# Uncovering the Impact of Growth Mindset Factors on the Text Selection of Middle School Students

By

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This research is dedicated to my family, mentors, and loved ones, whose support and encouragement have been a constant source of strength. I am deeply grateful for your presence throughout this journey. In your quiet strength and steadfast love, I found the light that guided me forward.

## ABSTRACT

National Common Core State Standards hold that students become increasingly more capable of comprehending complex text throughout their school years. There is high importance for students to increase their reading of complex text in order to support reading development. Text complexity research shows the factor of complex text offers students the opportunity to gain more vocabulary and knowledge as well as experience with more syntactically complex sentences and text structures. With regard to enhanced academic success, interventions using Carol Dweck's growth mindset concepts promote the consideration of non-cognitive factors amidst student growth in learning. However, research reveals growth mindset interventions have shown limited effects amongst elementary and adolescent-aged students. Some growth mindset interventions have, however, shown some effects for at-risk students. This study examined the relationship among student growth mindset, attitudes of reading complex text, text selection choices, and reading comprehension. Middle schoolers in the sixth grade were administered a growth mindset and text complexity survey. They also completed a standardized comprehension measure. They participated in a daily text selection task in which they had three different levels of text to choose from. On the last day, students were randomly assigned to two conditions, one in which they received directions intended to promote a growth mindset about text selection and a control condition. Contrary to hypotheses, the results indicated that students with a higher growth mindset tended to choose less complex text. Additionally, there was a statistically negative relationship between student growth mindset and reading comprehension, suggesting students with a higher growth

mindset tended to have lower scores in comprehension. In contrast, results also revealed that on average, students with exposure to growth mindset directions made more rigorous text selections than those without growth mindset instructions. However, those differences were not statistically significant.

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NCES: National Center for Education Statistics

CCSS: Common Core State Standards

MAP: Measure of Academic Progress

PALS: Patterns of Adaptive Learning Scales

WJIII: Woodcock-Johnson III Tests of Achievement

GMRT: Gates - MacGinitie Reading Test

TOSREC: Test of Silent Reading Efficiency and Comprehension

BAS: Benchmark Assessment System

ELA: English Language Arts

SEL: Social emotional learning

FORI: Fluency-oriented reading instruction

TOWRE: Test of Word Reading Efficiency

GORT: Gray Oral Reading Test

WIAT: Wechsler Individual Achievement Test

NIM: Neurological Impress Method

TCRS: Text Complexity Reading Survey

LCT: Lexile Choice Tas

# CHAPTER I

## INTRODUCTION

Research indicates reading as an essential skill for success in society and all other content areas (Hiebert and Pearson, 2014; Norris, Lucas, & Prudhoe, 2012). Despite this, there have been significant challenges regarding standards of literacy in education. As such, the National Center for Education Statistics (NCES, 2024) reports only 33% of fourth graders and 31% of eighth graders performed at or above NCES proficiency in reading on the NAEP. The average reading scores for 13-year-olds declined four points compared to reading scores in 2019 – 2020 (NCES, 2024). Such data shows an urgency for improvement in reading achievement as students reach adolescent stages.

As the need to access complex text increases, critical reading skills are crucial. Instruction for literacy should be aimed at gradually releasing scaffolds and helping students to face the challenges of text complexity. Skills such as rereading critical parts of texts, analyzing key vocabulary, and developing comprehension strategies have been deemed critical for success with complex reading (Hiebert, 2012). The action of increasing text complexity for students as they progress in school is essential for efficiency in college and career preparation (Coleman & Pimental, 2012).

### Significance of Text Complexity

To more deeply perceive the critical situation of reading within schools, one must understand the concept of text complexity and how it is measured. Cunningham et al. (2012) underscored text complexity consists of "points of interaction among the characteristics of text, reader, and task" (Cunningham et al., 2012, p. 236). Mesmer et al.

(2012) also noted the term goes beyond elements of word identification and vocabulary meaning and is also detailed as a function of text structure. The authors highlight a framework that includes structure as pivotal at both the sentence and discourse levels. Contributions of syntactic functions within phrases and clauses enables the reader to form connections to concepts portrayed with words.

The classic readability approach, or *readability measures* over the years have required some aspect of syntactic (sentence structure) and semantic (connection to meaning and comprehension) features (Chall, 1996). The first feature is either measured by words per sentence, while the second deals with word difficulty determined by comparison of words in a text to a select grade level vocabulary list, or number of syllables per word (Heibert, 2011). A newer and popular readability measure is the Lexile Framework, which uses a mathematical formula consisting of an average word frequency and average sentence length to determine reading levels from 0 to 2000 (Heibert & Mesmer, 2013). To address increased and more specific measurement of text complexity in education, Common Core State Standards (CCSS) in 2010 used the Lexile readability system to revise English Language Arts education standards for grades K – 12 as a safeguard to college and career readiness for students (Hiebert & Mesmer, 2013).

**Origins of Text Complexity**

The origins of text complexity have a long history, dating back to Greeks consulting skilled speakers to determine if texts could be understood by certain audiences (Chall, 1996). More modern readability formula developments began with Thorndike's (1921) list of word frequencies. Mathematical equations allowed for large amounts of

data to be integrated, often using specified words from the vocabulary list along with other language elements such as sentence structure or prepositions (Anderson, 1986). In efforts to confirm such procedures, Lively and Pressey (1923) led a research project to better understand the vocabulary burden of textbooks. Their continued research resulted in a weighted index number for reading grade levels ranging from second grade through college. Lively and Pressey's (1923) work sparked a series of research projects exploring readability formulas and concepts (Ferkinhoff, 1989).

Following Lively and Pressey's (1923) work, another readability formula emerged by Vogel and Washburne (1928). Their study was based on 700 books noted to be enjoyable by a total of 37,000 children. Measurements of linguistic reading elements such as total number of words, prepositions, and clauses were correlated with the reading scores of the children within the study. From this information, the Vogel and Washburne formula was created and used to predict scores necessary to read books appointed at specific reading levels. Elements of the formula included the number of different words in a 1000-word sample, total number of prepositions in the sample, total number of words not on the Thorndike list of most frequent words, and the number of clauses in seventy-five sample sentences. It was determined that reading score levels predicted by the formula had a correlation of .85 with the average reading test scores of the children. This formula represents basic elements of standard readability formulas and has served as a catalyst for the time period's research methodology advances (Anderson, 1986).

Hiebert and Mesmer (2013) highlighted that the most widely classic readability formulas include a word factor and sentence structure factor. They also discussed a

prominent debate in text complexity history underscored by Anderson and Davison (1986) on the overreliance of classic readability formulas in schools and the publishing industry. The question in research soon arose after the presentation of these formulas: Are there other significant elements of reading and language to consider when measuring text complexity/comprehensibility?

Arguments about classic readability claim that readability formulas do not consider reader characteristics. Chall (1996) proposed a cognitive structural approach with an emphasis on reader interaction and text organization. Later studies toward the end of her work portrayed a seemingly slightly different perspective on classic readability formulas, outlining and confirming how classic factors such as average word frequency can be intermingled with cognitive factors to be better predictors of text complexity.

**Educational Direction Through the Lexile Framework**

Using one of the second generation of readability formulas, the Lexile Framework, became one of the most prominent efforts of conducting digital readability formulas (Smite et al., 1989). It is based on a mathematical algorithm that is consistent with classic readability formulas, including a semantic and syntactic component. The syntactic measure is the mean log sentence frequency of a sentence sample, and the semantic component, the mean log word frequency, is based on the relevance of frequency to other words. This formula makeup is based on a staircase of Lexile ranges with readability of texts paired to grade level (Hiebert, 2011).

