The Influence of Motivational Factors on Reading Comprehension for Elementary School Students with Dyslexia

By

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Dedicated to…….

My late mother-in-law, Shirley Barber. She was more than my husband's mother; she was a good friend, a trusted confidante, and the hardest working woman I have ever met in my life. She was consistently supportive throughout this journey from attending lectures to helping take care of the kids while I studied, traveled, or just needed a break. Her passing in April 2021 was devastating to the family and left a hole that will never quite be filled. I wish she was here now and could attend my graduation. I know she would be proud. Until I see you again, I love you, Mamaw.

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ABSTRACT

Dyslexia is a reading disability that interferes with accurate and fluent word reading. Deficits in word reading may cause secondary consequences, including reading comprehension difficulties. However, despite inherent word reading problems, there are students with dyslexia who exhibit resiliency that manifests as better than expected educational outcomes despite their struggles to read words. In particular, a subset of individuals with dyslexia comprehend written language better than would be expected based on their basic reading skills. Emerging research is focused on identifying protective factors to mitigate the setbacks in reading comprehension students with dyslexia may experience. Specifically, motivational factors, such as growth mindset and grit, are theorized to act as protective factors to foster resiliency. A growth mindset provides students with dyslexia the belief that abilities change with effort, whereas grit provides the persistence to improve abilities and meet goals. The current study examined the influence of a growth mindset and grit on reading comprehension in a sample of 196 elementary school students with dyslexia. Multiple regression models were used to evaluate the unique role of motivational factors on reading comprehension. Growth mindset and grit did not predict reading comprehension in the sample of students with dyslexia included in the current study. However, the results highlighted that language skills might serve as a protective factor to mitigate the adverse effects of word reading deficits on reading comprehension for individuals with dyslexia. Limitations and future directions are discussed.

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CHAPTER I: INTRODUCTION

Learning to read accurately and fluently with adequate comprehension sets a child up for success in school and life (Hulme & Snowling, 2011). However, learning to read is difficult for the 5 – 17% of the population with dyslexia (Fletcher et al., 2018). Historically, dyslexia has been operationalized as a neurobiologically based learning disability characterized by word reading and spelling deficits. These deficits arise from difficulties mapping the phonological and orthographic components of language to support phonological decoding, word reading, and spelling. In addition, problems reading words disrupt a child's ability to comprehend written language, which is compounded when the child's difficulty reading words limits exposure to print, thus, hindering the development of vocabulary and background knowledge. As a result, children with dyslexia can experience pervasive deficits impacting multiple aspects of oral and written language that extend beyond isolated deficits with word reading and spelling to include their ability to comprehend written language.

The definition of dyslexia from the International Dyslexia Association (IDA, 2002) includes a secondary consequence of reading comprehension problems that arise from difficulties with accurate and fluent word recognition. Although reading comprehension problems are acknowledged as a secondary consequence of dyslexia, socioemotional effects also can emerge from struggling to read and spell words. The frustration and stress accompanying academic challenges resulting from difficulties in reading and spelling words may lead to anxiety, depression, and low self-esteem compared their peers without dyslexia (Mugnaini, 2009). Socioemotional effects are an unnamed and understudied secondary consequence of dyslexia not acknowledged in

existing definitions of dyslexia, such as the IDA definition of dyslexia. These effects have detrimental consequences for students struggling to read and achieve academically within the framework of modern multi-factor models of dyslexia.

Risk Factors for Dyslexia

Various accounts have been put forth to account for dyslexia, and several implicate a single causal factor. Yet, single deficit accounts of dyslexia, such as the phonological deficit hypothesis, have not adequately explained the variability found in dyslexia (Catts & Petscher, 2021). Instead, research suggests that multiple factors often place a child at greater risk for reading failure and developing the core behavioral characteristics of dyslexia – word reading deficits, spelling deficits, and a protracted slow rate of learning these written language skills. In response to these trends in the data, explanations have been proposed that appeal to multiple factors.

For example, Catts and Petscher (2021) proposed a multifactorial causal model of dyslexia. Their cumulative risk and resilience model of dyslexia suggests that multiple risk factors combine and interact to result in difficulty with reading. At the genetic level, various genes have been identified that increase the likelihood of dyslexia (Peterson & Pennington, 2015). In addition to the genetic component of dyslexia, environmental influences that emerge from low socioeconomic status (SES) are associated with poorer word reading and reading comprehension (Peterson & Pennington, 2015). Moreover, comorbidities such as attention deficit hyperactivity disorder (ADHD) and language impairment (LI) place a child at an increased risk of reading problems (Peterson & Pennington, 2015; Catts & Petscher, 2021). Additionally, Catts and Petscher (2021)

identified additional risk factors that included phonological deficits, visual problems, trauma, and stress.

The presence of executive functioning deficits have important implications for students with dyslexia. Deficits in executive functioning, such as attention, are linked to dyslexia (Willcutt & Pennington, 2000). There is a high incidence of comorbidity between dyslexia and attention problems (25-40%) that is higher than expected (Willcutt & Pennington, 2000). Furthermore, attention has been implicated as a predictor of responsiveness to intervention for students with dyslexia (Torgesen et al., 1999). These findings suggest that attention deficits serve as a risk factor to increase the severity of reading problems.

Protective Factors to Promote Resiliency

While multiple risk factors increase the likelihood of dyslexia, protective factors are theorized to reduce the likelihood of academic difficulties. Indeed, some individuals with dyslexia appear to compensate for their word reading struggles, thus, limiting the impact of their word reading difficulties on reading comprehension. To account for these exceptions to the norm, it has been hypothesized that individuals with dyslexia may possess resiliency factors that support reading comprehension despite word reading deficits (Farris et al., 2021; Haft et al., 2016). Haft et al. (2016) formalized the role of protective factors within a resiliency framework. In a general sense, resiliency minimizes risk by fostering recovery in the face of potential threats (Masten, 2014). The application of resiliency to reading has provided a conceptual framework to guide research into reading resiliency, defined as relative preservation of reading comprehension despite deficits in phonological decoding (Haft et al., 2016).

Theoretical Frameworks for Resiliency and Dyslexia

The Haft et al. (2016) reading resiliency framework incorporates cognitive and socioemotional protective factors to account for resilient readers. Cognitive protective factors include strong oral language skills, executive functioning, and additional language skills, such as vocabulary and morphological awareness (Farris et al., 2021; Haft et al., 2016). In addition, motivational factors may help students with dyslexia compensate for their primary deficits in word reading abilities. Motivational factors such as a growth mindset encourage a sense of control over one's academic potential. A sense of control and belief that skills will improve with effort may facilitate a student engaging in deliberate, effortful practice to acquire and improve reading skills (Haft et al., 2016). Moreover, by tapping into motivational factors and strengths in listening comprehension, students with dyslexia may mitigate deficiencies in reading comprehension as a secondary consequence of word reading problems. Similarly, the cumulative risk and resilience model of dyslexia (Catts & Petscher, 2021) proposed that students with dyslexia with similar risk factors may exhibit different outcomes due to variations in protective factors. The protective factors identified by Catts and Petscher (2021) include verbal skills, instruction, growth mindset, task-focused behaviors, coping strategies, and family/peer support.

While it is theorized that children with dyslexia can possess socioemotional protective factors that mitigate the detrimental effects of their word reading deficits on reading comprehension, limited research has explored this hypothesis. However, emerging research is beginning to examine motivational factors such as a growth mindset with supporting reading comprehension (Petscher et al., 2017; Wanzek et al., 2020).

These same factors are hypothesized to assist with reading outcomes for students with dyslexia (Haft et al., 2016; Haft & Hoeft, 2016). The current study investigated the influence of protective factors on reading comprehension in a sample of elementary school students identified with dyslexia. Understanding the role of these factors could provide greater insight into what factors support reading resilience and guide interventions to help individuals with dyslexia in reading comprehension.

