THE IMPACT OF REPEATED READING INTERVENTION ON ORAL READING FLUENCY FOR STUDENTS WITH AUTISM SPECTRUM DISORDER (ASD) IN SAUDI ARABIA

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By
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ABSTRACT

THE IMPACT OF REPEATED READING INTERVENTION ON ORAL READING FLUENCY FOR STUDENTS WITH AUTISM SPECTRUM DISORDER (ASD) IN SAUDI ARABIA

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August 2023

Dissertation supervised by Dr. Bridget Green

The prevalence rate of learners with autism spectrum disorder (ASD) has risen concurrently with their inclusion into public schools in Saudi Arabia. Being in schools, they face academic challenges, particularly in reading. This increased rate evokes the importance of implementing valuable strategies to keep up the academic skills of those students. These students require Evidence-Based Practices (EBPs), which have been demonstrated crucial for their reading development. Nevertheless, limited research has been done on examining the efficacy of EBPs used to enhance the reading skills of learners with ASD, especially their Oral Reading Fluency (ORF). This study used an effective approach to enhance ORF in ASD students. Repeated Reading (RR) intervention involves learners rereading the passage until they attain a specific level of ORF. Therefore, this study aimed to examine the effectiveness of RR intervention in improving ORF among learners with ASD in Saudi Arabia. Three students
diagnosed with ASD participated in this study in Saudi elementary public schools using a single-subject design, multiple baselines across participants, to determine the efficiency of RR instruction on ORF. The results of this study were positive in improving ORF by increasing the correct words and decreasing the errors as the past studies mentioned. The intervention maintained ORF’s impact over time after the intervention was removed.

*Keywords:* Reading skills, repeated reading, reading fluency, reading intervention, children with autism, ASD
DEDICATION

To begin, I want to express my gratitude to my God, Allah, for the inspiration, knowledge, patience, grace He has bestowed upon me. I would like to take this chance to thank everyone who helped me along the way in this scholarly study including my father, my mother, my lovely wife, and my children. They have been my inspiration and source of strength throughout the process of writing this dissertation.

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<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT:iv</td>
</tr>
<tr>
<td>DEDICATION:vi</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENT:vii</td>
</tr>
<tr>
<td>List of Tables:xv</td>
</tr>
<tr>
<td>List of Figures:xv</td>
</tr>
<tr>
<td>Chapter One:1</td>
</tr>
<tr>
<td>Introduction:1</td>
</tr>
<tr>
<td>Background of Academic needs:2</td>
</tr>
<tr>
<td>Problem Statement:4</td>
</tr>
<tr>
<td>Purpose of the Study:8</td>
</tr>
<tr>
<td>Research Questions:11</td>
</tr>
<tr>
<td>Hypothesis:11</td>
</tr>
<tr>
<td>Significance of the Problem:12</td>
</tr>
<tr>
<td>Conclusion:12</td>
</tr>
<tr>
<td>Chapter Two:14</td>
</tr>
<tr>
<td>Overview of the Chapter:14</td>
</tr>
<tr>
<td>Education in KSA:14</td>
</tr>
<tr>
<td>Public Schools in the Kingdom of Saudi Arabia:15</td>
</tr>
<tr>
<td>Public Education Levels:16</td>
</tr>
<tr>
<td>Preschool Education School:16</td>
</tr>
<tr>
<td>Elementary Education School:17</td>
</tr>
<tr>
<td>Middle Education School:17</td>
</tr>
</tbody>
</table>
High Education School ................................................................. 18

The History of Special Education in Saudi Arabia .......................... 18

Mainstreaming Programs for Students with Disabilities .................. 19

Partial mainstreaming for students with disabilities ......................... 20

Full mainstreaming for students with disabilities ............................. 21

Regulations of Special Education .................................................... 21

Individuals with Autism Spectrum Disorder (ASD) ......................... 24

ASD in the Kingdom of Saudi Arabia ............................................. 24

Prevalence of ASD in Saudi Arabia .............................................. 25

Etiology of ASD ........................................................................... 26

Comorbidities .............................................................................. 27

Educational performance of learners with ASD ............................... 28

Reading Performance of Students with ASD ................................... 30

Five Essential Components of Reading Instruction ......................... 30

Phonemic awareness and phonics .................................................. 30

Oral reading fluency ...................................................................... 31

Speed ............................................................................................ 31

Expression ..................................................................................... 31

Accuracy ....................................................................................... 32

Vocabulary .................................................................................... 32

Comprehension ............................................................................. 33

Reading on the line (Literal) ......................................................... 33

Reading between the lines (Inferential) .......................................... 33
Summary and Conclusion ............................................................................................................... 58

Chapter Three ................................................................................................................................ 60

Method .............................................................................................................................................. 60

Overview ........................................................................................................................................... 60

Participants ....................................................................................................................................... 60

*Inclusion Criteria* ............................................................................................................................ 60

*Exclusion Criteria* ............................................................................................................................ 61

*Participants Recruitment* .................................................................................................................. 61

Setting ............................................................................................................................................... 64

Materials ............................................................................................................................................ 65

*Reading Passages* .............................................................................................................................. 65

*Words correct per minute (Sheet)* .................................................................................................... 66

*Materials* .......................................................................................................................................... 67

Research Design ................................................................................................................................. 67

Independent Variable ......................................................................................................................... 69

Dependent Variables ........................................................................................................................... 70

*Correct Words Per Minutes (CWPM)* .............................................................................................. 70

Procedure .......................................................................................................................................... 71

*Teachers Training* ............................................................................................................................. 72

*Baseline Phase* ................................................................................................................................. 73

*RR Intervention* ............................................................................................................................... 74

*Maintenance Phase* ............................................................................................................................. 76

Treatment Integrity ............................................................................................................................... 77
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>88</td>
</tr>
<tr>
<td>Intervention</td>
<td>88</td>
</tr>
<tr>
<td>Maintenance</td>
<td>88</td>
</tr>
<tr>
<td><strong>The Effect of RR on EPM for Abdullah</strong></td>
<td>89</td>
</tr>
<tr>
<td>Baseline</td>
<td>89</td>
</tr>
<tr>
<td>Intervention</td>
<td>89</td>
</tr>
<tr>
<td>Maintenance</td>
<td>89</td>
</tr>
<tr>
<td><strong>The Effect of RR on EPM for Fahad</strong></td>
<td>89</td>
</tr>
<tr>
<td>Baseline</td>
<td>89</td>
</tr>
<tr>
<td>Intervention</td>
<td>89</td>
</tr>
<tr>
<td>Maintenance</td>
<td>90</td>
</tr>
<tr>
<td>Social Validity</td>
<td>92</td>
</tr>
<tr>
<td>Treatment Integrity</td>
<td>93</td>
</tr>
<tr>
<td>Interscorer Agreement</td>
<td>93</td>
</tr>
<tr>
<td><strong>Chapter Five</strong></td>
<td>95</td>
</tr>
<tr>
<td>Discussion</td>
<td>95</td>
</tr>
<tr>
<td>Overview</td>
<td>95</td>
</tr>
<tr>
<td>Review of the Results</td>
<td>95</td>
</tr>
<tr>
<td><strong>Effectiveness of RR intervention</strong></td>
<td>96</td>
</tr>
<tr>
<td>Implications for Practitioners</td>
<td>98</td>
</tr>
<tr>
<td>Implications for Research</td>
<td>101</td>
</tr>
<tr>
<td>Recommendations for Practitioners</td>
<td>102</td>
</tr>
<tr>
<td>Recommendations for Research</td>
<td>103</td>
</tr>
</tbody>
</table>
List of Tables

Table 1. Characteristics of Participants................................................................. 63
Table 2. The Participants’ Number of Sessions for Each Phase............................. 83
Table 3. WCPM’s Range, Mean, and Median for Participants................................. 86
Table 4. EPM’s Range, Mean, and Median for Participants................................. 90
Table 5. Social Validity Questionnaire................................................................. 93
List of Figures

Figure 1. Flow Chart of Procedures of the Current Study………………………………… 72
Figure 2. Participants’ Number of WCPM for Baseline, Intervention, and Maintenance……… 87
Figure 3. Participants’ Number of EPM for Baseline, Intervention, and Maintenance……….. 91
<table>
<thead>
<tr>
<th>Appendix</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix A</td>
<td>WCPM and EPM Tracking</td>
<td>139</td>
</tr>
<tr>
<td>Appendix B</td>
<td>WCPM Graphs</td>
<td>140</td>
</tr>
<tr>
<td>Appendix C</td>
<td>EPM Graph</td>
<td>141</td>
</tr>
<tr>
<td>Appendix D</td>
<td>Treatment Integrity Checklist</td>
<td>142</td>
</tr>
<tr>
<td>Appendix E</td>
<td>Social Validity Questionnaire</td>
<td>145</td>
</tr>
<tr>
<td>Appendix F</td>
<td>Student Assent Form- English Version</td>
<td>146</td>
</tr>
<tr>
<td>Appendix G</td>
<td>Student Assent Form- Arabic Version</td>
<td>150</td>
</tr>
<tr>
<td>Appendix H</td>
<td>Parental Permission Form- English Version</td>
<td>153</td>
</tr>
<tr>
<td>Appendix I</td>
<td>Parental Permission Form- Arabic Version</td>
<td>156</td>
</tr>
<tr>
<td>Appendix J</td>
<td>Approval Letter to Conduct Research Study</td>
<td>159</td>
</tr>
</tbody>
</table>
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

Chapter One

Introduction

In order for a country to thrive and succeed, it is essential to have a solid educational foundation. It is not enough to teach students in schools to impart information from a textbook. It has evolved into a collection of classroom activities and strategies instructors use to create lesson plans (Duchaine, 2011). Instructors play an increasingly vital role in achieving this goal. Students with developmental disorders or delays may not find schoolwork as easy as their peers who are developing normally. For students with autism spectrum disorder (ASD), the ability to identify academic information is particularly challenging (Duchaine, 2011). According to Lord et al. (2018), ASD is a developmental and neurological disorder that starts when a person is young and continues throughout life. Children who have ASD show some impairments in their spoken and written communication, social interactions, and repetitive and limited patterns in their behavior (Lord et al., 2018; Reisener et al., 2014).

As reported by the Centers for Disease Control and Prevention (CDC, 2009), ASD is growing fast since it increases at a rate of about 10–17% annually. A study by Maenner et al. (2020) found that 1 in every 36 students, eight years of age, were identified as showing a prevalence of ASD. The diagnosis of ASD has seen an increase among school-age students in recent years (Reisener et al., 2014). Across the United States, these students with ASD compose about 1-2% of school-aged students (CDC, 2016).

In Saudi Arabia, Human Resources Development Fund (2017) mentioned that the ratios of ASD grow from 10% to 17% annually. However, the prevalence of ASD has not been well determined in schools in Saudi Arabia (Almandil et al., 2019). From the growing number of ASD attending schools, the focus on many weaknesses of the students (e.g., behavior,
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

communication, academic skills) should be improved to keep up with their typical peers, especially educational needs.

**Background of Academic needs**

Even if learners with ASD have average or above-average IQs and academic aptitude, a disparity might remain between their academic achievement and IQ because they still struggle with academic abilities (Estes et al., 2011; Katusic et al., 2021). Students with ASD have struggled in multiple areas, including reading, written, and spoken abilities, comprehension, and complex problem-solving skills (Al Jaffal, 2022; Davidson & Weismer, 2014). Students with ASD may have trouble memorizing and comprehending mathematical methods (Minshew et al., 1994). To solve the math problems, the students need to be good readers to read and understand those problems. To be good readers in math is to skim the math problems quickly and with accuracy. Longitudinal research found that children with ASD had poorer arithmetic improvement than their counterparts without learning impairments (Wei et al., 2013). Learners with ASD may also have trouble writing because of handwriting mechanics (Church et al., 2000) and reduced motor skills and visual-motor speed, resulting in illegible or short written samples (Fleury et al., 2014). Regarding reading, it is a challenge for many students with ASD, ranging from mild to severe (McIntyre et al, 2017).

Learners with ASD usually have difficulties with improving their reading skills (Reisener et al., 2014). Research has shown that these students are generally neglected in the classroom, which impacts their ability to attain Oral Reading Fluency (ORF) (National Institute of Child Health and Human Development [NICHD], 2000). ORF is considered one of the five crucial components of reading instruction. It defines reading a text with speed and accuracy (NICHD, 2000). The other four components include comprehension, vocabulary, phonics, and phonemic awareness. Comprehension is the consciousness of the cognitive processes associated with
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

reading, vocabulary is the knowledge of the meaning of words read by connecting them with oral language, phonics involves realizing the connection between letters and sounds in spelling and reading, and phonemic awareness is the ability to recognize and manipulate spoken words within a language (NICHD, 2000). ORF is also a key to developing other reading skills, such as comprehension (LaBerge & Samuels, 1974). Words Correct Per Minute (WCPM) is the unit of measurement for ORF (Elish-Piper, 2010; Kara et al., 2020).

ORF enables the reader to understand the given text without decoding the written words (LaBerge & Samuels, 1974). Therefore, developing ORF is an integral part of remedial instructions that should be carried out in a school (Reisener et al., 2014). ORF may affect other reading skills, such as vocabulary and comprehension skills (LaBerge & Samuels, 1974). It is a more reliable indicator of how well students understand the material (Fuchs et al., 2001). Thus, to help learners with ASD achieve their academic development and success, educators need to establish and understand those learners' strengths and weaknesses. This knowledge is integral in designing the appropriate educational interventions (Reisener et al., 2014).

Many children with ASD have inadequate instructional services available in their particular educational environments to improve these needed skills in school in Saudi Arabia (Alnemary et al., 2017). Most of these facilities have insufficient access to activities that promote literacy acquisition. Consequently, students are usually disadvantaged, particularly in improving the suitable reading abilities needed to succeed in the educational setting (Reisener et al., 2014; Zascavage & Keefe, 2004). Unfortunately, most researchers have focused their efforts on the following types of interventions: behavioral, early language development, and social skills, even though learners with ASD exhibit difficulties in other areas, such as reading skills (Reisener et al., 2014).
Educators need to identify evidence-based practices (EBPs) that assist in developing the academic skills of these learners. EBPs are instructional procedures and effective practices that the researchers have used and show an acceptable level of positive results for the children with ASD including some requirements, such as being systematic, using with fidelity, and serving individual needs (Simpson, 2005). The interventions should focus on the core academic areas, especially ORF (Reisener et al., 2014). These interventions boost the success of learners with ASD by providing them with appropriate reading tasks. Research shows that using these EBPs improves the children's ability who are at risk of educational failure especially in developing ORF (Samuels, 1979). Repeated reading (RR) intervention is among the most effective interventions, especially in increasing ORF abilities (Reisener et al., 2014). However, in Saudi Arabia, EBPs, including RR are new, and educators have little information about them and need to keep up with these basic and necessary tools in improving those children with ASD in the educational environments.

RR intervention involves the learners rereading a series of texts until they achieve a given level of satisfaction with ORF (Samuels, 1979; Therrien, 2004). RR intervention refers to the Automatic Information Processing (AIP) theory in reading, proposing that visual information is transmuted via a sequence of processing phases involving phonological, visual, and episodic memory systems up to when it has been understood in the semantic system (LaBerge & Samuels, 1974). Processing occurs at each phase and is supposed to be learned, but this learning level is assessed based on automaticity and accuracy.

**Problem Statement**

In the United States, about 40% of learners with ASD who receive special education services under the Individuals with Disabilities Education Act (IDEA, 2004) spend about 80% or more of their day in public schools (U.S. Department of Education, 2016). In Saudi Arabia, there
are no clear numbers of how many children in public schools; however, about 92% of children
with ASD received services in public or private schools while 8% in specialized institutions (Al-
Mousa, 2010). In 2018, the education of the eastern region identified the percentage of students
with ASD who are integrated into regular schools as approximately 95% either in recourse or
claimed that the ratification of the United Nation Educational, Scientific, and Cultural
Organization (UNESCO) Salamanca Statement, which the official Saudi Arabian delegation
signed, bolstered support in Saudi Arabia for the movement for complete inclusion.

Teaching children how to read has become even more challenging and concerning
because of the pressure to achieve high academic standards in Saudi Arabia or any other country,
especially with the lack of teacher preparation about how to deal with learners with disabilities,
including ASD. Teaching those with disabilities is not required for general education teachers
(Aldabas, 2015). According to a summary by Alhammed et al. (2004), there are two main
problems which are a lack of training and preparation among instructors and a consequently
large number of unqualified teachers who do not have access to emerging research in Saudi
schools. Special education teachers, on the other hand, may lack of understanding some
important services and teaching strategies to improve the students' needs, such as evidence-based
practices ([EBPs], Alhossein, 2016). Therefore, teachers are required to meet learners' needs
despite their differences in culture, development, and language (Florian, 2012). However, many
teachers are inadequately prepared to handle learners with ASD, which poses a considerable
challenge because of the dramatically increased rate of school children with ASD over the last
few decades, especially in Saudi Arabia (Busby et al., 2012; Reisener et al., 2014). These
concerns adversely affect the overall educational experience of these learners (CDC, 2009). They
can also increase their academic difficulties (e.g., reading skills), especially for the ones who are integrated into and attend the general classrooms (Gjevik et al., 2011).

Reading skills are essential not only because they are mandated by the laws to be taught in school but also because these skills are needed to be more successful later in life. These skills boost the creativity of the learners as well as build their knowledge (Žakelj et al., 2019). These skills are integral in helping individuals in attaining success in their careers. Reading skills have also proven to be vital in increasing learners’ ability in other subjects such as mathematics (Žakelj et al., 2019). Learners with ASD have varying reading abilities. A study was done by Nation et al. (2006) on elementary learners with ASD focused on reading skills in UK. The results indicated that around half of the learners displayed lower reading skills than their peers of the same age. When administered the reading assessments, the learners with ASD scored lower than their peers, indicating large discrepancies in these critical reading skills such as ORF, vocabulary, and comprehension skills (Nation et al., 2006). The report also showed that 75% of the learners exhibited below-average performance in their comprehension skills (Nation et al., 2006). Due to their dysfluent reading skills, learners with ASD are less likely to comprehend simple context because they focus their extensive cognitive resources on reading words one at a time.

Words are instantly recognizable to those who are fluent readers; they don't have to worry about decoding difficulties. Learners with ASD may not read as quickly as students without, for example, 100 words per minute as the typical students do. Improving ORF is a significant step in developing good comprehension skills (LaBerg & Samuels, 1974). ORF skill is considered essential among learners because it can better predict their comprehension performance than the direct methods of measuring comprehension (e.g., story retelling and questioning) (Fuchs et al., 2001). Students with ASD have a greater risk of developing
difficulties in reading comprehension (Asberg et al., 2010; Ricketts et al., 2013). ORF has been discovered to correlate with high comprehension skills and overall reading proficiency (Fuchs et al., 2001). Therefore, EBPs need to be implemented (Wong et al., 2015). The interventions should target ORF due to the impact of this skill on overall reading skills. National Professional Development Center (NPDC, 2017) identified 27 EBPs that focus on learners with ASD; unfortunately, none of them has specifically targeted reading skills among learners with ASD (Wong et al., 2015). Research done on the interventions which target ORF indicated a need to explore the possible effect of such strategies on learners with ASD (Browder et al., 2006).

RR intervention is one way to support ORF, which is addressed in this study. The use of RR intervention as a reading intervention for struggling students has been well documented in the literature, and that tactic proved to be the most popular and successful in these experiments. RR intervention implementation as a reading intervention is new for students with disabilities, including ASD except for LDs. Instructional reading support using RR for students with LD is not new and has shown notable promise (Bryant et al., 2000; Freeland et al., 2000; Nelson et al., 2004; Therrien & Hughes, 2008). RR intervention has been shown to be beneficial in enhancing ORF for the learners with ASD, as shown in the research examining the subject (Reisener et al., 2014; Simons et al., 2022). ORF, reading comprehension and word recognition all benefit from RR treatments, which have been studied and shown effective. Repeating the material several times enhances the likelihood that students are be able to read it fluently. It contributes to correctly learning word arrangements, especially with word arrangements where they make frequent mistakes. RR intervention increases their ability to read the correct word within the text (Rashotte & Torgesen, 1985). RR may be employed with little time and effort (Strickland et al., 2020). Therefore, additional research is needed in the special education field to support the
findings of these studies, which theorize that RR is a beneficial method to enhance reading skills for learners with ASD (Kahraman & Tekşen, 2019; Reisener et al., 2014).

**Purpose of the Study**

Historically, EBPs have proved effective in improving the outcomes of students with ASD. EBPs are defined as teaching programs, instructional interventions, or strategies that present consistent positive learner results when tested scientifically (Marder & De Bettencourt, 2015). The rationale behind using EBPs is that teaching interventions must be based on scientific evidence of effectiveness (The IRIS Center, 2014). In order for teaching interventions, instructional strategies, and teaching programs to be termed EBPs, high-quality testing is required on each practice (Marder & De Bettencourt, 2015). Essentially, EBPs teaching interventions are used because there is scientific evidence that they work. Notably, EBPs increase the likelihood of positive child outcomes because there is evidence that these interventions are responsive to the learner’s needs (The IRIS Center, 2014). Implementing EBPs are beneficial for educators and students since these interventions are responsive to the learner’s needs (The IRIS Center, 2014). Furthermore, the practice of EBP is more likely to be supported by the parents, administrators, and other relevant stakeholders when there is data to back up its selection. Such factors support the need for having EBPs to improve ORF among learners with ASD. Unfortunately, in regard to students with ASD, none of the 27 EBPs that are recommended by the NPDC include strategies targeted ORF (NPDC, 2017). This critical skill needs to focus on additional research to ensure the EBP interventions are available in this area since the emphasis on it has been limited.

Furthermore, some studies focused on enhancing the ORF in learners with ASD using various strategies (Barnes & Rehfeldt, 2013; Reisener et al., 2014). For example, an internet-based reading program was done by Grindle et al. (2013), and the intervention package included
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

Phrase Drill Error Correction (PDEC), Listen Passage Preview (LPP), and Performance Feedback (PF) interventions done by Barnes and Rehfeldt (2013). Peer tutoring intervention also was used for learners with ASD (Colcord et al., 2019; Kamps et al., 1989; 1994), and Alghamdi (2021) examined the impacts of a treatment package of phrase drill and video modeling. These studies focus on reading difficulties for participants with ASD (e.g., ORF and comprehension). Seven studies focus only on ORF (Ceylan et al., 2018; Egarr & Storey, 2021; Fabrizio & Pahl, 2007; Reisener et al., 2014; Simons et al., 2022; Utley, 2017), while five were combinations of different skills besides ORF, such as comprehension and vocabulary (Hua et al., 2012; Kahraman & Tekşen, 2019; Kamps et al., 1989; 1994; Strickland et al., 2020).

RR intervention is among the most effective interventions, especially in increasing ORF abilities (Reisener et al., 2014). It involves the learners rereading a series of texts until they achieve a given level of satisfaction with ORF (Samuels, 1979; Therrien, 2004). It has proven to be practical and useful for learners who have difficulties learning to read (Oddo et al., 2010). It contributes to correctly learning word arrangements, especially with word arrangements where they make frequent mistakes. Therefore, RR helps to enhance ORF among learners who developed initial word reading skills but lack reading fluency. For instance, it can be used in children with ASD who do not read at grade level. According to the Institute of Educational Sciences (IES, 2014), RR is essential because it helps students with disability recall facts and enhances comprehension and outcomes in more progressive inquisitive insights. RR intervention increases their ability to read the correct word within the text (Rashotte & Torgesen, 1985), and it uses WCPM model to measure the effectiveness of RR by determining the participant’s instructional level (Ardoin et al., 2009).

RR intervention has proven to be useful for learners with ASD in improving ORF (Kahraman & Tekşen, 2019; Reisener et al., 2014). An extensive study conducted by Kahraman
and Tekşen (2019) indicated that this intervention increased the ORF skills of learners with ASD and improved their overall achievement. In addition, the utility of RR intervention has proven useful for both learners with and without disabilities. Additional studies carried out later (Begeny et al., 2009; Lo et al., 2011; Oddo et al., 2010; Reisener et al., 2014) confirmed that RR intervention is an EBP that has been shown to be effective by increasing ASD learners' ORF skills. However, additional studies are required that look at the impact of the RR intervention on the ability of ASD children to obtain ORF (Kahraman & Tekşen, 2019).