The Common Core State Standards Initiative (2010) adopted this staircase to support states in literacy initiatives. The CCSS devoted an entire standard (Standard 10)

to the description of complex texts for students. As compared to past academic standards, Standard 10 is specific and requires reader-task characteristics to be considered when analyzing text complexity. Lexile levels for the state standards have been revised to ensure texts on secondary levels are comparable to grades eleven and twelve and deliver rigor for college and career readiness (Hiebert & Mesmer, 2013). Mesmer et al. (2012) also highlighted the discrepancy of texts on secondary grade levels and underscored the attention needed to complex texts in order to offer preparedness for literacy competency beyond grade-level classrooms.

Coleman and Pimental (2012) provided an overview defining standard 10 of Common Core as a grade level progression that rises from emergent reading to college and career readiness. The overall goal should be to ensure that all students, inclusive of those struggling in reading performance, have ample opportunity for exposure and comprehension of grade level texts (Coleman & Pimental, 2012) Hiebert and Pearson (2013) closely examined the impact of qualitative systems when determining text complexity. Two essential purposes of these systems are to match texts to the reader's ability and to scaffold text features that may present challenges on various reading levels (Hiebert & Pearson, 2013). Early analysis of qualitative systems concentrated on text features such as sentence length, vocabulary and syntax, or sentence structure (Rubakin, 1889, as cited in Choldin, 1979; Sherman, 1893). Such factors were later used for more of a quantitative approach to predict readability of text. For instance, Gray and Leary's (1935) classic readability study used sentence length, word frequency, and some abstract factors such as prepositions, or words that show relationship to another word (on, to,

from) to estimate reading difficulty. Within 30 years, using similar analysis, nearly 100 readability formulas have been developed (Klare, 1984; Pearson & Hiebert, 2013).

Mesmer and Cunningham (2014) address similar matters with their analysis of quantitative aspects of text complexity. They outline the process for quantitative tool development which starts with a sample of passages; each one with an overall score of difficulty. Upon the selection of the criterion variable, sample texts may be analyzed for average word frequency, passage length, or average sentence length.

Hiebert and Pearson (2013) expressed the need for additional factors beyond quantitative methods, explaining that the use of formulas alone reflects a clouded view with regard to clarity, coherence, or subject matter adequacy of texts. They advocate using qualitative approaches with rubrics and exemplars to provide increased insight for educators to more accurately match texts to student reading abilities. The use of rubrics and exemplars involves the identification of text features that impact student capacity to read more complex text. The CCSS rubric consists of narrative and informational areas of texts, underscoring both common and differing elements needed to process both text types. Both text types require understanding of structure as well as language conventionality and clarity. With regard to aspects of knowledge demands however, narrative texts require connection to life experiences, culture, and literary knowledge. Informational texts, on the other hand, require attention exclusive to the content/discipline presented in the text. Attention to the purpose of the text is also a component of the CCSS rubric that differs from narrative texts requirements (Hiebert & Pearson, 2013). Such factors assist in “illustrating the complexity, quality and range of

student reading" (NGA Center for Best Practices & CCSSO, 2010, p. 32) across grade bands.

**A Growth Mindset Approach**

There is a high demand for students to perform at elevated academic levels. Though leaders in education have increased expectations, school districts are still obtaining low standardized achievement scores across academic areas (Barrington, 2017). Cognitive skills such as reasoning, reflecting, analyzing, and remembering are all skills students are expected to implement in order to learn and solve problems in school. Nevertheless, research demonstrates that it is not solely cognitive skills that propel students to perform at academic levels; non-cognitive skills - those skills that aid in strengthening character and resilience, have also been shown to increase academic performance (Barrington, 2017). If non-cognitive skills can produce such results, it is essential that these skills and traits are cultivated and developed by educators (Barrington, 2017).

With the pressing issue of progression in text complexity for students, students must be given the adequate skills needed to reach their full potential. The concept of growth mindset supports this purpose; its roots are in non-cognitive literature, which includes academic behaviors, academic perseverance, mindset, and social skills (Farrington et al., 2012). The question has been posed on how to assess such factors of mindset or grit that may have a significant role in student performance in the classroom (Zernike, 2016). Duckworth, a previous educator, noticed the difference in performance with students of varying abilities. She observed that some students with lower IQs had

top grades, while students with higher IQs did not perform at higher academic levels, indicating other contributing factors aiding in student success (Duckworth & Quinn, 2009). These outcomes led her to research motivation and persistence with academics. From her research, what emerged was the factor of grit, which showed to be a significant predictor of academic achievement (Duckworth & Quinn, 2009).

Grit can be perceived as "passions and persistence for long-term goals" (Duckworth & Quinn, 2009, p. 166). Duckworth later discovered Dweck's theory of growth mindset – with a focus on how fixed beliefs of failure being permanent can be detrimental to academic success. Dweck's research demonstrates that instruction on how the brain has the capability to change and intelligence is indeed malleable can encourage perseverance and growth mindset development (Perkins-Gough, 2013). Overtime, Dweck and Duckworth collaborated to ascertain the reasons why some students persist at academic goals, while others decline in their persistence. Duckworth's perspective is that grit goes beyond having resilience - it is indeed a commitment one holds for many years and remains loyal to its practice (Perkins-Gough, 2013).

Dweck (2015) brings light to common misconceptions of the growth mindset theory - perceptions that depict growth mindset as simply having effort. Indeed, Dweck acknowledges effort as a key factor of student achievement, but it is not the only element for gaining success. She emphasizes the importance of new strategies and the will to seek input of feedback from others when needed. A repertoire of approaches, not just effort, is needed to gain improvement. Dweck (2015) stated that growth mindset should be a tool

to target both short and long-term goals, helping students to thrive in challenges and setbacks on the road to academic progress.

Ingebrigtsen (2018) clarified that one's belief about the malleability or movability of intelligence is referred to as implicit theories of intelligence. Malleability of intelligence has evolved into a popular field in research, originating from an article published by Dweck and Leggett (1988) delving into how children with equal opportunities experience varying responses to setbacks. Some children experience setbacks as opportunities for learning, while others understand setbacks as failure or a decline in outcome (Diener & Dweck, 1978). Beliefs of implicit theories of intelligence are usually grouped into two groups: entity theory or referred to as having a fixed mindset, and incremental theory or having a growth mindset (Lüftenegger & Chen, 2017). Incremental theorists maintain that intelligence is a continuous work that develops with practice, experience or effort, and has been connected in research to positive outcomes. Entity theorists, however, believe intelligence is immovable and an inherited trait. Possessing this belief connects to accepting efforts with ease as well as having a view of failure from a negative perspective, contrasting with the view of failure as an opportunity to learn (Dweck, 2000).

**Measurement of Mindset**

Questions about the measurement of mindset have arisen, especially due to varying outcomes across studies (Sisk et al., 2018). Common items on most mindset survey measures are reflective of the entity theory of Dweck's Growth Mindset Scale: "You have a certain amount of intelligence, and you really can't do much to change it",

"Your intelligence is something about you that you can't change very much" and "You can learn new things, but you can't really change your basic intelligence," (Dweck, 2000, p. 177). Advanced versions of the mindset measure are also inclusive of incremental theory items: "No matter who you are, you can significantly change your intelligence level", "You can always substantially change how intelligent you are" and "You can change even your basic intelligence level considerably" (Dweck, 2000, p. 177). Such item responses are evaluated on a 1 - 6 Likert Scale with a range of strongly disagree to strongly agree. Upon conclusion of responses, average scores are computed, and respondents are classified as entity theorists, incremental theorists, or mixed depending on the scoring level (Ingebrigtsen, 2018).