CHAPTER II: REVIEW OF LITERATURE

Reading Comprehension

Students with dyslexia may struggle with reading comprehension due to underlying deficits with decoding and fluent word recognition. These difficulties impede access to word meaning (Kahmi & Catts, 2012). Because of decoding and word recognition problems, poorer readers typically read less than good readers. Less experience with reading may interfere with vocabulary knowledge and acquisition of background knowledge (Kahmi & Catts, 2012). Thus, poor decoding and fluent word recognition negatively affect reading comprehension. Students who develop vocabulary and knowledge despite their deficits in word reading abilities should better comprehend written language.

Reading comprehension is a complex cognitive process supported by phonological decoding, linguistic comprehension, and the interaction between these two components (Keenan et al., 2008). The Simple View of Reading (SVR) proposes that reading is the product of both decoding and linguistic comprehension (Gough & Tunmer, 1986). Reading comprehension will be negatively affected if either Simple View component is deficient. Research studies support the predictive power of these two components within the SVR (Catts et al., 2015; Hjetland et al., 2019). For example, Catts et al. (2015) examined word reading precursors (letter knowledge, phonological awareness, rapid naming, and nonword repetition) and oral language skills in kindergartners and their predictability with reading comprehension at the end of third grade. They found these precursor skills of word reading and word reading skills in

second grade serving as a mediator explained 90% of the variance in third-grade comprehension.

Similarly, Hjetland et al. (2019) conducted a six-year longitudinal study that began when participating children were four-years-old to explore the development of reading comprehension with a focus on skills predictive of comprehension. Language comprehension and decoding measured at age seven explained 99.7% of the variance in reading comprehension. Results from Catts et al. (2015) and Hjetland et al. (2019) provided suggestive evidence for the importance of the components of the SVR for reading comprehension and the critical role of language comprehension in supporting reading comprehension. For students with dyslexia, strong language skills may compensate for their poor word reading skills, thus, allowing them to glean meaning from text.

In addition to decoding and language comprehension, word-level knowledge has implications for comprehension. For example, the Lexical Quality Hypothesis proposed by Perfetti (2007) describes how the quality of word representations facilitates comprehension. High-quality word representations encompass phonology, orthography, morphology, and word meaning. Words with higher quality representations are more readily recognized when reading. However, if an individual lacks in-depth knowledge about the word, it is less likely to be retrieved by the reader. Thus, higher lexical quality improves comprehension. In addition, word knowledge improves the processes of word meaning and, therefore, comprehension. Word knowledge goes beyond the size of one's vocabulary and includes the depth of vocabulary knowledge. High-quality word representations develop due to instruction and experience with decoding, morphological

knowledge, morphological awareness, reading connected text, writing, and engaging with various language concepts (Perfetti, 2007). Oral language skills such as vocabulary knowledge and morphological awareness are theorized to be critical components for resilience in students at-risk for and with a reading disability such as dyslexia (Haft et al., 2016).

In summary, a reader must engage many skills for successful comprehension of written language. The SVR highlights two critical components of reading comprehension: listening comprehension and word recognition. Moreover, skills from vocabulary and background knowledge, decoding, working memory, and inference-making are essential for reading comprehension. Students with dyslexia often possess average to above-average listening comprehension skills, which are crucial for reading comprehension (Kahmi & Catts, 2012).

Language Skills as a Protective Factor

Oral language skills provide the foundation for acquiring many aspects of literacy (Snowling & Hulme, 2019) and is a critical component of reading comprehension. For example, vocabulary, verbal IQ, and story structure knowledge predicted reading comprehension in a longitudinal study of school-age children (Oakhill & Cain, 2010). Children with deficits in decoding due to dyslexia may compensate with language skills (such as vocabulary knowledge) by using semantic context to boost understanding of text (Nation & Snowling, 1998).

As such, language skills may be a protective factor to reduce the negative impact of risk factors on reading (van Viersen et al., 2019). For example, Berninger and

Abbott (2013) reported that in a sample of students with dyslexia, individuals with superior verbal reasoning skills significantly outperformed those with lower verbal reasoning skills in reading, spelling, morphological, and syntactic skills. Van Viersen et al. (2016) further found that gifted students with dyslexia showed high performance on verbal memory and language skills and outperformed their less gifted counterparts with dyslexia on measures of literacy skills.

Motivation

Beyond the SVR, other factors such as motivation may also influence comprehension. Research supports the influence of motivational factors on reading comprehension (Guthrie et al., 1999; Lau & Chan, 2003; Law, 2009; Petscher et al., 2017; Tabouda et al., 2009). Students with dyslexia may use their oral language skills to compensate for deficient word reading abilities to comprehend text (Kahmi & Catts, 2012). Additionally, for students with word reading problems, other attributes such as a growth mindset may help explain how a student with dyslexia can achieve relatively well academically despite reading difficulties (Haft et al., 2017). Students with word reading difficulties need to engage other skills besides word reading to comprehend text successfully (Haft et al., 2017).

Whereas maladaptive psychosocial adjustment including low self-esteem, anxiety, and depression may be detrimental to such outcomes, socioemotional protective factors such as motivation may promote resilience or positive psychosocial adjustment for students with a reading disability such as dyslexia (Catts & Petscher, 2021; Haft et al., 2016). Specifically, socioemotional factors such as self-determination and a growth mindset are proposed to counteract the adverse effects of a reading disability.

Motivational Factors to Support Resiliency

Generally, research supports motivational factors as influential in academics for students with learning disabilities. For example, self-determination was a predictor of academic achievement (i.e., reading and math) for 13-16-year-old students with learning disabilities (Zheng et al., 2014). Self-determination is the ability to persevere through intentional, self-initiated actions (Zheng et al., 2014). Self-determination is a similar construct to grit which involves perseverance toward long-term goals. With self-determination, individuals view themselves as causal agents when making decisions (Zheng et al., 2014). Furthermore, higher levels of self-determination enable a student to engage and persist through complex academic content, which allows for the deliberate, effortful practice necessary for skills acquisition (Ericsson et al., 1993; Wanzek et al., 2020). Self-determination is relevant for students with significant reading difficulties, such as dyslexia, who need deliberate practice to improve their reading skills (Wanzek et al., 2020).

Some theories of intelligence suggest students believe that skills are further developed through effortful practice. Students who believe intelligence is malleable demonstrate higher academic achievement than those who believe intelligence is static (Blackwell et al., 2007; Dweck, 2006; McCutchen et al., 2015; Yeager & Dweck, 2012). Theories of intelligence are beliefs regarding intelligence as either incremental or fixed. An incremental or growth mindset holds intelligence to be malleable and to grow with effort and learning (Dweck, 2006). A belief that ability and intellect are not innate facilitates a willingness to exert time, effort, and deliberate practice to improve academic outcomes. Students with dyslexia who exercise self-determination to grow their reading

ability may exhibit higher academic achievement. A student high in self-determination may display a growth mindset and grit to achieve their educational goals. By incorporating motivational factors such as grit and a growth mindset, students with dyslexia may feel their efforts improve their reading skills.

Grit

Grit is a motivational construct believed to be an integral component of academic success. Duckworth et al. (2007) defined grit as perseverance and passion for long-term goals. Grit is the sustained effort and interest in a goal over a long period despite setbacks. Those individuals high in grit set long-term goals with an intent to meet goals no matter the setback, even without positive feedback (Duckworth et al., 2007). Grit is a construct consisting of two lower-order ideals: perseverance of effort and consistency of interest (Crede′ et al., 2017). These factors contribute to success across various domains (e.g., sports, academics, spelling bees) because individuals need to persist through failures and maintain consistency without disengaging efforts to meet a goal.

Grit has been associated with academic achievement (Crede′ et al., 2017; Duckworth et al., 2007; Lam & Zhou, 2019). In a study of Ivy League undergraduates by Duckworth et al. (2007), grit scores were associated with higher GPAs indicating that grittier students outperformed their less gritty counterparts. A meta-analysis identified a positive relationship between overall academic performance and grit (Crede′ et al., 2017). The review by Crede′ et al. (2017) defined academic performance based on GPA. Another review of grit and academic achievement was conducted by Lam and Zhou (2019), with academic achievement measured by various outcomes such as GPA, standardized test scores across different subjects, and standardized national assessments.