Based on the teachers’ experiences, children with ASD benefit from repetition, which is one of the main characteristics of ASD (Eliçin & Yılmaz, 2015). ASD appears to have repetitive patterns of behaviors, activities, and interests as the American Psychiatric Association (APA, 2013) describes. A study conducted by Eliçin and Yılmaz (2015) asked 18 teachers to give their views on teaching learners with ASD how to read. The results indicated that many felt that teaching students with ASD required several repetitions of each concept. They reported that when the RR intervention was implemented, learners with ASD significantly improved their reading skills, decreasing the gap with their peers who displayed normal development. In fact, repetitive activities support the theory that RR intervention is beneficial because learners repeat information given to them since repetitive patterns are one of the major features the children with ASD have, such as repeating certain phrases (Kahraman & Tekşen, 2019). These learners can echo any information that is presented to them and repeat it immediately. Also, when these learners are given reading tasks, repetitive reading of a sentence or passage improves their ability to recognize the words in the passage (Kahraman & Tekşen, 2019).

RR is an elementary and straightforward intervention to apply in teaching. It has proven to improve ORF skills among learners with ASD (Strickland et al., 2020). With minimal time, supervision, and planning, RR intervention can be delivered through a one-to-one practice by
paraprofessionals, peers, parents, special education and general education teachers, or even
classroom wide. During reading instruction, teachers can implement RR as a part of the class
instruction (Strickland et al., 2020). There were just a few studies concentrating on RR
intervention for learners with ASD, and none in Saudi Arabia. Further research is needed to
support that RR intervention is a strong EBP that can be used to increase the ORF for learners
with ASD since there are only a few studies focusing on RR intervention for learners with ASD
(e.g., Ceylan et al., 2018; Egarr & Storey, 2021; Fabrizio & Pahl, 2007; Guthrie, 2017; Hua et
al., 2012; Kahraman & Tekşen, 2019; Kamps et al., 1989; 1994; Reisener et al., 2014; Simons et
al., 2022; Strickland et al., 2020; Utley, 2017). Therefore, this study is an additional study to
support the field of special education regarding improving ORF for learners with ASD, and it is
the first study is done in Saudi Arabia.

Research Questions

This study aimed to examine the effectiveness of RR intervention on ORF in school-age
students with ASD in Saudi Arabia. Since there have been limited studies on this topic, this
identified more academic strategies for students with ASD. The study used multiple baseline
designs across participants. This study was done to provide answers to the following two
questions:

1. Is the RR intervention effective in increasing ORF in elementary school-aged children
   with ASD in Saudi Arabia?

2. Does RR intervention maintain ORF's impact over time after the intervention in these
   students?

Hypothesis: The RR intervention is effective in improving ORF skills in students with ASD.
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

Significance of the Problem

Despite the significance of reading and increasing the reading instructional strategies, most learners with ASD still experience serious difficulties learning how to read (Lee et al., 2007). Moreover, various federal laws such as the IDEA (2004) ensure that all learners, including the ones who have ASD, are taught how to read in approaches that are effective and consistent with their reading abilities. A group of Saudi professionals analyzed and reviewed IDEA in 1990 to improve the special education policy. This policy introduced the regulations of Special Education Programs and Institutes of Saudi Arabia (RSEPI). RSEPI determined the rights, regulations, and services of people with disabilities in public or private schools in Saudi Arabia (Alquraini, 2011).

Intervention strategies that originate from the five reading components have shown to be useful, especially in limiting academic failure and remediating reading challenges. Among the five components of reading instruction, ORF is one of the critical aspects that educators use to enhance students’ reading skills and overall reading performance with ASD (NICHD, 2000; Odom et al., 2003). Nonetheless, there has been limited research on the effects of EBPs interventions, especially RR intervention on improving ORF in learners with ASD (Reisener et al., 2014), and no studies focus on this area in Saudi Arabia.

Conclusion

This chapter covers an overview of the study and the academic needs of learners with ASD in the schools, including ORF skills. The background of the problem was discussed, including the percentage of the students in general and particularly in the schools. It reflected the challenges accompanying ASD education, especially reading skills. The problem statement then mentions the problem and why it is essential. The researcher then discussed the purpose of the
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

study and the research questions to examine the effectiveness of RR intervention for students with ASD for ORF. Finally, the significance of the problem is mentioned.

The next chapter studies RR intervention on ORF for ASD students in Saudi Arabia (KSA). The first portion provides an overview of KSA education, covering public schools and levels, followed by the history of special education in KSA. This portion covers special education and mainstreaming requirements for students with disabilities, followed by a review of ASD, including classifications, prevalence, etiology, and comorbidities. This section discusses students' reading performance in this group, followed by five components of reading teaching and EBPs for boosting ORF. RR, Applied Behavior Analysis, ABA and ASD, and ABA and RR are described. The second portion reviews the literature, beginning with search strategy and coding processes. The researcher reviewed research on ORF interventions, including RR, for ASD children.
Chapter Two

Overview of the Chapter

This chapter aimed to study the effectiveness of repeated reading (RR) intervention on the oral reading fluency (ORF) for students with autism spectrum disorder (ASD) in Saudi Arabia. This chapter had two parts. The first part comprised an overview of the education in Saudi Arabia, including public schools, and public education levels followed by the history of special education in Saudi Arabia. This part was also covered regulations of special education and mainstreaming programs for students with disabilities followed by an overview of individuals with ASD, including definitions, the prevalence of ASD, etiology of ASD, and comorbidities. The educational performance was covered focusing explicitly on students' reading performance in this population followed by five essential components of reading instruction and evidence-based practices for improving ORF. The RR intervention, Applied Behavior Analysis (ABA), ABA and ASD, ABA and RR, and RR and Automatic Information Processing (AIP) theory were explained.

The second part was review of the literature starting with search strategy followed by coding procedures. Existing literature on using ORF interventions including the use of RR intervention for students with ASD were reviewed. The purpose of this review was to evaluate the effectiveness of the RR with learners with ASD and determine its usefulness in implementation in Saudi Arabia. Then lastly the summary and conclusion were covered.

Education in Saudi Arabia

Over the years, the education system in Saudi Arabia has greatly transformed since its commencement in 1925. This is because in 1932, when the Saudi Arabia was created, very few people had access to education, including the children of rich families that resided in big cities.
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

Currently, Saudi Arabia has a good and accessible education system comprising more than 50 private and public universities and well organized 30,000 schools from kindergarten to high school (Saudi Embassy, 2021). These institutions are open to all citizens, including people with disabilities. The Ministry of Education in Saudi Arabia focuses on providing equality in education for learners with special needs (Ministry of Education, 2021). This shows that the government is committed to offering effective education to all students regardless of their condition (Al-Ajmi, 2006). Students receive a free education, health services, and books. In addition to the study of Islam, the contemporary education system in Saudi Arabia offers students quality teaching in different fields of sciences and arts. This diversity, in turn, helps prepare the learners for life and work in a global economy (Saudi Embassy, 2021). Saudi Arabia has plans to transform its economy in the future, and one of the strategies is to attain the modernization of its education system (e.g., adding new courses focusing on future jobs, three semesters instead of two, deleting some courses that have no benefit to the students; AllahMorad & Zreik, 2021). For many decades, the education system in Saudi Arabia has been segregated because there is gender-based schools.

Public Schools in the Kingdom of Saudi Arabia

Initially, education was offered through mosques and basic religious schools in Saudi Arabia (Alrashidi & Phan, 2015), but this has changed as the government has established many public schools across the country. The central government in Riyadh make all the education-related decisions, even though there are 13 administrative regions. By 1930, formal primary education was established in Saudi Arabia, and in 1945 an extensive program was launched by King Abdulaziz bin Abdelrahman Al-Saud to start schools in the country (Alrashidi & Phan, 2015). By 1951, Saudi Arabia has established 226 schools with a capacity of 29,887 students.
(Saudi Embassy, 2021). The Ministry of Education was introduced in 1951, and the Ministry of Higher Education was founded in 1975. Nonetheless, when formal education began, girls were not given priority until 1964, when the government introduced schools for girls. Currently, the student population in Saudi Arabia exceeds 6 million, with more than 50% of girls (AllahMorad & Zreik, 2021; Saudi Embassy, 2021). The public schools are funded and managed by the ministry of education via its education offices, directorates, and departments based in different regions (Alrashidi & Phan, 2015).

**Public Education Levels.** In Saudi Arabia, general education comprises preschool education schools (kindergarten) followed by the elementary school (primary school) for six years, intermediate (middle education school), and high education schools (secondary; Saudi Embassy, 2021). After completing preschool, elementary, and middle education, the students have the choice to join a high school with programs in sciences and arts, commerce, or vocational schools. In Saudi Arabia, schools are compulsory up to the middle/intermediate school level (Saudi Embassy, 2021).

**Preschool Education School.** Preschool education is termed as 'nursery' in KSA, and it includes day care for children between the age of zero to three and those who haven't joined grade one. Preschool and kindergarten schools take students aged three to five (Aljabreen & Lash, 2016). In Saudi Arabia, kindergarten education was started in 1974, and the classes of preschool and kindergarten began in 1975 (Aljabreen & Lash, 2016; Rabaah et al., 2016).

There is little information about preschool education in Saudi Arabia outside the Arabic-speaking countries. This is because the international mainstream media only focus on the education environment of the Western nations (Aljabreen & Lash, 2016). According to Aljabreen and Lash (2016), most Saudi Arabians believe that the education of children in their early years
is imperative because it assures success for the future of the entire country. As such, preschool and kindergarten education in Saudi Arabia is essential to help nurture the personality and independence of the children as well as their capability to cooperate with others (Al-Shaer, 2008). Similarly, Al-Shaer, 2008 states, "The school has an undeniably important function in providing a comprehensive scientific and practical education to the younger generation in the areas of doctrine and worship, ethics, individual and social rights and duties, self-development" (p. 4).

Preschool education is termed as 'nursery' in KSA, and it includes children care for children between the age of zero to three and those who haven't joined grade one. Preschool/kindergarten schools take students aged three to five (Aljabreen & Lash, 2016). In Saudi Arabia, Kindergarten education was started in 1974, and the classes of preschool and kindergarten began in 1975 (Aljabreen & Lash, 2016; Rabaah et al., 2016).

**Elementary Education School.** Unlike kindergarten, elementary education in Saudi Arabia is compulsory for all children. This is because it offers a constructive educational environment laying emphasis on play activities, hygiene, and social behavior (Saudi Embassy, 2021). Thus, elementary education is the foundation of the advancement of further education. It comprises grades one to six. The subjects though in elementary education school are Islamic, Arabic, English, mathematics, geography, and history (Saudi Embassy, 2021). Teachers for elementary schools in Saudi Arabia are required to have a minimum bachelor's degree.

**Middle Education School.** Middle education in Saudi Arabia takes three years and comprises students in grades seventh to ninth. The students at the middle education level are aged 12th to 15th years. The subjects taught are like elementary school, including science,
mathematics, history, geography, Islamic studies, English, Arabic, physical and health education, and computers, and prepare them for the next stage of life (AllahMorad & Zreik, 2021).

**High Education School.** In high school education, students are given an opportunity to choose the program they can study, ranging from commerce, arts, and science, to vocational (AllahMorad & Zreik, 2021). In Saudi, all students can access free education from preschool to high school. High school is three years (10th to 12th grades). High education comprises secondary schools that prepare students for university, college, or practical life (Almannie, 2015).

**The History of Special Education in Saudi Arabia**

The Directorate of Knowledge is an educational system called now the Ministry of Education that started in 1925 (Aldabas, 2015). It was only focused on the typical people, and the parents took care of their children with disabilities until 1958 (Al-Ajmi, 2006). In 1958, the Kingdom of Saudi Arabia developed a system of special education and started with the first program focusing on the blind men to read Braille in Riyadh (Al-Wabli, 1996). This program was funded by a private organization because the special education system was not there (Al-Kheraigi, 1989).

The Saudi government opened the Al-Noor Institute for the blind, considered the first special school, in 1960 in Riyadh city. Al-Noor Institute trained students from the elementary level through high school. The students followed a modified version of the regular school curriculum (Aldabas, 2015). Special Education Unit was created by the Ministry of Education to help with rehabilitation and educational services in 1962. The blind girls, deaf, and impaired hearing were included in the rehabilitation and educational services in 1964 (Afeafe, 2000). The Ministry of Education opened Al-Amal Institutes, where the students taught sign language to the deaf students (Aldabas, 2015). The administration of Special Education was established in 1971
by the Ministry of Education, and the number of special schools increased for those students. Twenty-seven special education institutes were opened by 1987 and increased to 54 to 2000, serving only three categories of disabilities (e.g., blindness, deafness, and intellectual disabilities) across Saudi Arabia (Al-Kheraigi, 1989).

ASD and learning disabilities got attention after 1990. The first private program for people with ASD was started in 1993 (Al-Aoufi, 2011). In 2004, people with ASD were served in the first public program (Sulaimani & Gut, 2019). The learners with mild to moderate disabilities (e.g., ASD, intellectual disabilities, and learning disabilities) continue to be placed in the resource rooms within public schools (Ministry of Education of Saudi Arabia, 2012). The special education classrooms spread across Saudi Arabia in more than 746 public schools for intellectual disabilities, 47 programs for students with ASD, 171 for blind students, and 316 for deaf students. More than 1417 programs have been provided for children with learning disabilities. Those learners with disabilities are integrated into general classrooms according to their situations (Al-Mousa, 2010). However, those with severe disabilities are served in special schools (Aldabas, 2015).

**Mainstreaming Programs for Students with Disabilities**

In Saudi Arabia, "mainstreaming" refers to teaching learners with special educational needs in normal classes in the public school’s system while also providing those students with access to special education services (Al-Mousa, 2010). Saudi Arabia has emphasized education for students with special education needs and those with any disability. In conjunction with other government departments, the Ministry of Education has put in place mainstream programs that integrate learners with special education needs into public secondary schools (Battal, 2016). For instance, they have introduced policies for creating mainstreaming programs for students with
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

disabilities (Bagadood & Sulaimani, 2022). The special education department in Saudi Arabia was established because learners with a disability have challenges benefiting from the public education system in the country (Aldabas, 2015; Alquraini, 2011). The mainstreaming programs within the public school system for learners with special education needs in Saudi Arabia are offers in two types: partial or full mainstreaming (Al-Mousa, 2010; Battal, 2016). According to Bagadood and Sulaimani (2022), mainstreaming programs are affirmative developments towards effective education, despite the problems associated with their implementation.

**Partial mainstreaming for students with disabilities.** In Saudi Arabia's context, mainstreaming means teaching learners with disabilities or special needs in public schools and classes and giving them essential special education services (Battal, 2016). Partial mainstreaming is achieved by creating autonomous classes for learners with disabilities in normal schools (Al-Mousa, 2010). Learners with disabilities get their special education from these autonomous classes. This provides them with a chance to be mainstreamed with their colleagues who are not disabled in both curricula and non-curricula activities (Al-Mousa, 2010). For example, Saudi Arabia has mainstream programs for learners with intellectual disabilities and ASD. It involves creating a learning environment where learners with disabilities including those with ASD are seated in independent classrooms to receive special educational provisions (Bagadood & Sulaimani, 2022). Students with disabilities get marginal contact with their non-disabled peers in such a learning environment (e.g., breakfast breaks, prayer breaks, and school events). Students with disabilities may be placed in some classes during the day with their typical peers, such as students with learning disabilities place in regular classrooms all day except in some classes in which they face difficulties. Approximately 95% of learners with ASD are enrolled in public
schools in eastern regional education in Saudi Arabia, whether in general or resource classrooms (Ministry of Education, 2018).

**Full mainstreaming for students with disabilities.** Full mainstreaming is attained by creating special education support programs for learners with disabilities in normal schools (Al-Mousa, 2010). In Saudi Arabia, there are several full mainstreaming programs, such as teacher consultant programs (works with the classroom teachers in public school systems as a teacher assistant), itinerant teacher programs (visits the students' classrooms to work on IEP goals in different schools), and resource room programs (Al-Mousa, 2010). Through these programs, learners with disabilities get public education with their peers in normal classrooms. However, when learners with disabilities are required to get special education services, they are pulled out of normal classes. Until now, learners with ASD are not fully participated in the regular classrooms with the typical peers. This is because some of the subjects taught in the special education services cannot be taught by regular education instructors (Al-Mousa, 2010).

**Regulations of Special Education**

Special education policy highly focuses on the legislation that concentrates on inclusion since it is a critical issue to eliminate discrimination in education and boost learning competencies for children with disabilities (Cushing et al., 2005). Inclusion helps improve children with disabilities' behavioral, learning, and social abilities to be part of the community (Aldabas, 2015). Saudi Arabia tries to provide special education services in high-quality by establishing laws to ensure that education professionals can improve the services across the country. Many important rules were established, such as the Rules and Regulations of Special Education Programs (RRSEP) in 2001 and the Disability Law in 2000 (Aldabas, 2015; Ministry of Education of Saudi Arabia, 2002).
RRSEP is considered one of the most significant laws in Saudi Arabia for people with disabilities. It was inspired and designed from IDEA in 1990 when professionals across the country analyzed and reviewed it (Alquraini, 2011). It was instituted to establish benefits, services, and rights that students with disabilities can have and access. Students with disabilities are entitled to appropriate and free special education, associated services, early intervention, and transition program by this law (Ministry of Education of Saudi Arabia, 2002). RRSEP focuses on some principles, such as free and appropriate education, effective individualized education plan (IEP), and decision making and appropriate assessments and evaluations services (Aldabas, 2015; Alquraini, 2011).

Originally, RRSEP was for schooling and educational purposes, but now it covers all disabilities (e.g., ASD, deafness, intellectual disabilities, learning disabilities, blindness, and ADHD). The special education programs in each city evaluate the eligibility for receiving special education programs. RRSEP ensures that each person with disabilities receives the appropriate services according to their needs. RRSEP has limitations that minimize effectiveness, such as the lack of experts who administrate the diagnostic assessments. These assessments are not sufficient tools to choose the best educational settings and determine the child's different needs exactly (Aldabas, 2015). RRSEP also determines the child's placement with disabilities in elementary, middle school, and high school students, whether in resource rooms, special education classrooms in public schools, or special education schools and institutes to provide the services. This law does not contain information about early intervention, LRE, and full inclusion (Aldabas, 2015). An assessment and evaluation service were mandated by RRSEP in order for them to establish their requirements and eligibility (Alquraini, 2011).
Saudi Arabia gave its approval for the use of IEPs in 2002, as referred to by the Directorate General of Special Education (DGSE) in the rules released governing the organization of work in special and mainstream schools (Ministry of Education, 2002). Integration of learners with disabilities into regular classrooms and the issues that arise may be considered the driving force behind the development of IEPs (Fiscus & Mandell, 1983). This is of the utmost importance when it comes to the provision of necessary supplementary support services for a number of learners with disabilities, including ASD, who attend mainstream schools and when it has been discovered that the mechanisms currently in place are lacking. To help construct an Individualized Education Plan for children with disabilities, the RRSEP identifies those qualified to participate the interdisciplinary team as general and special education teachers, parents, school principals, and other specialists according to the learners’ needs. The RRSEP emphasized the need for IEP and the components that must be addressed for the learners with a disability to attain their ultimate goals (Alquraini, 2011). IEP is a written document created for each student who meets the criteria for such a program. What students' educational objectives are and how they would be met are outlined in this document (AL-Kahtani, 2015).

The other important law is Disability Law that is vital law established in 2000 by the Saudi government. This law ensures that people with disabilities have the entitlement to access free and appropriate mental health, educational, and rehabilitation services (Alquraini, 2011). People with disabilities under this law can easily access public services by modifying the public attractions and services if needed (Aldabas, 2015). To ensure that persons with ASD get high-quality services in a Least Restrictive Environment (LRE), this legislation emphasized the necessity of providing such services in a way that removes all obstacles to social interaction (Aldabas, 2015).
Individuals with Autism Spectrum Disorder (ASD)

ASD is one of a set of pervasive neurodevelopmental disorders that range from moderate to severe. Expression and reception of communication are all hampered, as are socialization and the development of social skills (Maenner et al., 2016). ASD is described by APA (2013) as a developmental disability marked by ongoing difficulties with interpersonal relationships. ASD affects the repetitive patterns of behaviors, activities, and interests. It incorporates a wide variety of patterns of behavior, from those that are severely disabled to those that are highly functional. IDEA defines ASD as a developmental disorder that causes impairments in social interaction and verbal and nonverbal communication. The condition is typically evidenced among children beginning around age three and negatively influences their academic performance (IDEA, 2004). The term ASD is used to categorize several types of developmental disorders. Typically, these children have difficulties in areas such as behavioral skills, social interaction, and language development (CDC, 2012).

ASD in the Kingdom of Saudi Arabia

Learners with ASD are educated in special education schools or learning environments with self-contained classes in the public schools (Battal, 2016; Rabaah et al., 2016). Alnemary et al. (2017) revealed little information and data on ASD services in KSA. This has made it difficult for parents to access essential services for the treatment of their learners with ASD. Nevertheless, the government of Saudi Arabia has made some strides in advancing ASD research and services. For instance, the government collaborated with the research centers of prominent universities and opted to cover the cost of private schools and sponsor scholarships to medical students and graduates interested in clinical research on ASD (Alnemary et al., 2017).
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

Students with ASD need special support and services that they may not find in the mainstreaming programs. There are insufficient services in public schools regarding the needs of the child with ASD. For example, students with ASD need special education and services because they have stereotyped behavior, sensory processing deficits, cognitive disorders, and communication and language deficits (Karimi et al., 2017; Sulaimani & Gut, 2019). Saudi Arabian families with children having ASD have challenges providing the necessary treatments, services, and accommodations for their kids. Moreover, special education professionals acknowledge that they face distinctive challenges related to the current comprehension and provision of services associated with ASD (Sulaimani & Gut, 2019). As a result, private schools are the most common setting in which Saudi Arabian parents may visit and get assistance for their children with ASD (Zahrani, 2013). Parents may go to the private schools inside the KSA, where they have adequate service or look for help outside the country. Some families may be able to get help from the government to cover their travel costs (Alnemary et al., 2017).

Prevalence of ASD in Saudi Arabia

In their cross-sectional study, Albertti and Colleagues (2022) estimated the prevalence of ASD for children in Saudi Arabia between three and four years. They found the prevalence of ASD to be approximately 2.51% representing 25 per 1000 children. Male children have a high ASD prevalence rate than females (Albertti et al., 2022). In their study, Sulaimani and Gut (2019) report that the precise figure for the prevalence of ASD is not available, but according to the subjective reports, The incidence of autism in KSA has increased dramatically recently. The high prevalence of ASD is influenced by accessibility to special autism care centers. The prevalence is increasing in the care centers because they have access to more knowledge about
ASD (e.g., assessments and characteristics). For instance, a low prevalence rate could imply that there are no centers for case reporting (Salhia et al., 2014).

Apart from Saudi Arabia, a high prevalence of ASD has also been reported internationally (Al-Zahrani, 2013). For example, in the United States, the prevalence rate was 18.5 per 1000 for children aged eight years (Maenner et al., 2020). For the past two decades, there has been rising steadily in autism among children in the United States (Xu et al., 2018). Maenner et al. (2020) in the CDC website showed that one out of every 54 kids aged eight was determined to have ASD. Similarly, Ramsey et al. (2016) acknowledge a broad variety of prevalence studies on ASD, making it hard for states to identify their rates.

**Etiology of ASD**

ASD has several etiologies, including toxic exposures, single-gene defects, cytogenetic abnormalities, brain structure anomalies, central coherence and neuron system disorders, chromosomal aberrations, mutations, convergent molecular abnormalities, epigenetics, and genetic polymorphism (Zeina, 2014). ASD is the main issue that should be addressed and resolved in Saudi Arabia. The primary cause of ASD remains unknown. However, both genetic and non-genetic factors are attributed to the etiology of ASD, making it multifactorial (Sauer et al., 2021). Etiologies have found a link between genetics and autism, while others found environmental factors and inadequate or imbalanced nutrition to cause ASD (Almana et al., 2017).