The achievement goal theory is an additional subscale on the mindset measure which explains that one sets either performance or learning goals, with performance aimed to being accepted in the eyes of others, while learning focuses on the improvement and skills and competence. Example items on the measure are: "An important reason why I do my schoolwork is because I like to learn new things'' or "I like schoolwork that I'll learn from even if I make a lot of mistakes'' (Blackwell et al., 2007, p. 249 - 250). There is also the effort theory, which assumes the basic belief that ones' effort will lead to success. Example items for this theory include: "The harder you work at something, the better you will be at it." Negative items will include: "If you're not good at a subject, working hard won't make you good at it" (Blackwell et al., 2007, p. 250). These subscales are also standardly rated on a 6-point Likert-type scale from 1 Agree Strongly to 6 Disagree Strongly (Blackwell et al., 2007).

This motivational model indicates that core beliefs can initiate alternative patterns of response to challenges and setbacks (Dweck & Leggett, 1988). Henderson and Dweck (1990) found that students holding an incremental view achieved higher academic scores in their junior high school year. Unfortunately, with challenges, many students endure declining grades and fail to recover from such setbacks (Wigfield et al., 1996). These conditions have yielded a need for intervention avenues based on theory that confront motivational issues prevalent amongst students in education (Midgley & Edelin, 1998). Additionally stressed is how malleable intelligence is not indicative of equivalent potential in every domain, but rather how intelligence in every individual has the ability to be further developed (Sternberg & Horvath, 1998).

Schrodt et al. (2023) reported the challenges with students and motivation, particularly in the areas of self-reporting and assessment. Their study pushes for assessment that involves task-related behavior of students as opposed to traditional self-reporting, as outcomes of the latter type of assessment have questionable credibility (Schrodt et al., 2023; Lai, 2011). The authors reference studies that underscore student difficulty with differentiating their presumed effort from their behavior, as well as student survey responses that aim to please the teacher, which impedes on reliability of measurement (Muller & Dweck, 1998; Ruzek et al., 2020; Turner, 1995). These findings laid the foundation of their study, which aimed to highlight a more productive approach for student advancement in motivation and academics.

# CHAPTER II

## LITERATURE REVIEW

There has been extensive research on growth mindset and its potential of a positive impact on academic success (Burnette et al., 2022; Dweck & Leggett, 1988). In a meta-analysis, Sisk et al. (2018) examined correlations between growth mindset and achievement and found an overall effect of $r = .10$. In a second analysis, the researchers then examined effects from interventions and found an overall effect of $d = 0.08$. Fifty-eight effect sizes were non-significant, reflecting little impact for most students. There were a few studies, however, within the second analysis indicating a higher effect on academic achievement for students with lower socio-economic status (Sisk et al., 2018). The second meta-analysis reported similar results, with an overall effect *of* $d = 0.14$ on academic outcomes (Burnette et al., 2022). Considering these results, past and on-going researchers have attempted to clarify contradicting outcomes pertaining to educational progress.

This research proceeds with the underscoring of the urgency within education to address the issue of high numbers of students falling behind during the pivotal moments of secondary school stages. Statistics have shown a significant percentage of students falling beneath graduation standards (Swanson, 2010). Also notable is how students more likely to not experience academic gains and drop out are students with low skill in comprehension (Leu et al., 2005). Accordingly, Common Core Curriculum Standards have reviewed texts and text levels for students, implementing the goal of students possessing critical literacy and cognitive skills to ascertain and embrace challenges of

complex texts (Fisher et al., 2012). Robb (2013) emphasized that particularly with text complexity skills, students must engage in close reading of challenging literacy and informational text every day. There are contrasting views, however, that point to other factors beyond methods of direct instruction which help to solicit a deeper understanding of complex text (Cassidy et al., 2010). This chapter will outline what the impact of factors such as growth mindset have on literacy and academic achievement. It will also highlight specific strategies and instruction relevant in making successful gains towards the reading and selection of complex literature.

**Mindset Intervention and the Connection to Challenge and Rigor**

Tecker (2017) performed a mixed-method study that placed emphasis on the implementation of growth mindset in the classroom. The study was performed to better understand the perspective of teachers and students within the classroom setting. Tecker closely analyzed the practical implication of teacher praise and emphasis on effort and learning. The effectiveness of four growth mindset strategies were examined (i.e., celebrating mistakes and failures, praising the learning process instead of the student, giving adequate feedback and assessments, and providing challenging academic tasks), as well as student achievement. Tecker (2017) interviewed two focus groups for identification of student perspectives for two middle schools within a district. The sample was pulled from a total of 449 sixth grade students. Qualitative measures in the form of student and teacher surveys were performed to gauge perception of mastery goal structures. This portion involved the data of twenty-two students. The study also featured a quantitative segment, analyzing math scores and the association of the growth

mindset intervention and overall GPA using the MAP assessment, or Measures of Academic Progress (Northwest Evaluation Association, 2011).

The mindset intervention involved a standard lesson on brain development with direct instruction and discussion for two sessions lasting 90 minutes. The students watched videos and read an article about the brain being a muscle. Students also wrote a letter, created a poster, or designed a PowerPoint on how the brain grows when making mistakes or meeting challenges. The study used the Patterns of Adaptive Learning Scales ([PALS]; Midgley et al., 2000) student survey to assess the students' mastery goal structure and performance avoidance. The survey featured items posed to students such as, "In our class, how much you improve is really important" (Tecker, 2017, p. 60). Scores were measured on a 5-point scale. Teacher surveys mirrored strategies of celebrating mistakes; praising the process, not the person; feedback and assessments for learning; and challenging academic tasks. As for quantitative data, MAP scores and trimester grades were recorded quarterly to measure academic achievement (Tecker, 2017).

The PALS survey was administered to 449 students. There were three performance approach statements (fixed mindset) and three performance avoidance statements (growth mindset). The lowest means were found for the performance approach, indicating that students found goals based on performance to be true. The average mean on a classroom of mastery goal orientation, or students who agreed with a performance avoidance approach was not statistically significant. Performance-

avoidance did however have missing data due to lack of responses from students within the sample (Tecker, 2017).

Surveys and responses of teachers reported having both performance and mastery goals embedded within their instruction. All teachers in the study reported celebrating mistakes frequently or daily. Sixteen out of twenty-two students from both schools reported their teacher responding to mistakes as an opportunity to learn. In the area of praising mistakes, no students shared responses consistent with the mindset intervention. Students reported responses such as "*Good job,"* and rewards such as candy or free play were given for good performance. Thirteen students gave examples of fixed-mindset praise (while there were seven students with missing data). As for responses to feedback and assessments, there were four students who shared their teacher rarely gave feedback and seven students who gave no response. Those that did report feedback gave an overall positive rating for teachers. Students reported teachers would observe and explain mistakes, as well as encouraged students to do a closer analysis of their work. Overall, there were no students who reported feedback consisting solely of growth and mastery; however, at least thirteen students reported feedback mixed with both fixed and mastery growth. As for the mindset area for challenges, sixteen of twenty-one students reported that they prefer tasks that were more challenging. It was reported that both teachers and students saw the value of engaging in open-ended and challenging tasks (Tecker, 2017).