A small but significant effect of grit on academic achievement was found. The facets of grit, consistency of interest, and perseverance of effort were further examined. Consistency of interest and perseverance of effort was associated with academic achievement with a stronger effect for the perseverance of effort (Crede′ et al., 2007).

Although grit has shown a positive relationship to academic achievement, there is no published research on grit and its relationship to reading outcomes. The literature on grit and academic achievement has focused mainly on high school and college students' GPA and standardized achievement measures. Yet, grit may be a protective factor in school-age children with reading difficulties by enabling a student to persevere through challenging tasks such as reading and extract adequate comprehension from the text. Given the intricacies of reading comprehension, grit may provide students with characteristics of dyslexia the stamina and sustained effort required for text comprehension.

Mindset

A growth mindset is another motivational factor theorized to promote resiliency in students with dyslexia. A growth mindset originates from the psychological research of noncognitive factors influencing individuals' self-beliefs regarding their ability (Dweck, 2006). These self-beliefs are referred to as mindsets that have roots in implicit theories of intelligence (Dweck, 2006). Implicit theories of intelligence are core beliefs about the nature of intelligence, including how personal qualities can change (Yeager & Dweck, 2012). It is a belief of one's ability (Dweck & Leggett, 1988). The term 'implicit' denotes that these beliefs are not known explicitly (Yeager & Dweck, 2012). It is referred to as a

theory because it makes predictions about behavior. Implicit views of intelligence can be an entity (fixed) or incremental (i.e., growth mindset; Dweck & Leggett, 1988).

An incremental viewpoint (i.e., growth mindset) holds that intelligence is not fixed; it can be further developed with effort and time (Dweck & Leggett, 1988; McCutchen et al., 2015; Williams et al., 2011). An individual with an incremental viewpoint has a goal to learn, work harder and smarter in response to challenges, and increase grades in response to adversity (McCutchen et al., 2015). A growth mindset can lead to persistence in academics and, thus, higher grades (McCutchen et al., 2015). Those who believe that intelligence is ever-changing and grows with increased effort may be more likely to take on challenging tasks and master a new skill. Holding these beliefs may improve academic performance because engaging in challenging academic tasks in support of learning requires more effort (Law, 2009). Students with a growth mindset view failure not as a setback but as a chance to learn from mistakes (Dweck, 2012). By possessing a growth mindset, students use grit to succeed (Petscher et al., 2017).

Conversely, a fixed or entity viewpoint holds that intelligence is stable and cannot be improved or changed (Dweck & Leggett, 1988). Individuals with a fixed mindset tend to avoid difficult tasks that undermine self-esteem and give up and earn low grades during adversity (Claro et al., 2016; Law, 2009; McCutchen et al., 2015). These students do not take on challenges and typically engage in low-risk behavior. By engaging in low-risk behaviors, they avoid situations where failure may occur. A student with an entity viewpoint does not like to fail, as failure can be detrimental to self-esteem (Claro et al., 2016; Williams et al., 2011).

Students who possess a fixed mindset persist less in the face of difficult tasks (McCutchen et al., 2015). What contrasts these two mindsets is the students' belief that abilities can change. Student who believe their abilities can change also possess feelings of control over their learning (McCutchen et al., 2015). In contrast, when students view their abilities as 'fixed,' academic achievement can be negatively affected due to these students perceiving a lack of agency (Law, 2009). Academic achievement may be improved by associating effort with success (Law, 2009). Activities that are viewed as more difficult may be avoided, thus, resulting in reduced academic performance (Law, 2009).

Mindset and Goal Orientation

Implicit theories about one's ability lead to different goal orientations (Dweck & Leggett, 1988). Two classifications of goal orientations are performance and learning or mastery-oriented (Dweck & Leggett, 1988). A performance goal orientation focuses efforts on outperforming others, while individuals with a mastery goal orientation concentrate on self-improvement and the task itself (Dweck & Leggett, 1988; Guthrie et al., 1999). An incremental viewpoint on intelligence lends itself to a mastery-goal orientation which involves pursuing challenging tasks and persistence while striving under failure (Dweck & Leggett, 1988). Intellectual ability is viewed as malleable from an incremental viewpoint (Blackwell et al., 2007).

Evidence supports that mastery goal orientation is related to positive academic outcomes (Guthrie et al., 1999). Individuals who possess a fixed orientation toward intelligence will also tend to hold a performance goal approach that predisposes them to make favorable judgments and avoid negative judgments (Dweck & Leggett, 1988).

Thus, individuals with a fixed viewpoint tend to avoid challenges to prevent failure. Motivational research has shown that individuals with a positive belief about ability, valuing an activity for intrinsic reasons, and learning goals for that activity should do better at the activity and choose to do it more frequently (Wigfield & Guthrie, 1997). Therefore, students with dyslexia who endorse a growth mindset with a mastery goal orientation may persist through reading challenges and improve reading skills.

Mindset and its Relation to Academics

Noncognitive factors such as motivation are thought to contribute to academic achievement, and numerous studies have investigated the relationship between mindset and academic achievement (Blackwell et al., 2007; Claro et al., 2016; Henderson & Dweck, 1990; McCutchen et al., 2015; Stipek & Gralinski, 1996). For example, Blackwell et al. (2007) conducted a longitudinal study across 7th and 8th-grade students. They investigated the students' theories of intelligence, learning goals, effort beliefs, and helpless response to failure. The outcome measure was math grades, given the complexity of this academic area for many students. Math grades were evaluated at the end of 7th and 8th grades. Students with an incremental mindset (i.e., growth mindset) outperformed those with a fixed mindset on math grades even when accounting for previous academic performance in math.

Similarly, McCutchen et al. (2015) conducted a longitudinal study with third through sixth grade students. They found that students with a growth mindset exhibited a slower decline in math test scores. In general, all students showed decreased standardized test scores over time. However, those with a growth mindset had a slower decline. Similarly, Henderson and Dweck (1990) investigated the relationship between mindset

and academic achievement for junior high students during their first year. They found that those with more of a growth mindset exhibited higher grades than those with a more fixed mindset.

Stipek and Gralinski (1996) investigated the relationship between beliefs of intelligence, effort, and performance in a population of third through sixth grade students. A fixed belief of intelligence is negatively correlated with academic achievement. Further, students with an incremental (i.e., growth) mindset exhibited higher perseverance. Students' views regarding intelligence and performance were predictive of academic achievement. Individuals with an incremental viewpoint of intelligence adopt a learning or mastery goal orientation because of their desire to develop new skills and master them (Stipek & Gralinski, 1996).

While the belief has been that motivational factors, such as mindset and grit, should influence academic outcomes, the evidence has not always supported this belief. A meta-analysis conducted by Sisk et al. (2018) examined the strength of the relationship between a growth mindset and academic achievement and also the effect of growth mindset intervention on academic achievement. Academic achievement was defined by standardized assessments, exams, and GPA. Results yielded a small correlation of $r = .10$. Additionally, the meta-analysis investigating growth mindset intervention on academic achievement produced an average effect size of $d = 0.08$. Yet, additional moderator analysis indicated a larger effect for the students at high risk for academic failure ($d = 0.19$) and those from lower socioeconomic backgrounds ($d = 0.34$), suggesting that these groups might benefit from growth mindset intervention to improve academic achievement outcomes. The high-risk academic and low socioeconomic groups

were statistically significant moderators. This research suggests a need for further examination into how growth mindset intervention may benefit more vulnerable students. Students from low socioeconomic backgrounds and at-risk academic failure may benefit from growth mindset intervention.

Motivation and Reading

In light of the overall pattern of results in the motivational factors on academic achievement, it seemed reasonable to anticipate that motivational factors may play an important role in attenuating the deferential impact of the primary deficits of dyslexia on reading comprehension. However, while many studies investigated the relationship between mindset and academic achievement, less research has focused on mindset and reading. The limited research that has been conducted in this area has focused mainly on motivational factors, such as intrinsic and extrinsic motivation and self-efficacy, and their association with the use of various reading comprehension strategies (Law, 2009).

