Among sight-word instructional methods, several techniques have been explored; including paired associate learning, stimulus fading, and picture-to-text matching (Fossett & Mirenda, 2006). Paired associate learning involves pairing unfamiliar print with familiar pictures in order to teach recognition of the unfamiliar print;

however, the use of pictures in teaching recognition of unfamiliar words has resulted in a well-documented blocking effect (Didden, Prinsen, & Sigafoos, 2000; Solman, Singh, & Kehoe, 1992; Singh & Solman, 1990; Samuels, 1967). The blocking effect occurs during sight-word instruction when learners are presented with text plus picture stimuli and the request to read the text (Fossett & Mirenda, 2006). Reading researchers hypothesized that the pairing of familiar pictures with unknown text would improve learners' ability to read unknown words; however, researchers of paired associate learning have found the opposite, that the pairing of pictures tends to interfere with learners' ability to attend to the unknown print stimuli (Fossett & Mirenda, 2006). While the blocking effect is well documented, it should be noted that Didden et al. (2000), Solman et al. (1992), and Singh and Solman (1990) studied populations of people with some level of intellectual disability, and did not include any participants with autism. Samuels (1967) studied 30 participants with kindergarten experience, with no indication as to their level of intellectual functioning or whether they had other disabilities. Dittlinger and Lerman (2011) tested the blocking effect with a group of three participants with autism. They found that all participants learned words more quickly when they were presented alone rather than with pictures, suggesting that the blocking effect remains intact for individuals with autism. The blocking effect and how it interferes with sight-word learning must be considered when reviewing or implementing any specific sight-word instructional method.

While there is support and criticism for both the phonics-based and sight-word instructional reading methods, it is apparent that individuals with autism have more success with literacy instruction that incorporates multiple instructional strategies (Mirenda, 2003). The particular sight-word instruction method that will be reviewed in the next chapter incorporates multiple instructional strategies, especially ones that have been proven successful for individuals

with autism and their particular strengths (i.e. use of visuals; accessing of other learning modalities such as auditory, kinaesthetic, and digital; incorporating interests into instruction; and use of errorless learning).

The Oelwein Method of Sight-Word Instruction

Patricia Oelwein originally proposed the Oelwein Method (OM) of sight-word instruction in 1995 in her book *Teaching Reading to Students with Down Syndrome: A Guide for Parents and Teachers*. The method was created to take advantage of the relative visual learning strengths typically observed in individuals with Down syndrome (Oelwein, 1995, p. 45). By utilizing the visual modality strengths of these learners, Oelwein sought to overcome the phonological awareness and auditory short-term memory difficulties experienced by this population (Oelwein, 1995). After reading Oelwein's book in 1995, an itinerant resource teacher named Leslie Broun implemented the approach with a group of students with Down Syndrome and observed immediate and continued progress in their reading skills (Broun, 2004). These students were eventually able to take turns reading with their classmates, which facilitated a high level of inclusion in classroom programming (Broun, 2004). Broun began working with an increasing number of students with ASD, and felt that the visual learning style of this population would lend itself well to the OM (Broun & Oelwein, 2007, p. vi). Many researchers have noted strengths in the visual perceptual modality for individuals with ASD (see Samson et al., 2012; Perreault, Gurnsey, Dawson, Mottron, & Bertone, 2011; Ashwin, Ashwin, Rydderch, Howells, & Baron-Cohen, 2009; Jolliffe & Baron-Cohen, 1997; Shah & Frith, 1993, 1983). Broun (2004) noticed immediate success in using the OM to teach students with ASD to read, including some students with more severe learning difficulties who were resistant to typical reading instruction approaches.

The OM is a direct instruction approach that employs the skills of matching, selecting, and naming as the critical building blocks of acquiring a sight-word vocabulary (Broun & Oelwein, 2007, p. 14). In this three-part process, students' visual skills are engaged, as well as

their kinaesthetic, auditory and digital skills, allowing this method to appeal to multiple learning styles and strengths (Broun & Oelwein, 2007, p. viii). In essence, the OM instructional technique is a form of paired associate learning, in that students are required to take a flashcard containing a word and match it to another card that depicts the same word along with a pictorial representation of the word. Calkins (1896) was the first to study and create a methodology for the paired associate learning technique. This memorization procedure has been thoroughly studied and is recognized to be an effective instructional method (see Thorndike, 1908; Cason, 1926; Stoddard, 1929; Seibert, 1930).

Materials Required

Preparation of the initial materials required to implement the OM can be done in as short a time as ten minutes (Broun & Oelwein, 2007). The teaching process is based on a structured framework consisting of a blank two by two word grid, measuring 8½" by 11" (see Figure 1). The flash cards have the words printed on them to match the words on the picture cards (see Figure 1). The picture cards consist of a word, along with a pictorial representation of the word. Please note that Figure 1 shows caricature-type pictures for family members; however, student-specific materials would have real photographs of parents, family members, and other special interest items and activities. For words that don't have a natural pictorial representation, such as *I* and *see*, two identical flashcards can be created, as opposed to a flashcard and matching picture card. The authors recommend using Arial type font if creating materials using a computer. It is essential that the grid, flashcards, and picture cards be prepared on a uniform colour of paper to provide the student with a more cohesive visual picture that is free from the distractions of different colours (Broun & Oelwein, 2007). The word grid can be reused for each additional set