For the quantitative portion, GPA scores showed a .29 point increase after implementing the mindset intervention. However, growth results on the MAP assessment showed the intervention group for 2016 - 2017 did not grow more than the

comparison group in 2015 - 2016. Despite the lack of MAP growth, overall passing grades and higher GPA indicate the mindset intervention may have had a positive impact on effort and learning (Tecker, 2017).

**Growth Mindset and Effects of Feedback**

Gauthreaux (2015) examined the importance of specific feedback for students. Gauthreaux provided specific examples of praise that help students embrace the process of learning: “I like the way you tried all kinds of strategies on that math problem until you finally got it. You thought of a lot of different ways to do it and found the one that worked!” (Gauthreaux, 2015, p. 5). Part of the intervention also involved a strategy known as the cognitive wrapper - a learning assessment task that fosters students’ metacognition. The wrapper is a self-monitoring concluding activity that prompts the student to provide a rationale for improvement, reflection on preparedness, as well as a reflection on mistakes. In this study, the growth mindset approach towards academic achievement yielded no significant difference in mindset scores or the science standard assessment. There was, however, a significant correlation with mindset; as mindset scores increased, GPA, and overall academic performance increased. Similarly, Bates and Li (2017) also conducted research using growth mindset with a strong emphasis on praise feedback. Contrary to expectation, the mindset condition only had a minimal effect on positive responses to challenging feedback. The outcomes of these studies suggest a potential for positive effects on mindset praise towards student achievement.

**Growth Mindset and Elementary Literacy Achievement**

Andersen and Nielsen (2016) performed a study involving growth mindset and constructive mastery-oriented instruction for second grade students. The study consisted of parent-to-child read-aloud within a home setting. The construct was an in-depth discussion before, during, and after reading a selected text using a growth mindset approach while giving verbal feedback. Results of the children's reading achievement revealed substantial effects after seven months, particularly with parents of higher fixed beliefs. Outcomes support concepts that both growth mindset and parental influence can aid in supplementing efforts to gain increased student performance in reading.

Saia (2016) examined growth mindset within early childhood education and literacy outcomes. She advocated that although connections between growth mindset and reading have been shown, there had been little research that focused on young students in early elementary grade levels. Specifically, Saia sought to understand how does growth mindset impact reading capabilities of first grade students. An additional pursuit of Saia's was to determine how motivation and ownership of learning impact achievement outcomes. At the onset of the study, negativity with attitudes towards literacy were observed, as students verbalized feelings of anxiety toward reading. To measure mindset, each child completed a Mindset Assessment Profile that assessed belief about individual ability. Students were also given timed logic puzzle tasks and were observed on verbal talk related to perspectives of their own intelligence. Results revealed that during each phase of the logic puzzle measure, students significantly increased time worked on the task, as well as produced talk reflective of positive attitudes towards productive struggle.

All students in the study obtained growth in reading levels as well as acquired a growth mindset indicated by transformations in mindset profiles (Saia, 2016).

Petscher et al. (2017) also addressed the possible impact of the growth mindset on reading achievement outcomes. More specifically, the authors examined whether "general and reading specific growth mindsets are uniquely related to reading comprehension performance" (p.376). The authors acknowledged that decoding and language comprehension significantly influence reading comprehension. They also acknowledged other factors for enhanced student achievement including background knowledge, learning strategies, inference making skills, and reading attitudes. The participants in this study were 195 fourth graders chosen from six public schools within the United States. Students who scored below the 30$^{th}$ percentile in reading comprehension or had high needs were selected for examination. Growth mindset was assessed using specific statements from Dweck's Student Mindset Survey. The survey was inclusive of language to meet fourth grade comprehension. For example, the word "smart" was substituted for the word "intelligent" for items such as: "When I have to work hard at my school, it makes me feel like I'm not very intelligent" (Petscher et al., 2017, p. 10). Statements specific to reading included: "Even if you're not a good reader, you can always get better if you work hard" (Petscher et al., 2017, p. 10). Items on general mindset and reading mindset were programmed and administered on Survey Monkey. Reading measures included the Woodcock-Johnson III Tests of Achievement ([WJIII]; Woodcock et al., 2001) using the Word Attack, Letter Word Identification, and Reading Comprehension subtests. Other comprehension measures included the Gates -

MacGinitie Reading Test ([GMRT]; MacGinitie et al., 2006) and the Test of Silent Reading Efficiency and Comprehension ([TOSREC]; Wagner et al., 2010). All tests and surveys administered were over a course of a 3 and ½ week period (Petscher et al., 2017).

Structural equation modeling and confirmatory factor analysis were used to examine the relationships amongst various variables. Specific relationships examined were growth mindset and reading comprehension, growth mindset factors and word reading, and growth mindset to comprehension to word reading when controlling for word reading. Results indicated that the relationship of growth mindset and reading comprehension varied across conditions. For students at lower reading comprehension levels performing at or below the 25$^{th}$ percentile, growth mindset was strongly related to comprehension at $r$ = .62, whereas weaker association of $r$ = .48 was found for students performing at or above the 75$^{th}$ percentile. After observing correlations with standardized reading measures, findings conveyed that growth and reading mindset were significantly related to achievement in reading comprehension. These results help to further demonstrate the importance of mindset concepts to reading and achievement performance.

To further examine growth mindset and reading comprehension, Solotruk (2013) conducted a study that used growth mindset for third and fourth graders. The goal of the study was to improve reading fluency and comprehension using a structured after-school program. Participants included a total of 33 third and fourth grade students from a northeastern U.S. suburban public school. Staff in the program included two general

education teachers and one special education teacher. Two teacher aids also participated in the program. Measures in this study involved pre and posttest assessments: DIBELS Oral Reading Fluency (ORF; Barger, 2003), the AIMSweb MAZE CBM (2007), and Dweck's Mindset rating scale (Dweck, 2006).

The mindset rating scale used 20 items rated on a five-point scale from strongly agree to strongly disagree. The measure included items such as: "You can learn new things, but you can't really change your basic intelligence" (Solotruk, 2013, p. 37) or "No matter who you are, you can significantly change your level of talent" (Solotruk, 2013, p.37). There were ten items each that either reflected the fixed mindset or the growth mindset. Strong scores include a mindset of 45 - 60 (Solotruk, 2013).

This program included fifteen 1.5 hour sessions for third graders and 16 sessions for fourth graders. Students in the program received 30 minutes of homework and participated in the online Study Island program as academic practice. Direct instruction for the program included language arts, as well as math and science. At the end of the program, a progress report was sent home to parents and students about general performance and participation. Solotruk (2013) found that there were no significant changes in fluency and comprehension for 3rd and 4th graders after implementing growth mindset. Findings from this study suggest a closer analysis of factors that impact student literacy and comprehension outcomes.

Wilson (2016) also executed a mixed-methods study examining connections with growth mindset, grit, and reading achievement. It further focused on factors of influence that would aid in closing the achievement gap in reading. The study involved students on

third, fourth, and fifth grade levels at a Midwest small suburban elementary school. The total number of students who participated in the study was 167 students. Scores for all three grade levels were collected in August of 2015 and May of 2016. Quantitative data was also taken at these dates, as students performed a survey on a 4-point mindset scale measuring grit and individual mindset. Upon analysis of data, it was revealed that there was no relationship between grit, growth mindset, and reading scores as the achievement gap remained evident upon conclusion of the study at the researched school (Wilson, 2016).