Because reading is a complex endeavor involving multiple aspects of language and cognition, a student must be motivated to learn the skills and strategies required to become a competent reader (Wigfield et al., 2016). Reading motivation is defined as an individual's goals and beliefs about reading (Guthrie & Wigfield, 1999). Motivation involves various central processes, including task-mastery goals, intrinsic motivation, and self-efficacy (Guthrie & Wigfield, 1999). Task-mastery goals are the reader's intent to understand the text, while intrinsic motivation is the engagement with the reading activity while constructing knowledge from the text (Guthrie & Wigfield, 1999). Students with high intrinsic motivation are likely to read more often (Guthrie & Wigfield, 1999). Self-efficacy is the belief in one's ability, and in reading, it is the sense that one can read

effectively (Wigfield & Guthrie, 1997; Guthrie & Wigfield, 1999). An implication regarding self-efficacy is that children may be more likely to read when they believe they are competent (Wigfield & Guthrie, 1997). Fostering motivation in struggling readers is critical since they may be more likely to engage with reading tasks if they feel their skills will improve.

Motivational Factors and Comprehension

Researchers have found motivational factors influential for the cognitive processes involved in comprehension. For example, a student with a task-mastery orientation may integrate background knowledge with information when reading to construct a mental model of the text (Guthrie & Wigfield, 1999). Active engagement in the reading process supports the integration of motivational and cognitive factors, thus resulting in improved text comprehension (Guthrie & Wigfield, 1999). Tabouda et al. (2009) researched motivational and cognitive processes' contribution to reading comprehension across two-time points. Their results demonstrated that background knowledge, student questioning, and students' internal motivation each made independent contributions to reading comprehension. The authors speculated that internal motivation helped students engage effortful cognitive engagement with the text. A student internally motivated to read will access background knowledge and questioning to improve reading comprehension. As a result, an internally motivated student may build more robust mental representations of text by connecting background knowledge to the text (Tabouda et al., 2009).

Reading Comprehension Strategies

Other studies investigated motivation and the use of strategies for reading comprehension. Lau and Chan (2003) examined motivation variables, reading comprehension skills, and reading comprehension strategies used by seventh-grade students with various reading abilities. Overall, the researchers observed differences between poor and good readers in reading comprehension strategies and motivation. A students' motivation and attributional beliefs about intelligence were related to reading strategies and comprehension. Poor readers exhibited less intrinsic motivation than good readers.

Researchers speculate that intrinsic motivation may indirectly influence reading comprehension through metacognitive strategies (Law, 2009). Additionally, Law (2009) found that beliefs about intelligence, ability, and metacognitive awareness were positively related to reading comprehension with a group of elementary school students of various reading abilities. Metacognitive awareness of reading strategies was the most influential factor in predicting students' reading comprehension.

Reading Self-Efficacy

Self-efficacy is the belief about one's abilities to learn or perform skills at a designated level (Schunk & Rice, 1993). Reading self-efficacy in one's belief regarding reading ability and has also been observed to be correlated positively with reading comprehension (Schunk & Rice, 1993). Students with higher levels of self-efficacy scored higher on reading comprehension than students reporting lower levels of perceived competence, even when controlling for past performance (Schunk & Pajares, 2009). Similarly, Guthrie et al. (1999) found intrinsic and extrinsic motivation predicted

reading amount with reading amount as a significant portion of the variance in reading comprehension in a group of third and fifth-graders. Additionally, variables including socioeconomic status, past text comprehension, reading amount, and reading efficacy were significant predictors of reading comprehension for a group of eighth and tenth-grade students.

Growth Mindset and Reading Outcomes

Despite the importance of reading comprehension and conceptual frameworks implicating motivational factors in its development, few studies have investigated grit and growth mindset on standardized reading outcome measures of reading comprehension. Petscher et al. (2017) responded to the need for research on the unique role of a growth mindset on standardized reading outcomes. These authors adapted wording from a previous theory of intelligence surveys (Blackwell et al., 2007; Dweck, 2006) to improve understanding of question items for younger students.

Petscher et al. (2017) investigated the contributions of general and reading-specific mindsets to reading comprehension for upper elementary students. A general mindset is one's belief regarding general intelligence, while a reading-specific mindset is an academic mindset regarding reading. Petscher et al. (2017) found that a global growth mindset (GGM) existed as a function of general growth and reading-specific mindsets.

GGM and reading mindset were significantly related to reading comprehension. A reading growth mindset was more predictive of reading comprehension in students with higher comprehension abilities. This was the first study to investigate the relationship of domain-specific mindset to standardized outcome measures. Further, after controlling for word reading skills, GGM and reading mindset explained unique variance in reading

comprehension. GGM and reading mindset predicted comprehension even without including word reading skills. Lower performing students may benefit from a stronger global growth mindset to exhibit the grit or perseverance to persist when reading becomes a challenge. Students with a more fixed mindset may not believe their reading ability can improve with effort and therefore do not persevere when reading is challenging.

The aforementioned studies illustrate the relevance of motivational variables on academic constructs such as reading. In the academic area of reading, students that possess a growth mindset may believe that their skills will improve with perseverance and grit. Aspects of motivation such as a growth mindset are theorized to be essential factors for a student with dyslexia (Haft et al., 2016). Students with dyslexia who holds a growth mindset may persist with reading, despite their reading struggles.

Summary

Reading comprehension is a complex construct with multiple influential factors. A critical contributor to reading comprehension is decoding, although it is not the only critical component. According to the SVR, comprehension is the product of listening comprehension and word recognition (Gough & Tunmer, 1986). If either component of the SVR equation is deficient, reading comprehension will be negatively affected.

Fluent word recognition and decoding problems are core features of dyslexia. Accurate and fluent word reading weaknesses may inhibit comprehension due to word recognition's critical role in reading comprehension (Snowling, 2013). The word reading difficulties in dyslexia typically originate from a phonological processing deficit (Vellutino et al., 2004). This phonological processing deficit affects the processing of

speech sounds, which affects the development of decoding (Vellutino et al., 2004). Word reading problems could lead to frustration with reading, and therefore, a student with dyslexia may read less. Less exposure to written language may impede vocabulary growth and background knowledge, negatively affecting reading comprehension (IDA, 2002). Some students with dyslexia can perform well academically and exhibit adequate reading comprehension capabilities despite word reading difficulties (Haft et al., 2016).

Despite inherent word reading difficulties, the ability to succeed in academics may result from many positive influential factors. Individuals with dyslexia may possess protective factors that foster resiliency. Resiliency helps to minimize risk and promote the ability to withstand and overcome adversity (Masten, 2014). Students with dyslexia that persist in reading despite its difficulty exhibit resiliency. The resilient reader is theorized to use strong oral language skills and motivational factors such as a growth mindset to persist through arduous situations such as reading and comprehending complex text (Haft et al., 2016). In particular, the resiliency framework proposed by Haft et al. (2016) and the related framework proposed by Catts and Petscher (2021) specify characteristics that promote academic success despite a reading disability, such as dyslexia. Students with dyslexia who exhibit resiliency may possess protective factors that enable them to comprehend text despite word reading difficulties (Catts & Petscher, 2021). Beyond strong oral language skills, a student with a growth mindset and grit may perform beyond expectations, given the word reading difficulties that are a core feature of dyslexia (Haft et al., 2016).

Current Study & Research Questions

The research literature on motivational factors and academic achievement continues to grow. Despite the growth in this research area, several gaps continue to exist. Research on grit has primarily focused on academic achievement outcomes with older students. Limited research exists on this construct and its influence on reading comprehension, particularly among elementary school students with dyslexia. Additionally, growth mindset research has focused mainly on older students, and few studies explored reading outcomes specifically. The few studies that have examined mindset and reading comprehension do not include students that are struggling readers.