Almana et al. (2017) measured the general knowledge of Saudis on ASD, its etiology, and treatment. They found out that the majority of people in Saudi Arabia are becoming aware of access to educational opportunities for learners with ASD, and they know that its etiology does not include contact and is not linked to families' socioeconomic status. Salhia et al. (2014)
acknowledge that the risk factors influencing the etiology of ASD in KSA are lacking (e.g., genetics and environmental risk factors). Factors such as environmental exposure and genetics have not been researched in detail in the Gulf Cooperation Council (GCC) countries. Saudi Arabian epidemiological study on autism is still in its infancy, hence the severity of the disorder's impact on the country's population is as yet unknown. Autism epidemiology in Saudi Arabia is now being studied by experts, and they are making suggestions for further study (Salhia et al., 2014). Results from genetic and epidemiological research identify the risk factors associated with ASD, including gene-environmental interactions, environment, and genes. (Chaste & Leboyer, 2012). Others include prenatal risk factors such as pre-eclampsia, proteinuria, maternal hypertension, and previous fetal loss (Gardener et al., 2009). Even though a lot less is known about how autism manifests and occurs in many developing nations like Saudi Arabia, this disorder has frequent comorbidities associated with ASD, which may appear before or after three years old.

**Comorbidities**

The criteria used to diagnose autism are characterized in the Diagnostic and statistical manual of mental disorders 5th edition (DSM-5; APA, 2013). According to DSM-5, a child must meet six of the 12 diagnostic criteria across the three domains and meet at least one criteria in each domain in order to be diagnosed with ASD. The three domains are deficits in nonverbal communicative behaviors utilized for social interaction, in social-emotional reciprocity, and in developing, understanding, and maintaining relationships. These symptoms primarily occurred during the first 36 months of childhood (APA, 2013).

Some comorbid disabilities with ASD may be gastrointestinal disorders, dysfunction, sleep difficulties, epilepsy, Tuberous Sclerosis, and seizures (Kohane et al., 2012). Sleep
difficulty is one of the common comorbidities with approximately 50% to 80% of people with ASD reporting difficulties (Goldman et al., 2011), and 11% to 39% have epilepsy (Ko et al., 2016). They may show mental health problems (e.g., intellectual disability, depression, ADHD, and anxiety) (Masi et al., 2017).

Among children with ASD, anxiety and poor stress management are typical issues to be concerned about. Young individuals may grow more anxious throughout adolescence as they encounter a more complicated social environment and evolve more conscious of their distinctions and interpersonal problems (White et al., 2009). Comorbidity in people with ASD was studied by Gadow and colleagues (2005), who showed that instructors reported greater levels of anxiety, sadness, and tic symptoms compared to parents. Students' anxiety levels may rise in school settings, especially when they are with their classmates or in circumstances that require them to do well academically.

**Educational performance of learners with ASD**

Even the students with ASD exhibit average or higher than average IQ scores and have a potential for attaining academic success, a discrepancy can exist between their academic performance and IQ for many students with ASD since they still continue to have difficulties with academic skills (Estes et al., 2011). Many learners with ASD face difficulties in school, both socially and academically. Learners with ASD may have difficulty writing because of issues with handwriting mechanics (Church et al., 2000) and have a lower level of proficiency in motor abilities and visual-motor speed which may cause a tough undertaking that results in illegible or short written samples (Fleury et al., 2014). For ASD students, compared to peers without learning difficulties, progress in mathematical skills was considerably slower in a longitudinal
study (Wei et al., 2013). They may have difficulties in remembering arithmetic procedures to solve equations and interpreting instructions (Minshew et al., 1994).

A study done by Wei et al. (2011) showed also that learners with ASD gain reading skills as they advance through formal education, but the pace at which they grow is much slower than that of those with learning difficulties. Individuals with ASD have difficulty processing text, regardless of whether they have acceptable or exceptional word-reading skills (Fleury et al., 2014). Studies demonstrate that learners with ASD fail to acquire various reading skills due to limitations in developmental aspects (e.g., attention movement, language ability and acquisition, motivation and reading) (Bicard & Heward, 2013; Browder & Snell, 2000). Reading is one of the essential educational skills for independent living (Nation & Norbury, 2005). It relates to many cognitive skills (e.g., social development and language) (Conlon et al., 2006), which are critical for learners with ASD (Knight et al., 2019).

Most learners with ASD in schools score below grade level literacy expectations (Huemer & Mann, 2010; Spector & Cavanaugh, 2015). Literacy has been described as the capacity to read and write and communicate in the own language in daily life (Guthrie, 2017). Reading, written expression, comprehension, oral language, problem-solving skills, written language, and mathematics are areas where people with ASD struggle (Whitby & Mancil, 2009). They have a hard time developing linguistic expression (Mohammadzaheri et al., 2015). They also have complications with memory and attention skills (Wolf & Katzir-Cohen, 2001). Recognizing students' academic strengths and limitations could make finding appropriate educational interventions to aid in their academic development and performance more accessible. To increase the achievement of learners with ASD with appropriate reading activities, EBPs can develop these academic skills, explicitly reading skills (Guthrie, 2017).
Reading Performance of Students with ASD

Reading is a crucial part of the school curriculum for children with ASD since reading is an essential skill for social and economic success (Snow et al., 1998). Reading is necessary for participation and essential for freedom, choice, effective communication, and developing connections (Houston & Torgesen 2004). Reading helps improve creative thinking, concentration, knowledge, memory, focus, writing skills, conversations, and peacefulness. When it comes to school, job, and community involvement, children with ASD may be disadvantaged if they lack reading skills because written texts incorporating social clues may also impact ASD children's overall knowledge (Mandak et al., 2019). Learners with ASD struggle to evolve the appropriate reading skills. This struggle is reflected in their inability to master the five components of reading without additional assistance.

Five Essential Components of Reading Instruction

All learners including those with ASD, are to be provided the opportunity to develop their reading skills based on both reading research and five evidence-based components of reading (IDEA, 2004; No Child Left Behind [NCLB], 2001). Phonemic awareness, phonics, reading fluency, vocabulary, and comprehension are these components (NICHD, 2000; Whalon et al., 2009).

Phonemic awareness and phonics. Phonemic awareness involves identifying and manipulating spoken language (NICHD, 2000). For example, it includes listening and saying the word that has three sounds, or phonemes /h/ /a/ /t/. On the other hand, phonics relates to the capability to identify the connection between written letters and sounds in both reading and spelling (Whalon et al., 2009). Phonics allows learners to decode text (NICHD, 2000).
**Oral reading fluency.** ORF is the aptitude to read the text fast and accurately (NICHD, 2000). ORF is, in addition, described as the capacity to read at an accurate and satisfactory speed, and it is closely associated with understanding the content (Burns et al., 2002). There were about 1,779 fourth-grade learners who participated in a national representative study and showed approximately 40% of American learners did not read fluently (Daane et al., 2005). To understand written text, crucial reading skills need to be performed automatically (Samuels, 1979). Learners are considered fluent in reading when they can swiftly and accurately interpret the words in a text (Burns et al., 2002). Speed, expression, accuracy, and comprehension are the three components of ORF and are explained below (Elish-Piper, 2010).

**Speed.** The speed is to read quickly and at an efficient rate. WCPM also is used to measure the speed (Elish-Piper, 2010; Williams et al., 2011). Fluent reading requires the integration of speed, accuracy, expressiveness, and understanding. The term "rate" does not imply that youngsters should read as quickly as possible. Children who read fast but lack expressiveness or comprehension are not considered to be reading fluently, to use an example from the real world (Elish-Piper, 2010).

**Expression.** The expression is the second component which is the ability to utilize suitable emotion to read aloud. The students stop for commas, periods in the text (Elish-Piper, 2010). Both accuracy and speed are critical to conveying an expression. An effective reader should be able to comprehend words quickly and deconstruct long passages of text into smaller, more understandable chunks. Those students who demonstrate superior expression in oral reading are also more likely to score better on their silent reading comprehension tests (Zimmerman et al., 2019).
**Accuracy.** The accuracy of the reading is the key to improve the fluency. Students who need to read the word correctly should read without stopping and decoding them. Decoding is the capacity to accurately pronounce written words using your understanding of letter-sound correlations, especially letter patterns. Comprehending these linkages allows learners to swiftly recognize known words fast as well as find out unfamiliar terms (Gough & Tunmer, 1986). The learners have an opportunity to think about what being read when they read the word correctly (Elish-Piper, 2010). The reading accuracy and speed are measured by words correct per minute (WCPM). The specialists ask the learners to read aloud for one minute and they score mistakes until the learners finished their reading. Then the specialists calculate the total number of words in the passage minus the total number of mistakes while reading the passage divided by the total number of words (Williams et al., 2011).

**Vocabulary.** Vocabulary is the knowledge of the meaning of words read by connecting the word with oral vocabulary. Familiarity with terminology is vital in word recognition, and individuals should possess it to understand what others say (Whalon et al., 2009). Students learn to recognize words and word components through the process of word recognition. It starts with the knowledge that letters represent sounds in words and continues to the capacity to comprehend complicated word pieces and syllabication rules (Wheeler, 1970). When the learner's reading level increases, they increase their vocabulary (NICHD, 2000). Reading has been linked to an increase in vocabulary. There is a good chance that readers increase their vocabulary as they become more proficient readers (Yildirim et al., 2014). According to Paige and Smith (2018), individuals with good reading fluency may gain more from vocabulary exposure since they spend more time reading.
Comprehension. Comprehension is teaching learners to be conscious of the cognitive processes associated with reading. It is the understanding of the passages that the students have after they read it (Whalon et al. 2009). Therefore, while reading, the student understands the interactions that occur within the passage. The two skills—fluency and comprehension—are linked. Students should have the ability to read at a fluent level, and those who can do so have a larger capacity for reading comprehension (Morgan et al., 2012). There are strategies that can be used for comprehension skills (e.g., story mapping, graphic organizers, question generation, and summarization) that can be used during reading a text (Whalon et al. 2009). Consequently, learners have to read the word in a passage, give an explanation of what the word means, and understand the text (NICHD, 2000). Reading comprehension can be divided into three categories (literal, inferential, and evaluative).

**Reading on the line (Literal).** Students derive immediate meaning from the text at this stage. "Who?" "What?" "When?" and "Where?" are questions they are thinking about while reading (Basaraba et al., 2013).

**Reading between the lines (Inferential).** Students’ interpretations of the text take on a more complex tone at this point. As students read, the following are the most pressing issues on their minds: Is there a symbolism, implication, or personification inherent in a passage? What is the significance of a certain allusion or metaphor? They are also understanding, categorizing, contrasting, comparing, and identifying patterns in what they read (Basaraba et al., 2013).

**Reading beyond the lines (Evaluative).** Students are able to connect with deeper levels of meaning than only what is found in the text. They are thinking, for example, Is my morality or value system compatible with yours? "How does this book relate to my life?" What type of worldview is being conveyed to me by the author? while they read (Basaraba et al., 2013).
It was revealed that 68% of the participants with ASD had mild to severe reading problems (McIntyre et al., 2017). Learner with ASD have some difficulties regarding the five essential components of reading instruction. They have limited phonemic awareness that includes several cognitive processes such as word coding, and reading comprehension compared with their typical peers (Klingner et al., 2004). Furthermore, difficulties with memory skills and attention in students with ASD, these difficulties can lead to limitations in phonemic awareness skills and, therefore, difficulty in ORF (Wolf & Katzir-Cohen, 2001). The vocabulary of learners with ASD, also, has been noted to be more limited than expected due to inadequate language skills (McGee et al., 1986). Because of their restricted vocabulary, they may also have difficulty with content-area reading (Nation et al., 2006). In comprehension, learners with ASD are sometimes challenged regarding interpreting and understanding information (Bishop & Norbury, 2002). Individuals with ASD struggle to develop the appropriate reading skills. This struggle is reflected in their inability to master the five reading components without additional assistance (i.e., oral reading fluency, comprehension, vocabulary, phonics, and phonemic awareness) (Odom et al., 2003).

ORF and ASD. Learners with ASD often have poor language acquisition. This poor oral language acquisition strongly predicts reading accuracy problems in learners with ASD (Nation et al., 2006). Their receptive and expressive oral language skills can have a bearing on their literacy development (Davidson & Weismer, 2014). Overall reading abilities, including comprehension skills, also may be affected by the inadequate oral expression skills and prosody in their speech (Davidson & Weismer, 2014). Due to these needs, they may struggle with learning to read. Although not all students with ASD have challenges developing reading skills,
many have problems with ORF compared with their typical peers (Nation et al., 2006). According to a few research findings, the children in question do not suffer from a unique learning disability characterized by a higher incidence of symptoms (McIntyre et al., 2017). ORF can affect other reading skills (e.g., reading comprehension). Learners should be able to read fluently, and fluent readers have greater reading comprehension abilities (Morgan et al., 2012). However, students with ASD struggle to read fluently (Reisener et al., 2014). ORF seems to be very uneven among students with ASD, and for many, it appears to continue as a source of reading problems throughout time (Solari et al., 2019). Learners with ASD are less able to grasp basic contexts because they spend their cognitive resources reading words one at a time rather than focusing on the text's overall meaning. An essential stage in having strong comprehension abilities is enhancing one's ORF (LaBerg & Samuels, 1974). The ORF skill is regarded as crucial among learners to be able to predict and understand stories more accurately (e.g., tale recounting and questioning) (Fuchs et al., 2001). ORF has been shown to be a strong predictor of comprehension and overall reading ability (Fuchs et al., 2001). Unconsciously, the reader who decodes material quickly and accurately is known as a "fluent reader." Consequently, it frees up mental resources for processing and understanding information (LaBerge & Samuels, 1974).

**Evidence Based Practices for Improving ORF**

Among the limited research studies done on ORF, few have targeted the learners with ASD even though they have difficulties in ORF skills. Some interventions on students with ASD to improve ORF showed positive results in improving their ORF and overall reading skills. For example, an internet-based reading program was done by Grindle et al. (2013), and the intervention package included Phrase Drill Error Correction (PDEC), Listen Passage Preview (LPP), and Performance Feedback (PF) interventions were done by Barnes and Rehfeldt (2013).
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

Peer tutoring intervention also was used for learners with ASD (Colcord et al., 2019; Kamps et al., 1989; 1994), and Repeated Reading (RR) intervention was done by Ceylan et al. (2018), Kahraman and Tekşen (2019), Reisener et al. (2014), and Strickland et al. (2020). Video modeling also was used that was done by (Alghamdi, 2021).

Some studies utilized a single intervention, while others implemented multiple interventions, as was done by Barnes and Rehfeldt (2013). They implemented an intervention package to improve ORF and topography-based comprehension for three students with ASD. PDEC, LPP, and PF interventions were included in this study and used multiple probes design across participants. Two studies were done on the use of ClassWide Peer Tutoring (CWPT) to improve ORF and comprehension skills (Kamps et al., 1989; 1994). One study utilized Peer-Assisted Learning Strategy (PALS) which is also considered a peer tutoring technique (Colcord et al., 2019). MimioSprout Early Reading (MER) to improve reading fluency was also used as an ORF intervention in a study conducted by Grindle et al. (2013). The remaining studies (four studies) used RR interventions to improve ORF for learners with ASD (Ceylan et al., 2018; Kahraman & Teksen, 2019; Reisener et al., 2014; Strickland et al., 2020). Alghamdi (2021) examined the effectiveness of a treatment package consisting of video modeling and phrase drills on enhancing ORF in learners with ASD.

The results for all EBPs studies that were used in this paper showed that reading skills could be improved if learners with ASD receive the appropriate interventions (e.g., PDEC, LPP, PF, RR, CWPT, VM, PALS, and SEC) (Alghamdi, 2021; Barnes & Rehfeldt, 2013; Ceylan et al., 2018; Colcord et al., 2019; Grindle et al., 2013; Kahraman & Teksen, 2019; Kamps et al., 1989; 1994; Reisener et al., 2014; Strickland et al., 2020). The participants in these studies showed a significant improvement in their ORF skills. These interventions have been shown to
improve not only the ORF and other areas such as reading comprehension and social skills when the intervention was implemented by their peer and interact with them (Colcord et al., 2019; Kamps et al., 1989; 1994).

In spite of the increased interest in using EBPs to improve ORF for students with ASD, some gaps exist leading to other areas for further research in these scholars’ studies. In general, information on EBPs targeting ORF for learners with ASD is still minimal (Reisener et al., 2014). Very few studies have been conducted to explore the effectiveness of ORF on the reading skills of young learners with ASD through research has existed which focused on the effectiveness of other EBPs such as RR (Kahraman & Tekşen, 2019; Kamps et al., 1994; Reisener et al., 2014). RR intervention can be used effectively to improve ORF among school-aged learners with ASD (Ceylan et al., 2018; Guthrie, 2017; Kahraman & Teksen, 2019; Kamps et al., 1994; Reisener et al., 2014; Strickland et al., 2020).

RR intervention have been shown to enhance not only the ORF but also reading comprehension and word recognition. When learners repeat the passage many times, it increases the chance of being familiar with words in the passage and read them fluently (Kamps et al., 1989; 1994; Strickland et al., 2020). The learners with ASD could read, hear themselves make the sounds, and enjoy their achievement as they read fluently while using RR. RR can be used with minimal time, supervision, and planning, as shown in the studies. It can be delivered through a one-to-one practice by paraprofessionals, peers, parents, special education and general education teachers, or classroom wide (Ceylan et al., 2018; Kahraman & Tekşen, 2019; Kamps et al., 1994; Reisener et al., 2014; Strickland et al., 2020).
Repeated Reading

RR intervention is an EBP developed to improve ORF and comprehension skills (Therrien, 2004). RR is a unique intervention for developing automatic decoding for students who have reading difficulties in ORF. This approach requires students to read portions of the text (50–200 words) aloud until they meet success criteria which is specific speed and accuracy targets (Samuels, 1979). Fluency is described as consisting of two essential distinct elements: reading speed and word recognition accuracy (Samuels, 1979).

The implementation of RR intervention contains three critical guiding elements (Therrien, 2004). First, the students read the excerpt aloud to a competent instructor. Second, the instructor provides modified feedback. Third, the students need to read the passage until they have reached the performance criteria. Teachers should be trained to monitor learners' oral reading and give feedback (Therrien, 2004). RR intervention has been applied in a variety of populations. A number of studies focus on students without disabilities (e.g., Bryant et al., 2000; O’Shea et al., 1985; Rasinski et al., 1994), while other focus on children with learning disabilities and it is the most common strategy used for them (Donhower, 1987; Freeland et al., 2000; Gilbert et al., 1996; Levy et al., 1993; Mathes & Fuchs, 1993; Mercer et al., 2000; Nelson et al., 2004; O’Shea & O’Shea 1988; O’Shea et al., 1987; Rashotte & Torgesen, 1985; Sindelar et al., 1990; Therrien & Hughes, 2008; Vaughn et al., 2000).

A small number of studies have shown RR intervention to be effective with learners with deafness (Schirmer et al., 2012; 2016), students with the emotional or behavioral disorder (Alber-Morganet al., 2007; Kubina et al., 2008; Staubitz et al., 2005), learners with intellectual disability (Alqahtani, 2020; Hua et al., 2016; Strickland et al., 2020), and learners with low vision (Koenig & Layton, 1998). Multiple studies also focused on using RR interventions with
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

learners with ASD. The results showed when RR strategy was practiced, the learners with ASD showed an increase in ORF (e.g., Ceylan et al., 2018; Guthrie, 2017; Hua et al., 2012; Kahraman & Tekşen, 2019; Kamps et al., 1994; Reisener et al., 2014).

From the selected studies, it is to be noted that all the intervention methods proved to be effective. One intervention method that stands out was RR as the EBP used by the majority of the researchers to improve ORF. RR intervention can be used effectively to enhance ORF among school-aged learners with ASD. It was the strategy used the most often in these studies as it was utilized in many studies that were used for ASD (Ceylan et al., 2018; Egarr & Storey, 2021; Guthrie, 2017; Hua et al., 2012; Kahraman & Teksen, 2019; Kamps et al., 1989; 1994; Reisener et al., 2014; Strickland et al., 2020; Utley, 2017). Kahraman and Tekşen (2019) attributed the success of ORF to the learner's ability to master the vocabulary and read without any flaws while feeling proud of their achievements. The children with ASD could read, hear themselves make the sounds, and enjoy their achievement as they read fluently while using RR. To understand the RR intervention more, the conceptual framework needs to be clarified and how they related to each other (e.g., Applied Behavior Analysis (ABA) and Automatic Information Processing (AIP) theory).

**Conceptual Framework: Applied Behavior Analysis (ABA)**

Applied Behavior Analysis (ABA) is a method of studying behavior that is based on science (Cooper et al., 2007). ABA is a form of interpersonal therapy designed to help children diagnosed with disabilities. Pediatricians recommend ABA to children diagnosed with ASD to help them enhance social and emotional skills (Begum, 2021). According to Cooper and Colleagues (2007), ABA therapy gives procedure and doctrines required to transform socially significant behavior methodically. The therapy also helps comprehend the reasons for that
transformation. The purpose of ABA is to help comprehend and improve human behavior
(Cooper et al., 2007). Therefore, Cooper et al. (2007) define ABA as “a scientific approach for
discovering environmental variables that reliably influence socially significant behavior and for
developing a technology of behavior change that takes practical advantage of those discoveries”
(p.18).

The fundamental principles of ABA comprise of the environmental variables that have an
effect on behavior. These variables are antecedents (stimulus events, happenings that take place
right before the behavior) and consequences (occurrences following the behavior) (Miltenberger,
2004). Every behavior has an antecedent which, in turn, helps learners know what to do. on the
other hand, the consequences of ABA can be used as a reinforcement to strengthen appropriate
behaviors.

**ABA and ASD**

ABA therapy uses interventions grounded on the doctrines of learning theory to improve
social skills among learners with ASD. When used for ASD, ABA therapy helps children
moderate negative behaviors such as self-harm, teaches them to transfer learned behavior to new
environments, and enhances their social abilities such as learning new skills, communication,
and completing tasks (Begum, 2021). ABA approach and its techniques have been used at
“Raisingchildren.net” organization to help learners with ASD enhance their communication
skills, self-care skills, social skills, and capacity to manage their own behavior.

Moreover, ABA is imperative among children with ASD because it helps them transform
the learning environment to challenge them in certain circumstances and makes it possible to
implement maintenance behaviors such as self-regulation and self-control (Begum, 2021).
Children hailing from ASD have delays in starting verbal expressive language that affect the
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

reading (Mohammadzaheri et al., 2015). Several studies have shown that learners who struggle with expressive language in their early years are more probable to have difficulties with both oral and reading comprehension in the future (Del Tufo et al., 2019). Nevertheless, ABA therapy has been used to improve their reading literacy which, in turn, supports them academically. Dunlap et al. (2001) provide evidence of how ABA is used to support academic instruction and its important contributions in the context of academics. They find out that the antecedent interventions, principles and methods of ABA has been comprehensively incorporated into routine educational procedures (Dunlap et al., 2001).

**ABA and RR**

ABA has played a substantial part in improving the literacy level of students, including reading comprehension, reading fluency, vocabulary spelling, word recognition, and phonological decoding (Joseph et al., 2016). ABA helps to define literacy behaviors in discernable and quantifiable terms so that the instructors can focus on effective teaching that aligns with the student's needs. For instance, ABA helps to target the teacher to use precise measurement methods that allow the direct observation of students' oral passage reading (Joseph et al., 2016). This means that when a student is reading an oral passage, the teacher can use accurate measurement methods that permit direct observation on the ability of the learner to read instead of indirect measures for example a parent and instructor rating how well they believe the student read texts. Thus, ABA is applied in targeting literacy behaviors of the student. RR is not only improving the ORF but also social skills when learners with ASD received when they interact with their teacher or classmates (Kamps et al., 1994). In the study conducted by Kamps et al. (1994), they used typical peers (as tutors) to implement the RR intervention. The study
showed improvement in the mean length of the interaction time between the participants and their peers and correctly read more words per minute.

Among the many different approaches to education that might be categorized as "ABA," discrete-trials teaching (DTT) also stands out. It is organized to break down abilities into smaller, more "discrete" components (Pratt & Steward, 2018). DTT has been used to help learners with ASD with new skills, such as speech and language skills, and reading skills (Kitchen & Kraus, 2018). RR intervention can be used in this approach (i.e., DTT). The teacher can break down the instruction for teacher the in reading skills into small steps. For example, if the students read a passage and the students cannot read a single word in the passage, the teacher can spell that word slowly and ask the students to repeat it immediately and fast. The teacher then reinforces the students verbally (e.g., good job) after saying the word correctly many times.