The impact of growth mindset has also been assessed on writing achievement. As mentioned earlier in the introduction, Schrodt et al. (2019) noted how the skill of writing calls on heightened levels of self-regulation due to the perseverance and stamina required of writing tasks (Zimmerman & Risemberg, 1997). Twenty-seven kindergarten participants were randomly assigned to either an experimental group or control group for the quantitative segment of the study. The experimental group consisted of a 1-hour daily routine three days of the week for a 10-week time frame. Forty minutes of each session was inclusive of practice with writing conventions, encoding and independent writing tasks. The other twenty minutes for mindset instruction included tasks and read-alouds teaching mindset principles such as determination and conquering challenges, as well as a special strategy modeling positive thinking through fictional characters. Students in the control condition participated in the traditional Writer's Workshop treatment. This involved focused instruction on specific writing skills in addition to independent writing tasks on student-led topics. Pre and post qualitative data were also gathered in the form of

interviews, notes, and classroom observations. Results of the study revealed significant effects of growth mindset on writing outcomes, both in basic ($d$ = 0.72) and conceptual ($d$ = 1.77) writing. Qualitative data from the study also reinforced the effectiveness of growth mindset on writing skills (Schrodt et al., 2019).

**Growth Mindset and Adolescent Achievement**

Similarly, Zhu et al. (2019) conducted a study using online modules designed to communicate how the brain can grow stronger and will result in increased efforts to achieve personal goals. Modules were 25-minute sessions, conveying information that efforts can increase with actions of trying new strategies and seeking help from knowledgeable professionals. The study was a randomized controlled design using ninth grade students, including a sample of 11,888 ninth graders from over 60 high schools in the United States. Students in the treatment group completed computer modules on growth mindset and the malleability of the brain, while the control group read an article on basic brain functions. Both groups were administered a survey answering reflective questions about their experiences. Upon conclusion of the study, the intervention had an impact on self-reported beliefs and perspectives towards efforts and failures. Compared to the control group, it was more probable for students in the treatment group to disagree with statements that showed limitations with intelligence such as “You have a certain amount of intelligence, and you really can’t do much to change it” (Zhu et al., 2019, p. 5). Fifty-one percent of the students from the treatment group reported they would choose more difficult challenges, while only 38% of the control group would choose the challenge. The intervention also was effective for enhanced academic performance, as it

produced statistically significant effects on achievement measures for math, literacy, and overall GPA performance (Zhu et al., 2019).

**Mindset Approach to Adolescent Math and Literacy**

West et al. (2016) conducted a study with a large sample in a Boston school district to test relationships of non-cognitive factors with math and ELA (English Language Arts) performance. Factors such as desire to work hard or conscientiousness, grit, and growth mindset were examined with eighth graders in the 2010-2011 school year. The Big Five Inventory was the questionnaire administered to provoke reflection in these areas, which included 44 items on a Likert-type scale (John & Srivastava, 1999).Students rated their positions on statements such as "You have a certain amount of intelligence, and you really can't do much to change it" (West et al., 2016, p. 21) or "I think I am a reliable worker" (West et al., 2016, p. 6). Administrative data was also used to track test score performance in math and ELA from fourth to eighth grade. Upon analysis of the non-cognitive factors of conscientiousness, grit, and growth mindset, each was positively correlated with test score gains, with growth mindset having the strongest correlations with eighth grade test scores. Based on data results, West et al. (2016) concluded that efforts from schools to support and influence such non-cognitive factors could result in impactful gains over time in academic achievement.

In another study, Claro and Loeb (2019) studied 840 students within select districts in grades fourth to seventh who displayed needs for math and ELA improvement. Social-emotional learning (SEL) surveys were administered to examine student beliefs toward learning and intelligence. Similar to the West et al. (2016) study,

students rated themselves on specific statements on a 5-point category Likert scale. Results revealed that students with higher levels of academic achievement displayed increased levels of growth mindset compared to their student counterparts. The most disadvantaged students regarding academic performance displayed more fixed mindsets (Claro & Loeb, 2019).

Martinez et al. (2022) delved further into the issue of academic achievement in the middle school age group, particularly on challenges with reading. Martinez conducted The Florida Twin Project with a focus on factors of behavior, environment, and reading achievement. Questionnaires were mailed to twins at three different time periods to measure the growth mindset component. The twins answered questions about growth mindset and fixed mindset for the survey measure. Data for reading comprehension was taken with the Gates – MacGinite Reading Test (MacGinitie & MacGinitie, 2006). Structural equation modeling was also used to assess genetic and environmental factors on mindset, grit, and reading comprehension. Results revealed weak to moderate correlations between growth mindset, grit, and reading achievement. Martinez et al. (2022) concluded that focused intervention on reading may be more advantageous than growth mindset treatment in order to obtain increased reading performance.

**Math, Science, and Psychological Factors**

Wilkins (2014) further examined how psychological factors can have positive academic gains for middle school students. Seventh grade students in a large urban school district were selected to test perceptions of individual abilities in math and science. In her study, Wilkins highlights Blackwell's et al. (2007) explanation of

imperative factors that potentially influence academics and effort performance of students within this age group. These students tended to experience heightened levels of disinterest in school due to how the "junior high school environment emphasizes competition, social comparison, and ability self-assessment at a time of heightened self-focus" (Blackwell et al., 2007, p. 246). Such circumstances during this time of transition must be met with effective approaches that can aid school success (Blackwell et al., 2007). Wilkins lays the foundation for the experiment with a sample size of just over 1,000 students of an ethnically diverse population. This study focused on the Brainology program (Blackwell et al., 2007) and its impact on mindset and effort beliefs, as well as academic self-efficacy. Correlations among self-efficacy and science and math achievement were examined using the PALS subscale, as well as grades and benchmark tests. Pre and post questionnaires as well as science and math assessments were administered during the first, second, and third quarters of the school semester.

Wilkins (2014) found no significant change in mindset amongst students. Results also showed there was no significant change in overall effort beliefs or in perceptions of capabilities and academic performance. Academic performance, however, had mixed results. With math performance, there was no impact from the intervention on achievement. Conversely, science achievement showed to be significantly higher for students within the treatment group.

De Koning (2021) highlighted the difficulty of students taking on complex tasks and problem-solving. He focused on the factor of motivation, which if lacking can minimize effective effort needed for students to make gains with learning. A foundation

of his research is the cognitive load theory (Sweller et al., 1998) which states that instructional methods can differ in effectiveness based on the complexity of the task. Also underscored is how working memory is limited, which may affect the learning process as complexity of tasks increases (De Koning, 2021). Participants included 118 students from ages 10-13. Participants consisted of four groups representing two factors of growth mindset and task complexity. For the growth mindset condition, students were assigned to an intervention called *You Can Grow Your Intelligence*, where they worked on reading and writing tasks with exposure to information on brain malleability. Measurement of growth mindset was conducted using the Revised Implicit Theory of Intelligence Scale questionnaire (De Castella & Byrne, 2015). As for the complexity condition, students were assigned to a low or high group – the low group working through math probability problems with replacement, and the high group learning of probabilities without replacement. Results revealed that treatment participants reported more of an increased growth mindset than participants in the control condition. Data, however, did not demonstrate an impact on motivation. These findings are consistent with previous studies amongst adolescents and growth mindset (De Koning, 2021).