The current study extended the Petscher et al. (2017) study by incorporating their general growth mindset and reading mindset measures and standardized reading outcomes in a sample of elementary school students identified with dyslexia. Petscher et al. (2017) investigated the relationship of motivational factors (i.e., global growth mindset, general growth mindset, and reading mindset) on reading comprehension in a sample of fourth-grade students. Our study extends their research by including students from second through fifth grade with dyslexia. Additionally, we included grit as another motivational factor. The relationship between motivational factors and reading comprehension in a population of students with dyslexia is a relatively unexplored research area. Due to the adversity students with dyslexia face in the education system, continued investigation into motivational factors to improve academic outcomes is warranted. The current study was undertaken to answer the following research questions:

1) What is the influence of risk factors (i.e., low SES, attention deficits, phonological awareness, phonological decoding, word recognition) on reading comprehension outcomes in elementary school students with dyslexia?

2) What is the influence of language factors (i.e., listening comprehension, verbal IQ) over and above the influence of risk factors on reading comprehension outcomes in elementary school students with dyslexia?

3) What is the influence of motivational factors (i.e., general growth mindset, reading-specific mindset, and grit) over and beyond the influence of risk factors and language on reading comprehension in school-age children with dyslexia?

CHAPTER III: METHODOLOGY

Participants

Student data used in the current study were obtained as part of a more extensive study investigating the effects of a dyslexia-specific intervention on reading outcomes for students in Tier 3. The data for this research was obtained from students attending a suburban public- school district within the Southwestern United States. The participants for the more extensive study were 265 elementary school students within a grade range of first through eighth grade who were identified as struggling readers through the district's Response-to-Intervention (RTI) process within the parameters outlined by state law.

Only students with complete cognitive and academic assessments were included in the analytic sample. The analytic sample consisted of 196 elementary school children from second through fifth grade across 41 schools. Further, the analytic sample was composed of 34 second graders, 11 third graders, 32 fourth graders, and 13 fifth graders. Female students made up 48% of the sample. The racial composition of the sample was 67% White, 13% Black, 8% Hispanic, 4% Asian, 2% American Indian/Alaska Native, and less than 1% Hawaiian/Pacific Islander. Five percent of the sample identified with more than one race. Fifteen percent of the sample qualified for free or reduced lunch. Additionally, 9% had comorbidity of ADHD, 2% were ELL, and 13% were in special education.

Identification of Dyslexia

The students selected for the study were eligible to receive Tier 3 intervention. These students demonstrated poor response to Tier 2 interventions consisting of leveled reading instruction and some targeted phonemic awareness and phonics instruction.

Students initially identified and provided Tier 2 instruction did not respond to the core reading instruction provided in Tier 1. Thus, due to poor response to Tier 1 and Tier 2, these students were eligible for Tier 3 intervention services. Additional norm-referenced assessments conducted by the school district's personnel confirmed the presence of dyslexia, and participants were enrolled in the district's Tier 3 services for students with dyslexia.

See Table 1 for a list of norm-referenced assessments and standard scores. The scores demonstrate a profile indicative of dyslexia. The students exhibit average listening comprehension skills with deficits in phonological decoding (i.e., Word Attack) and below average in word recognition (i.e., Word Identification). Difficulties with accurate and fluent word recognition are a component of the definition of dyslexia from the IDA (IDA, 2002). Furthermore, the students show lower than average skills in phonological awareness. According to the IDA definition of dyslexia, difficulties in phonological processing may result in subsequent problems with decoding and word reading.

Table 1

Participant Demographics and Standardized Assessment Scores

Variable	Mean	SD	Range
Age	8.60	0.81	7-10
Verbal IQ (KBIT-2)	103.67	11.45	70-141
Listening Comprehension (WRMT-III)	105.47	15.01	71-145
Phonological Awareness (CTOPP-2)	85.53	8.57	58-112
Word Identification (WRMT-III)	86.87	8.52	68-117
Word Attack (WRMT-III)	83.37	7.30	64-100
Passage Comprehension (WRMT-III)	94.62	11.12	59-139
Reading Comprehension (GORT-5)	89.32	9.18	65-115
General Growth Mindset	3.82	0.74	0.92-6
Reading Mindset	3.68	0.49	2.54-5.23
Grit	3.34	0.68	1.63-5

Note. CTOPP-2 = Comprehensive Test of Phonological Processing Second Edition; KBIT-2 = Kaufman Brief Intelligence Test 2nd Edition; Woodcock Reading Mastery Test Third Edition; GORT-5 = Gray Oral Reading Tests Fifth Edition.

Measures

The norm-referenced assessments administered by school personnel included measures of phonological processing skills, word reading, decoding, listening comprehension, reading comprehension, and verbal IQ. Noncognitive measures included surveys of motivational factors (e.g., growth mindset and grit). The growth mindset survey encompassed two domains: general mindset and reading mindset.

Growth mindset

The construct of global growth mindset developed by Petscher et al. (2017) consisted of reading and general growth mindset survey items. Global growth mindset contained 26 survey items (13 reading mindset and 13 general mindset). Reliability analysis for the 13 general mindset items for this sample yielded a coefficient α of .60 for the general mindset items while the reading mindset items had low reliability. Petscher et al. (2017) adopted the general mindset questions from the Student Mindset Survey (Blackwell et al., 2007) with minor modifications to ensure comprehension for younger students. In addition, additional modifications were made for its use in this study. Specifically, black and white smiley faces were added to accompany the six possible Likert scale survey items. Students selected one of six Likert-scaled response options that remained constant across all items (*disagree a lot, disagree, disagree a little, agree a little, agree, agree a lot)*.

The reading growth mindset items were new items developed by Petscher et al. (2017) to describe students' mindsets about reading. The reading mindset questions addressed the gap in growth mindset research related to reading. The reading mindset items were associated with the general intelligence items (e.g., "Even if you're not a good

reader, you can always get better if you work hard"). The reading mindset questions also consisted of the six Likert-scaled response options listed above. All survey items were individually administered and read aloud to students by a reading interventionist.

Grit

The Short-Grit Scale (Grit-S; Duckworth & Quinn, 2009) was adapted from the original 12 item Grit Scale developed by Duckworth et al. (2007). The Grit-S consists of eight items on a Likert scale with two factors, Consistency of Interest and Perseverance of Effort, that factor into the latent construct of grit (Duckworth & Quinn, 2009). The Likert scale response items were consistent throughout the survey (*very much like me, mostly like me, somewhat like me, not much like me, not like me at all*). The Grit-S contains questions targeting an individual's consistency of interest and sustained effort with questions such as – "I often set a goal but later choose to pursue a different one, and I finish whatever I begin." Survey items were read aloud to students. The Grit-S has an internal consistency of $\alpha = .51$ for this sample which indicates low reliability. The total score on this scale was used for analysis.

Phonological Awareness

The Phonological Awareness Composite from the Comprehensive Test of Phonological Processing, Second Edition (CTOPP-2; Wagner et al., 2013) was individually administered to assess students' awareness of sound structure. For the age group of this student sample, three subtests compose the Phonological Awareness Composite: Elision, Blending Words, and Phoneme Isolation. The examinees listened to a verbal stimulus and were instructed to perform different tasks such as deleting portions of a given word, blending phonemes into a word, and isolation sounds in words. Standard

scores were utilized. Test-retest reliability coefficients for the Phonological Awareness Composite for the seven to eleven-year old group was .76

Phonological Decoding

The Word Attack subtest from the Woodcock Reading Mastery Test, Third Edition (WRMT-III; Woodcock, 2011) was individually administered to assess students' decoding skills. This subtest required students to read nonsense words of increasing complexity. Alternate-form reliability for Word Identification was .76 for grades pre-kindergarten through second grade and for grades third through eighth.

Word Reading

The Word Identification subtest from the Woodcock Reading Mastery Test, Third Edition (WRMT-III; Woodcock, 2011) was individually administered to assess word reading skills. Word Identification required the students to read a list of increasingly complex words. Standard scores were utilized. For pre-kindergarten through second grade, alternate-form reliability for Word Identification is .93 and .81 for grades 3-8.