**RR and Automatic Information Processing (AIP) theory**

RR is considered one of the oldest, most frequently used, and most studied techniques for developing ORF (Meyer & Felton, 1999). This strategy grew out of the Automatic Information Processing (AIP) theory (LaBerge & Samuels, 1974). In reading, AIP is supposed to be transformed within a series of steps connected to visuals. It is presented that visual information in reading is transformed through a succession of processing steps, involving visual, phonetically, and episodically based memory systems, before it is finally processed and comprehended by the semantic system (LaBerge & Samuels, 1974). Therefore, the student must become automatic at understanding words in a passage to be able to be fluent (Samuels, 1979).

According to AIP theory, the fluent reader can automatically decode a passage, that is, without attention, so that it leaves one's focus free to be utilized for comprehension (LaBerge & Samuels, 1974). In different ways, when the children could identify the printed words accurately
and quickly, they would be able to focus their attention on discovering the meaning of the passage. Consequently, the readers can automatically identify words with little of the readers' attention since they can recognize words fast. Because of this automatic word recognition, they are able to focus on the assignment at hand, which requires that they pay close attention to the text's meaning (Spedding & Samuels, 1977). Conversely, the beginning readers are non-automatic in their decoding because their attention is needed. The attention of beginner readers is on decoding; thus, they are unable to devote their whole mental energy to understanding what they read. Therefore, making the inferring meaning process more complicated and slower (LaBerge & Samuels, 1974).

Method

Search Procedures

This paper aimed to study the effectiveness of RR intervention on the ORF for students with ASD. A review of emergent literature was conducted for this paper on electronic databases first, including ERIC, SAGE, ProQuest, EBSCO, PsycINFO, and Scopus. Then, a hand search was done of reference lists of the content of relevant journals. Key search terms included child ('children' OR 'student') and or with ('autism' OR 'ASD' OR 'autism spectrum disorder') and (fluency, repeated readings, reading, reread, reading fluency, reading speed, decode, reading accuracy, oral reading, verbal fluency, literacy, strategy instruction, fluency instruction). Some authors were contacted to send their articles for review. The researcher looked at the references in the excluded papers if there were potential studies. From the initial search, the interventions that focus on students with ASD were selected from 1980 until May 2022. These articles’ titles and abstracts were read and reviewed. The initial search resulted in 142 studies. There were 58 articles that were immediately eliminated because they did not meet the primary criteria. This
left a total of 84 articles in the final review. After an in-depth analysis of these studies, 12 studies were included in this study.

**Inclusion criteria**

An in-depth analysis of the remaining 84 articles was done to determine articles in the final review included articles based on (a) a disability category which was ASD, (b) age group which was between 7–21 years old; (c) having at least one participant with ASD or more; (d) include ORF among the targeted academic skills, (e) include the study that implements RR intervention as part of the study procedure, or (f) single subject design. Following this review, the studies that were included in this paper and met the required criteria were 12.

**Coding Procedures**

The studies that met the paper’s criteria were 12 and coded using a coding protocol. Data was coded into Excel. Data extracted include six sheets that were opened in the same document under purposes, participants, methods (type of single subject), settings, procedures, and results. The participants included the number of participants, age, IQ, gender, problems, race, and grade level. The procedures contained dependent and independent variables, implementers, materials, duration, intervention delivered, and how to implement the study.

**Overall Findings of the Studies**

The RR intervention studies that have been located that met inclusion criteria are 12 studies, including students with ASD (Ceylan et al., 2018; Egarr & Storey, 2021; Fabrizio & Pahl, 2007; Guthrie, 2017; Hua et al., 2012; Kahraman & Tekşen, 2019; Kamps et al., 1989; 1994; Reisener et al., 2014; Simons et al., 2022; Strickland et al., 2020; Utley, 2017). These studies focus on reading difficulties for learners with ASD (e.g., ORF and comprehension). Seven studies focus only on ORF (Ceylan et al., 2018; Egarr & Storey, 2021; Fabrizio & Pahl,
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

2007; Reisener et al., 2014; Simons et al., 2022; Utley, 2017), while five were combinations of different skills besides ORF, such as comprehension and vocabulary (Hua et al., 2012; Kahraman & Tekşen, 2019; Kamps et al., 1989; 1994; Strickland et al., 2020).

The main purpose of these studies was to improve the ORF using RR intervention alone (Ceylan et al., 2018; Kahraman & Tekşen, 2019), combined with two (Hua et al., 2012; Guthrie, 2017; Reisener et al., 2014; Strickland et al., 2020), or combined with more interventions (Egarr & Storey, 2021; Fabrizio & Pahl, 2007; Kamps et al., 1989; 1994; Simons et al., 2022; Utley, 2017). Four studies used error correction combined with RR intervention (Fabrizio & Pahl, 2007; Guthrie, 2017; Strickland et al., 2020; Simons et al., 2022). Simons et al. (2022) and Utley (2017) in their studies included reinforcement which is a total of three combined interventions. Egarr and Storey (2021), Fabrizio and Pahl (2007), and Kamps et al. (1989; 1994) were using RR intervention in their procedures. Reisener et al. (2014) used two interventions (LPP / RR interventions).

Participants

A total of 37 students with ASD participated in the studies. The age of the participants were seven students (nine years old), one student (10 years old), nine students (eight years old), one student (seven years old), three students (21 years old), four students (11 years old), two students (12 years old), two students (14 years old), one student (15 years old), and one student (16 years old). Hua et al. (2012), Kahraman and Tekşen (2019), Kamps et al. (1994), Simons et al. (2022), and Strickland et al. (2020) have three participants in their studies, while four studies have four participants in their studies (Ceylan et al., 2018; Egarr & Storey, 2021; Guthrie, 2017; Reisener et al., 2014). Only two participants were engaged in Kamps et al. (1989) and one in Fabrizio and Pahl (2007) studies.
The 35 participants were diagnosed with ASD and two participate were diagnosed with mild intellectual disabilities (MID) in the study that was done by Strickland et al. (2020). Strickland et al. (2020) selected three participants (one students with ASD and two with MID). The participants were various gender (nine participants were females and 22 males); however, two study done by Kahraman and Tekşen (2019) and Utley (2017) did not mention the gender of the three participants in each study. The participants have different races in these studies (e.g., five Caucasian, four African American, one Hispanic, one Asian, eight white, seven Turkish, one Multiracial, and four UK); however, Kamps et al. (1989) and Utley (2017) did not mention the race of the participants.

The participants in the studies were various the IQ. The participants have an average IQ in the study by Reisener et al. (2014), while Hua et al. (2012) mentioned that the two participants have an IQ of 64 and 69, and 71 and 101 for the participants in Kamps et al. (1994) study. The two participants in the study by Kamps et al. (1989) have an IQ of 50 and 68/73/80/92 Guthrie's (2017) study. The rest of the studies did not mention the IQ of the participants (Ceylan et al., 2018; Egarr & Storey, 2021; Kahraman & Tekşen, 2019; Simons et al., 2022; Strickland et al., 2020). Simons et al. (2022) mentioned that the participant fell between poor and average cognitive abilities.

In all studies, the participants were behind in their grade levels compared with their age by at least one grade level. For example, Reisener et al. (2014) recruited participants in the third grade (nine–nine–10 years old). In the study done by Kamps et al. (1989), the two participants were in second grade while they were nine and 11 years old. The rest of the participants were between first and sixth grades and were between seven and 21 years old, which is a significant gap between age and the actual grade level.
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

Design

The studies used a single-subject design. Four of them used multiple baselines across participants designs to improve their reading skills, including ORF (Hua et al., 2012; Guthrie, 2017; Kamps et al., 1989; Strickland et al., 2020). Reisener et al. (2014) used a single-subject withdrawal design in their study to evaluate the effective of the LPP/RR interventions in improving ORF. Simons et al. (2022) used a nonconcurrent multiple-baseline across-participants design to assess the impact of RR on ORF. Ceylan et al. (2018) and Kamps et al. (1994) focused on using multiple baseline designs across subjects; however, Kamps et al. (1994) used it with a reversal. A single-subject, alternating treatment design (ATD) was used by Egarr and Storey (2021), Fabrizio and Pahl (2007), and Utley (2017) to enhance the ORF for learners with ASD. In the study done by Fabrizio and Pahl (2007) was followed by a reversal design.

Setting

Most researchers conducted their studies in public schools in different sittings (Egarr & Storey, 2021; Guthrie, 2017; Kahraman & Tekşen, 2019; Kamps et al., 1989; 1994; Reisener et al., 2014; Strickland et al., 2020; Utley, 2017). Reisener et al. (2014) implemented the study in a quiet, tiny room in the participants' school. The assessment and intervention procedures were done one-on-one. The general education teachers oversaw all aspects of the intervention. Every study session was held in the student's regularly scheduled classes in regular classrooms in the study done by Kahraman and Tekşen (2019), Kamps et al. (1989; 1994), and Strickland et al. (2020) and Utley (2017) did their studies in self-contained classrooms in public schools, while students met in a quiet office at the school throughout the school day for study sessions (Guthrie, 2017). Egarr and Storey (2021) used the school gym to conduct the instructional sessions.
Ceylan et al. (2018) implemented their study in a special education school. They conducted it in a quiet resource room at the school. The study done by Hua et al. (2012) was conducted in a postsecondary education program since the participants were enrolled in that program at a Midwestern university. The study took place in empty office in an university. Simons et al. (2022) conducted the study in the clinic setting. The therapist did the sessions in distraction-free rooms (Simons et al., 2022), while Fabrizio and Pahl (2007) used a leisure area in the participant’s house where all the treatment sessions were held individually.

**Procedures**

The studies that met the criteria focused on ORF alone (e.g., Ceylan et al., 2018; Egarr & Storey, 2021; Fabrizio & Pahl, 2007; Guthrie, 2017; Reisener et al., 2014; Simons et al., 2022; Utley, 2017). The other studies analyzed the improvement in ORF and comprehension (Hua et al., 2012; Kahraman & Tekşen, 2019; Kamps et al., 1989; 1994; Strickland et al., 2020). Kahraman and Tekşen (2019) also investigated the improvement of the participants' vocabulary. WCPM as a dependent variable was used to measure the ORF (Egarr & Storey, 2021; Guthrie, 2017; Hua et al., 2012; Kamps et al., 1989; 1994; Reisener et al., 2014; Simons et al., 2022; Strickland et al., 2020; Utley, 2017). Error per minute (EPM) also was used by Ceylan et al. (2018), Guthrie (2017), and Strickland et al. (2020). Comprehension questions were also used to see if the participants answer the five Ws after reading the passage fluently (Hua et al., 2012; Kahraman & Tekşen, 2019; Kamps et al., 1989; 1994; Strickland et al., 2020). Kahraman and Tekşen (2019) used flash cards for the vocabulary. The rate of error correction per min was the dependent variable in the study done by Fabrizio and Pahl (2007).

**Implemenfer.** The researchers administered some studies (e.g., Ceylan et al., 2018; Egarr & Storey, 2021; Guthrie, 2017; Kahraman & Tekşen, 2019; Utley, 2017). The studies done by
Kamps et al., 1989, 1994, and Hua et al. (2012) were implemented by their typical peers after the researchers trained them on the study procedures. The teachers also worked as interventionists for some studies (e.g., Reisener et al., 2014; Strickland et al., 2020). The therapists implemented the study by Fabrizio and Pahl (2007) at home and Simons et al. (2022) in the clinic. All studies were done one-on-one, except the study by Kamps et al. (1994) was implemented in three to five small groups.

**Materials.** Different materials were used, such as AimsWeb progress monitoring and improvement systems, dynamic indicators of basic early literacy skills (DIBELS), curriculum-based measurement (CBM), a basal reading series, ginn reading series, the structure (Random House), a series of informal reading inventories, school textbook, or reading A–Z texts. Reisener et al. (2014), Guthrie (2017), and Utley (2017) used AimsWeb progress monitoring and improvement systems, while Kahraman and Tekşen (2019) and Ceylan et al. (2018) used a school's textbooks. DIBELS was used in the study by Simons et al. (2022). Hua et al. (2012) used CBM and Kamps et al. (1989) used structured reading program (Random House) for the first grade and ginn reading series for the second grade. Egarr & Storey (2021) utilized Reading A–Z texts, while Strickland et al. (2020) chose to use a series of informal reading inventories. A basal reading series was implemented in the study by Kamps et al. (1994). Fabrizio and Pahl (2007) two trade books, such as I Hate My Bow and Five Little Pumpkins.

**Duration.** The duration was varied between the studies. For example, Reisener et al. (2014), and Simons et al. (2022) implemented the studies almost four times each week and lasted approximately between 30 to 45 minutes. Kamps et al. (1994) and Utley (2017) lasted for 20-30 minutes each session. Kamps et al. (1989) and Hua et al. (2012) took place three times a week for approximately 15 to 20 minutes each session. A maximum of up to six times a week for a
total of 10 minutes of text everyday (Fabrizio & Pahl, 2007). Guthrie (2017) implemented the study twice a week, and five days in the study by Ceylan et al. (2018). Reisener et al. (2014) took 20 instructional days, and a total of 42 sessions were held over the course of 53 days for the research for the study by Strickland et al. (2020). Throughout all stages, participants got a daily 15-minute educational session (Strickland et al., 2020). Guthrie (2017) took place over 33 sessions, while Ceylan et al. (2018) and Egarr and Storey (2021), and Utley (2017) lasted for around 24 sessions. Kahraman and Tekşen (2019) continued for three months.

**Implementation of the intervention.** During the baseline, the students were asked to read out loud from one of the provided passages. The timers began as soon as the student read the first word of the text. The instructor marked the learner’s reading on the instructor's copy of the chapter by making a slash through the word that was read wrongly. Whenever a student failed to read a word during the reading portion of the lesson within three seconds, the tutor would read the word and then mark it as a mistake (Ceylan et al., 2018; Egarr & Storey, 2021; Guthrie, 2017; Hua et al., 2012; Kahraman & Tekşen, 2019; Kamps et al., 1989; 1994; Reisener et al., 2014; Simons et al., 2022; Strickland et al., 2020; Utley, 2017).

Ceylan et al. (2018), Guthrie (2017), and Strickland et al. (2020) used the EPM sheet and counted how many mistakes the participants did. When the learner had stopped reading the texts in the time mentioned by the instructors, then notes were made of the amount of time that had passed or the WCPM and EPM. Kamps et al. (1989), (1994), Hua et al. (2012), Kahraman and Tekşen (2019), Strickland et al. (2020) Egarr and Storey (2021) prompted the learner to read and verbally respond to comprehension questions that were in the passages.

Hua et al. (2012), Guthrie (2017), and Simons et al. (2022) used multiple-baseline across-participants design. The RR was introduced to participants in a staggered fashion to describe the
functional connection between the two variables (the independent variable and dependent variable). To show a functional relationship, reading fluency should only improve after intervention is started with all participants. Hua et al. (2012) used a strategy called Reread–Adapt and Answer–Comprehend (RAAC). It is a program that combines RR intervention with a comprehension intervention rather than relying just on RR instruction on its own.

During the intervention, when the learner read the material out loud three times, the tutor timed each reading in accordance with the baseline method. Each time a student read aloud, the tutor would point out the word they had misread, demonstrate how to read it properly, and then urge the student to do the same. The first thing the tutor did was give the student some comments on how they were doing (Guthrie, 2017; Hua et al., 2012; Kamps et al., 1994; Simons et al., 2022; Strickland et al., 2020; Utley, 2017). Kamps et al. (1989) continued using the same procedure that was in the baseline (no feedback and correction) during the peer tutoring. During the first session of the intervention, the student read general comprehension questions and they were asked to answer them after they finish reading (Egarr & Storey, 2021; Hua et al., 2012; Kamps et al., 1989; 1994; Strickland et al., 2020). It took Ceylan et al. (2018) 95 words to utilize their text in their paper. To begin, the practitioner demonstrated for the students how repeated reading works before leading them through guided practice and asking them to read on their own.

In the study by Reisener et al. (2014), the LPP and RR treatments were balanced against one another. Model A was used to determine the sequence of the phases for two individuals, and the phases occurred in the following order: baseline (A), LPP (B), withdrawal (A), and RR (C). The treatment conditions were given to the other two participants in the opposite sequence than
they were listed (Model B). After the baseline phase, these two subjects were given RR, and after the withdrawal period, they were given LPP.

Fabrizio and Pahl (2007) encouraged the participant to read by pointing to the first word of the first sentence in the text section. The participant read loudly until she made a mistake, and then she stopped. It was decided by chance which sort of mistake correction would be applied after she had committed an error; the therapist used either Word Supply or Discrimination. Therapist corrected the mistake and asked her to read the sentence out loud until she read without mistake, then proceeded to the following one.

The word recognition in the study done by Kahraman and Tekşen (2019) aimed to determine the percentage of error against the total number of words pronounced. The study included five main phases: the preparation phase (the authors has taken the required permissions to implement the intervention); pre-administration phase (the authors provided a place for the students and described what they will do); intervention phase (the authors provided recognizable flashcards for the learners); and post-administration phase (the authors administered the Word Recognition Test with the use of the RR Technique. The pre-test is the first reading, and the post-test stage is the second and third reading); and analysis of the data (the outcomes were presented and explained).

Egarr & Storey (2021) implemented VM and RR interventions. The participants were encouraged to see a video model of the instructor first before they were given a text to read. The model for the first activity was a classroom instructor who was well known to all of the participants. The participant watched the film on an iPad that was always held in front of them. There are three different versions of this movie, each of which has the instructor reading the leveled material that was given to the students. The Feedforward Video Self-Modelling
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

Intervention (FFVSM) was then implemented. The participants saw an altered video of themselves reading aloud and scored 100% accuracy. The third stage is when participants repeated the readings many times.

**Results of the Studies**

The studies used visual analysis of the graphs to explain the results of the participants' progress easily in the baseline, intervention, and the follow-up or the maintenance phases. In all the studies, significant progress, and improvement in the participants' skills were shown (Ceylan et al., 2018; Fabrizio & Pahl, 2007; Guthrie, 2017; Hua et al., 2012; Kahraman & Tekşen, 2019; Kamps et al., 1989; 1994; Reisener et al., 2014; Simons et al., 2022; Strickland et al., 2020; Utley, 2017), except for one study was done my (Egarr & Storey, 2021). When they implemented the VM there was a steady in the participants' OFR, while there was an improvement for some participants in FFVSM and RR interventions. Egarr and Storey (2021) mentioned that the study's fluency gains might have been attributed to continuous reading during the intervention period and RR intervention during the maintenance phase. This study's fluency gains might have been attributed to continuous reading during the intervention period and RR intervention. Therefore, a student's progress may have been impacted by the repeating of texts they read throughout the maintenance phase (Egarr & Storey, 2021).

Guthrie (2017), Simons et al. (2022), and Strickland et al. (2020) used RR combined with SEC. After receiving an intervention that included RR, and SEC, the participants with ASD exhibited improved WRCM from their baseline. The researchers were able to show that all participants could attain adequate performance by the final intervention sessions. As shown in research, Simons et al. (2022) mentioned that some reading deficiencies in young children with ASD might be alleviated by using RR in conjunction with other interventions. Fabrizio and Pahl
(2007) said that the participant saved more time with word supply corrections than with
discrimination corrections, both in terms of how many corrections she had to make when she
repeated the words and sentences until she read the text correctly.

Guthrie (2017) cited that for three of the four participants, RR interventions raised
CWPM but had little or no impact on EPM, while one participant had a considerable influence
on EPM. RR intervention combined with SEC procedure resulted in a considerable drop in the
total EPM of three individuals, whereas CWPM continued to rise for two individuals. Guthrie
(2017) supports what Simons et al. (2022) mentioned: RR can be made stronger by using other
interventions regarding decreasing the EPM. The results showed that the use of RR with the SEC
in the study done by Strickland et al. (2020) was effective and improved learners’ ORF.
However, learners’ comprehension skills showed no consistent gains and were noted to foster
them. The student with ASD exhibited a steady decelerating trend, averaging 35 WCPM during
baseline. During the intervention stage, his WCPM level quickly raised with an immediate
increase of 15 WCPM with a total of 35 WCPM and rapidly reduced his EPM to a mean level of
50.5 WCPM.

Hua et al. (2012) and Reisener et al. (2014) demonstrated substantial advancement in
ORF for all participants. The two studies used two combined interventions (e.g., RR combined
with LPP or Answer–Comprehend). The study done by Hua et al. (2012) showed significant
improvement in either ORF or reading comprehension for all participants. After reading the
identical text three times, all three students showed an increase in ORF compared to their
baseline points. During the intervention, one student's trend line in the baseline was downward
and turned into an upward in intervention. The other two students' baseline data pathways were
rising, but their intervention slopes show that they achieved more progress than would be
predicted from a continuation of their baseline trend when they got RR assistance. The
participants responded to comprehension questions correctly than they did at baseline contrary to
what Strickland et al. (2020) mentioned in their study that RR intervention could be effective for
ORF and other reading skills, such as comprehension skills.

Reisener et al. (2014) supported the use of RR intervention to improve ORF skills when
they use it combined with LPP. The study findings showed an improvement in the participants’
reading skills; thus, while using the WCPM, the results of the study support the hypothesis that
the use of educational, motivational interventions tends to increase the ORF in learners with
ASD. The four students’ WCPM baseline mean scores were 83, 58.7, 41, and 57. They increased
their ORF and received a mean of 110.7, 75.1, 44, and 60.5, in the WCPM, when implementing
LPP intervention, while they had a mean WCPM of 120, 97.2, 60.6, and 83, when implementing
RR. Overall, the students increased in ORF as measured by WCPM. The use of the RR method
provided the most significant gains than LPP n ORF for all students when looking at descriptive
statistics. RR and LPP exhibited greater scores in WCPM for three students, but one student’s
score did not significantly increase in the withdrawal phase. Interestingly, the participants'
highest intervention score was RR intervention in the study done by Utley (2017). For the most
part, RR was shown to be the most successful strategy for all participants compared with other
interventions in the study (Utley, 2017).

Ceylan et al. (2018) and Kahraman and Teksen (2019) are the only studies that focus on
RR intervention alone. These studies showed considerable progress in their academic skills
including ORF. The results enabled the teachers to identify the weakness of each student with
ASD when it came to repetitive verbal reading. The students were able to hear themselves read
fluently and understand how it sounded and felt (Ceylan et al., 2018; Kahraman & Teksen,
2019). Kahraman and Teksen (2019) mentioned that after the intervention was implemented, all three learners improved their ORF as well as reading comprehension, and vocabulary. Student A was able to read 82% of the words during the baseline while that increased to 93% of the words after the intervention. Student B was able to read 80% of the words in the baseline and 83% after the intervention. Finally, student C was able to read 82% of the words and 94% after the intervention phase. The students’ word recognition improved making it easier to read the words and text fluently.

Ceylan et al. (2018) showed that while S-1 read the text at an average speed of 13.48 minutes at the baseline level; at the end of six repetitions, the same text was read in 8.57 minutes. For S-2, the average for the starting point was 12.56 minutes. While after five repetitions, the speed with which the participant read the same text was 7.43 minutes. S-3 read the text at an average speed of 8.25 minutes at the baseline level, and at the end of seven repetitions, he read the same text in 2.53 minutes. For S-4, the text at the baseline level was read at an average of 4.29 minutes while he read the same text in 1.37 minutes after seven repetitions. The RR method reduced the duration to read the text and word errors of students with ASD. Two weeks after the intervention was terminated with the last student, data were collected from all students to monitor the permanence of progress made after two sessions one week apart.

Ceylan et al. (2018) also revealed that the participants did well in decreasing their reading errors. S-1 made 31 reading errors while reading the text in the first session at the baseline level. This number decreased to seven reading errors at the end of six repetitions. S-2 made 24 reading errors while reading the text in the first session of the baseline level. After reading the same text at the end of five repetitions, the number decreased to seven reading errors. S-3 made 23 reading errors in the baseline while he made four reading errors after reading the same text at the end of
seven repetitions. S-4 made 16 reading errors while reading the text in the first session of the baseline level, but he made one reading error in the same text at the end of seven repetitions. The RR method reduced the reading errors of students with ASD while reading a text. Two weeks after the intervention was terminated with the last student, all data were collected from the students to monitor the permanence of the progress made after two sessions one week apart.

From the results of the study done by Kahraman and Teksen (2019), researchers concluded that RR intervention was an efficient strategy in the short term, especially with the participants’ overall increase in reading capabilities. After the intervention was implemented, all learners improved their ORF as well as reading comprehension, and vocabulary. These studies indicated that the RR method has proven effective as a permanent method for learners with ASD to reduce the time required to read a text (Ceylan et al., 2018; Kahraman & Teksen, 2019).