Baynard (2020) also sought to understand the relationship between academic achievement and growth mindset, calling attention to the influence of psychological factors such as motivation and self-efficacy. The foundation of this study highlights the call to rigor mathematics employs on students, and the urgency of performance improvement as students encounter rigorous tasks. The research encompassed three case studies, the first being a pre and post design of data gathered from students ages 13-14

years. Data methods included modules assessing knowledge on basic brain behavior and functioning, as well as mindset survey data. The second case study further delved into implicit theories of intelligence impacting mathematics achievement, with a particular focus on assistance and obstructions towards motivation. Participants in this study were 373 seventh grade students, all taught the same math curriculum. The students were also administered surveys addressing a variety of elements associated with motivation, including beliefs about intelligence, orientation of goals, attribution, and strategies for encountering failure. Students responded to their rate of agreement with posed questions on a 6-point Likert Scale. The third case included a sample of 700 students. Methods for this cycle of data included pre and post journals and assessments with a total of eight mindset interventions within a sequence. The qualitative measure of journals was inclusive of thoughts and emotions toward interventions as well as reflections on self-identified strategies for problem solving (Baynard, 2020).

Results of the case studies supported growth mindset interventions decreasing fixed mindsets amongst students. Both quantitative and qualitative data indicated an increase in growth mindset as well as noted observations in shifts on approaches to academic tasks. Findings also revealed a significant difference in motivational scores within the treatment group, showing an advantage in performance while engaging in academic tasks (Baynard, 2020).

**Adolescents and "At Risk" Students – Growth Mindset and Literacy Development**

A notable point about the previous study (i.e., Baynard, 2020) was the characteristics of the sample. Overall, there was a very diverse student body of

adolescents, with over half of the sample from one of the case studies eligible for free and reduced lunch. In another case study within the experiment, 97% were of African American and Latino culture, and 3% White/Asian. Of these students, 79% of these students were eligible for free and reduced lunch. This group was also comparatively low in achievement to standard academic performance (Baynard, 2020). Interestingly, outcomes for this group of students after implementation of growth mindset were advantageous toward educational performance and attitudes of accomplishment. Solotruk's study (2013) was also conducted with an at-risk population group with social/emotional problems, academic failure, or low-socio-economic status. Also emphasized is how reading difficulty is one of the primary factors associated with this population group.

Saunders (2013) emphasized key factors of the adolescent stage that impact performance in school academics. He identified it as one of the most significant and unique stages in life with its own set of challenges. Rapid neurological and social changes make a substantial impact on academic achievement. Contrary to past findings, the brain continues to grow beyond childhood stages into adolescent years and well into adulthood (Ramsden et al., 2011). Sociological changes regarding the relationship between peers and adults also affect growth and development. This critical stage between the ages of 12-18 years is known to be a difficult transition for adolescent youth. Such factors have displayed an impact for adolescents reaching adulthood, as a recent study found that 25% of young adults lacked basic literacy skills needed for society advancement (Wilson, 2016). Saunders (2013) reported that a significant decline in

achievement and motivation is apparent during the adolescent years, especially for minority groups. Motivation is very important for struggling students, as students can remain trapped in a recursive pattern of failure. Bedford (2017) suggested that a key factor impacting motivation is self-efficacy - a belief that one can succeed and reach competency in mastering a skill. If students do not have the tools to be motivated, they can experience what is known as the Matthew Effect (Stanovich, 1986). This occurs when the repeated cycle of failure and low motivation leads to successful students having exposure to new words and ideas more than their struggling peers. These effects and concepts are seemingly apparent amongst student sub-groups of minorities, low-income and special education, as students outside of these groups have achieved significantly higher readers scores (Rampey et al., 2009). Such outcomes confirm the need for intervention in the areas of character building and motivation.

Saunders (2013) highlighted the issue surrounding adolescence and achievement, placing emphasis on the wealth of interventions students receive in the elementary years. As a result, studies on growth mindset have been aimed toward the adolescent and secondary age group, as research confirms this stage as having a downturn in motivation (Blackwell et al., 2007; Dweck, 2000; Dweck & Master, 2009; Eccles & Roeser, 2009). Specifically, during this age, there is a significant decline with mastery goals and interest in school, and many students struggle academically for the first time with the transition. To improve the status of motivation factors amongst students, Saunders conducted a study using the Brainology program, which encourages the adoption of a growth mindset with instruction on brain growth and development. Strong emphasis was made on

applying knowledge to schoolwork performance. Students in this study were considered at-risk regarding reading achievement. The Read 180 program (Haslam et al., 2006; Nave, 2007) was also an element of the intervention, which utilizes computer modules, independent reading and direct instruction. The aim of the study was to determine if there was a difference in reading achievement for at-risk adolescence after implementing growth mindset. After analyzing standard assessments such as the MAP, it was determined that no statistically significant main effect of the treatment was found on achievement or mindset attitudes (Saunders, 2013).

Paunesku et al. (2015) examined the effect of growth mindset on at-risk high school students. The authors' research is centered on unsettling facts of adolescents and education: millions of students drop out of high school every year that are unprepared for college or workforce environments (Dianda, 2008). Two mindset interventions were tested for this study - one for growth mindset of intelligence and a second for sense of purpose. The sample size was 1,500 students in 13 high schools. The students within this study varied widely in socioeconomic characteristics. In about five schools, there was a very low percentage of students receiving free or reduced, while there were six schools in the study that had over 50% of students receiving free or reduced lunch. Public, private, and charter schools were all featured in the study - all of which featured varied ethnicities, including African American, Hispanic, Asian, and Caucasian backgrounds (Paunesku et al., 2015).

The intervention took place for two 45-minute sessions about two weeks apart during the spring semester. The students registered online to a program that either

assigned each student to a control group, growth mindset condition, the sense of purpose condition, or both growth mindset interventions combined. Growth mindset activities in the computer module drew directly from past research: an article was presented describing the brain's ability to grow and re-organize after conditions of hard work and challenges. It also stressed how setbacks and struggles in school provided opportunities to learn. In the control condition, students also received brain information, but it omitted information about the malleability and influence on intelligence perceptions. For the sense of purpose condition, students were asked to respond to prompts with the context of working hard in school and making an impact on the world. Students were also asked to reflect on their own goals and connect achievement to their hard work in school (Paunesku et al., 2015).

Measures of academic performance were based on the GPA of students. GPA, race, gender, and school were all controlled for prior to the intervention. In the sample, at least 519 students earned a GPA of 2.0 prior to the interventions. Regression analyses revealed the variable for students "at risk" had a significant interaction with the growth mindset intervention, as well as the sense of purpose intervention (Paunesku et al., 2015). The mindset interventions produced no effects for GPA growth with at-risk students. The authors noted their intrigue with lower scores for the combined mindset conditions. This outcome is attributed to the possible inability of students to distinguish between basic beliefs and approaches to schoolwork. It is suggested that further research is conducted on combined interventions to prevent confusion about learning outcomes (Paunesku et al., 2015).