Reading comprehension

Reading comprehension was individually administered and measured by two assessments: Passage Comprehension subtest from the Woodcock Reading Mastery Test, Third Edition (WRMT-III; Woodcock, 2011) and the Gray Oral Reading Tests-5th edition (GORT-5; Wiederholt & Bryant, 2012). The Passage Comprehension subtest utilizes a modified cloze procedure where students are required to identify missing words from the text. Alternate-form reliability for Passage Comprehension is .74 for pre-kindergarten through second grades and .71 for grades 3-8

The GORT-5 is an individually administered measure of oral reading fluency and comprehension. After reading aloud the passage, the student is asked several open-ended questions by the examiner. The average test-retest reliability of the comprehension subtest for first and second grades is .82 and .83 for third through fifth grades.

Listening Comprehension

The Listening Comprehension subtest from the Woodcock Reading Mastery Test, Third Edition (WRMT-III; Woodcock, 2011) was administered to measure verbal comprehension skills. The examinee listened to a passage either read by the examiner or played from the audio CD. The examinee verbally responded to questions about the content. Alternate-form reliability for Listening Comprehension was .70 for pre-kindergarten through second grade and .75 for grades 3-8.

Cognitive Skills

The Kaufman Brief Intelligence Test Second Edition (KBIT-2; Kaufman & Kaufman, 2004) is a brief verbal and nonverbal intelligence measure. The Verbal Scale from the KBIT-2 was utilized to measure verbal cognition. The Verbal Scale consists of two subtests: Verbal Knowledge and Riddles. These items cover receptive and expressive vocabulary, respectively. Test-retest reliability for ages four through twelve for the Verbal subtest was .88.

Attention

The National Institute for Children's Health Quality (NICHQ) Vanderbilt Assessment Scales (Wolraich et al., 2013) is a tool to identify attention problems in children ages six to twelve. It is a commonly used measure to evaluate behavioral symptoms in the classroom. The NICHQ is composed of two components: Parent

Informant and Teacher Informant. For this study, the Teacher Informant portion was utilized and completed by a reading interventionist. It consists of forty-three questions designed to assess symptoms, academic performance, and classroom behavioral performance. The first thirty-five questions are designed to assess for symptoms of ADHD. The question items are rated on how frequently symptoms are present (0 = Never, 1 = Occasionally, 2 = Often, 3 = Very Often). The Vanderbilt Assessment Scales have demonstrated test-retest reliability from 0.79 to 0.91.

CHAPTER IV: RESULTS

Analytic Approach

A series of multiple regression models were conducted to answer the research questions. There are two reading comprehension outcome measures – one taken from the GORT-5 and one from the WRMT-III. A set of three regression models was performed for each reading comprehension measure included as the outcome variable. For both sets of models, the first model addressed research question 1 and included risk factors commonly specified in multicomponent models of dyslexia (SES, attention deficits, phonological awareness, phonological decoding, and word identification) as predictors of reading comprehension. The second model addressed research question 2 by adding proxy measures of aspects of oral language theorized to serve as protective factors (verbal IQ and listening comprehension) as predictors of reading comprehension. The third model addressed research question 3 by adding motivational factors theorized to serve as protective factors (general growth mindset, reading mindset, and grit) to the model as predictors of reading comprehension.

The following equations specify the three multiple regression models used to examine the relationship between risk and protective factors and reading comprehension. There are six models in total – three models predicting student performance on the reading comprehension measure taken from the GORT-5 and three models predicting student performance on the reading comprehension measure taken from the WRMT-III.

Equation Model 1

$$y^{1=(readingcomp)} = \beta_0 + \beta_1 X_{(SES)} + \beta_2 X_{(attention\ deficits)} + \beta_3 X_{(phonological\ awareness)} + \beta_4 X_{(decoding)} + \beta_5 X_{(word\ reading)}$$

Equation Model 2

$$y^{1=(readingcomp)} = \beta_0 + \beta_1 X_{(SES)} + \beta_2 X_{(attention\ deficits)} + \beta_3 X_{(phonological\ awareness)} + \beta_4 X_{(decoding)} + \beta_5 X_{(word\ reading)} + \beta_6 X_{(verbal\ IQ)} + \beta_7 X_{(listening\ comprehension)}$$

Equation Model 3

$$y^{1=(readingcomp)} = \beta_0 + \beta_1 X_{(SES)} + \beta_2 X_{(attention\ deficits)} + \beta_3 X_{(phonological\ awareness)} + \beta_4 X_{(decoding)} + \beta_5 X_{(word\ reading)} + \beta_6 X_{(verbal\ IQ)} + \beta_7 X_{(listening\ comprehension)} + \beta_8 X_{(grit)} + \beta_9 X_{(general\ mindset)} + \beta_{10} X_{(reading\ mindset)}$$

Correlational Structure

Table 2 displays the correlational structure of the predictors included in the regression model. The language factors, Verbal IQ and Listening Comprehension, exhibited strong positive relationships among one another (r = .56). Verbal IQ was statistically significantly correlated with reading comprehension measures from the WRMT_III and GORT-5 (r = .32, r = .34). Additionally, Listening Comprehension (LC) was reliably correlated with both reading comprehension measures (r = .29, r = .28). The reading comprehension measures had a moderate positive relationship with each other (r = .39). Phonological Awareness (PA) was reliably correlated with Word Attack (WA) (r = .32). Word Identification (WID) had a moderately positive association with the WRMT_III and GORT-5 (r = .36, r = .41). WA and WID had a very small correlation (r = .04). This could be attributed to the age group of the participants which spanned from seven to ten years old. The younger students have less developed decoding skills than the older students. Perhaps the age span is a factor to explain this negligible correlation.

Regarding the motivational variables, Grit had a small negative correlation with most variables except WA and Passage Comprehension (PC). Grit and Reading Mindset

had a moderate negative correlation (r = - .31). The Grit and General Mindset had a small positive relationship (r = .21). Reading Mindset and General Mindset had a small positive relationship (r = .20). Motivational variables (Grit, Reading Mindset, and General Mindset) had small negative associations with Verbal IQ and the reading comprehension subtest from the GORT-5. Reading Mindset had a statistically significant negative correlation with LC (r = - .18). Reading Mindset had a small correlation with PC (r = .02) and a small negative correlation with General Mindset (r = - 0.3). This could be attributed to the students exhibiting average reading comprehension skills therefore, endorsing a reading mindset may not benefit students who do not have comprehension difficulties.

Table 2

Correlations Between Study Variable

Variable	1	2	3	4	5	6	7	8	9
1. KBIT-2 Verbal IQ	–								
2. CTOPP-2 PA	.18*	–							
3. WRMT-III WID	.24*	-.02	–						
4. WRMT- III WA	.09	.32**	.04	–					
5. WRMT-III LC	.56**	.17*	.13	.04	–				
6. WRMT-III PC	.32**	.11	.36**	.02	.29**	–			
7. GORT-5 Comp	.34**	.01	.41**	-.08	.28**	.39**	–		
8. Grit	-.01	-.08	-.11	.05	.01	-.09	-.02	–	
9. Reading Mindset	-.03	.05	.01	.05	-.18*	.02	-.03	-.31**	–
10. General Mindset	-.13	.03	-.13	.08	-.12	.12	-.14	.21**	.20**

Note. KBIT-2 = Kaufman Brief Intelligence Test 2nd Edition; CTOPP-2 PA = Comprehensive Test of Phonological Processing Second Edition, Phonological Awareness; WRMT-3 WID= Woodcock Reading Mastery Test Third Edition Word Identification; WRMT-3 WA = WRMT-3 Word Attack; WRMT-3 LC = WRMT-3 Listening Comprehension; WRMT-3 PC = WRMT-3 Passage Comprehension; GORT-5 Comp = Gray Oral Reading Tests Fifth Edition Comprehension.

*** p < .01, * p < .05.*

Predicting reading comprehension WRMT-III

The initial set of regression models included the Passage Comprehension subtest from the WRMT-III as the outcome variable. Table 3 displays the results for this regression analysis. The first model was conducted to determine if risk factors (low SES, attention deficits, phonological awareness, phonological decoding, word identification) predicted reading comprehension. For this model, there were statistically significant predictors of reading comprehension F (5, 190) = 6.73, $p < .001$, $R^2 = .15$. Phonological Awareness and Word Identification predicted reading comprehension, $p = .04$; $p < .001$.