Looking at the findings, the RR intervention is a permanent method for reducing the reading errors that students with ASD make while reading a text (Ceylan et al., 2018)

In continuation to support the effectiveness of using RR interventions, Kamps et al. (1989), (1994), and Egarr and Storey (2021) use RR intervention in the procedures of their studies. Kamps et al. (1989) and (1994) indicated that peer tutoring combined with RR intervention was an efficient and productive method of boosting the academic performance of ASD students and their typically classmates. Reading fluency (the percentage of WRGM) and accurate answers to reading comprehension questions were two areas in which CWPT had a significant favorable impact on students' academic performance.

Kamps et al. (1989) showed a mean of 3.7 error words per minute during baseline which decreased to 1.3 during the peer tutoring session for the first student. He read 12.5 to 30 WCPM with a mean of 19.6 words during the intervention. In the comprehension questions, the number
of correct responses increased, scoring a mean of 3.8 after the intervention, while during the baseline phase, the mean was 1.9. A tremendous improvement was registered in the three tasks after the student was introduced to the peer tutoring strategy. For the second student, WCPM ranged from 22 to 35.5 with a mean of 30.2 during the baseline and 33 to 46 with a mean of 39.7 during the intervention. During the intervention phase, there were also increased their correct answers to the comprehension questions with a mean of 3.5, while during baseline, the mean was only 1.3. Therefore, this study showed positive improvement in ORF when the students increased WCPM.

The study done by Egarr and Storey (2021) did not show a significant improvement for all participants during the VM (teacher model), but some showed little progress during the FFVSM and the maintenance when they implemented RR intervention. The researcher cited that it is crucial to note that the increases in fluency shown in this research might have been the result of repeated reading both during the intervention and maintenance periods. Therefore, more frequent exposure to a larger variety of texts has enhanced participants' reading abilities. A possible effect on progress might have been the repeating of materials that students read throughout the maintenance phase.

Summary and Conclusion

The purpose of this chapter is to investigate how successful the RR intervention was on the ORF for students who were diagnosed with ASD. This chapter gives a brief overview of the history of special education in Saudi Arabia is followed by an overview of Saudi Arabian education, encompassing public schools and public education levels. Additionally, this section covers laws for special education and mainstreaming programs for kids with impairments, including definitions, prevalence, etiology, and comorbidity of ASD. Students' reading
performance in this group is the primary emphasis of the educational performance, which is then followed by five key components of reading teaching and evidence-based approaches for enhancing ORF.

After reviewing 12 studies on the effectiveness of RR on students with ASD, it is clear that RR intervention can be used effectively to improve ORF among students with ASD. It was the strategy used the most often in these studies and the most effective. RR interventions have been shown to improve ORF, reading comprehension, and word recognition. Learners repeating the passage many times increases their chances of being familiar with the words in the passage and reading them fluently. The studies show that RR can be used with minimal time, supervision, and planning. It can be delivered through one-to-one practice by paraprofessionals, peers, parents, general and special education teachers, or classroom wide (Ceylan et al., 2018; Kahraman & Tekşen, 2019; Kamps et al., 1994; Reisener et al., 2014; Strickland et al., 2020). Overall, limited studies were found focusing on RR intervention for students with ASD, and there was none in KSA. Therefore, the field of special education in KSA needs more studies in this area.

This study is the first to examine RR intervention's effectiveness on the ORF for students with ASD in Saudi Arabia. In the next chapter, the researcher included the students with high-functioning ASD in this study. This study used multiple baselines across participants design to examine the effectiveness of the intervention. The participants' characteristics, setting, research methodology, independent and dependent variables, and the materials utilized in the study were outlined in more detail.
Chapter Three

Method

Overview

The current chapter described the study’s methodology in detail. The first section presented an overview of the purpose and research questions, followed by the description of the research design (a single-subject design) to examine the effectiveness of RR intervention. Next, the participants' characteristics, setting, research design including independent and dependent variables, and the materials to be used were described. Furthermore, this chapter described the procedures and data collection methods afterward, then treatment integrity, and interscorer agreement and social validity were addressed. The last section in this chapter explained the limitations and the ethical considerations.

This study aimed to examine the effectiveness of RR intervention on ORF in school-age students with ASD in Saudi Arabia. Since there have been limited studies on this topic, this identified more academic strategies for learners with ASD. The study is conducted to answer the following two research questions:

1. Is the RR intervention effective in increasing ORF in elementary school-aged children with ASD in Saudi Arabia?
2. Does RR intervention maintain ORF's impact over time after the intervention is removed?

Participants

Inclusion Criteria

In this study, three students were selected to participate. The participants were recruited according to the following inclusion criteria: (1) between ages 8 to 12, (2) had an official
diagnosis of ASD, (3) diagnosed with high functioning autism, (4) received special education services in regular or in private classroom in a general education school, (5) read below average grade level in school instructional reading exams, (6) had the basic decoding and sight word identification skills (knowing the written words and what they mean), (7) did not have previous experience with RR instruction, (8) had verbal fluency in Arabic.

**Exclusion Criteria**

The participants were excluded if they: (1) were diagnosed with other severe sensory disabilities, such as blindness and deafness, (2) had comorbid disabilities (e.g., cognitive, and intellectual disabilities), and (3) had severe challenging behaviors (e.g., aggression, exhibiting extreme agitation, hatred, and erratic aggressive behavior toward others and self-injury, causing harm to oneself on purpose).

**Participants Recruitment**

The Institutional Review Board (IRB) approval from Duquesne University was obtained first before the recruitment of the participants in this study. Then, the participants were recruited for this study by collaborating with the Saudi Arabian Cultural Mission (SACM). SACM sent the study's paper to the Ministry of Education in Saudi Arabia to receive permission to conduct this study. Then the ministry gave permission to the public schools in Najran city, which is in the south of Saudi Arabia, to allow conducting the study. Once the school was identified and received permission from the ministry of education, the researcher contacted the school principal and requested their consent to conduct the study in their school.

The principal identified the general and special education teachers who worked with learners with ASD. The principal introduced the researcher and explained the study to them. The researcher then set a meeting with the general and special education teachers and psychologists
at school to find out who wanted to participate in the study. The researcher explained the benefit of the study and how it might improve the participants' skills. They were explained the process of this study and their roles. Teachers and school psychologists supported the researcher as a data collector. They assisted in the recruitment of the participants, and one of them worked as an interventionist. The researcher then described to the teachers in detail how this intervention considers an effective strategy for learners who have difficulties in reading in general and more specifically for reading fluency. The researcher explained to them how the RR intervention is implemented. After they agree to participate, the special education teacher sent information home to the possible participants' parents. Parents could choose to contact the researcher for more information about how the study worked and requested their child participates if they met the study inclusion criteria.

Some forms were sent to the parents of the possible participants including the consent and assent forms. The consent form included an undertaking about keeping confidential the information, and the participants were assigned pseudonyms. The parents had to sign the consents and were collected. Other forms were sent explaining the goals of the study, and how this intervention could help their children's reading skills. They also received a form describing the study process including the setting, the baseline, intervention, and maintenance phases. Participants’ parents were provided the contact information of the special education teacher and were welcome to visit the school for further questions regarding the study. Then the eligible participants who met the criteria and had the possibility of benefiting from the intervention were identified to participate in the study. The participants then were included in this study and went through the study procedures.
Following the final selection of participants, four students were eligible to participate in this study and met the inclusion criteria of the participants; however, one withdrew after the first session. Three participants participated in this study (Abdullah, Fahad, and Zid). The data in Table 1 below was compiled and organized according to a number of demographic characteristics.

**Table 1**

*Characteristics of Participants*

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>Age</th>
<th>Grade Level</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdullah</td>
<td>M</td>
<td>11</td>
<td>5</td>
<td>ASD &amp; ADHD</td>
</tr>
<tr>
<td>Fahad</td>
<td>M</td>
<td>12</td>
<td>5</td>
<td>ASD</td>
</tr>
<tr>
<td>Zid</td>
<td>M</td>
<td>11</td>
<td>5</td>
<td>ASD</td>
</tr>
</tbody>
</table>

The participants were given pseudonyms to protect their privacy. They were all in fifth grade at Musa bin Nusair elementary school. They were in an autism program within the public school. The participants were Saudi citizens and live in Najran city, Saudi Arabia. They received special education services in a private classroom in a general education school. They were all diagnosed with high-functioning autism.

Abdullah had ASD and attention-deficit/hyperactivity disorder (ADHD). He was 11 years old. He could not do his life skills independently in the past, but he improved. He was interacting and communicating well with his peers in the classroom. He was doing well in sports and self-defense courses. He has off-task behavior and is super active in class. He had difficulties in reading class and read below average grade level in school instructional reading exams. He was doing satisfactorily in the other courses. He took extra time to complete the job and was a slow reader. He was friendly with his peers and cooperative with his teachers.
Fahad was 12 years old and diagnosed with ASD. He had low self-confidence and poor expressive language and letter exit difficulties. He had difficulties pronouncing letters. He had reading complications. He substituted a different word for the one that appears in the passage, skipped words, and mispronounced a word. He received speech and language therapy. He was interacting and communicating well with his peers in the classroom. He was independent in his life skills and daily motor skills. He is accomplishing satisfactorily in math, science, digital skills, life and family skills, English, and sports courses.

Zid was diagnosed with ASD. He was 11 years old and a smart student. He was a self-confident and independent person. Except for reading, he excelled in all of his academic courses. He was a slow reader and mispronounced words within a text. He engaged in off-task behavior and felt boring by the long instructions during the classes. He invested more time into completing the task at hand. He wanted to play with others. He was cooperative, friendly, and socially interactive.

**Setting**

The recruitment process of selecting participants (described in detail in the procedure section) were stopped when the number of eligible students (three students with ASD) was reached. The study was conducted in Najran city, where is in the southern province of the Saudi Arabia. The school system in Saudi Arabia is to separate males and females in public schools. Therefore, this study was in a male school. The school, that have an inclusion of students with ASD, normally should include general and self-contained classrooms, resource rooms, and some other facilities (e.g., gyms, restaurants, mosques, and libraries). Therefore, the current study took place in one of those public elementary schools.
The researcher conducted the study in the resource room during the participants’ reading class period. The participants might follow a modified version of the regular school curriculum. Each class lasted approximately 45 minutes. The resource room was well organized and a quiet classroom. The teacher administrated the baseline, intervention, and maintenance phases during school hours. The researcher observed the whole process. The study was provided with one-to-one instruction (i.e., individually with each participant). The researcher ensured that the classroom was free of distractions and noises and used proper comfortable lighting. If the resource room had other students, the researcher made sure to work with the participants at a table away from peers and instruction. The teacher was trained on how to implement the RR intervention. The researcher was silently sitting beside the participants and noted and collected the data without interrupting instruction.

**Materials**

*Reading Passages*

In this study, the reading passages that were utilized were taken from the classroom textbook that the Ministry of Education publishes in Saudi Arabia for each grade level. Reading passages approved by the Ministry of Education were chosen because the textbooks are only the educational tools used and are available to the students, teachers, and parents. The students received a new reading book every semester called “my language” for the reading classes. These textbooks consider standardized books for elementary through high school. To make sure that the participants had not read the passage before, the researcher conducted the study at the beginning of a semester to ensure that the reading passages were new for the students. In addition, the researcher used the old versions of the grade books called “read” to make sure that there were
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

enough passages and had not read the passages before. The old versions were completely
different than what they have now with new passages.

All the participants had one and the same passage (at grade level reading passage) in
each session during the baseline. In the intervention, they had one passage each session and they
repeated this passage only four times per day (per session). Then the next day (next session) had
a new passage. The total passages were 16 in all phases (i.e., baseline, intervention, maintenance
phases) for the whole process.

For the elementary reading classes, the textbooks include over 200 passages in total
(Alghamdi, 2021). The reading passages move from the least to the most difficult to each grade
level with increasing the number of words in the passage while going forward. The researcher
selected passages based on each participant's grade level. The researcher made sure that the
participants had not read the passages before by asking the teacher. These passages were used
during the baseline, interventions, and maintenance phases. The baseline phase and maintenance
phase sessions lasted about five to seven minutes each, and the intervention sessions lasted for 15
to 20 minutes each. All phases continued approximately eight weeks in total, including teacher
training, baseline, intervention, maintenance sessions.

Words correct per minute (Sheet)

RR intervention means that learners are encouraged to read the same texts over and over
until they reach a certain degree of ORF (Samuels, 1979; Therrien, 2004). ORF, the dependent
variable, is all about reading a material quickly and correctly (National Institute of Child Health
and Human Development [NICHD], 2000), and is measured by WCPM. During a minute of
reading, the interventionist writes down each word read incorrectly for each student until they
complete one minute. As a final step, interventionist determine how many words there are in the passage by dividing it by how many errors readers make while reading it (Williams et al., 2011).

The teacher was provided with an unmarked folder by the researcher for each participant with three different passages each week. This folder included WCPM and errors per Minute (EPM) progress graphs and the WCPM and EPM tracking sheets. The researcher created WCPM and EPM forms, such as the participants' WCPM and EPM tracking sheets (see Appendix A) and the WCPM and EPM progress graphs (see Appendices B and C). These forms provided the researcher and classroom teacher with a visual reference for each participant's performance.

**Materials**

The teacher was be given a stopwatch prior to the start of the baseline. The stopwatch was used for the duration of each phase and season. The interventionist recorded one minute to measure WCPM and EPM. Therefore, the stopwatch was necessary to measure the duration of how many words the participants read a minute and wrote it down in the WCPM and EPM tracking sheets and progress graphs. Other school materials were used (e.g., pencil, copy of the reading passage, and recording device). Each session also was recorded using voice recording in the iPhone to review sessions later if needed for the accuracy of the process.

**Research Design**

A Single-Subject Design (SSD), specifically, multiple baselines across participants design, was used in this study to determine the effectiveness of RR instruction on oral fluency in students with ASD. The SSD efficiently identifies the educational practices and effective interventions in literacy research involving learners with ASD (Guthrie, 2017; Horner et al., 2005; Odom et al., 2003). This design includes a baseline, intervention, and follow-up phases consecutively (Richards et al., 2014). SSD is used to evaluate the effectiveness of interventions
for students with disabilities in many studies (Maggin et al., 2018). It allows researchers to evaluate the impacts of different interventions in applied research with a small number of participants than in group research (Richards et al., 2014). The researchers can document the causal relationships between the independent variable (IV) (i.e., RR intervention) and the dependent variables (DV) (i.e., WCPM, and EPM) when using SSD (Horner et al., 2005). These studies have primarily used multiple baseline designs to establish a functional connection between the intervention and the target behavior. They do so by replicating the intervention impacts with two or more behaviors, people, or settings (Richards et al., 2014).

The multiple baselines across participants design improve internal control during the research because it allows replication across time by staggering the beginning of sessions (Richards et al., 2014). It also helps control factors that impact internal validity among the students under observation (Colcord et al., 2019). In addition, this design demonstrates the effects of academic interventions on skills, in this case, the effects of the RR intervention on ORF (Hua et al., 2012). It is an appropriate design because, after several sessions, it gives solid experimental evidence of the efficacy of treatment effects being observed in many replications across students with ASD (Lord & McGee, 2001). A successful experiment is one in which the experimental variable results in a change in the desired behaviors of the participants (i.e., improving ORF). In this design, the researcher may use IV (i.e., RR intervention) to compare participants' responses rather than focusing on recent changes in the target behavior (ORF) (Bear et al., 1968).

In this study, the baseline phase was established through observations before RR intervention to assess the participants' reading fluency ability in the classroom. The baseline phase was presented to every participant concurrently at the same time until the researcher
observed that their performances were stable for the first participant at least three consecutive times. The participants moved to the RR intervention phase sequentially. Then the RR intervention was introduced to the second participant. The others remained in the baseline phase. When the intervention showed effectiveness on the second participant, the RR intervention moved on to the third participant.

**Independent Variable**

The independent variable (IV) is the RR intervention, in which learners repeatedly read the passage until they reach a predetermined level of ORF. This approach requires students to read portions of the text (for example, 50–200 words) aloud until they meet the success criteria (Samuels, 1979). The RR intervention was implemented in one session each time, three times a week (one day between sessions). Each intervention session continued for approximately 15-20 minutes per session, depending on the participant’s daily performance. It continued approximately for eight weeks or up to 18 sessions in total for all participants. The researcher developed the WCPM tracking sheets (see Appendix A) and the WCPM and EPM progress graphs to gather the data (see Appendix B). Southward (2018) used similar WCPM tracking sheets and progress graphs.

When the first participant moved to the intervention phase after having at least three consecutive sessions with different passages each session (one session each day) in the baseline, the rest of the participants stayed at the baseline and moved to the RR intervention sequentially. During the intervention phase, each participant in this phase was presented with the Arabic reading passages at grade level reading passage, then they read one chosen passage per session. Different and new passages in each session were used. The participants were asked to read the passage four times per session out loud. The stopwatch was used for one minute for each read
when the participants started the first word of the passage. The word that read incorrectly was slashed (/). At the end of one minute, the participant was asked to stop and square bracket ([]) in each reading. After the fourth reading only, CWPM and EPM were recorded. Therefore, in the first three readings, there was no CWPM recording. The progress graphs were used and offered concrete illustrations of how to create goals and assist the participants with ASD in accomplishing those goals visually so that they might be rewarded for their efforts. Then calculating WCPM was as simple as subtracting the errors in one minute from the total number of words read per minute.

**Dependent Variables**

*Correct Words Per Minutes (CWPM)*

In this study, ORF is the dependent variable. The ORF involves reading a text with speed and accuracy (NICHD, 2000), which is measured by the CWPM (Shinn, 1998). In this case, each student received a score of how many words are read correctly per minute as CWPM. This score was recorded for all phases in each session. If a word was read correctly without help by the students within three seconds after the word was presented to the participant, it counted as reading the word correctly. The word was still considered correct if the students mispronounced it but corrected themselves within three seconds (Shinn, 1998). The tracking sheets and the WCPM progress graphs were used as assessment for monitoring student progress. These forms’ results provided student growth in the classroom as the reading passages. The tracking sheets, in addition, showed EPM for the participants because when a participant misread (substitute a different word for the one that appears in the passage), skipped (does not read a word in a passage) or mispronounced (read a word incorrectly) a word, or when it took them more than three seconds (hesitation) to get to the next word after reading the previous one, that word was
marked as an error (Guthrie, 2017). Self-correction, word repetition, insertion, and dialect variances were not considered mistakes (Shinn & Shinn, 2002). Whenever a participant made a mistake when reading a passage, the teacher would put a slash (/) next to the mistake (Shinn & Shinn, 2002).

**Procedure**

The procedures of this study were present in figure 1 which consisted of three main stages: study initiation, study procedures, and conclusion. The first stage was that IRB approval was obtained, then the recruitment of participants started followed by the teacher training. In the second stage, the researcher started baseline, then the RR intervention phases. The maintenance phase was after the intervention phase immediately. The last stage was measured interscorer agreement, treatment integrity, and social validity.
Figure 1

*Flow Chart of Procedures of the Current Study*

*Teachers Training*

During the planning periods, the researcher trained the teachers (the interventionist and interscorer agreement) individually. The training continued until the teachers were able to understand and implement the intervention well. This training provided the teachers with the intervention procedures, implementation guidelines for RR protocols, and data collection. The teachers were trained on how to collect the data using WCPM and calculate them and put them on the WCPM tracking sheets (see Appendix A) and the WCPM progress graphs to gather the data (see Appendix B). The teachers had a chance to ask questions and feedback about the study.
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

The teachers then were asked to implement the process experimentally on any students in the class to make sure that the teachers did all the elements correctly during the baseline, intervention, and maintenance phases. The training procedure continued until each teacher implemented it with a 100% proficiency criterion for two subsequent trials for no more than two days of training using procedural checklists. The teachers conducted three 35 to 40-minute training sessions over two school days with no more than two hours total for approximately two sessions.

**Baseline Phase**

In this phase, the recourse room was free of distractions and quiet. The ORF skills of the participants were measured using WCPM and EPM at the end of each session by subtracting errors in one minute from the total number of words read per minute. During the delivery of the RR intervention, AIMSweb procedures (standard curriculum-based measurement [CBM]) done by Shinn and Shinn (2002) were translated into Arabic and used. Each participant was asked to read the grade reading level passage for one minute in the resource classroom without any support or feedback. The baseline instructions followed in the next steps prior the start:

The study materials, including the passages and forms were prepared and placed in front of the students. The participants were asked to follow the verbal instruction (e.g., When I say "start," you can start to read the passage from the beginning), and they were asked to read every word in the passages out loud. If they had any word that they do not know what it is, they were told to move to the next word (e.g., any word that you do not know, leave it, and move on). They were told what the errors were after the reading. They were asked to point to the passages using their fingers while reading in order to not get distracted and lose their spot when reading. They were told if they had any questions and the teacher encouraged them by saying, “do your best
reading, and I know you can do it,” and if they did not have any questions, then they were asked to begin (Shinn & Shinn, 2002).

When the participants heard the instruction, they were asked if the instruction was clear and understood. The teacher then asked the participant then to start reading “start,” and the stopwatch was used when the participants said the first word. The teacher followed along with the participants using hard copies. The teacher marked the word "incorrect" if the participant could not read or mispronounce the word within three seconds and asked them to move to the next word and underlined the word that read incorrectly by the participant. Then teacher squared bracket ([]) at the end of 1 minute after the last word was read in the teacher’s copy and told the participant to stop (Shinn & Shinn, 2002).

At the end of the session, WCPM and EPM were recorded and calculated immediately for each baseline session. The participant should have established stable performances and a consistent response pattern at least three consecutive times for three days per week before starting the first intervention phase for the first participant. The first participant moved the RR intervention while the rest continued in the baseline phase. The baseline lasted for three days (three sessions) for the first participant, and around three weeks for the last participant with a total of seven sessions approximately in the baseline for the last participant. Each baseline session lasted about five minutes. The researcher was observing the process and check integrity.

**RR Intervention**

In this phase, the researcher prepared the reading passages, and any other papers related to the study (e.g., folder, WCPM and EPM progress graphs, tracking sheets, stopwatch, school materials, treatment integrity checklist) before the RR intervention was started. Each participant was presented with the reading passage (50 to 100-word passages). The participants read various
chosen grade-level reading passages per session. In this study, the RR procedure was
implemented following procedures that were recommended by Samuels (1979). During the
intervention phase, RR intervention was administered for approximately eight weeks (three days
each week using three different passages each week). The intervention continued for
approximately eight sessions for the first participant and six for the last participant. The RR
intervention was used for the first participant while the others continued in the baseline. The
participants began the intervention sessions sequentially.

In this phase, some procedures in the baseline were followed using AIMSweb procedures
(Shinn & Shinn, 2002). The recourse room was free of distractions and quiet. The study
materials were prepared, including the folders and the reading passages. The ORF skills of the
participants were measured using WCPM and EPM at the end of each session. Each intervention
session lasted for approximately 20-25 minutes. The participants and teacher followed the
intervention steps below.

The participants were informed by the teacher that they should have read every word in
the passages out loud and used their fingers while reading, and they were told that they would
receive feedback in the intervention phase, and they would read for one minute. The teacher then
told the participant “Any word that you do not know, leave it, and move on. I will tell you after
you finish the reading.” The participants were encouraged by saying, “do your best reading, and I
know you can do it.” They were asked to follow the directions, “When I say "start," you can read
the passage.” After that, the teacher called out, "Begin" in the 1st reading, and set a timer after
the participant began. The researcher and the teachers (i.e., interventionist and the interscorer)
followed along with the participants using hard copies. While the participant was reading, the
teachers underlined the word that read incorrectly, and provided a support to continue reading by
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

moving to the next word when they hesitated for more than three seconds with miscues corrected. Therefore, a word that was mispronounced correctly within three seconds, deleted, mispronounced, inserted, or replaced was marked as miscues (Alber-Morgan et al., 2007). The participants read until they were asked to stop. The teachers then squared bracket (]) at the end of 1 minute where the participant had stopped (Shinn & Shinn, 2002).