Interestingly, one might question the effect of growth mindset on a broader selection of samples. Mofield and Peters (2018) conducted a study including gifted and advanced students. The aim was to determine what do students of these abilities believe about their intelligence and potential. The authors give light to how these students are highly vulnerable to receive praise based on intelligence, which could perpetuate the need to identify as smart and avoid challenges that threaten this identity (Dweck, 2012a). It has been argued, however, that gifted students already benefit from appropriate mindsets, and that superior performance is indeed a result of a "malleable conception of ability" (Simonton, 2001, p. 154). After careful analysis of attitudes using the Mindset Assessment profile tool (2012), it was found that gifted and advanced students scored higher on personal standards and academic self-perception compared with typical students (Mofield & Peters, 2018). These results help to demonstrate gifted and advanced students do naturally benefit from and gravitate toward growth mindset concepts. Furthermore, the results help to confirm how growth mindset strategies have potential to be effective amongst students on a variety of learning levels.

**The Importance of Text Complexity and Academic Achievement**

Research indicates that students lacking in academic achievement and in jeopardy of dropping out more often experience poor reading comprehension skills (Leu et al., 2005). Hence, Common Core has focused its ELA standards on students progressing in capabilities with complex text over their school careers (Hiebert, 2011). Paige et al. (2019) differentiated the differences between the term, *text complexity*, a characteristic of written text, and *text difficulty*, the efficiency in reading and

understanding a specific text. Thus, the authors emphasize the importance of growth in literacy across grade levels and how text complexity in Lexile levels provides a metrical analysis of reading progress. Reading standards of Common Core are scaffolded reading standards, so that upon completion of 12th grade, students have reached a Lexile range of 1250L-1325L. To achieve proficiency, their research proposes literacy instruction beginning in the early elementary grade levels and encompasses basic foundational skills to support reading achievement (Paige et al., 2019).

Lexile metrics entail the reading level expansion along with the complexity of text, capable of ranging from levels of 0L-2000L. Features of measurement include vocabulary or semantic frequency, word frequency or letters and syllables within a word, and sentence length, which are syntactical components of text. Also notable is the significance in Lexile level standard increase from the third to fourth grade, progressing 76% in rigor from 420L-740L. Due to this *Lexile leap,* the authors formulated a study on the basis of sub-skill development in reading to ensure sufficient preparation (Paige et al., 2019).

**Text Complexity and Adolescent Achievement**

Quinn (2015) conducted a study to determine effective strategies that would raise student Lexile levels of secondary students. A study using a "read to learn" model was conducted at an alternative high school within a sub-urban district amongst adolescents struggling in reading performance. Students were involved in sustained silent reading for a minimum of twelve weeks and participated in pre and post assessments in reading. The aim of the study was to examine the impact of sustained

reading on reading scores, as well as the changes in Lexile levels. Findings from pre to post tests showed significant Lexile growth amongst students.

Budd (2015) also underscored literacy outcomes of adolescents with his focus on the importance of understanding text complexity concepts. He began his study by identifying common themes of complex text, defining it as "those elements inherent to the text itself as perceived by the individual reader during the reading act" (Budd, 2015, p. 27). Foundations of the study included concepts of *disciplined literacy* which encompasses the reader activating several abilities during reading instruction, including attending to the text, embracing problems and challenges, appreciating uncertainty and processes when reading, and open-mindedness during text interpretation (Blau, 2003).

Budd (2015) sought to unveil how students processed and analyzed decontextualized text and worked through text with context through discourse practices. Case studies of tenth grade students were conducted using a think-aloud protocol. Participants read featured texts during a five-to-six-week study and were interviewed answering select questions: "How difficult of a text do you believe this has been? Why do you say that? Be as specific in your response as possible" (Budd, 2015, p. 105). During the data process, observations revealed all students produced productive comments toward text processing both verbally and in writing. Other impactful reading behaviors included awareness of story elements, identifying interests within the reading, clarifying thoughts/ideas, and re-reading segments of texts during discourse (Budd, 2015).

**Importance of Complex Text Selection**

Stange (2013) noted research supporting how ultimate instruction and learning occurs when students experience intellectual challenge. Therefore, students need to read books at the appropriate level so that maximum growth can be obtained in fluency, literacy strategies, and word knowledge, thus mitigating the risk of lagging behind their student peers (Stanovich, 1986). This research considers imperative components of text selection, including finding books at suitable levels for readers. Also noted is research which stresses an extensive scope of texts - including narrative, expository and digital sources (International Reading Association, 2010). A key question posed in this research is, "Can we motivate children to read and want to read more with books at varied levels of difficulty?" (Stange, 2013, p. 111).

Stange (2013) focused on instruction of literacy at complex text levels. Specifically, educators aimed to incorporate targeted assessments and text selection at independent, instructional, and frustration levels from students ranging at grades two to five. Surveys and inventories were also administered to ascertain student interests. These implementations built a rapport with students and created opportunities for teachers to select literacy based on the interests of the children. As a result, more time was allotted to instruction and comprehension of text, and less on encouragement of students to maintain motivation. Participants in the study also made gains through instructional reading levels, as well as fluency rates and comprehension scores (Stange, 2013). This research suggests possible achievement gains for students when receiving instruction and actively reading at rigorous levels.

Bell (2022) also examined the importance of complex text selection with her study examining the relationship amongst teacher mindset, knowledge of text complexity, and instructional practices with complex text. Her research examined the relationship between teacher growth mindset and student mindset and achievement (Dweck, 2006). Bell highlights how teacher knowledge of text complexity might be lacking, as some educators may not consider Lexile levels or other qualitative features during reading instruction (Papola-Ellis, 2014). To analyze relationships between teacher mindset and text choices, survey data was gathered from 55 teachers within an eight-week time frame. Lesson plans and daily instruction were also observed to evaluate implementation of text complexity during student reading (Bell, 2022). Bell found no significant relationships between teacher literacy implementation and teacher growth mindset. There was also no correlation between teacher Lexile Level choices and knowledge of text complexity. These results are opposite of some research which revealed teacher mindset to be a factor in instructional practices (Park et al., 2016). Bell also found that the teachers in her study had more of a fixed mindset as compared to a growth mindset, which according to research affects confidence (Dweck, 2007a). These results suggest a closer examination of various factors impacting text complexity instruction within the classroom.

**Study Purpose**

This review of research shows that as students in our society gradually reach the point of graduation, the demand for complex text analysis and comprehension will be even higher. The literature also demonstrates mixed findings for studies focusing on growth mindset. However, growth mindset may impact certain students more than others.

Studies considering the impact of growth mindset on text complexity choices will aid in expanding on the limited research indicating how student mindsets potentially impact reading achievement for adolescents. With the pressing issue for text complexity skills to be further advanced amongst students, especially at secondary grade levels, this research aims to identify the relationship of growth mindset and the selection of complex text amongst adolescents.

The data collected within this study will be used to further conceptualize and understand the relationship between growth mindset and student attitudes toward complex texts. Research on growth mindset and reading performance is limited, and therefore we will add to the data related to growth mindset and reading gains. As noted earlier, this study will also add to the findings from research regarding the adolescent age group. If growth mindset is associated with text selection, further studies in growth mindset instruction may be useful in getting students to make more complex text choices. This study will examine the following research questions:

1. To establish the validity and reliability of the measures the following questions will be examined:
    a. Is there a relationship between the researcher designed measure of growth mindset in reading and an established survey of growth mindset?
    b. Does the growth mindset in reading measure have adequate reliability?
2. Is there a relationship between students' reported mindset about reading (growth vs. fixed) and the complexity of texts they select?
3. Is there a relationship between growth mindset and reading comprehension?

4. When given directions that encourage a growth mindset in text selection, will students select more complex text than students who were not given such directions?