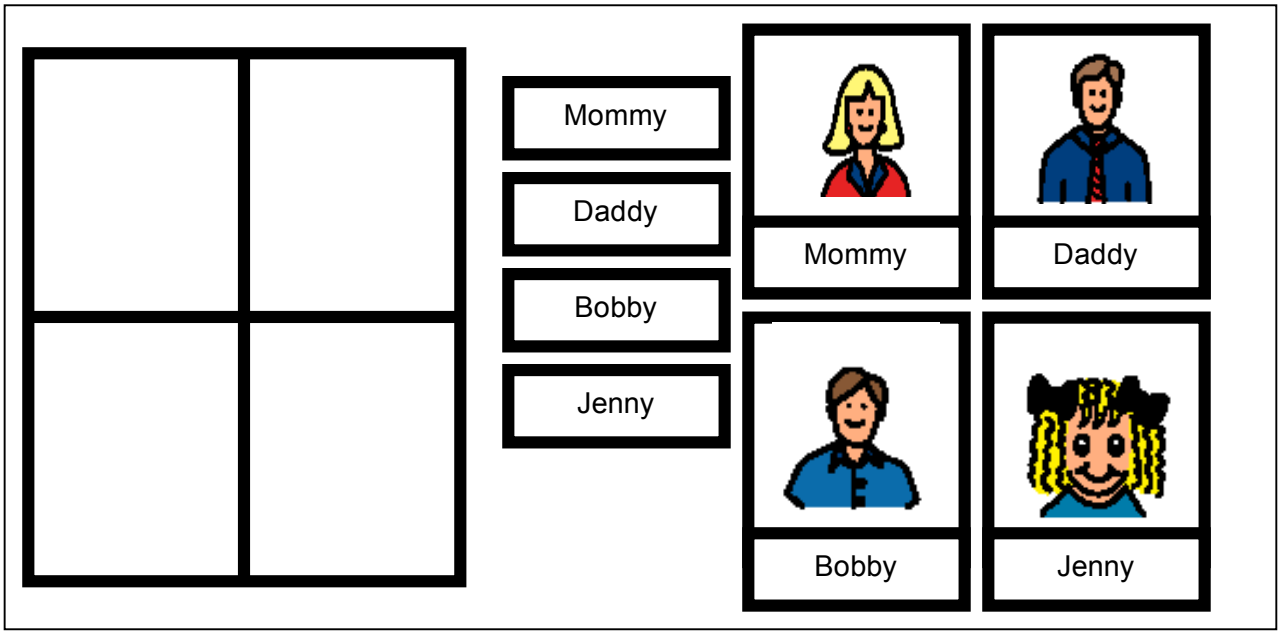

Figure 1. Example of blank two by two word grid, flash cards, and picture cards (not to scale).

of four words that will be taught, as each picture card is placed on one of the four quadrants of the words grid. New flash cards and picture cards need to be made for each additional word to be taught.

Pre-Requisite Skills Needed by Students

In order for students to have success with the OM, it is recommended that they possess the pre-requisite skills of table-readiness and matching (Broun & Oelwein, 2007, p. 37). Table readiness is defined as being "…able to sit at a table and respond to and cooperate with the instructor for approximately five minutes at a time" (Broun & Oelwein, 2007, p. 37). Table readiness is one of the first skills taught to individuals with autism through applied behaviour analysis (ABA) or intensive behavioural intervention programs (IBI; see What is ABA Therapy, 2013; Kalmeyer, 2010; Barber, 2009). It is also one of the first skills recommended for instruction in behavioral intervention guides for young children with autism (Maurice, 1996). Matching is an essential skill for all learners and is an indicator of other important early learner abilities. The student who can match can typically focus on visual stimuli, discern differences between stimuli, and can engage in the required motor movements to physically match two pictures, shapes, or objects (Sundberg & Partington, 1998). Instructional programs that teach matching skills are a key component of several popular early autism intervention programs (see Partington, 2006; Maurice, 1996; Sundberg, 2008). In each of these programs, matching is one of the initial skills targeted to teach.

The two most widely accepted literacy models are the reading readiness and emergent literacy models (Erickson, 2000). Each approach posits that certain pre-requisite skills should be in place before reading instruction can commence. The reading readiness model suggests that students possess the following skills as pre-requisites before learning to read: age-appropriate

oral language development and vocabulary, appreciation of stories and books, phonemic awareness, understanding of basic print concepts, understanding that letters represent sounds, ability to distinguish shapes, and ability to identify at least some letters (National Institute for Literacy, 2003). In terms of the emergent literacy model, Teale and Sulzby (1996) maintain that emergent literacy learners typically exhibit an understanding of reading and writing early in their lives, such as identifying signs and playing with early writing behaviours. Students should also have an understanding of the communicative nature of reading and writing, and have increased vocabulary, basic knowledge of story structure, and an understanding of the difference between written and oral language (Teale & Sulzby, 1996). Students with autism may enter the school setting with limited verbal ability, which often excludes them from typical literacy instruction because they lack some of the pre-requisite skills cited by the emergent literacy and reading readiness models (Koppenhaver & Erickson, 2003). In fact, some researchers recommend avoiding reading readiness models altogether when considering reading instruction for students with autism, and that spoken language behaviour should not be a pre-requisite for literacy learning (Lanter & Watson, 2008). Both of the literacy models described above require at least some of the above skills be mastered before literacy instruction can occur. The OM, however, only requires two basic skills to be mastered (i.e. table readiness and matching). Therefore, this method may be more appropriate than typical literacy instruction methods for students with autism who have difficulty with new skill acquisition and who possess very few early learner skills.