In the 2nd, 3rd and 4th readings, the teacher followed the same above steps. In the 4th reading, the researcher and the teachers recorded WCPM and EPM and calculated them immediately after the reading and notified the participants of the result using the WCPM and EPM tracking sheets to show the progress. Thus, the participant was asked to read the passage aloud four times per session for three days a week. Every new session had a new passage to read four times in the intervention phase. Every participant read the same passage on session day whether the participants were in the intervention phase or in the baseline phase. Nevertheless, those who were still in the baseline phase read the passage one time per session.

Maintenance Phase

After the intervention was over, the maintenance phase began immediately. The success of the RR intervention was evaluated throughout time during this phase, which took place after the intervention had been terminated. The participants read the reading probes sequentially as what happened in the intervention phase. This phase continued for about 2 weeks (up to six sessions) and a week for the last participant (three sessions). For instance, when the first participant started the maintenance, the other participants were still in the intervention phase. The maintenance phase was used the same procedures that were applied in the baseline using AIMSweb procedures by Shinn and Shinn (2002), such as saying standardized directions, marking the word "incorrect" if the participant could not read the word within three seconds or
mispronounce it and underlining it, squaring bracket ([)] at the end of 1 minute after the last word was read, and telling the participant to stop. The participants then were told their errors after the reading. This phase was five sessions for the first participant and three for the last participant. The researcher provided the participants with new reading passages to read for one minute with no feedback. WCPM and EPM were recorded each time using the participants' WCPM and EPM tracking sheets (see Appendix A) and the WCPM and EPM progress graphs (see Appendices B and C).

**Treatment Integrity**

Treatment integrity is the degree that intervention is implemented as initially planned (Lane et al., 2004; Gresham, 1989). It indicates the accuracy and consistency of the intervention's implementation of all parts, and no steps are missed (Gresham, 1989). It is essential to collect treatment integrity to see how the intervention goes and strengthen the effectiveness of the intervention (Fiske, 2008). In the current study, the teachers were provided with integrity checklists that explained each step required to follow for intervention (see Appendix D). Integrity checklists ensured that the procedures were conducted effectively and implemented with integrity. The teacher was asked to complete these checklists daily for each stage (see Table 1 for baseline; see Table 2 for intervention phase; see Table 3 for maintenance phase). The range of treatment integrity by the teachers in all the phases should be 80% or better (Cooper et al., 2007). In certain cases, a score between 80% and 100% might be used to indicate a high degree of integrity. A state of poor integrity might be defined as at least 50% integrity being compromised (Galloway & Sheridan, 1994; Holcombe et al., 1994). For conclusions regarding the effect of the intervention, maintaining treatment integrity is crucial. The success of the intervention may depend on how well it is carried out (Perepletchikova & Kazdin, 2005).
researcher checked integrity checklists for at least 50% of the sessions for each participant (i.e., baseline, intervention, and maintenance phases). If the RR intervention, for example, had 10 steps and the instructor implemented only 9, then the given session would be 90% (\([9/10] \times 100 = 90\%\)).

**Interscorer Agreement**

The interscorer agreement is known as two or more observers reporting the exact data for the same events. It is done to ensure that investigators are harmonious in scoring. If the interscorer agreement is weak, it can have negative effect on the study's reliability (Cooper et al., 2007).

In this study, the researcher recruited a second teacher using the same procedures that were used for the first teacher to measure interscorer agreement. The researcher was with them in each step. The researcher trained the second teacher personally during planning times. Up to two school days, the teacher worked three 35- to 40-minute training sessions for about two sessions. Training continued until the teacher could implement the intervention properly. The teacher learned RR intervention techniques, RR protocol implementation recommendations (how to implement RR), and data gathering. The second teacher was also trained on how to calculate WCPM and write it on WCPM tracking sheets (see Appendix A) and the WCPM progress graphs to gather the data (see Appendix B). The second teacher might ask questions and provide comments. The teacher could next apply the method to any student in the class to ensure they accomplished all the aspects properly throughout the baseline, intervention, and maintenance phases. The training method continued until the teacher executed it with 100% competence for two following trials, utilizing procedural checklists. The second teacher scored the participants’ ORF through independent scoring of selected passages read by students. The interscorer
agreement was determined by dividing the incorrect and correct words read by adding total disagreements and agreements and multiplying by 100. An interscorer agreement rate of 80% or more is the minimum criterion that is considered adequate (Cooper et al., 2007).

**Social Validity**

The term "social validity" refers to the social acceptability of the intervention's purposes, outcomes, and procedures (Foster & Mash, 1999). The specialists state a relationship between intervention fidelity and social validation. If the social validity is low, the intervention will be less likely to be implemented (McDuffie & Scruggs, 2008). Social validity is crucial to close the gap between research and practice. When the educators think the intervention is not relevant or acceptable, they will be less likely to use and provide them in the future (Greenwood & Abbott, 2001).

In the current study, the researcher conducted informal interviews with the participants to explore their attitudes toward the use of RR intervention after completing this study. Then the participants were given social validity questionnaire during these informal interviews (see Appendix E). The questionnaire was provided to see positive and negative items to determine whether the students were pleased with the use of RR intervention to improve their ORF skills, and if there were items that need to be careful with future research. They were asked to circle one of the five emojis that best fit ( 😞, 😞, 😞, 😞, and 😞). These emojis pointed to five options (1 = *strongly disagree* to 5 = *strongly agree*). The questionnaires are: (1) RR intervention was easy to implement; (2) I think RR intervention improves my ORF; (3) RR intervention reduces my incorrect words; (4) I like every element of RR intervention; (5) RR intervention assists me in understanding what happened in the passage; and (6) I would use RR intervention in different courses, such as science or social studies.
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

**Data Analysis**

There is limited research on the effectiveness of RR intervention on ORF for students with ASD, and none in Saudi Arabia. This study analyzed the effectiveness of RR intervention on ORF for learners with ASD. CWPM provided the effectiveness of using RR intervention.

This study was reported using visual analysis and descriptive statistics. Visual analysis has a long-standing history and is one of the earliest methods of data analysis (Harrington & Velicer, 2015). It looks for within and between phase patterns (baseline, intervention, and maintenance) and sees if changes could be attributed to RR intervention (Kennedy, 2005; Kazdin, 2011). Visual analysis (graphs) makes it easy to create, interpret graphs, and draw conclusions with fewer tools and less effort and is frequently used to analyze single-subject research (Harrington & Velicer, 2015; Horner et al., 2005). Three characteristics that can assist and analyze the data are a trend, variability, and level (Lane & Gast, 2013).

The level that shows the average (mean) of the data points within each phase is computed to present a functional connection and compare the students’ performance and intervention and locate patterns (Kennedy, 2005). It is split into three sections or more based on the y-axis (e.g., low level, moderate level, and high level) (Cooper et al., 2007). The trend (the overall direction of the data points) is presented in a visual graph. It can be flat positive, or negative. The trend helps to determine if the data is a decreasing or acceleration and an increasing or deceleration trend (Horner et al., 2012). By viewing trend direction, the level of stability, and level of change, every participant's data are analyzed. Variability (differences in data values from session to session) describes how the data differ from each other and how they spread on the graphs (Cooper et al., 2007).
Conclusion

The purpose of this study was to ascertain whether and how RR intervention improved ORF among Saudi Arabian students who had ASD. This was the first study focusing on this important area in Saudi Arabia. It used a single-subject, multiple-baseline design across participants. This chapter provided an in-depth explanation of the research methods used. The chapter covered the overview of the purpose and research questions. It explained the single-subject design and how it was effective to be used in this study to investigate the effectiveness of RR intervention. The DV and IV were defined. The participants and how to recruit them were presented and included the eligible participants. This chapter covered how to train the teachers who participated in this study. The sittings and materials were discussed in detail for the implementation of this study. The baseline, intervention, and maintenance phases were illustrated step by step. As a follow-up, this chapter discussed data collecting techniques, followed by treatment veracity, interscorer agreement, and social validity. Data analyses were also covered, including graphs, levels, and trends. The next chapter covered the result of the study for the participants.
Chapter Four

Results

Overview

The current study was to investigate the effectiveness of Repeated Reading (RR) intervention on Oral Reading Fluency (ORF) in school-age students with ASD during reading classes in Najran, Saudi Arabia. WCPM and EPM were used to measure the impact of RR intervention. The primary objective of this study was to answer the next research questions: 1) Is the RR intervention effective in increasing ORF in elementary school-aged children with ASD in Saudi Arabia? 2) Does RR intervention maintain ORF’s impact over time after the intervention is removed? The purpose of this chapter was to provide the results pertaining to these research questions, along with the results for social validity, treatment integrity, and interscorer agreement.

As mentioned in chapter three, pseudonyms were assigned so that privacy could be preserved for the three participants after meeting the inclusion criteria and receiving the assent and parental consent forms. They are all students in the fifth grade at Musa bin Nusair elementary school in Najran city. They attended a public school but were placed in a separate classroom in order to obtain special education services. All participants have high-functioning forms of autism as evidenced by their health reports. The participants had difficulties with reading skills, especially in ORF according to their academic assessments done by the teacher.

Every participant started in the baseline phase until the researcher saw that the first participant's performance was stable at least three consecutive data points, at which point they progressed to the intervention phase consecutively. The second participant received RR intervention. The third participant stayed on the baseline. The RR intervention moved to the third person after the second individual showed success. WCPM tracking sheets (see Appendix A) and
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

the WCPM progress graphs to gather the data (see Appendix B) were used to gather the data.

The baseline phase and maintenance phase sessions lasted about five to seven minutes each, and
the intervention sessions lasted 15 to 20 minutes each. Table 2 shows each participant's study
sessions over all three phases.

Table 2

<table>
<thead>
<tr>
<th>Participant</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zid</td>
<td>3</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Abdullah</td>
<td>5</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Fahad</td>
<td>7</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

Visual Analysis of Results

Visual analysis was used to identify if there was a functional relation between the
independent variable (i.e., RR intervention) and dependent variable (i.e., WCPM). Line Graphs
were used to visually analyze the results specifically, trend, variability, and level. CWPM is
reported in Figure 2 and EPM is in Figure 3.

The Effect of RR Intervention on Words Correct Per Minute

The participants were provided with the same passage in each session during the baseline.
In the intervention, they had one and the same passage in each session. They repeated that
passage four times per session. Then the next session had a new passage. The total passages were
16 in all phases for the whole process. Based on the results of the visual analysis, all participants
improved their ORF during the RR intervention phase as demonstrated by an increase in WCPM
compared to either the baseline or maintenance phases. The three participants improved their mean WCPM scores during the RR intervention phase (see Table 3 & Figure 2).

**The Effect of RR on WCPM for Zid**

**Baseline.** The first participant who moved from baseline to the intervention phase and then to the maintenance phase was Zid after the researcher observed a stable data point. During the baseline (see Figure 2), Zid had \( M = 31.66 \). He scored 34, 34, 29 WCPM respectively during the first three sessions. His results in baseline with relatively stable and his last data point had a slightly decreasing trend indicating intervention was appropriate at this time with low variability.

**Intervention.** After three decreasing data points, Zid started the RR intervention. During the RR phase, he showed a significant improvement compared with baseline data in a trend with low to moderate variability by scoring \( M = 58.5 \) ranging 54-66 WCPM (see Table 3). He scored 55, 54, 58, 56, 57, 59, 63, 66 WCPM respectively in eight sessions. An instant increase in level was recorded as moderate to a high level. Therefore, Zid gained \( M = 26.84 \) after implementing RR intervention. He gained about 20 – 35 words during this phase.

**Maintenance.** During the maintenance, WCPM was variable moderate to high levels with \( M = 51.6 \) ranging 49-55 WCPM (i.e., 50, 51, 49, 53, 55 WCPM). There was a slight decrease in this phase \( M = 6.9 \) compared to the intervention phase; however, the trend continued increasing. The maintenance data points were below treatment but above the baseline.

**The Effect of RR on WCPM for Abdullah**

**Baseline.** Abdullah was the second participant to move to RR intervention phase. He also scored better than Zid. His WCPM ranged from 37-42 WCPM \( M = 39.4 \) in the baseline. He scored
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

respectively 42, 37, 41, 39, 38 WCPM. During this phase, WCPM was variable with moderate levels with a slight decrease in the trend (see Figure 2).

**Intervention.** Abdullah started the RR intervention after five sessions in the baseline. He showed an instant improvement in WCPM compared with baseline data in a trend with low to moderate variability ($M = 65$). The data points during the RR intervention phase ranged 59-70 WCPM (i.e., 59, 60, 65, 67, 66, 68, 70 WCPM). After implementing the RR intervention, he earned ($M = 25.6$) with more words ranging from 22-25 WCPM. Therefore, with the continuous rise of the data points, moving to the next phase was appropriate currently.

**Maintenance.** A majority of the maintenance data points fell beyond the treatment range but still outperformed the baseline. During the maintenance, WCPM was variable moderate to high levels ($M = 55.75$). Abdullah scored 56, 55, 57, 55 WCPM respectively. There was no clear trend, and there was decrease in the mean compared with intervention ($M = 9.43$). However, the decrease was not as what was in the baseline.

**The Effect of RR on WCPM for Fahad**

**Baseline.** The third participant was Fahad. He was the last participant who transferred to the intervention phase. Fahad in the baseline reported moderate levels and low to moderate variability ($M = 49.42$) ranging from 44-54 WCPM (see Table 3). He achieved 48, 54, 44, 51, 50, 48, 48 WCPM cross all sessions during the baseline phase. The trend was a slight downward trend (see Figure 2). Looking at the stability of the result, driving to the treatment phase was proper.

**Intervention.** After seven data points in the baseline, Fahad moved to the RR intervention phase. During the intervention phase, the trend increased with moderate to high levels and low to moderate variability ranging 71-82 WCPM ($M = 76.5$). Fahad’s scores
immediately increased (i.e., 71, 73, 77, 79, 77, 82 WCPM) compared with baseline data points.

There was a clear and fast improvement right after the implementation of the RR intervention. The mean compared to the baseline phase was \( M = 27 \).

**Maintenance.** In the maintenance phase, there was no trend with a decline \( (M = 62.33) \) ranging 62-63 WCPM. He scored 62, 63, 62 WCPM respectively cross all maintenance phase. Fahad in the maintenance noted moderate levels and low variability. Compared to the intervention phase, the mean was reduced \( (M = 14.17) \). The data from the maintenance phase were still much better than baseline data points and lower than the intervention phase.

**Table 3**

*WCPM’s Range, Mean, and Median for Participants*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Word Correct Per Minute (WCPM)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Intervention</td>
<td>Maintenance</td>
<td>Range</td>
<td>Mean</td>
<td>Median</td>
</tr>
<tr>
<td>Zid</td>
<td>29-34</td>
<td>31.66</td>
<td>32</td>
<td>54-66</td>
<td>58.5</td>
<td>57.5</td>
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<td></td>
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<td>51.6</td>
<td>49-55</td>
<td>51.6</td>
<td>51</td>
</tr>
<tr>
<td>Abdullah</td>
<td>37-42</td>
<td>39.4</td>
<td>39</td>
<td>59-70</td>
<td>65</td>
<td>66</td>
</tr>
<tr>
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<td>55.75</td>
<td>55-57</td>
<td>55.75</td>
<td>55.5</td>
</tr>
<tr>
<td>Fahad</td>
<td>44-54</td>
<td>49.42</td>
<td>50</td>
<td>71-82</td>
<td>76.5</td>
<td>77</td>
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<tr>
<td></td>
<td></td>
<td>62-63</td>
<td>62.33</td>
<td>62-63</td>
<td>62.33</td>
<td>62</td>
</tr>
</tbody>
</table>
Figure 2

Participants’ Number of WCPM for Baseline, Intervention, and Maintenance

Baseline

Intervention

Maintenance

Zid

Abdullah

Fahad
The Effect of RR Intervention on Errors Per Minute

Participants' baseline means of EPM were high; however, the means during RR intervention dropped significantly. The three participants improved their reading and reduce their EPM during the intervention phase. Refer to Table 4 and Figure 3. Therefore, there was an inverse correlation between WCPM and EPM meaning as the WCPM increased the EPM decreased.

The Effect of RR on EPM for Zid

Baseline. As mentioned earlier, Zid was the first participant who moved to the intervention phase. In the baseline (see Figure 3), Zid had \((M = 10)\) ranging from 9-11 EPM (i.e., 9, 11, 10, 14 EPM). There was a general uptrend in baseline data points and low to moderate variability.

Intervention. Zid started the RR intervention after three decreasing data points of WCPM. During the RR phase, he showed a significant decrease in EPM compared with baseline data with low variability by scoring \((M = 0.75)\) ranging 0-2 EPM (see Table 4). Zid’s scores cross all intervention’s sessions were 1, 2, 2, 0, 0, 1, 0, 0 EPM respectively. An instant decrease in level was recorded as a low level. Thus, the mean for him dropped \((M = 9.25)\) after implementing RR intervention.

Maintenance. The EPM during the maintenance was variable low to moderate levels \((M = 2.2)\). There was a slight increase in the maintenance phase (range 1-3 EPM) compared to the intervention phase with a slightly increasing trend \((M = 1.45)\). Zid scored 2, 1, 2, 3, 3 EPM. These scores were slightly higher than intervention phase but substantially better compared with his baseline.
The Effect of RR on EPM for Abdullah

Baseline. During the baseline, Abdullah's EPM was 13, 12, 10, 11, 14 EPM respectively with $M = 12$ (see Table 4). He scored the highest EPM compared with other participants in this study (Zid's $M = 10$ and Fahad's $M = 8.29$). During this phase, EPM was variable with moderate to high levels with a general increase in the trend (see Figure 3).

Intervention. When Abdullah started the RR intervention, he showed an instant decrease in EPM compared with baseline data in a trend with low to moderate level ($M = 1.43$) with a ranged 0-3 EPM. He got 3, 2, 3, 1, 0, 1, 0 EPM cross his intervention sessions. The mean for Abdullah dropped ($M = 10.57$) with more correct words after implementing the RR intervention.

Maintenance. EPM was variable low to moderate levels ($M = 2$) ranged 1-3 EPM (i.e., 2, 1, 3, 2 EPM) in the maintenance phase. There was with no trend in the graph. There was a little increase in the mean compared with intervention ($M = 0.57$). Abdullah improved his WCPM by decreasing his EPM. There was a gap between the result during the baseline phase and the maintenance phase regarding to the number of EPM.

The Effect of RR on EPM for Fahad

Baseline. Fahad in the baseline reported moderate to high levels and moderate variability ($M = 8.29$) ranging from 6-10 EPM (see Table 4). He achieved 8, 7, 10, 9, 10, 6, 8, 14 EPM. There was not a clear trend in his data points showing on the graph (see Figure 2). He was the least participant of making errors during the baseline (Zid’s M = 10, Abdullah’s M = 12).

Intervention. When Fahad moved to the RR intervention phase, the level was low with low to moderate variability. The EPM’s scores were 0, 2, 0, 1, 3, 0 respectively ($M = 1$). There was a clear and significant improvement right in EPM after the implementation of the RR intervention. The mean was significantly different from the baseline period with $M = 7.29$. 
**Maintenance.** During the maintenance phase, there was a slight decrease in trend of the mean ($M = 2.67$; range 1-4 EPM). His scores during this phase were 3, 4, 1 EPM respectively. This result considers high compared with the intervention phase; however, it is lower than the baseline result. Fahad showed low to moderate levels and low to moderate variability during this stage. His mean scores little increased compared to the intervention phase ($M = 1.67$).

**Table 4**

*EPM’s Range, Mean, and Median for Participants*

<table>
<thead>
<tr>
<th>Participants</th>
<th>Error Per Minute (EPM)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Intervention</td>
<td>Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>Mean</td>
<td>Median</td>
<td>Range</td>
<td>Mean</td>
<td>Median</td>
<td>Range</td>
<td>Mean</td>
</tr>
<tr>
<td>Zid</td>
<td>9-11</td>
<td>10</td>
<td>10</td>
<td>0-2</td>
<td>0.75</td>
<td>0.5</td>
<td>1-3</td>
<td>2.2</td>
</tr>
<tr>
<td>Abdullah</td>
<td>10-14</td>
<td>12</td>
<td>12</td>
<td>0-3</td>
<td>1.43</td>
<td>1</td>
<td>1-3</td>
<td>2</td>
</tr>
<tr>
<td>Fahad</td>
<td>6-10</td>
<td>8.29</td>
<td>8</td>
<td>0-3</td>
<td>1</td>
<td>0.5</td>
<td>1-4</td>
<td>2.67</td>
</tr>
</tbody>
</table>
Figure 3

Participants’ Number of EPM for Baseline, Intervention, and Maintenance

- **Zid**
- **Abdullah**
- **Fahad**
Generally, after the implementation of RR intervention, the participants' ORF increased. Their WCPM and EPM exhibited an improvement in the intervention phase and continued to the maintenance phase although there was a decrease in ORF and a slight increase in EPM for all participants. In the maintenance phase, there was a slight decrease in the ORF and a boost in the EPM compared with the treatment phase. Nonetheless, this result in the maintenance phase still much better than the baseline phase. Thus, findings supported the study's central hypothesis that RR intervention would improve students' ORF and decrease their EPM.

Social Validity

To indicate the degree to which the participants agree or disagree with the six questions below, they were asked to circle the visual face they agreed with from the five best-fitting options (1=Strongly Disagree 2=Disagree 3= Neutral 4=Agree 5=Strongly Agree). The results of social validity are presented in Table 3. The six questions were answered by the three participants. The social validity questionnaire was to explore the participants' attitudes toward the use of RR intervention after completing this study and to see positive and negative items to determine whether the students were pleased with the use of RR intervention to improve their ORF skills, and if there were items that need to be careful with future research. They were asked to circle one of the five emojis that best fit. All participants strongly agreed that RR intervention was easy to implement, improved their ORF, reduced their incorrect words, and helped them to understand what happened in the passage. They also would use RR intervention in different courses. Regarding to the question "I like every element of RR intervention," two of the three participants were strongly agreed, except one was agreed. He mentioned that it would be better if they read it less than four times.
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

Table 5

Social Validity Questionnaire

<table>
<thead>
<tr>
<th>Statements</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. RR intervention was easy to implement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>√√√</td>
<td>5</td>
</tr>
<tr>
<td>2. I think RR intervention improves my ORF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>√√√</td>
<td>5</td>
</tr>
<tr>
<td>3. RR intervention reduces my incorrect words.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>√√√</td>
<td>5</td>
</tr>
<tr>
<td>4. I like every element of RR intervention.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>√√√</td>
<td>4.66</td>
</tr>
<tr>
<td>5. RR intervention assists me in understanding what happened in the passage.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>√√√</td>
<td>5</td>
</tr>
<tr>
<td>6. I would use RR intervention in different courses, such as science or social studies.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>√√√</td>
<td>5</td>
</tr>
</tbody>
</table>

Treatment Integrity

The teacher was asked to complete these checklists daily for each stage. Refer to Table 1 for baseline, Table 2 for the intervention phase, and Table 3 for the maintenance phase. The teacher marked "Yes" on the checklist for items that were done, or "No" for items that were not done. The researcher checked integrity checklists for at least 45% of the sessions for each participant (i.e., baseline, intervention, and maintenance phases). The implementation percentage of RR intervention sessions was 100% and treatment integrity across all phases was 100%. Therefore, the RR intervention was implemented as planned.

Interscorer Agreement

The special education teacher measured interscorer agreement. He used WCPM and EPM tracking sheets. This sheet included the students' names, session, date, passages' titles, WCPM and EPM (see Appendix A). Interscorer agreement was collected for 50% of the study (i.e., eight...
sessions). The interventionist and the second teacher reported how many words read correctly and errors through all sessions (baseline, intervention, and maintenance phases). Zid, Abdullah, and Fahad had high acceptance in interscorer agreement with level of 99.4% (range 97-100), 99.87% (range 99-100), and 100% respectively.
Chapter Five

Discussion

Overview

Learners with ASD face specific problems with reading skills including Oral Reading Fluency (ORF). Nonetheless, these learners can be capable readers if targeted strategies are used (Kahraman & Tekşen, 2019). The current study aimed to examine the effect of repeated reading (RR) intervention on ORF in reading classes for students with ASD in Najran, Saudi Arabia. RR intervention effectiveness was evaluated using word correct per minute (WCPM) and errors per minute (EPM). The following questions guided the research for this article: (1) is the RR intervention effective in increasing ORF in elementary school-aged children with ASD in Saudi Arabia? and (2) Does RR intervention maintain ORF's impact over time after the intervention is removed? In this section, the findings from the current investigation are discussed, the limitations of the study, the implications for practitioners and research, and recommendations for future research.