The second regression model added predictors of oral language skills (i.e., Verbal IQ and Listening Comprehension). The inclusion of these predictors improved the overall ability of the model to predict reading comprehension F (7, 188) = 7.60, $p < .001$, $R^2 = .22$ with a change in R^2 of .07. Word Identification and Listening Comprehension both reliably predicted reading comprehension, $p < .001$; $p = .04$. However, phonological awareness was no longer a reliable predictor of reading comprehension in the second model.

For the third regression model, motivational factors (Grit, Reading Mindset, General Mindset) were included as predictors. This model was statistically significant, but the overall predictive value of the model was not improved with the addition of the motivational factors F (10, 185) = 5.40, $p < .001$, $R^2 = .23$. Word Identification significantly predicted reading comprehension, $p < .001$, and Listening Comprehension significantly predicted reading comprehension, $p = .03$. Whereas the motivational factors were not reliable predictors of reading comprehension.

Predicting reading comprehension GORT-5

For the second analysis, a multiple regression was conducted to determine if risk factors (low SES, attention deficits, phonological awareness, phonological decoding, word identification) predicted reading comprehension as measured by the Reading Comprehension subtest from the GORT-5 as the outcome variable. Table 4 displays these regression results. Overall, the model predicted reading comprehension F (5, 190) = 8.94, $p < .001$, $R^2 = .19$. However, Word Identification was the only reliable predictor of reading comprehension, $p < .001$.

Overall, the second regression model that introduced proxy measures of language skills as protective factors predicted reading comprehension and accounted for more variance in reading comprehension than the first model, F (7, 188) = 9.56, $p < .001$, $R^2 = .26$ with a change in R^2 of .07. In this model, Word Identification predicted reading comprehension, $p < .001$ as did Verbal IQ, $p < .02$.

For the third regression model, motivational factors (Grit, Reading Mindset, General Mindset) were included as predictors. The third regression model reliably predicted reading comprehension, but the overall fit index of the model was not improved by the inclusion of proxy measures of motivational factors, F (10, 185) = 6.72, $p < .001$, $R^2 = .27$. Word Identification predicted reading comprehension and Verbal IQ continued to predict reading comprehension, $p < .001$; $p = .03$. However, the motivational factors did not predict reading comprehension.

Table 3

Regression Results for Reading Comprehension (WRMT-PC)

Variable	Model 1			Model 2			Model 3		
	B	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β
Constant	41.60	12.63		25.56	12.79		23.24	15.70	
SES	0.85	2.11	0.03	1.33	2.04	0.04	1.75	2.09	0.06
ADHD Status	2.86	2.55	0.08	3.58	2.46	0.10	3.37	2.52	0.09
Phonological Awareness	0.19	0.09	0.15*	0.12	0.09	0.09	0.11	0.09	0.09
Word Identification	0.48	0.09	0.37**	0.41	0.09	0.32**	0.40	0.09	0.31**
Word Attack	- 0.07	0.11	-0.04	-0.07	0.10	- 0.04	- 0.06	0.11	- 0.04
Listening Comprehension				0.12	0.06	0.16*	0.13	0.06	0.18*
Verbal IQ				0.15	0.08	0.15	0.14	0.08	0.15
Grit							- 0.37	1.18	- 0.02
Reading Mindset							1.44	1.65	0.06
General Mindset							- 0.38	1.06	- 0.03
R^2			.15			.22			.23
ΔR^2						.07			.01

*** p < .01, * p < .05.*

Table 4

Regression Results for Reading Comprehension (GORT-5 Comprehension subtest)

Variable	Model 1			Model 2			Model 3		
	B	*SE*	β	*B*	*SE*	β	*B*	*SE*	β
Constant	59.96	10.19		46.39			45.95	12.62	
SES	- 2.39	1.71	- 0.09	- 1.98	1.64	- 0.08	- 2.05	1.68	- 0.08
ADHD Status	0.05	2.06	0.02	0.62	1.98	0.02	0.39	2.03	0.01
Phonological Awareness	0.04	0.08	0.04	- 0.01	0.07	- 0.01	- 0.01	0.07	- 0.10
Word Identification	0.44	0.07	0.41**	0.38	0.07	0.35**	0.38	0.07	0.35**
Word Attack	- 0.15	0.88	- 0.12	- 0.15	0.08	- 0.12	- 0.15	0.09	- 0.12
Listening Comprehension				0.08	0.05	0.13	0.08	0.05	0.13
Verbal IQ				0.15	0.06	0.18*	0.14	0.06	0.18*
Grit							0.69	0.95	0.05
Reading Mindset							0.34	1.33	0.02
General Mindset							- 0.73	0.85	- 0.06
R^2			.19			.26			.27
ΔR^2						.07			.01

*** p < .01, * p < .05.*

CHAPTER V: DISCUSSION

Students with reading disabilities such as dyslexia are at risk for negative psychosocial effects such as anxiety, lower academic self-concept, and depression (Bear et al., 2002; Elbaum, 2002; Maag & Reid, 2006; Nelson & Harwood, 2011). The presence of risk factors such as attention problems, language deficits, low SES, and poor phonological processing exacerbate reading difficulties. The presence and severity of risk factors may worsen the symptoms of dyslexia by having a cumulative effect. Risk factors increase the likelihood of severe and persistent reading difficulties (Catts & Petscher, 2021). In contrast to risk factors, resiliency factors buffer against risk. Fostering a growth mindset and persistence in challenging situations is thought to benefit individuals with dyslexia. A students' self-determination is correlated with academic achievement (Zheng et al., 2014). Students with higher self-determination are more equipped to persevere through challenging academic tasks. Furthermore, the ability to engage in deliberate and effortful practice may be relevant to individuals with dyslexia. A growth mindset may enable a student to stay engaged even when tasks such as reading become more difficult.

A growth mindset is theorized to be a protective factor for students with academic struggles such as dyslexia. Along with a growth mindset, other factors have been theorized to mitigate the adverse effects of dyslexia. These additional factors include strong oral language skills and task focused behavior (Catts & Petscher, 2021; Haft et al., 2017). Task focused behavior is the ability to remain engaged and persistent in the face of failure (Catts & Petscher, 2021). Task focused behavior is similar to the construct of grit

which includes consistency of interests and perseverance of efforts (Duckworth et al., 2007).

The purpose of the current study was to examine the influence of protective factors on reading comprehension in a sample of elementary school students with dyslexia. According to the SVR, reading comprehension is dependent upon two main factors: linguistic comprehension and decoding (Gough & Tunmer, 1986). Research supports the influence of these two factors on reading comprehension (Catts et al., 2015; Hjetland et al., 2019). Oral language skills are implicated as protective factors for students with dyslexia. Strong oral language skills may offset the detrimental effects of poor word reading on reading comprehension. Aside from language skills, socioemotional factors such as growth mindset and task-focused behavior are identified as possible protective factors. This study investigated the potential influence of socioemotional factors such as growth mindset and grit on reading comprehension.

Regarding the correlations, Grit and Reading Mindset had a moderate negative correlation (r = - .31). The negative correlation could be due to a couple of reasons. First, each measure has low reliability for this sample of students. Secondly, the surveys are measuring different aspects of motivation. Specifically, the Grit scale consists of questions related to consistency of interests and perseverance of efforts. The Reading Mindset survey items are related to beliefs about abilities specific to reading. Perhaps these differences account for the unexpected negative correlation between these variables.

For the first regression analysis, Research Question 1 (RQ1), regarding the influence of risk factors on reading comprehension, the ability to read real words was a significant predictor of reading comprehension across both regression models. Additionally, with the WRMT-III Passage Comprehension subtest as the outcome variable, phonological awareness skills were also a statistically reliable predictor. Although not a statistically reliable predictor, decoding skills had a small negative relationship to both reading comprehension measures. It is unusual that decoding would not predict reading comprehension. These could be due to students in the current sample not relying on decoding to read words. Instead, the students may be engaging whole word reading from memory and guessing. It could be the case that these students discount decoding as a viable option for reading due to the deficits and struggles in these areas.