The Oelwein Method Process

The OM is a four-part process consisting of the following stages of learning: (1) Acquisition; (2) Fluency; (3) Transfer; and (4) Generalization (Broun & Oelwein, 2007).

Stage 1: Acquisition. Prior to starting the Acquisition stage, it is important to establish a collection of words that are of high interest to that specific individual, such as names of family members, friends, or special interests (Broun & Oelwein, 2007). Incorporating the interests of young learners with ASD into early intervention practices has been shown to be an effective procedure. Dunst, Trivette, and Hamby (2012) conducted a meta-analysis of 24 studies that incorporated interest-based interventions; results indicated that high-interest interventions were more effective than low-interest interventions in terms of increasing pro-social behaviour and decreasing aberrant child behaviour. The first four words taught using the OM should be the names of four people who are important to the student; three people, along with the student's own name, can also be used. The second set of four words should include *I*, *see*, plus two more names of people important to the student. The third set of words should include *like*, *and*, plus two more names of people important to the student or things the student likes. The fourth set of words should be words derived from items or characters the student likes. The fifth set of words should include *the*, *go*, *school*, and *bus*. Additional sets of words should include vocabulary to facilitate sentence construction, such as *here*, *is*, *my*, and *to*, and other words common to primer word lists (Broun & Oelwein, 2007). The Dolch word list is a list of basic words that early readers should recognize on sight as these words are used in all forms of writing (Johns, 1970). It is recommended that each new set of four words include two sentence building words and two nouns, verbs, or adjectives. Once the initial words to teach have been chosen, the Acquisition stage can commence. The Acquisition stage consists of three levels: Matching, Selecting, and Naming.

Matching Level. In the Matching level of the Acquisition stage, the student is required to match the flashcard to the matching picture card on the word grid for each of four words in the

first set. The learning materials are arranged by placing each of the four picture cards on one of the word grid quadrants. The flash cards are placed in front of the student. Prior to starting the first student learning trial, the instructor draws the student's attention to the instructional materials by pointing to the picture of *Mommy* on the picture card and saying "It's *Mommy*. Point to *Mommy*." For individuals who communicate via sign language, the instructor pairs the word *Mommy* with the sign for *Mommy*. Next, the instructor points to the word *Mommy* on the flashcard and says, "This says, *Mommy*". To start the first learning trial, the instructor gives the *Mommy* flashcard to the student with the instruction, "This says *Mommy*. Put the word *Mommy* on *Mommy*". The student is expected to place the flashcard with the word *Mommy* on top of the picture card with *Mommy* that is affixed to one of the quadrants of the word grid. The student may need some prompting (e.g. full physical prompting, partial physical prompting, gestural prompting, positional prompting) at first in order to learn the motor movements required to complete this process. The student should be given immediate positive reinforcement after each successful matching response. This process is continued for each of the remaining three words in the first set. The order of presentation of the four flashcards in the first set should be randomized to avoid order effect problems. The errorless learning approach is used to correct the student if they begin to place the flashcard on top of an incorrect, non-matching picture card. The errorless learning approach, first introduced by Terrace (1963), is a type of discrimination learning that decreases or eliminates the chance of incorrect responses, therefore increasing the possibility of a correct response. An example of errorless learning would be intervening before the student makes an error and prompting them to the correct response, then applying positive reinforcement. The premise behind errorless learning is that error responses have negative effects, especially for individuals with autism, given their rigid adherence to rules (Texas

Statewide Leadership for Autism, 2010). The benefits of using errorless learning include: minimization of number of errors, increase in overall instructional time, reduction in likelihood of errors on subsequent trials, and reduction in frustration and occurrence of inappropriate emotional behaviours by increasing opportunities for reinforcement. The Matching level is continued until the student is able to match the flashcard to the correct picture card for all four words in the first set without any form of prompting (including errorless learning correction) at a success rate of 80%, which is considered mastery in the OM. In other words, when testing whether a student has attained mastery, no additional errorless learning prompting should be delivered. If the student does not attain 80% success when testing for mastery, the instructor can go back to using errorless learning prompts for a few sessions, and then go back to retesting for mastery without errorless correction.

Selecting level. The next level of the Acquisition stage is Selecting. This involves having the student select a word on request by picking it up and giving it to the instructor (Broun & Oelwein, 2007). To start the first learning trial, the instructor places the word grid in front of the student with all four picture cards on it, then places all four of the flashcards in front of the student. Next, the instructor starts the first trial by saying, "Take *Mommy*". The student is expected to select the *Mommy* flashcard and place it on top of the *Mommy* picture card on the word grid. The errorless learning approach is used to correct any incorrect responses. Immediate positive reinforcement is delivered to the student after each successful selecting response. This process is continued for each of the remaining three words in the first set. Once the student has matched each flashcard to picture card, the instructor places each flashcard next to its corresponding picture card and says, "Point to *Mommy*". The student is expected to point to the word that the instructor says. The errorless learning approach is used to correct any

incorrect responses. Immediate positive reinforcement is delivered to the student after each successful selecting response. This process is continued for each of the remaining three words in the first set. The order of presentation of the four flashcards in the first set should be randomized to avoid order effect problems. Once the student has successfully pointed to each of the four words in the first set without any form of prompting, the instructor removes the picture cards and asks the student to read each flashcard. This step can be omitted for individuals who are nonverbal. For individuals who communicate via sign language, the instructor will ask them to sign the word on each flashcard. The removal of the picture cards before the end of the Selecting level is important in order to avoid the blocking effect that can interfere with learning when pictures are paired with unfamiliar words (Didden, Prinsen, & Sigafoos, 2000; Solman, Singh, & Kehoe, 1992; Singh & Solman, 1990; Samuels, 1967). The Selecting level is continued until the student is able to select the flashcard and say/sign the word for all four words in the first set, without any form of prompting at a success rate of 80%.