Review of the Results

Saudi public schools require reading classes as part of the inclusion setting. Each class lasts for 45 minutes. The schoolteachers included in the study indicated that they focus more on improving social and behavioral skills ignoring academic skills even though there was a reading class every school day. Most researchers have focused their efforts on the following types of interventions: behavioral, early language development, and social skills, even though learners with ASD exhibit difficulties in other areas, such as reading skills (Reisener et al., 2014). The three participants with high-functioning ASD in this study, Abdullah (11 years old), Zid (11
years old), and Fahad (12 years old), had not received any type of EBPs previously to improve their ORF skills from the teachers in their reading classes before this study was started.

Learners with ASD have the right to receive appropriate interventions to improve their academic skills (Al-Dakroury et al., 2022). The results of current study provide data about the benefit of appropriate interventions to help learners with ASD improve their reading skills as reading is an important life skill. Additionally, educating the teachers and the community on the importance of these academic strategies could improve academic skills and the independence of these students (Utley, 2017; Yaw et al., 2011).

Effectiveness of RR intervention

RR intervention has proven to be sufficient, uncomplicated, and available at no cost for educators, especially when used to improve ORF skills for students with ASD in enhancing their reading performance (Reisener et al., 2014). It was implemented with minimal time, supervision, and planning by the teacher and researcher. In this study, the descriptive statistics and visual analysis of the results reveal that the RR intervention led to more significant improvements in ORF for the participants in this study, which was consistent with prior research findings about the significant result of RR in improving ORF skills (e.g., Ceylan et al., 2018; Egarr & Storey, 2021; Fabrizio & Pahl, 2007; Guthrie, 2017; Hua et al., 2012; Kahraman & Tekşen, 2019; Kamps et al., 1989; 1994; Reisener et al., 2014; Simons et al., 2022; Strickland et al., 2020; Utley, 2017).

The results of this study were presented easily in the graphs to assess the effectiveness of RR intervention on the participants' progress through the baseline, intervention, and maintenance phases. According to these graphs, the current study supported the previous studies' findings showing that RR is highly beneficial in boosting ORF in ASD children. Significant progress and
improvement in the participants' skills were shown when the RR intervention was implemented (Ceylan et al., 2018; Fabrizio & Pahl, 2007; Guthrie, 2017; Hua et al., 2012; Kahraman & Tekşen, 2019; Kamps et al., 1989; 1994; Reisener et al., 2014; Simons et al., 2022; Strickland et al., 2020; Utley, 2017). Furthermore, participants improved WCPM and reducing their EPM when reading. Positive changes in the participants' targeted skills persisted even after the intervention was cut off for two weeks. This study demonstrated that using EBPs (i.e., RR) was helpful in enhancing ORF, which supports prior research that RR intervention can help students become more fluent readers orally (Ceylan et al., 2018; Fabrizio & Pahl, 2007; Guthrie, 2017; Hua et al., 2012; Kahraman & Tekşen, 2019; Kamps et al., 1989; 1994; Reisener et al., 2014; Simons et al., 2022; Strickland et al., 2020; Utley, 2017).

The current study focused on RR intervention alone to see the effectiveness of the intervention to improve ORF. However, most of the previous studies included RR in combination with other interventions, except for Ceylan et al. (2018) and Kahraman and Tekşen (2019) using RR alone. The current and previous studies used almost similar procedures and instructions to implement RR intervention that was used in many previous studies (Fabrizio & Pahl, 2007; Guthrie, 2017; Hua et al., 2012; Kamps et al., 1994; Reisener et al., 2014; Simons et al., 2022; Strickland et al., 2020; Utley, 2017). AimsWeb instructions were used as what was used in the studies of Reisener et al. (2014), Guthrie (2017), and Utley (2017). For the three participants, the ORF levels increased throughout the intervention phase and remained elevated throughout the maintenance phase; however, they never returned to the baseline levels as shown in past studies. Furthermore, the current study was implemented by the teacher and the findings indicated that the teacher implemented the intervention properly as in the previous studies. Only two previous studies were done by the teachers (e.g., Reisener et al., 2014; Strickland et al.,
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

2020). Most studies were done by the researchers (e.g., Ceylan et al., 2018; Egarr & Storey, 2021; Guthrie, 2017; Kahraman & Tekşen, 2019; Utley, 2017).

During the baseline, it was noted that Zid’s baseline had the lowest data points compared with other participants ($M = 31.66$) with 29-34 WCPM. When the intervention phase started, an immediate increase in ORF happened ($M = 58.5$) with 54-66 WCPM. Fahad, the last participant who started the intervention phase, scored the highest data points in WCPM compared with other participants' data points during the baseline ($M = 49.42$) with 44-54 WCPM. During the intervention phase, his ORF increased by 71-82 WCPM, which He also scored the highest data points compared with other participants ($M = 76.5$). Based on these results, RR intervention appears to contribute significantly to the automatic recognition of written content by participants with ASD which is also supported by the results of the study completed by Kahraman and Teksen (2019).

Overall, the current study's findings showed that RR is effective in improving academic performance among Saudi students with ASD. The results further contribute to the limited body of literature in favor of EBP reading interventions for ASD students in Saudi Arabia. This investigation expands on the current body of research on ORF interventions for students with ASD who have difficulties with reading. Additionally, it examines the role of RR intervention in enhancing students' overall reading performance, with a particular focus on WCPM. This study helps to grow the field by introducing it to students in Saudi Arabia.

**Implications for Practitioners**

The current study has some potential implications for practitioners who use EBPs like RR intervention with children with ASD. EBPs, such as RR, have the potential to help students with ASD improve their ORF and other academic abilities. These EBPs can boost the success of
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

learners with ASD by helping them improve their reading ability. Previous research showed that
the use of these EBPs improved the ability of children at risk of educational failure especially in
developing ORF (Reisener et al., 2014; Strickland et al., 2020). Because of EBPs' effectiveness
in improving students' reading skills, EBPs should be included in training programs for teachers
and classrooms.

As seen in the positive findings of the current study, including EBPs for teaching students
with ASD in pre-service teacher preparation programs suggest that teachers may potentially
benefit to teach learners with disabilities in Saudi Arabia. In this study, two teachers were trained
to implement RR intervention. They were provided step-by-step instructions on how to
implement RR intervention for only two school days and were able to do so with 100% accuracy.
Therefore, the implementation of EBPs was not difficult but could be easier if the teachers
received training during their college. The social validity questionnaires in this study helped the
teachers reconsider the importance of implementing appropriate interventions that could be
implemented for ORF and overall reading skills for ASD students. The purpose of the
questionnaire was to collect participants' opinions about the implementation of RR intervention
and its effectiveness. The teachers in this study found that RR intervention was welcomed by the
participants. Therefore, after witnessing its benefits and hearing back from students in a survey,
teachers were more probable to implement it. In general, reading interventions for learners with
ASD have been shown to increase educators' knowledge of EBPs and motivate them to use such
practices with their learners.

Implementing EBPs (e.g., RR intervention) may be challenging for teachers because they
may have variable dispositions toward using these EBPs relying on factors (e.g., workload and
class size). RR intervention can be used in a variety of settings, including one-on-one or across
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

an entire classroom, with little preparation or oversight required (Strickland et al., 2020).

Including RR intervention in reading classes not only improves ORF but also other reading skills (e.g., comprehension and vocabulary). Thereby, including RR intervention during reading courses can potentially enhance critical reading skills, despite challenges teachers face that may impact students with ASD.

The participants in this study improved their ORF consistently and significantly during the intervention phase. However, when the RR intervention was removed, the participants' ORF decreased, but still above the data points in the baseline. The teachers should consider that students with ASD may need to be ongoing using these kinds of interventions, such as RR intervention as an accommodation throughout their school classes. RR may need to be part of the curriculum for those students with ASD.

Finally, the current study demonstrated that there are serious considerations the field in Saudi Arabia should consider when implementing interventions. This study changed the way that Saudi practitioners look at those academic interventions since the schoolteachers had low expectations about how effective the academic interventions can improve the ORF for students with ASD and their overall reading skills. The teachers stated that they focused on behavioral interventions and how to change the students' behavior more than implementing academic interventions to improve reading skills. They were unsure of the feasibility of using academic strategies because they had not found any previous studies in Saudi Arabia that supported the use of these strategies. However, when they implemented the intervention by themselves and saw how the participants improve their ORF, they changed their beliefs about using academic interventions (e.g., RR intervention). This study holds considerable promise for influencing educators' beliefs toward using these academic interventions. Therefore, the current study has
implications for practitioners and for future research in the special education field, especially ASD in Saudi Arabia.

**Implications for Research**

There are limited studies that have reviewed EBPs with learners with ASD to improve their ORF skills and none in Saudi Arabia. The current study is the first research of its kind in the Arabic-speaking world. Therefore, the current study makes a significant contribution to the research area of special education and ASD in Saudi Arabia. It can provide the foundation for the development of teaching strategies in the classroom to teach ASD students struggling with reading skills.

An important implication the researchers should consider is the biases of the interventionist when implementing EBPs. For example, in this study, the schoolteachers had low expectations about the ability to improve the academic skills of students with ASD. The teacher initially said these students could not improve their reading skills, especially ORF, and had doubts about the effectiveness of EBPs even though they had not tried to implement any EBPs to improve reading skills. Any biases regarding the effectiveness of the interventions or the ability of the students could potentially affect the research and hurt the data collection and the validity of the intervention.

Important implications arose from the length of treatment effects since a short period of impact could limit the validity and viability of RR. Prior studies sometimes failed to specify how long an intervention's benefits would last (e.g., Fabrizio & Pahl, 2007; Hua et al., 2012; Kahraman & Tekşen, 2019; Kamps et al., 1989; 1994; Utley, 2017) or had a short duration of effect (Ceylan et al., 2018; Reisener et al., 2014; Simons et al., 2022). Some of them failed to specify the duration of an intervention's usefulness, and some had a short duration of effect. In
this study, the researcher assessed the impact of RR over time after the intervention is removed by monitoring treatment outcomes for a total of five sessions following the conclusion of the treatment. Therefore, the current study successfully addressed the need to examine the persistence of EPBs, especially RR intervention's effects on ORF improvement for students with ASD.

The final implication is social validity. It is essential to close the gap between research and practice. If the social validity was low, the intervention would be less likely to be implemented (McDuffie & Scruggs, 2008). However, most of the previous studies failed to check the social validity. In the current study, the social validity questionnaire was given to the participants to answer six questions. According to their answers, they thought that the RR intervention effectively improved their ORF, and they liked every element of the RR intervention. They also mentioned that RR assisted them in understanding what happened in the passage and would use it in different courses. Therefore, it is important to get feedback from participants and see their views about implementing EBPs.

**Recommendations for Practitioners**

In the current study, the findings showed a significant improvement in the participants' reading skills (e.g., ORF) for the population of ASD. Initially, the teachers doubted the usefulness of implementing the academic intervention before the study; however, when they saw the result, they were pleased to learn this strategy. Based on this study, Saudi teachers are recommended to receive training on EPBs in reading, specifically reading fluency for specific disability populations or who struggles with reading in Saudi Arabia. They also may have an opportunity to be trained in more EPBs to determine if they are beneficial for their students.
They also need to learn how to choose adequate strategies that improve specific skills of reading for children with ASD (e.g., ORF, vocabulary, or comprehension skills).

The practitioners should ensure that students with disabilities participate in appropriate EBPs, such as RR intervention according to their academic needs in the classrooms. They need to learn how to choose adequate strategies that improve specific skills of reading for children with ASD. For example, they need to learn how to select the proper EBPs that operate best for ORF, vocabulary, or comprehension skills. They also should monitor the student's progress daily over time to close the gap between them and their typical peers as this may have a positive impact on their attendance in academic settings.

The final recommendation is to have students with ASD use passages that the students are already familiar with or based on preferred interests when practicing ORF or any other reading skills. To keep these students engaged and motivated, it is important for teachers to choose reading material that matches their interests and reading abilities. While many studies have selected passages based on the student's current reading level, teachers should also be mindful of identifying the student's instructional reading level.

**Recommendations for Research**

It is important to draw attention to a few recommendations for follow-up research. Since this is the first study focused on EBPs to improve ORF, further research is needed to bolster the results of this study with different academic skills (e.g., the comprehension, vocabulary, and math), ages, and populations. Replicating the existing study with a different population in Saudi Arabia, in addition, would support the efficacy of the RR intervention with learners with ASD and conducting small group instruction in future research.
The three participants significantly improved during the intervention phase in the current study. They increased their WCPM and decreased their EPM. The improvement continued during the maintenance phase but with a slightly decreased in WCPM and an increase in EPM compared with the intervention phase across all participants. This decrease might be caused by the short period of implementing RR during the intervention phase. Thus, future research should consider having more prolonged intervention occurrences to ensure RR intervention's effectiveness over time.

Parental assistance to enhance reading abilities in their children with ASD is an effective strategy. There is no research on the benefit of parents implementing the EBPs for children with ASD at home in support of the work being done at school in Saudi Arabia. Therefore, the third recommendation is that the researchers are recommended to include the parents as interventionists to help their children with ASD improve their reading skills as it has proven effective and easy to implement at home and generalize in schools. Further research needs to be done in which the parents provide the intervention.

Peer tutoring combined with RR is a critical strategy to teach different skills, including reading skills to students with ASD with their typical peers. Even though the increasing number of children with ASD who attend public schools has increased over the years, few studies that focus on peer tutoring for learners with ASD associated with RR intervention were conducted (Oddo et al., 2010; Kamps et al., 1994; Colcord et al., 2019), and none in Saudi Arabia. Peer-mediated RR not only improves reading skills but also improves social skills at the same time (Kamps et al., 1994). Accordingly, new research needs to consider employing RR using two different peer tutoring techniques with ASD students since peer teaching is usually more interactive and fun therefore increasing the overall reading and social interactions.
The fifth recommendation is that researchers in the future include teachers' and participants’ feedback and participation in treatment validity testing in their studies. The teachers providing feedback are giving consistent and accurate results about the effectiveness of the intervention and their satisfaction with it. There is no previous study using EBPs for students with ASD that includes teachers' feedback. In this study, only participants participated in this study's questionnaires of social validity. Therefore, measuring teachers' perceptions is crucial for establishing whether or not they are content with the current treatment and its results. Because increased acceptance may increase treatment uptake and effectiveness.

The duration of treatment effects has crucial significance since a short duration of effect might reduce the intervention's validity and practicality. Previous research often does not state the length of the intervention's effects would last. The last recommendation for future research focuses on including long-term follow-up as part of the study. Assessments of long-term follow-up should be included in future research to identify whether or not any gains made through the intervention are able to be maintained. This can be helpful in identifying characteristics that contribute to the longevity of the intervention's benefits and in informing recommendations for ongoing support and intervention.

Recommendations for Policy

Effective implementation of the EBPs by teachers is a vital part of this intervention. Saudi Arabia needs to consider creating a policy that requires knowledge of EBPs from the teachers. The Ministry of Education Policy in Saudi Arabia should focus on professional development and specialized training in implementing EBPs for educators so that they can effectively accommodate students with disabilities, including ASD, by incorporating strategies like RR and other interventions into their lesson plans.
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

To implement EBPs effectively in schools for students with disabilities, more resources, including specialized reading materials, assistive devices, and support personnel, are also needed to perform these interventions. The Saudi government should provide adequate funding and resources to guarantee that children with ASD are properly supported in schools. Then, they hold schools accountable for any failure to implement them.

Policymakers in Saudi Arabia should set up a framework for monitoring and evaluating the implementation of EBPs on a nationwide scale to guarantee the strategy's efficacy. This may involve accumulating information on the development of individual students, the efficiency of individual teachers, and the overall effect on reading fluency and comprehension. All learners with disabilities should be able to receive the appropriate teaching methods, such as EBPs to improve their academic skills. These teaching methods must be written in the students' IEPs after IEP teams identify the student's weaknesses. This implies that the Ministry of Education should then increase the accountability of the school systems to deliver education to all learners using EBPs according to the students' needs.

Saudi schools do not use formal assessments to assess reading skills (e.g., Expressive Vocabulary Test, AIMSweb, DIBELS, and Test of Word Reading Efficiency). Therefore, the Ministry of Education in Saudi Arabia should charge policymakers to develop a reading assessment that allows educators to understand the grade level performance of struggling students including those with disabilities to effectively intervene and monitor the process. These assessments are necessary to measure the current grade level of the students and where the teachers should start to improve the student's academic skills.

The Ministry of Education should require future educators to have experience in implementing EBPs in the classrooms for all students with disabilities or who struggle with
reading. Thus, special education teacher candidates in Saudi Arabia should be required to complete at least a course on the implementation of EBPs. General education teachers should be required to attend at least a special education course which includes EBPs to prepare them to work with children who have disabilities as part of their formal education.

Limitations

While this study has added something new to the body of academic literature on supporting students with ASD in Saudi Arabia, six limitations emerged in this study. The first limitation was the small sample size. There were only four eligible participants in fifth grade. One participant withdrew at the beginning of the study leaving three participants. With the small sample, the data obtained in this study cannot be generalized to a larger population (Horner et al., 2005). Even though the use of three participants is adequate for a single-subject design, additional replication of this study's findings is required to further evaluate treatment effects including more participants who come from the same community as the original subjects.

The second limitation is that Saudi schools do not use reading fluency formal assessments (e.g., DIBELS) since there is not much attention on ORF skills in schools for children with ASD. The educators do not take ORF for those students with ASD seriously. The teachers had low expectations of the participants with ASD. According to the teachers, they thought that learners with ASD would not show any signs of improvement in their reading abilities, particularly in ORF. They mentioned that they focus more on the sentences that were important to be used in the daily life for these students. In addition, they only focused on the behavioral skills of the learners with ASD more than academic skills. As a result, this limitation might have affected this study's procedures.
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

The third limitation is the reliability of the treatment. The social validity questionnaire targeted the participants only. This research did not measure the point of view of the teachers about the effectiveness of RR intervention. Social validity targeted teachers, who implemented this study, will improve the treatment's credibility and efficacy. Therefore, involving teachers in social validity questionnaires should be considered with participant questionnaires in future research.

The fourth limitation was the individual characteristics of students with ASD (e.g., behavior challenges). Some participants showed inappropriate behavior during the intervention procedures (e.g., off-task behavior, feeling bored, playing with pens, grumbling, bad mood, and looking around). The teacher sometimes encouraged them verbally to stop these behaviors. Some participants refused to participate during the intervention session saying that they did not want to read at that time. Accordingly, the teacher implemented the intervention at another time that day (e.g., afternoon). They mentioned that they got tired of reading after the second or third readings. The teacher was encouraging them verbally to continue. This limitation might contribute to the different degrees of effectiveness of RR interventions and impact the responsiveness to RR interventions.

The fifth limitation was the teacher biases. In the beginning, the teachers were skeptical of the effectiveness of the intervention until they saw the positive outcomes of implementing the intervention. Even though RR intervention can be easily implemented, this intervention may be challenging for teachers to implement regularly without the assistance of a teaching assistant due to the size of the classes. The teachers' biggest complaints were about the number of students in a class. The class had over 15 students with ASD, and the teacher (i.e., interventionist) could not leave them alone and implement the intervention for the three participants.
The last limitation is the length of the intervention phase. The intervention phase continued for eight sessions for the first participants and six sessions for the last participants. Even with the immediate increase when RR was implemented in the participants' ORF, there was a rapid decrease in their WCPM during the maintenance phases when the intervention was removed but not returned to what it was in the baseline. RR may need to occur longer to show more efficacy when the RR was stopped in the maintenance phase. Therefore, the shortening of the intervention phase might affect the effectiveness of RR over time.

Conclusion

The current study confirmed the feasibility of applying academic interventions for students with ASD which prove in turn the usefulness of RR intervention in improving their ORF skills in KSA. The results of this study show that RR intervention can well increase ORF for learners with ASD in elementary schools. After receiving RR intervention, the three participants dramatically increased ORF, and they maintained these gains in the maintenance phase. These findings corroborated previous studies finding that children with ASD who participated in RR intervention had increased their WCPM and decreased EPM. Accordingly, RR intervention was evaluated as effective, safe, and applicable in Saudi schools. Special education teachers and students with ASD benefited greatly from putting the research into practice at the school. The encouraging outcomes seen in the research sample piqued the interest of the educators to implement the RR intervention.

Overall, this research aimed to create more detailed information that might help teachers in the Saudi Arabian setting find one important strategy to effectively improve students' performance on academic skills. Since this is the first study to examine the efficacy of RR intervention in increasing WCPM and improving ORF in Saudi Arabia, it makes a significant
contribution to the field of ASD. It is suggested that more studies be conducted to confirm the results. The current study has some implications for research that need to be considered. This study can be an important reference to be used, support, and guide the researchers. The findings of the current study suggest that the researchers can effectively implement EBPs, especially RR intervention to improve ORF and overall reading skills.
The Impact of RR on ORF for Children with ASD

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Appendix A

WCPM and EPM Tracking Sheet

Student:

Session: _______ Date: ___________ Start Time: ___________ Passage: _______
WCPM: _______ EPM: _______ Note: _____________________________________________

Session: _______ Date: ___________ Start Time: ___________ Passage: _______
WCPM: _______ EPM: _______ Note: _____________________________________________

Session: _______ Date: ___________ Start Time: ___________ Passage: _______
WCPM: _______ EPM: _______ Note: _____________________________________________

Session: _______ Date: ___________ Start Time: ___________ Passage: _______
WCPM: _______ EPM: _______ Note: _____________________________________________

Session: _______ Date: ___________ Start Time: ___________ Passage: _______
WCPM: _______ EPM: _______ Note: _____________________________________________

Session: _______ Date: ___________ Start Time: ___________ Passage: _______
WCPM: _______ EPM: _______ Note: _____________________________________________
Appendix B

WCPM Progress Graph

Student:
Baseline Date: ___________ Intervention Date: ___________ Maintenance Date: ___________
Date Completed:

<table>
<thead>
<tr>
<th>WCPM Progress Graph</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
</tr>
<tr>
<td>90</td>
</tr>
<tr>
<td>80</td>
</tr>
<tr>
<td>70</td>
</tr>
<tr>
<td>60</td>
</tr>
<tr>
<td>50</td>
</tr>
<tr>
<td>40</td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>10</td>
</tr>
</tbody>
</table>

Session Number
Appendix C

EPM Progress Graph

Student:

Baseline Date: ___________ Intervention Date: ___________ Maintenance Date: ___________

Date Completed:

|    | 100 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|    | 90  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|    | 80  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|    | 70  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|    | 60  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|    | 50  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|    | 40  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|    | 30  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|    | 20  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|    | 10  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
### Treatment Integrity Checklist for the Baseline

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participant name:</strong></td>
<td><strong>Observer:</strong></td>
<td><strong>Date:</strong></td>
<td><strong>Time:</strong></td>
</tr>
<tr>
<td>1.</td>
<td>The recourse room were free of distractions and quiet.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>2.</td>
<td>Prepared the study materials, including the passages and forms.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3.</td>
<td>Followed the instruction (e.g., When I say &quot;start,&quot; you can read the passage).</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4.</td>
<td>Participant was told they would read for one minute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Encouraged the participants by saying, “do your best reading, and I know you can do it.”</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>6.</td>
<td>Asked the participant to begin and used stopwatch after the first word.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>7.</td>
<td>Participant was told they would read for one minute.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>8.</td>
<td>Participant was told (any word that you do not know, leave it, and move on).</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>9.</td>
<td>The participant read every word in the passages out loud and used their fingers while reading.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>10.</td>
<td>The teacher called out, &quot;Begin&quot; in the reading.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>11.</td>
<td>Followed along with the participants using hard copies.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>12.</td>
<td>Provide no support or feedback in the baseline phase.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>13.</td>
<td>Underlined the word that read incorrectly.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>14.</td>
<td>Squared bracket (]) at the end of 1 minute.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>15.</td>
<td>WCPM and EPM recorded and calculated immediately.</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Table 2

*Treatment Integrity Checklist for the Intervention*

<table>
<thead>
<tr>
<th>Participant name:</th>
<th>Observer:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:// Time:</td>
<td></td>
</tr>
<tr>
<td>Session:</td>
<td></td>
</tr>
</tbody>
</table>

1. The recourse room were free of distractions and quiet. | Yes | No |
2. Prepared the study materials, including the passages and forms. | Yes | No |
3. The RR intervention will be applied to the first participant while the other participants continue in the baseline. | Yes | No |
4. Followed the instruction (e.g., When I say "start," you can read the passage). | Yes | No |
5. Asked the participant read out loud and used their fingers while reading. | Yes | No |
6. Provide feedback in the intervention phase. | Yes | No |
7. Participant was told they would read for one minute. | Yes | No |
8. Participant was told (any word that you do not know, leave it, and move on. I will tell you after you finish the reading). | Yes | No |
9. Encouraged the participants by saying, “do your best reading, and I know you can do it.” | Yes | No |
10. The teacher called out, "Begin" in the 1st reading. | Yes | No |
11. Followed along with the participants using hard copies. | Yes | No |
12. Underlined the word that read incorrectly. | Yes | No |
13. Squared bracket ([]) at the end of 1 minute. | Yes | No |
14. The teacher called out, "Begin" in the 2nd reading. | Yes | No |
15. Set a timer after the participant began. | Yes | No |
16. Underlined the word that read incorrectly. | Yes | No |
17. Squared bracket ([]) at the end of 1 minute. | Yes | No |
18. The teacher called out, "Begin" in the 3rd reading. | Yes | No |
19. Set a timer after the participant began. | Yes | No |
20. Underlined the word that read incorrectly. | Yes | No |
21. Squared bracket ([]) at the end of 1 minute. | Yes | No |
22. Participant instructed to read for final one minute. | Yes | No |
23. The teacher called out, "Begin" in the 4th reading. | Yes | No |
24. Set a timer after the participant began. | Yes | No |
25. Underlined the word that read incorrectly. | Yes | No |
26. Squared bracket ([]) at the end of 1 minute. | Yes | No |
27. WCPM and EPM recorded and calculated immediately after the 4th reading and notified to the participants. | Yes | No |
Table 3

*Treatment Integrity Checklist for the Maintenance*

<table>
<thead>
<tr>
<th>Participant name:</th>
<th>Observer:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:// Time:</td>
<td>Session:</td>
</tr>
</tbody>
</table>

1. The recourse room were free of distractions and quiet. | Yes | No |
2. Prepared the study materials, including the passages and forms. | Yes | No |
3. Followed the instruction (e.g., When I say "start," you can read the passage). | Yes | No |
4. Participant was told they would read for one minute. | | |
5. Encouraged the participants by saying, “do your best reading, and I know you can do it.” | Yes | No |
6. Asked the participant to begin and used stopwatch after the first word. | Yes | No |
7. Participant was told they would read for one minute. | Yes | No |
8. Participant was told (any word that you do not know, leave it, and move on). | Yes | No |
9. The participant read every word in the passages out loud and used their fingers while reading. | Yes | No |
10. The teacher called out, "Begin" in the reading. | Yes | No |
11. Followed along with the participants using hard copies. | Yes | No |
12. Provide no support or feedback in the baseline phase. | Yes | No |
13. Underlined the word that read incorrectly. | Yes | No |
14. Squared bracket (]) at the end of 1 minute. | Yes | No |
15. WCPM and EPM recorded and calculated immediately. | Yes | No |
Appendix E

Social Validity Questionnaire

To indicate the degree to which you agree or disagree with each of the six questions below, please circle the face that you agree with from the five options that best fit.