Since reading comprehension measures are constructed differently with more dependency on some cognitive skills than others, researchers recommend the use of multiple measures of comprehension (Cutting & Scarborough, 2006;. Keenan et al., 2008). Several researchers have raised concerns with reading comprehension assessments measuring different underlying skills (e.g., Cutting & Scarborough, 2006; Keenan et al., 2008). The format of reading comprehension assessments may place more demands on lower-level or bottom-up skills such as decoding or word recognition whereas other reading comprehension assessments place more demands on top-down skills such as oral language and inferences (Cutting & Scarborough, 2006).

For Research Question 2 (RQ2), the addition of language factors such as Listening Comprehension and Verbal IQ improved the overall fit of both regression models. Listening Comprehension was a statistically reliable predictor of WRMT-III

Passage Comprehension, while Verbal IQ was a statistically reliable predictor of reading comprehension on the GORT-5. These results indicate that language skills are influential in the comprehension of text. Further, for students with dyslexia, strong language skills would appear to function as a protective factor to buffer against the effect word reading deficits have on reading comprehension.

For Research Question 3 (RG3), the addition of motivational factors (e.g., general mindset, reading mindset, and grit) did not add predictive value to either regression model. The change in R^2 from Model 2 (addition of language factors) to Model 3 (additional of motivational factors) across both reading outcome measures only changed by .01. Furthermore, none of the motivational factors were significant predictors of reading comprehension for either reading comprehension measure.

Motivational factors may not contribute to reading comprehension in this sample of students for a variety of reasons. First, the Reading Mindset and Short Grit Scale have a very low internal reliability of .02 and .51 respectively for this sample, therefore, these findings should be treated with extreme caution. Secondly, regarding General Mindset, these findings are similar to results from Sisk et al. (2018) meta-analysis on the relationship between growth mindset and academic achievement. The average correlation from the meta-analysis of $r = .10$ indicates a very small relationship. Additionally, Petscher et al. (2017) found a stronger relationship between general mindset and reading mindset to reading comprehension, however, the analysis did not include language skills. Perhaps if language skills were included, then general mindset and reading mindset may not have contributed significantly to reading comprehension. Finally, the age of the students in this study may be a factor. This study included students from second to fifth

grade whereas Petscher et al. (2017) included only fourth-grade students. It is possible that motivational factors are not as influential for younger students. Another reasonable hypothesis is that younger students may not comprehend the motivational survey items as well as older students.

Grit and Reading Comprehension

Along with growth mindset factors, grit did not predict reading comprehension. Grit is a construct composed of two underlying factors: perseverance and consistency of interests (Duckworth et al., 2007). The perseverance and consistency of interests revolve around a commitment to a particular goal. An individual has a goal and works hard to reach the goal despite pressure while maintaining the continued interest and commitment to reach that goal. The wording on the grit scale does not include reading or working hard to achieve a reading goal. Perhaps if the grit scale was reworded to be about reading, there might have been a stronger, more positive relationship to reading comprehension. As with a growth mindset, a student may exhibit grit in specific domains. Petscher et al. (2017) found domain-specific mindset (e.g., reading mindset) existed aside from general mindset. Grit may be similar to a growth mindset where domain-specific grittiness may exist. Further research into domain-specific grit may be warranted to delve into this topic.

Unique Reading Profiles and Motivational Factors

The influence of motivational factors, such as growth mindset and grit, may differ based upon the reading profiles of the student. For example, the results of this study were not similar to Petscher et al. (2017). They utilized general mindset and reading mindset measures when investigating the influence of these motivational factors on reading outcomes such as word reading and reading comprehension. Petscher et al. (2017) found

reading mindset and word reading predicted reading comprehension. However, their sample of students did not specifically include students with dyslexia. The students exhibited lower than average reading comprehension with average word reading whereas the children in the current study displayed below average word reading scores and average reading comprehension scores on the WMRT-III. Petscher et al. (2017) stated growth mindset may be necessary for students with lower reading comprehension capabilities to demonstrate grit and perseverance to persist despite challenging situations. Students with average word reading skills and below average reading comprehension may benefit more from a reading mindset. Children who are able to read words relatively well may feel that increased efforts at reading will improve reading comprehension. Thus, there's a possibility that a student must read words well for motivational factors to be influential for reading comprehension.

Conversely, the students in this study had below average word identification and decoding abilities with largely average reading comprehension. Since these students exhibited average language skills, endorsing a reading mindset may contribute little to reading comprehension. These students relay on a stronger language network to compensate for weaker word reading skills to comprehend text.

The Influence of Socioeconomic Status

The Petscher et al. (2017) study consisted of more students from low SES backgrounds (94%) than the current study (15%). Past research has suggested that students from lower SES backgrounds may benefit from having a growth mindset and receiving growth mindset intervention (Sisk et al., 2018). The meta-analysis on growth mindset and academic achievement from Sisk et al. (2018) discussed how although there

is a weak relationship between growth mindset and academic achievement, growth mindset may be beneficial for certain subgroups of students. These subgroups included economically disadvantaged students and those at high-risk for academic failure. Since this sample did not include a high percentage of economically disadvantaged students, this may partly explain why growth mindset did not predict reading comprehension. Students from economically disadvantaged backgrounds may be more influenced by motivational factors.

Given mindset may be influential for certain subgroups of students, it is important for research to continue to delve into this topic to identify those groups of students that will benefit the most from growth mindset to work toward academic goals.

Limitations

The findings are limited in several ways. First, the internal reliability for the Reading Mindset and Short Grit Scale for this sample was very low with α of .02. and .51 respectively. Furthermore, the reading mindset survey developed by Petscher et al. (2017) was developed for fourth grade students. The students in this study ranged from second to fifth grade. It is possible that the younger ages within this sample of students affected the overall reliability. Younger students may have had difficulty with understanding the wording on the reading mindset survey. The younger student sample may have also impacted reliability of the Short Grit Scale.

Additionally, the study only included a subset of resiliency factors that have been proposed to support individuals with dyslexia. Moreover, the current study explored resiliency as defined by relatively preserved reading comprehension despite deficits in decoding and word reading abilities. Future research would benefit from exploring the

extent to which motivational factors predict growth in decoding and word reading skills in response to targeted intervention. It could be the case that opposed to a direct path from motivational factors to reading comprehension there is an indirect pathway. It could be that motivational factors facilitate greater growth in word reading abilities in response to intervention and those gains facilitate growth in reading comprehension. A sensible hypothesis that could not be tested in the current study.

Future Directions

Continued research is needed explore potential resilient factors for students with dyslexia. Since some students with dyslexia experience, negative socioemotional consequences such as depression and anxiety, building resilience is critical. Resiliency may provide a buffer against the detrimental effects a reading disability has on self-esteem and academic confidence. There remains scarce literature on resilient factors within this population of students. More research is needed to help determine if motivational factors influence the reading outcomes for students with dyslexia from diverse economic backgrounds. Moreover, the continued investigation into risk and protective factors within dyslexia is required to identify resiliency factors to improve academic outcomes and risk factors that lead to poorer outcomes.

Cutting et al. (2015) suggested the role of executive functioning facilitates the interconnection of decoding and language skills for skilled reading comprehension. Perhaps resilience in dyslexia stems from strong language skills and executive functioning. While this current study investigating the specific role of motivational factors did not show evidence for a specific role in reading comprehension, other factors

such as executive functioning skills may be worth investigating as it relates to building resiliency for students with dyslexia.

The influence of a growth mindset and grit may mostly benefit students with reading comprehension difficulties; not necessarily for those with poor decoding and good comprehension. Perhaps motivational factors do not make a substantial contribution to reading comprehension when a student possesses some executive functioning capabilities. When executive functioning is low, motivational factors may play a larger role. Students with comprehension problems may benefit from growth mindset training to engage executive functioning skills to facilitate reading comprehension.

Finally, further research in the area of content-specific mindset and grit would provide additional important information in the field of literacy. Since a domain-specific mindset exists aside from general mindset, perhaps domain-specific grit may exist as well.

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