Naming level. In the final level of the Acquisition stage, the student is required to say or sign each of the four words in the first set in response to seeing the word on the flashcard and being asked, "What does this say?" Nonverbal individuals can be instructed to "Show" or "Touch" that required word. The picture cards are left on the learning grid in front of the student while the instructions are delivered for each successive word; the student is expected to place each flashcard on its corresponding picture card after reading, signing, or showing/touching the word. The errorless learning approach is used to correct any incorrect responses. Immediate positive reinforcement is delivered to the student after each successful naming response. This process is continued for each of the remaining three words in the first set. The order of presentation of the four flashcards in the first set should be randomized to avoid order effect

problems. The Naming level of the Acquisition stage continues until the student is able to say, sign, or show/touch each word and match it to its corresponding picture card for all four words in the first set, without any form of prompting at a success rate of 80%. At this point, the picture cards are removed and the student is asked to read or sign each of the words on the flashcards. This step can be omitted for individuals who are nonverbal. Pictures are also faded in this stage, just like in the Selecting level, in order to avoid the blocking effect.

Stage 2: Fluency.

Once the student has ten words in their sight word vocabulary, increasing fluency is the next stage of learning in the OM (Broun & Oelwein, 2007). The purpose of this stage is to increase the student's fluency with all words that have been learned. This involves review and practice of words through engaging activities that give the student a reason to match, select, and name words. One method to engage the student is through the use of games, which provide motivation, opportunities for reinforcement, and a chance for peers to become involved in the learning process. Broun and Oelwein (2007) suggest using games such as lotto, in which the student matches the word to word to increase fluency or matches word to picture to work on comprehension. In matching word to picture for comprehension, the student can be shown a picture card and have to match it to the word on the lotto game board; matching picture to word would demonstrate comprehension. Other games to increase fluency include concentration, bingo, treasure hunt, and a fishing game. The authors do not provide a definitive level of fluency that must be reached before proceeding to the next level of learning in the OM. In teaching this method to educators, it may be useful to define a specific level of fluency that must be reached before moving on to Stage 3: Transfer.

Stage 3: Transfer.

In this stage, the student is taught to read the word in a variety of different presentations (Broun & Oelwein, 2007). Presentations of words can be varied easily by using different fonts, letter sizes, and letter colours, presented on different colours of paper. The authors provide sample activities to develop this stage of the learning process. Examples include creating labels out of learned words that the student can place on items in their environment, putting place cards at the table where family members sit, reading simple sentences in a variety of fonts and colours, and reading commercially available print that includes learned words. As in Stage 2: Fluency, the authors do not provide an exact measure of transfer that should be attained before the student can proceed to the final level of learning. Again, it would be helpful to designate specific measurable levels of transfer ability so that educators can assess and determine exactly when a student should move on to Stage 4: Generalization.

Stage 4: Generalization.

In the final stage of the four-part OM process, the student is taught to read the learned words across all settings at any time, in any print form or medium (Broun & Oelwein, 2007). Once the student is recognizing a word across multiple settings and mediums at a response consistency rate of 75% or more, the word is considered embedded in long-term memory and is recognized in any format or context. The authors of the OM suggest that recognizing a word at 100% consistency from one day to the next is difficult for individuals with ASD due to a variety of performance difficulties, especially in the area of word retrieval (see Turner, 2010; Losh, Esserman, & Piven, 2010; Åsberg & Dahlgren-Sandberg, 2012). The generalization stage is important as individuals with ASD have difficulty with this stage of learning (Bondy, 2011; Krumins, 2008; Cumine, Dunlop, & Stevenson, 2008; Henry & Myles, 2007). In terms of

behaviour, generalization is defined as, "the occurrence of relevant behaviour under different, non-training conditions (i.e., across subjects, settings, people, behaviors, and/or time), without the scheduling of the same events in those conditions (Stokes & Baer, 1977, p. 350). While the authors do provide a specific threshold of 75% or greater response accuracy for establishing when generalization has occurred, they do not give specific information about the number of settings or different types of print mediums that must be included in student responses.

Sentence and Grammar Construction

Broun and Oelwein (2007) understand that one of the most essential components in literacy development is to show students that words have a purpose and can be manipulated to have meaning. They recommend that sentence construction practice be a part of daily instruction, starting early in the learning process. By adding the word *like* to the eight words a student has successfully learned from their first two grids, 12 different sentences can be constructed: *I see/like Mommy/Daddy/Jenny/Bobby/Rover/mailman*; *I like Mommy/Daddy/ Jenny/Bobby/Rover/mailman.* With practice, most students will be able to create sentences independently. Independent sentence creation on the part of the student indicates that they understand sentence format, printed words convey meaning, and particular groups of words have meaning. To facilitate sentence construction, Broun and Oelwein (2007) recommend creating a sentence board. This is done by creating a duplicate set of the student's mastered words, creating a sentence using those words, and having the student replicate the same sentence directly below with the original set of flashcards. Once the student has successfully replicated the sentence created by the teacher, they are asked to read the sentence.

After a period of practice, Broun and Oelwein (2007) suggest having the student create their own sentence by giving them a group of words with the instruction, "make a sentence".