(1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree)

<table>
<thead>
<tr>
<th>Statements</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. RR intervention was easy to implement.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I think RR intervention improves my ORF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. RR intervention reduces my incorrect words.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I like every element of RR intervention.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. RR intervention assists me in understanding what happened in the passage.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I would use RR intervention in different courses, such as science or social studies.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix F

Student Assent Form- English Version

Duquesne University
Institutional Review Board
Protocol #: 2022/11/19
Verified On: 11/23/2022
Expires: No Expiration Date

DUQUESNE UNIVERSITY
600 FORBES AVENUE ♦ PITTSBURGH, PA 15282

STUDENT ASSENT TO PARTICIPATE IN A RESEARCH STUDY

TITLE:

The Impact of Repeated Reading Intervention on Oral Reading Fluency for Students with Autism Spectrum Disorder (ASD) in Saudi Arabia.

WHO IS DOING THE STUDY?

Ahmed Saleh Al-Naji, Ph.D. Candidate, Special Education, School of Education
alnajia@duq.edu, (940)595-6282

ADVISOR:

Dr. Bridget Green, Assistant Professor of Special Education, Special Education Program
Director, Department Education Foundations and Leadership, greenb@duq.edu, 412-396-1852

WHAT IS A STUDY?

I am conducting a research study to improve reading skills. This study is to find a new way to help students who may feel like they are struggling in reading. You can take part in this study as a participant, and we will follow some steps to have better results and you benefit from it. If you are interested to participate, I can explain any point you need. I will be happy to answer your questions.
WHY IS THIS STUDY BEING DONE?

In this study, I try to answer some questions about the effectiveness of the repeated reading (RR) intervention. As you know, reading skills are essential in your life. Thus, RR intervention means that you read the same passage over and over until you become a fluent reader.

WHAT DO YOU HAVE TO DO?

If you would like to participate in this study, you need first to sign consent form. Then we will do the next steps that you will be asked to do:

- You will read a passage each session as fast as you can with accuracy for one minute for few days during the normal reading classes.

- The teacher will record how many words you read correctly per minute (WCPM) and show you the result.

- Some sessions you will be asked to read the same passage four times.

WHERE WILL THE STUDY HAPPEN AND HOW LONG WILL IT TAKE PLACE?

This study will be conducted during the reading classes in your school. It will be in resource room to ensure. This study will last approximately 12 weeks. You will meet with me three times per week.

IS THIS STUDY HARMFUL? HOW IS IT HELPFUL?

Do not worry, there are no potential risks associated with this participation. If you feel uncomfortable at any time, you can tell me or your teacher.

WILL YOU GET PAID TO DO THIS STUDY?

You will not get paid by anyone, and you will not pay anything. It is free.
ARE OTHER PEOPLE GOING TO KNOW WHAT YOU DID OR SAID?

Do not worry, we will protect your anonymity and the privacy of any information you disclose as a result of your participation in this study.

CAN YOU QUIT IF YOU WANT?

Of course, you can quit any time you want. You are under no obligation to participate in this study. You are free to withdraw your consent to participate at any time by contacting the special education teacher or me. Your parents also can call and tell us that you want to quit.

CAN YOU HEAR ABOUT WHAT HAPPENED?

If you are interested, I can provide you with a summary of the study's findings after the study is over. I can provide you with a copy of the study and what we found out. You can email me at any time asking me for that at no cost.

OK, WOULD YOU LIKE TO DO IT?

If you have read the above statements and understand what is being requested from you, including understanding that you can quit at any time or do not have to participate at all, you can sign your name below. If you still have questions, you can ask me, or call me at 940-595-6282. You can also contact my advisor, Dr. Bridget Green, at greenb@duq.edu or at 412-396-1852.

Please circle the red X sign if you do not want to participate, or the green √ one and write your name below you want to participate.
Appendix G
Student Assent Form- Arabic Version

Duquesne University
Institutional Review Board
Protocol #: 2022/11/19
Verified On: 11/23/2022
Expires: No Expiration Date

.student assent form-

Duquesne University
600 Forbes Avenue • Pittsburgh, PA 15282

موافقة الطالب على المشاركة في دراسة بحثية

العنوان:
أثر داخل القراءة المبتكر على إعاقة القراءة الشفوية لدى الطلاب المصممين باضطراب طيف التوحد في المملكة العربية السعودية.

المحترف:
- alnajja@duq.edu

الدكتورة برينغيت جرين، أستاذ مساعد في التربية الخاصة، كلية التربية، قسم الإرشاد وعلم النفس والتربيه الخاصة

- greenb@duq.edu

150-396-4182

ما هي الدراسة?

تهدف هذه الدراسة إلى إيجاد طريقة جديدة لمساعدتك وللمواكبة زملائك في الوصول إلى أفضل مهارات القراءة. تقتصر هذه الدراسة على دراسة طيف التوحد في المملكة العربية السعودية.

لماذا يتم إجراء هذه الدراسة?

إن هذه الدراسة، والحاجة الإيجابية على بعض الأسئلة حول فعالية داخل القراءة المبتكر. كما تعلم، فإن مهارات القراءة ضرورية في حياتك.

هل يمكنك المشاركة بشكل مستقل وسريع ودقيقة؟ سوف تقرأ المقطع مرتين وتكارا فقط حتى تحصل قارئًا بطلاقة.

ماذا يجب عليك أن تفعل؟

إذا كنت ترغب في المشاركة في هذه الدراسة، فأنت بحاجة أولاً إلى التوقع على إصدار موافقتك. ثم سنقوم بالخطوات التالية التي ستطلب منك:

- سوف تقرأ مرة في كل جملة بسرعة ما يمكن ودقة لمدة دقيقة واحدة لمساعدة ألم تعلم فصول القراءة العادية.
- سوف تقرأ مرة في كل جملة بسرعة ما يمكن ودقة لمدة دقيقة واحدة لمساعدة ألم تعلم فصول القراءة العادية.
- بعد ذلك، سنكتب النصوص التي قرأها بشكل صحيح في الدقيقة، حتى تصل إلى 15 دقيقة خلال هذه المرحلة.
- ستستخدم هذه الدقيقة للقاعدة بعد نهاية القراءة الرابعة.

إذا كنت ترغب في المشاركة في هذه الدراسة، فأنت بحاجة أولاً إلى التوقع على إصدار موافقتك. ثم سنقوم بالخطوات التالية التي ستطلب منك:

- سوف تقرأ مرة في كل جملة بسرعة ما يمكن ودقة لمدة دقيقة واحدة لمساعدة ألم تعلم فصول القراءة العادية.
- سوف تقرأ مرة في كل جملة بسرعة ما يمكن ودقة لمدة دقيقة واحدة لمساعدة ألم تعلم فصول القراءة العادية.
- بعد ذلك، سنكتب النصوص التي قرأها بشكل صحيح في الدقيقة، حتى تصل إلى 15 دقيقة خلال هذه المرحلة.
- ستستخدم هذه الدقيقة لقياس مدى قراءتك بعد نهاية القراءة الرابعة.
- إذا كنت ترغب في المشاركة في هذه الدراسة، فأنت بحاجة أولاً إلى التوقع على إصدار موافقتك. ثم سنقوم بالخطوات التالية التي ستطلب منك:

إذا كنت ترغب في المشاركة في هذه الدراسة، فأنت بحاجة أولاً إلى التوقع على إصدار موافقتك. ثم سنقوم بالخطوات التالية التي ستطلب منك:

- سوف تقرأ مرة في كل جملة بسرعة ما يمكن ودقة لمدة دقيقة واحدة لمساعدة ألم تعلم فصول القراءة العادية.
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THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

Duquesne University
Institutional Review Board
Protocol #: 2022/11/19
Verified On: 11/23/2022
Expires: No Expiration Date

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THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD
PARENTAL PERMISSION FORM TO PARTICIPATE IN A STUDY

TITLE:
The Impact of Repeated Reading Intervention on Oral Reading Fluency for Students with Autism Spectrum Disorder (ASD) in Saudi Arabia.

INVESTIGATOR:
Ahmed Saleh Al-Naji, Ph.D. Candidate, Special Education, School of Education
alnajia@duq.edu, (940)595-6282

ADVISOR:
Dr. Bridget Green, Assistant Professor of Special Education, Special Education Program
Director, Department Education Foundations and Leadership, greenb@duq.edu, 412-396-1852

SOURCE OF SUPPORT:
This study is being performed as partial fulfillment of the requirements for the doctoral degree in School of special education at Duquesne University. This study is not supported by any a grant.

WHAT IS THE PURPOSE OF THE STUDY?
Your child is being asked to participate in this study that seeks to investigate the impact of repeated reading (RR) intervention on oral reading fluency (ORF) for students with Autism Spectrum Disorder (ASD) in Saudi Arabia. Your child must meet the inclusion criteria to participate in this study. The criteria are between ages 8 to 12, have an official diagnosis of ASD, receive special education, have reading difficulties.
WHY IS THIS RESEARCH STUDY BEING DONE?

Your child is being asked to participate in this study because reading skills are essential because they are federally mandated to be taught in school and because these skills are needed to be more successful later in life. Most children with ASD still experience serious difficulties learning how to read. RR intervention is beneficial in improving ORF in students with ASD, including your child.

WHERE WILL THE STUDY TAKE PLACE AND HOW LONG WILL LAST?

This study will be contacted during the regular reading classes in your child's school. It will be in resource room to ensure the room is free of distractions (e.g., peer interruptions). This study will last approximately 12 weeks. Your child will participate three times a week (three sessions per week).

WHAT WILL MY CHILD BE ASKED TO DO?

To participate in this study after reading and signing the child consent form, your child will be asked to:

- Read a passage each session as fast as your child can with accuracy for one minute. The words correct per minute your child reads will be recorded. This phase will last up to 7 minutes.
- When the RR intervention is implemented, your child will read one passage four times a session (per day). This phase will last up to 25 minutes during the regular reading schedule in the school day.
- Your child's progress will be measured using WCPM progress graphs and the WCPM tracking sheet by the end of the 4th reading during the intervention phase.
- Your child will have a chance to see his progress.

WHAT ARE THE RISKS AND BENEFITS?

There are no more risks than normal occurrences in one's life. There are benefits from implementing this intervention. One of them is that your child will improve his reading skills and keep up with his typical peers in the classroom. The other one is that RR intervention is easy to be used; therefore, that your child can do it himself at home.

Duquesne University
Institutional Review Board
Protocol #: 2022/11/19
Verified On: 11/23/2022
Expires: No Expiration Date
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

COMPENSATION:

Your child will not be compensated in this study. The child will not require monetary cost in this study.

CONFIDENTIALITY:

Your child's information and identity will be always kept confidential to every extent possible. The participants will be assigned pseudonyms. All forms will be kept secure on a locked computer or in a locked room. Your child's information, including written and electronic forms, will be secure, and not be used outside the study, including the study materials. Therefore, in every way feasible, we will protect your child's anonymity and the privacy of any information you disclose due to your participation in this study.

RIGHT TO WITHDRAW:

Your child is under no obligation to participate in this study. You are free to withdraw your consent to participate at any time by contacting the special education teacher or the researcher. In addition, you are free to allow the researcher to use your child’s data or withdraw them from the study entirely.

SUMMARY OF RESULTS:

If you are interested, the researcher can provide you with a summary of the study's findings at no charge.

VOLUNTARY CONSENT:

I have read the above statements and understand what is being requested of me. I also understand that my child's participation is voluntary and that I am free to withdraw my consent at any time, for any reason. On these terms, I certify that I am willing for my child to participate in this study.

I understand that should I have any further questions about my participation in this study, I may call the researcher, Ahmed Al-Naji at (940)-595-6282 or send an email to alnajia@duq.edu. I may also contact the chair of the investigator committee Dr. Bridget Green, Assistant Professor of Special Education at 412-396-1852 or send an email to greenb@duq.edu. Should I have questions regarding the protection of human subject issues, I may call Dr. David Delmonico, Chair of the Duquesne University Institutional Review Board, at 412.396.1886.

155
Appendix I

Parental Permission Form- Arabic Version

Duquesne University
Institutional Review Board
Protocol #: 2022/11/19
Verified On: 11/23/2022
Expires: No Expiration Date

نموذج إذن الوالدين للمشاركة في دراسة

العنوان:
أثر تدخل القراءة المتكرر على طلاقة القراءة الشفوية لدى الطلاب المصابين باضطراب طيف التوحد في المملكة العربية السعودية.

معلومات الباحث:
أحمد صالح ال ناجي، مرشح دكتوراه للتنمية الخاصة، كلية التربية، 412-396-1852 - greenb@duq.edu

المشرف:
الدكتورة بريدجيت جرين، استاذة مساعدة في التربية الخاصة، كلية التربية، قسم الأشخاص وعلم النفس والتنمية الخاصة

مصدر الدعم:

يتم إجراء هذه الدراسة كتحقيق جزء لمتطلبات درجة الدكتوراه في كلية التربية الخاصة بجامعة دوكين. هذه الدراسة غير مدعومة بأي منحة.

ما هو الغرض من الدراسة؟

نطلب من طلاب المشاركة في هذه الدراسة التي تسعى إلى تحقيق تأثير تدخل القراءة المتكرر على طلاقة القراءة الشفوية للطلاب المصابين باضطراب طيف التوحد في المملكة العربية السعودية. يحتاج طلاب كليهما إلى تدريبات مهارية التتمها المشاركون للمشاركة في هذه الدراسة.

لماذا يتم إجراء هذه الدراسة البحثية؟

نطلب من طلاب المشاركة في هذه الدراسة لأنهم يعانون من حالة القراءة ضرورية ولأنهم قد يتطلب منهم حكوميا بالتدريس في المدرسة. هذه المهارات ضرورية ليكون طلاب أكثر نجاحا في وقت لاحق في الحياة. لا يزال معظم الطلاب المصابين باضطراب طيف التوحد يواجهون صعوبات حادة في تعلم القراءة، وشكلا واحد منهم.نحن نعمل على تحقيق أهداف أفضل الاستراتيجيات المناسبة التي تعمل على تقديم أداة القراءة العام للأطفال المصابين باضطراب طيف التوحد. لذلك، أشارت الآراء التي أجريت على التدخلات التي تستهدف القراءة الشفوية بطلاقة إلى الحاجة إلى اكتشاف التأثير المحتمل لمثل هذه الاستراتيجيات على المتعلمين المصابين باضطراب طيف التوحد. بالإضافة إلى ذلك، فقد ثبت أن تدخل القراءة المتكرر مفيد في تحسين طلاقة القراءة الشفوية لدى الطلاب المصابين باضطراب طيف التوحد. كما هو واضح في الأبحاث السابقة التي درست هذا الموضوع. هذا ما تحاول هذه الدراسة استكشافه نظرًا لوجود عدد قليل من الدراسات التي تركز على تدخل القراءة المتكرر.
الاطفال المصابين باضطراب طيف التوحد، ولا توجد أي دراسات في المملكة العربية السعودية. نتيجة لذلك، يلزم إجراء بحث إضافي في هذا المجال في التعليم الخاص.

أين ستكمل الدراسة وكيف ستستمر؟

سيتم إجراء هذه الدراسة خلال فصول القراءة الادائية في مدرسة طفلك. سيكون في غرفة المصدار للتأكد من أن الغرفة خالية من المشتقات (على سبيل المثال، تعليمات الفصل الادائية). ستستمر هذه الدراسة حوالي 12 أسبوعاً. سيشارك طفلك ثلاث مرات في الأسبوع (الي، ثلاث جلسات في الأسبوع).

ماذا ستحتاج من طفلك أن يفعل؟

 للمشارك في هذه الدراسة بعد قراءة نموذج موافقة الطفل والتوقيع عليه من قبل، سيدخل عن طفله:
- إقرأ قصة في كل جلسة بسيرة ما يمكن لطفلك بذكاء لمدة دقيقة واحدة. سيتم تسجيل الكلمات الصحيحة في الدقيقة التي يقرأها طفلك. ستستمر هذه المرحلة لمدة تصل إلى 7 دقائق لكل جلسة.
- عندما يتم تنفيذ التدخل (أي استراتيجية القراءة المتكررة)، سيقرأ أطفالك قصة واحدة أربع مرات في الجلسة (في اليوم). ستستمر هذه المرحلة (أي، الجلسة) لمدة تصل إلى 25 دقيقة خلال فصول القراءة الادائية.
- سيتم قياس تقدم طفلك باستخدام الرسوم البيانية كم عدد الكلمات الصحيحة لكل دقيقة في نموذج تتبع الكلمات الصحيحة المطروحة في دقيقة بناءاً على القراءة الرابعة أثناء مرحلة التدخل.
- سيتاح لطفلك فرصة لرؤية تقدمه.

ما هي المخاطر والفوائد؟

لا توجد مخاطر محتملة مرتبطة بهذه المشاركة، ولكن ليس أكثر من الأحداث الادائية في حياة القرد. القواعد من تنفيذ هذا التدخل كثيرة جداً. إحدى هذه القواعد هي أن طفلك سوف يحسن مهارات القراءة لديه ويشارك أقرانه العاديين في الفصل. سيقرأ أطفالكم بثقة عند القراءة بسرعة وبدقة بدون مساعدة من أحد.

التعويضات:

لن يتم تعويض طفلك مادياً في هذه الدراسة. ولن يحتاج الطفل إلى أي تكلفة مالية في هذه الدراسة.

السرية:

سيتضمن نموذج المواطنة الذي سيتم إرساله إلى الوالد تعهدًا بالحفاظ على سرية المعلومات، وسيتم تعيين أسماء مستعارة للمشاركين في هذه الدراسة. لذلك، بكل طريقة ممكنة، سندعم إخفاء هوية طفلك وخصوصية أي معلومات تكشف عنها نتيجة لمشاركتك في هذه الدراسة.

الحق في الانسحاب:

طفلك غير ملزم بالمشاركة في هذه الدراسة. لك مطلق الحرية في سحب موافقتك على المشاركة في أي وقت عن طريق الاتصال بعلم التربوية الخاصة أو الاباح. بالإضافة إلى ذلك، لك مطلق الحرية في السماح بالبحث باستخدام بيانات طفلك أو سحبها من الدراسة تماماً في النتائج.
THE IMPACT OF RR ON ORF FOR CHILDREN WITH ASD

Duquesne University
Institutional Review Board
Protocol #: 2022/11/19
Verified On: 11/23/2022
Expires: No Expiration Date

ملخص النتائج:

إذا كنت مهتمًا، يمكنك للباحث تزويده بملخص النتائج الدراسة. كل ما عليك هو التواصل مع الباحث.

الموافقة الطوعية:

لقد قرأت البيانات المذكورة أعلاه وفهمت ما هو مطلوب مني. أفهم أيضًا أن مشاركة طفلي طوعية وأنني حر فيسحب موافقي في أي وقت ولاي سبب. بموجب هذه الشروط، أقر بانني على استعداد لمشاركة طفلي في هذه الدراسة.

أفهم أنه إذا كان لدي أي أسئلة أخرى حول مشاركتي في هذه الدراسة، فيمكنني الاتصال بالباحث أحمد الناجي على alnajia@duq.edu أو إرسال بريد إلكتروني إلى 0557000714. يمكنني أيضًا الاتصال بالموظف الدراسية للبحث الدكتور بريجيت جرين، الاستاذة المساعدة للتربية الخاصة على الرقم 412-396-852 أو إرسال بريد إلكتروني إلى greenb@duq.edu.

إذا كان لدي أسئلة بخصوص حماية الموضوعات البشرية، فيمكنني الاتصال بالدكتور ديفيد ديمونيكو، رئيس مجلس المراجعة المؤسسية بجامعة دوك، على الرقم 412.396.1886.

__________________________
اليوم

__________________________
توقيع ولي الأمر / الوصي القانوني

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اليوم

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اسم الطالب

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توقيع الباحث
Appendix J

Approval Letter from to Conduct Research Study

المملكة العربية السعودية
وزارة التعليم
الإدارة العامة للتعليم بجهران
التعليم، التخطيط، والتطوير

صناديد المدير العام للشؤون التعليمية
مدير إدارة التربية الخاصة
مدير مدارس التربية الخاصة (طيف التوحد)

الموضوع: طلب تسهيل مهمة الباحث أحمد صالح ال ناجي

المعneedle النحية

وفقهم الله

السلام عليكم ورحمة الله وبركاته

إشعارًا إلى إحالة المدير العام للتعليم بمنطقة جنجران رقم 7/2021 وتاريخ 3/3/1442، وتشمل مهمة الباحث أحمد صالح ال ناجي المبتعث من جامعة جنجران قسم التربية الخاصة، ومرشح الدكتوراه، والذي يرغب في تطبيق أدوات البحث والدراسة من جامعة دويسن السلام الأเมريكية (Duquesne University) بعنوان "أثر تدخل القراءة الشفوية لدى الطلاب المصابين بإضطراب طيف التوحد في المملكة العربية السعودية.">

عليه نأمل التكرم في تسهيل مهمته في تطبيق أدوات البحث والدراسة على شريحة الطلاب المعينة، مع ملاحظة تحمل الباحث كامل المسؤولية بالحفاظ على سرية البيانات واستخدامها في غرض البحث فقط.

وتقبلوا خالص الشكر والتقدير.

مدير إدارة التخطيط والتطوير

علي بن حاميد الاسمري