The authors accept that this step in the sentence construction process will take some practice and experimentation, leading to the student understanding that the words can be manipulated to create meaning. The student's vocabulary words should be used to create as many combinations as possible; length and complexity of sentences should increase as the student's vocabulary increases. Once the student demonstrates a consistent competency in sentence construction, the teacher will have the student construct sentences from the student's entire bank of known words, as opposed to a smaller pre-set grouping. Broun and Oelwein (2007) do not provide a specific, measurable, mastery criterion as to when a student's sentence construction should move from a smaller, pre-set grouping of words to their bank. Once the student is independently creating sentences using their entire vocabulary, the next step is to have the student copy the sentences into a notebook or into a word processing computer program, if they are able. The final stage of sentence construction involves the student bypassing the sentence board entirely and creating sentences independently, which can then be copied to a notebook or computer file. The authors recognize that not all students will reach this final step in the sentence construction process, but will be able to have success at one of the stages along the way.

Development of Phonics Skills Using the Oelwein Method

One common criticism of the sight-word approach to reading instruction is that it does not provide readers with the skills required to decode unfamiliar words. The OM of instruction includes procedures for teaching the alphabet and sound-symbol associations after the student has established their own sight word vocabulary. According to Broun and Oelwein (2007), students who are successful learning whole words through the OM are generally successful learning the alphabet and sound-symbol association using the same method. A student's existing sight word vocabulary is used to teach phonemic awareness and decoding skills.

Teaching the Alphabet and Sound-Symbol Associations.

A four stage learning process, similar to that used for sight words, is used to teach students letter names and sounds. A personal alphabet book and alphabet flashcards are used as teaching materials in this process. In the first stage, students match, select, and name the upper- and lowercase letters, starting with the first letter of each of the first four sight words learned. The instructor emphasizes the sounds of each letter as they are being taught. Once the student is able to match, select, and name a letter consistently, the next step of this stage is to match letters to letters in known sight words. This process is repeated for each of the other first letters in the first set of words taught via the OM. Once the student can match, select, and name two letters, they are taught to discriminate between these two letters. The authors suggest using an upper- and lowercase lotto game to practice letters discrimination. As more letters are learned, the student can be taught to discriminate between more than two letters at a time; however, the authors recommend limiting the number of letter choices for discrimination practice to five at a time. In the second stage of this process, the student practices and reviews letters to increase fluency. In the third stage, the student will practice recognizing and discriminating upper- and lowercase letters in different fonts, sizes, colours, and on different surfaces; in other words, the student will be able to recognize letters in any presentation. The final stage is complete when the student is able to recognize all letters in any presentation over all contexts and environments.

Teaching Word Families.

Once the student has 50 to 100 words in their sight word vocabulary and can recognize most letters, Broun and Oelwein (2007) recommend progressing to word family instruction with the student. Similar to the previous learning processes, the teaching of word families follows the same four-stage process, in that the word family is taught as a sight word. In the first stage of

learning, the first word family (e.g. *at*) is taught using the match, select, and name process. Other words in the word family (e.g. *cat*, *rat*, *bat*, etc.) are taught using the same process. Once other words in the family have been learned, the instructor then demonstrates how to change the initial consonant to create different words, followed by the student changing initial consonants to make words. When the student can successfully change the initial consonant to make two more words, the next task is to make words following a verbal cue. In this part of stage one, the student is given the verbal cue, "Make *cat*", and is expected to create the word. After the student can correctly spell out three words, the student is instructed to make words based on the name of the letter (e.g. "Take the *c*, put it with *at*"). Once the student has successfully created three words in this fashion, they are instructed to create words based on the sound of the letter (e.g. "Take the letter that makes the sound *c*, and put it with *at*"). When the first three words and letter sounds of the family are mastered, the other letters in the same family are added one at a time. Additional word families are taught using this method, which will show students how phonics can be used to create words. As new families are introduced, discrimination tasks will be important so the student does not get in the habit of only attending to the first letter of a word. Broun and Oelwein (2007) provide other activities to facilitate discrimination among words from different word families (e.g. *cat*, *can*, *car*, etc.). Just as the sight word and letter identification learning processes progressed, the word family instruction continues through three more stages to increase fluency, transfer to different word presentations, and generalize learning across all presentations, contexts, and environments.

Summary

The OM includes several aspects that make it an effective approach for teaching sight words to students with autism. It appeals to the visual strengths of individuals with autism and

engages several other learning modalities. The OM requires two basic prerequisite skills and materials can be created in a short amount of time. Effective educational practices for individuals with autism are employed in the OM, including the use of structured frameworks, errorless learning, and elements of applied behaviour analysis. The OM accounts for the well-documented blocking effect by eliminating the pictures that are initially paired with words. Transfer and generalization are built into the OM, as well as methods to practice sentence construction and grammar. Broun and Oelwein (2007) also outline methods for progressing from sight words to phonics-based skills. One drawback of the OM as described in the Broun and Oelwein (2007) text is the lack of specific indicators as to when a student is ready to progress from one level to the next. Measurable outcomes that indicate when to move on to a new stage will be critical for teachers to ensure consistency of the OM instructional process across school boards. This will be an important drawback to be addressed if the OM is to be adopted as an accepted instructional practice within school boards.

Policy and Program Implications

The learning profile of strengths and weaknesses for individuals with severe autism makes the Oelwein Method (OM) an effective approach for teaching sight word vocabularies to these students. The use of visuals in the instructional methodology taps into the strengths in the visual perceptual domain that many people with autism exhibit. At its core, the OM is a form of paired associate learning, which is deemed to be an effective instructional method based on empirical research (see Thorndike, 1908; Cason, 1926; Stoddard, 1929; Seibert, 1930). Early learners with autism often lack many of the basic learning skills required to engage in reading instruction; however, the OM only requires that students have table readiness and matching skills before instruction can commence. Table readiness and matching skills are often among the first skills taught to individuals with autism through applied behaviour analysis (ABA) methods or intensive behavioural intervention (IBI) therapy. Limited research exists regarding the reading abilities of those severely affected by autism; however, research on effective approaches to reading instruction does support the use of the sight word or whole language approach as a method for teaching sight word recognition to individuals with autism (see Spector, 2011).

Even though this method fits well with the learning profiles of individuals with autism and certain aspects of the approach are supported by empirical research, it must meet other criteria before it can be widely adopted as an effective practice within a school board. This chapter will include an examination of how the OM satisfies current Ministry of Education policies. This chapter will also explore the implications of adopting the Oelwein Method as a best practice approach for teaching sight words to individuals with autism who do not respond well to typical reading instruction.

Effective Educational Practices for Students with ASD

The Ministry of Education released a document called *Effective Educational Practices for Students with Autism Spectrum Disorders* (EEPSASD, 2007a). The purpose of the document was to support elementary and secondary educators in planning and implementing effective educational programs for students with ASD. The Ministry of Education created it collaboratively with Ontario school boards, the Geneva Centre for Autism, and regional autism service provider agencies. In the section devoted to effective practices for teaching reading, the Ministry of Education (2007a) acknowledges that, "Many students with ASD have strong visual skills and are often more successful in learning to read through a whole word sight recognition approach than through a more traditional phonics program" (pg. 60). The OM is a sight word recognition approach that satisfies this recommendation from the Ministry of Education. The EEPSASD states:

> Students may be better able to understand and learn the phonetic components of words after they have learned to read them through a whole word sight recognition approach, working backwards within a top-down framework from the whole to the parts" (Ministry of Education, 2007a, p. 60).

The OM teaches students to read by first learning a bank of sight words, and then moving to letter recognition, sound-symbol understanding, and finally on to word families (Broun & Oelwein, 2007). Therefore, the OM coincides with the Ministry of Education statement above in that students are taught sight words first before moving on to phonetic understanding, which the Ministry of Education recognizes may be an better approach for students with ASD.

According to the Ministry of Education, "it is essential to provide activities in which words are used in meaningful contexts. Ongoing practice in sentence construction enables

students to understand how words are organized to express thoughts and needs" (2007a, p. 60). Broun and Oelwein (2007) recommend that sentence construction practice be a part of daily instruction, starting early in the learning process, and describe methods for practicing sentence construction as soon as the student has learned their first eight sight words. The OM supports the recommendations of the Ministry of Education by making practice in sentence construction and early activity in reading instruction that should be practiced daily.

In terms of what content topics should be used to engage the early reader in learning, the Ministry of Education posits that:

> A student's motivation to read and comprehension levels are likely to be increased when the vocabulary and storylines are familiar and meaningful. Initially, when students first engage in reading, stories created about family life, pets, favourite television characters, and similar topics will be far more relevant than stories about things, people, and places that are unfamiliar (2007a, p. 62).

Individuals with autism also respond well to instructional methods that incorporate their own interests. Koegel, Singh, and Koegel (2010) found that when the specific interests of participants with autism were incorporated into academic tasks, the participants completed work at a faster rate, showed decreased disruptive behavior, and improved interest in the academic task. When the OM is initially started with a student, Broun and Oelwein (2007) recommend that six of the first eight words taught to the student are names of people who are important to the student. The authors recommend that six of the next eight words be derived from items or characters the student likes, thus incorporating their special interests into the academic task of learning sight words. These words, along with the words *I* and *see* can then be used to create simple stories about important people in the student's life. Again, the OM supports effective educational practices for students with ASD as per the recommendations of the Ministry of Education.

Policy/Program Memorandum No. 140

In May of 2007, the Ministry of Education released Policy/Program Memorandum No. 140 (PPM-140), *Incorporating Methods of Applied Behaviour Analysis (ABA) into Programs for Students with Autism Spectrum Disorders (ASD)* (Ministry of Education, 2007b). One key requirement of PPM-140 is that "School boards must offer students with ASD special education programs and services, including, where appropriate, special education programs using ABA methods" (Ministry of Education, 2007, p. 3). The OM incorporates several types of ABA techniques that will help school boards in Ontario meet this requirement. PPM-140 (Ministry of Education, 2007, p. 5) requires school boards to incorporate the following four principles that underlie ABA programming: The program must be individualized; positive reinforcement must be utilized; data must be collected and analyzed; and transfer, or generalization, of skills should be emphasized. The OM satisfies each of the above four principles. The OM instruction is individualized in that the first 25 words that are taught should be high interest words that are meaningful to the individual, such as the names of family members, friends, or special interests (Broun & Oelwein, 2007, p. 39). Positive reinforcement is used throughout OM instruction following correct student responses. Data is collected throughout the ongoing OM instructional process to keep track of mastered words. Generalization of word reading is part of the OM in that once students have mastered a word, it is then presented in a variety of different fonts, letter sizes, on different coloured paper and in different text colours. The words are also generalized by incorporating them into the student's natural environment and by creating individualized books containing the words the student has mastered. In fact, the final two learning stages in the OM method are called Stage 3: Transfer, and Stage 4: Generalization (Broun & Oelwein, 2007). This is the exact terminology used by the Ministry of Education in PPM-140: "Transfer,

or generalization of skills should be emphasized" (2007b, p. 5). The OM meets the criteria described by the Ministry of Education as an effective educational practice for students with ASD, and also satisfies the requirements of PPM-140 that, "School boards must offer students with ASD special education programs and services, including, where appropriate, special education programs using ABA methods" (2007b, p. 3).

Learning for All

The *Learning for All* resource created by the Ministry of Education (2011, p. 11) indicates three effective instructional approaches that respond to the characteristics of diverse groups of students and is tailored to the unique strengths and needs of each student: universal design for learning (UDL), differentiated instruction, and the tiered approach.

Universal Design for Learning.

The UDL approach includes seven broad principles: equitable curriculum, flexible curriculum, simple and intuitive instructions, multiple means of presentation, success-oriented curriculum, appropriate level of student effort, and appropriate environment for learning (Ministry of Education, 2011, p. 11). The OM (Broun & Oelwein, 2007) of instruction satisfies all seven of these principles:

Equitable curriculum: Students are able to develop literacy skills across the curriculum through the OM, as words associated with any part of the curriculum can be taught using this method.

Flexible curriculum: The OM allows teachers to modify content and allows for meaningful student participation. Teachers can decide which words to teach the student

via the Oelwein method; as students build their sight word vocabulary, they will gain opportunities to participate more inclusively in classroom activities.

Simple and intuitive instruction: The OM provides a means of instruction for individuals with developmental disabilities who are visual learners. This method also relies on empirically supported instructional methods such as paired associate learning, sight word instruction, and aspects applied behaviour analysis.

Multiple means of presentation: The OM presents material in a way that meets the needs of individuals who have developmental disabilities and are visual learners. Materials are presented via pictures, text, and auditory presentation. The OM access multiple learning modalities as well: visual is accessed via the pictures and text on the cards; auditory is accessed when the spoken word is heard by the student; kinesthetic is accessed when students are matching and selecting words, and through constructing sentences; and for students who are verbal, the spoken/digital element is accessed when they read words aloud.

Success-oriented curriculum: Student success is paramount and all instruction is geared toward enabling students to learn effectively and efficiently. By incorporating approaches such as positive reinforcement and errorless learning, the OM ensures early and frequent success for early readers.

Appropriate level of student effort: The OM allows students to access content through visual supports and other means of student effort, such as hand signs, pointing, and the use of assistive technology.

> Appropriate environment for learning: The OM is explicit in its organization of the learning space, with an emphasis on the physical and visual aspects of organization. (p. 4).

Differentiated Instruction.

Differentiated instruction (DI) is another effective educational practice recommended by the Ministry of Education (2011). DI is based on the concept that because students differ greatly in their strengths, interests, learning styles, and readiness to learn, it is necessary to adapt instructional methods to meet these differing characteristics (Ministry of Education, 2011). The OM incorporates the strengths of individuals with ASD by utilizing their strength in the visual domain as a primary instructional tool. Individual interests are included as initial words are selected based on what is most important to the student. Learning styles are addressed as the OM incorporates multiple learning modalities, including visual, auditory, and kinesthetic. Readiness to learn is addressed in the OM as there are only two prerequisite skills required to initiate the OM: table readiness and matching skills; this allows for students at varying levels of learning readiness to engage in the OM, as long as the possess the two prerequisite skills.

According to Tomlinson and Eidson (2003), teachers can differentiate their instruction by modifying any of the following: what students are going to learn and when, the types of tasks and activities, the ways in which students demonstrate learning, and the context and environment in which students learn and demonstrate learning. The OM corresponds well with the DI approach. Teachers can decide exactly what words the student will learn and when, going so far as to dictate which four words the student will learn first, then the next four words, and so on. The OM provides teachers will numerous tasks and activities at all levels of learning that the

teacher can choose from, including sentence construction, lotto games, concentration-type games, and other task formats. The OM allows for multiple ways for students to demonstrate learning. The match, select and name aspects of the initial OM learning process provide three different ways for students to demonstrate learning. Beyond the initial OM learning process, students can demonstrate learning by constructing sentences and reading books created from their sight word vocabularies. The context and environment in which students learn via the OM is very important. The final two stages of the learning process require that the student read words in multiple presentation formats (e.g. differing fonts, colours, sizes, etc.) and across multiple environments to ensure transfer and generalization. Teachers can differentiate their instruction in any of the four ways outlined by Tomlinson and Eidson (2003) by following the OM.

The Tiered Approach.

The tiered approach to prevention and intervention is a systematic approach to providing assessment, instruction and appropriate interventions based on students' individual needs (Ministry of Education, 2011). It involves frequent monitoring of student progress and using assessment data that focuses on learning rate and level, to identify students who are facing difficulties in learning. This leads to a plan for specific assessment and instructional interventions of increasing intensity to address individual student needs. At tier 1, assessment and instruction are planned using the curriculum for all students, while applying the principles of UDL and DI. The teacher monitors student progress and notes which students are having difficulty. At tier 2, students identified as having difficulty receive further DI and planned interventions in an attempt to overcome these difficulties. The teacher closely monitors learning

progress in response to these interventions. Students who are still experiencing difficulty after tier 2 interventions are escalated to tier 3. Tier 3 is meant for students who require intense support to achieve learning goals and involves more precise and personalized assessment and interventions. The OM could be an option for teachers to employ for students with autism who reach tier 3 when experiencing reading difficulties.

Logistics: Creation of Materials and Staff Training

The materials required for the initial implementation of the OM can be created in a relatively short amount of time. Broun and Oelwein (2007) estimate that two or three learning grids and the accompanying flashcards can be created in about ten minutes. Once students have mastered their first eight to twelve words, more time will be required to create materials to help support practice, transfer and generalization of newly learned sight words. If a school board were to adopt this method across all schools, templates could be created and shared easily via internal email and file-sharing applications, drastically reducing the additional prep time that would be required to create materials beyond the learning grids and flashcards.

In terms of training, a half-day or approximately three hours has been found to be an effective time frame for teaching educators to implement the OM (Trafford, 2011). Any teacher, educational assistant, paraprofessional or parent can be taught to implement the OM. ASD consultants, through the School Support Program (SSP), can conduct training for staff. The Ministry of Students and Youth Services and the Ministry of Education established the School Support Program in 2004 (Ministry of Child and Youth Services, 2011). The SSP links school boards with ASD consultants across the province of Ontario. Consultants can provide free training and instructional workshops to parents, teachers, teaching assistants and other

educational support staff. There are more than 185 ASD consultants currently supporting school boards across Ontario. Leslie Broun, co-author of *Literacy Skill Development for Students with Special Learning Needs, A Strength-Based Approach*, from which the OM is derived, has conducted regional training sessions on the OM to ASD consultants in the SSP. The SSP ASD consultants could facilitate widespread training of school staff. The SSP ASD Consultants have developed their own training modules that they currently deliver to school staff, but school staff must specifically request this training (Trafford, 2011).

Conclusion

The Oelwein Method (OM) is a sight word-based reading instruction method that appeals the strengths and needs of the learner with autism. It satisfies many of the Ministry of Education's policies and practices for students with severe autism. Many aspects of the OM are supported by empirical research, such as paired associate learning, incorporating the specific individual interests and using the visual modality to present learning materials which plays to the visual perceptual strengths of individuals with autism. While research supports many features of the OM, no empirical studies exist to date that assess the effectiveness of the OM itself. Before this method could be implemented on a School Board-wide or province-wide scale, research must be conducted to examine the effectiveness of this specific method. According to the Ontario Ministry of Education's (2012) Research and Evaluation Strategy, "The ministry is committed to being evidence-based in the decisions we make, the policies we develop and the programs we implement". Therefore, the Ministry of Education will require further research of the OM with school-aged populations of individuals with severe autism before it makes a decision to implement this approach. While the aim of this paper was to provide support for the use of the OM with individuals more severely affected with autism, research should also be conducted with other populations of learners who do not respond to typical literacy instruction models, such as those with Down syndrome, developmental delays, and other types of Autism Spectrum Disorders (ASDs; i.e. Asperger's Syndrome, Pervasive Developmental Disorders – Not Otherwise Specified). Research could help determine what makes the OM an effective approach for teaching literacy to individuals with severe autism. Is it the behavioural approach that the OM incorporates through the use of positive reinforcement, prompting, and errorless learning? Is it the intensiveness of the OM that makes it effective, in that a student would be

spending more time working one to one with an instructor? Early research could be conducted at a School Board level, perhaps implementing a simple multiple baselines design. If early research shows positive results, the OM could be examined using a true experimental approach that includes randomly assigned participants to experimental and control groups.

The OM would also benefit from a few other modifications before it is implemented in the public education system. More clearly defined indicators as to when a student is ready to move from one learning stage to another would be beneficial for teachers and other educational staff. For example, when a student is in Stage 2: Fluency of the four-part learning process, it would be helpful for educators to have a clear operational definition of fluency and measurable goal for fluency skill so they know when to proceed to Stage 3: Transfer. These clearly defined mastery levels would allow the OM to be implemented consistently across an entire school board. Standardized data collection forms would be beneficial as well in terms of ensuring consistency of practice across a school board. School boards would also need to decide who would be trained in the delivery of the OM. Would school boards ensure that there is at least one staff member in each school that can delivery the OM? Or would school boards ensure that all educators are trained in this method? These are other important questions that would require review once research is complete.

Studies examining other literacy instruction models for teaching decoding to individuals with Autism Spectrum Disorder (ASD) have been conducted (see Basil & Reyes, 2003; Coleman-Martin et al., 2005; Heimann et al., 1995; Tjus at al., 1998). These models were reviewed in Chapter 2. While each of the methods examined showed that individuals with ASD could make literacy gains through these interventions, each of the methods studied involved

computer-assisted instruction. Therefore, not only would individuals need to have access to a computer, they would also require the skills to attend to a screen and use simple computer skills, such as pointing and clicking using a mouse. Further, while these research studies indicated increases in mean scores on reading measures, sample sizes were small, ranging from one single subject design in the Coleman-Martin et al. (2005) study, to thirteen participants in the Tjus et al. (1998).

Educators are always seeking effective, evidence-based interventions to teach students with unique strengths and needs learning profiles, like those students severely affected with autism. The OM is an approach that is built on evidence-based learning practices such as sight word instruction, paired associate learning, errorless learning, and applied behaviour analysis. With schools facing special education cutbacks in funding, inexpensive interventions are extremely valuable. The simple preparations of materials and access to free training that are associated with the OM make it a viable option for school boards that are seeking evidence-based and strength-based approaches for teaching some of the most challenging learners, such as those severely affected by autism.

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