# CHAPTER III

## METHODOLOGY

The purpose of this study is to examine the relationship of growth mindset amongst adolescents and their selection of complex text. This chapter will outline the methodology, research design, participant selection, measures used, procedures, and data analysis. This study will address the following research questions:

1. To establish the validity and reliability of the measures the following questions will be examined:
    a. Is there a relationship between the researcher designed measure of growth mindset in reading and an established survey of growth mindset?
    b. Does the growth mindset in reading measure have adequate reliability?
2. Is there a relationship between students' reported mindset about reading (growth vs. fixed) and the complexity of texts they select?
3. Is there a relationship between growth mindset and reading comprehension?
4. When given directions that encourage a growth mindset in text selection, will students select more complex text than students who were not given such directions?

### Research Design

This research used both a correlational and randomized controlled design using survey data to understand the relationship between student mindsets and text choices.

## Participants

This study took place at a middle school located in middle Tennessee. The middle school facility is divided into three grade levels. The population at the sixth-grade level at this school consisted of approximately 345 students. Data for the study was gathered from 63 students within this grade level. Only participants who received daily instruction from me, the primary researcher, were eligible to take part in the study. Other students such as the remaining sixth graders on site or students in the seventh and eighth grade levels were excluded due to inability to supervise during instruction and research procedures. All participants were overseen by me, also serving as an English Language Arts instructor within the school.

**Table 1**

*Participant Characteristics*

| Characteristic | *n* = 63 |
|---|---|
| Gender | |
| Female | 35 |
| Male | 28 |
| Special Education | 4 |
| English Language Learner (ELL) | 4 |

## Measures

### Text Complexity Reading Survey (TCRS)

The survey questionnaire in this study can be found in Appendix A and included items in the areas of book interests and selection, text complexity, and growth mindset. The first section of this measure on book interests and selection was used to ascertain

relationships between book choices and text complexity. This section had eight items on a 4-point Likert scale from 1 - very important, 2 - important, 3 - somewhat important, and 4 - not important.

Book interests and selection examples: *I'm interested in the content of a book, I like the way a book cover looks,* or *I choose books that are challenging for me to read.*

The next section of this survey was customized to assess student attitudes toward reading and text complexity. There were ten items within this section. The first two items assessed general mindsets toward reading. These items represented the *incremental* and *entity* constructs.

General Reading example: *No matter what your reading ability, you can always change it a great deal (incremental)* or *It is hard to change one's reading ability because how smart you are matters (entity).*

The remainder of the survey measured student mindset toward text complexity within two constructs of the Theory of Intelligence Scale. The next six items were within the constructs of *achievement/learning goals*.

Text Complexity Example (1): *I enjoy texts that are more challenging to read, even if it means reading words that are difficult to understand (achievement/learning goals)* or *I like reading texts that I can understand easily with simple vocabulary (inverse of achievement/learning goals).*

The final two items of the text complexity survey were within the construct of *effort beliefs.* Text Complexity Example (2): *When I am reading a text that is difficult, I want to work harder to understand* it *(effort beliefs)* or *When I experience frustration*

*from reading difficult texts, it makes me feel like I am not smart (inverse of effort beliefs).*

All items in this section were rated on a 6-point Likert-type scale to emulate Dweck's established research measure, the Theory of Intelligence Scale. Items ranged from 1- Strongly agree, 2 - Agree, 3 - Mostly Agree, 4 - Mostly Disagree, 5 - Disagree, to 6 - Strongly Disagree. Items 2, 4, 6, 8, and 10 received reverse scoring, or scoring in the opposite direction. This ensured that positive and negative responses show consistency in value (Blackwell & Dweck, 2007).

**Growth Mindset Survey**

The final items were used from the Theory of Intelligence Scale by Dweck (1999). There were six items measuring the general mindset toward intelligence of the students. Students answered the first three items under the entity (*fixed mindset*) construct. The final three items were posed to assess the incremental (*growth mindset*) construct. These subscales were rated on a 6-point Likert-type scale ranging from 1- Strongly agree, 2 - Agree, 3 - Mostly Agree, 4 - Mostly Disagree, 5 - Disagree, to 6 - Strongly Disagree. Items 1 - 3 which were categorized under the entity construct (fixed mindset) received reverse scoring so that scores are represented consistently in one direction (Dweck, 1999). The reported reliability for this measure is $\alpha = .76$ (Petscher et al., 2017).

**GMRT-4**

The (GMRT-4) includes several subtests for assessment of essential skills in literacy. Development of the test was designed for both group and individual

administration, and for this experiment, the students performed the assessment within a group setting. Students were administered level 6, form S and took the vocabulary and comprehension subtests. This consisted of 45 vocabulary words presented in brief context, as well as 11 narrative and informational passages with a total of 48 questions assessing understanding of reading. Students took the test within a 35-minute time constraint (MacGinitie et al., 2000). Alternate form reliability between forms S and T of the GMRT-4 is 0.91.

**Lexile Choice Task (LCT)**

All texts within the LCT were related to the students' unit of study, which involved a span of non-fiction content in connection to science – including national epidemics, exploration, and scientific investigations. All participants, regardless of their reading level, had the option to choose an article of the same content that was available within three Lexile ranges – below grade level (third grade through fifth grade; Lexile Range: 501-920), at grade level (sixth grade; Lexile Range: 921-1010), and above grade level (seventh grade through 12$^{th}$ grade; Lexile Range: 1011- 1260 or above). Before the completion of each LCT, students were exposed to directions that informed them of the meaning and purpose of the various Lexile levels they would select from, as well as how they would choose a Lexile level of their assigned article: *"Before you begin, you may choose your level of reading shown in Lexile levels by viewing the drop-down menu at the top of this article. Each article you choose from has a different Lexile level. Lower Lexile levels for an article have easier vocabulary and simpler sentences. Articles with higher Lexile levels have more detailed sentences and contain higher levels of*

*vocabulary."* Additionally, students were instructed to go to the "Activities" section of the article to take a short quiz upon completion of the reading.

**Procedures**

Before the start of the experiment at the on-site school location, IRB (Internal Review Board) approval was received from Middle Tennessee State University in addition to Rutherford County district approval. All student participants were given a parent consent and child assent documentation form, specifying procedures of experimentation.

Upon reception of parent and student consent documentation, data collection was gathered within the second semester of the 2023-2024 academic year for participants at the sixth-grade level. Data for this experiment was group administered and collected over the course of seven days. The first day consisted of the completion of a Growth Mindset Survey and Text Complexity Reading Survey (TCRS) Under my supervision, students completed the surveys during the beginning of their English Language Arts class. Students were instructed to complete the Growth Mindset Survey and TCRS via a *Qualtrics* link sent to their school email address or posted on their teacher's webpage. Directions were given to participants to respond to all items within the survey based on their own opinions and personal experiences related to reading, effort, and achievement. Students were exposed to specific directions within the survey before responding to the survey items: *Click the blue arrows throughout this survey shown at the bottom of each page to continue or go back to any response. Please take your time and give a response to each statement that best reflects your point of view. Continue until you have reached the end of this survey. Type your first and last name. Then, click the blue arrow below to continue."* Participants responded to

the survey independently and were asked not to converse with others until all surveys were completed. On the second day, students took the Gates-MacGinitie Reading Test – fourth edition (GMRT-4). The students completed the assessment in class under my guidance and supervision. This was a written assessment and taken independently by all participants.

On the third day of the study, students began a Lexile Choice Task (LCT) of selecting from articles of the same content presented at varied Lexile levels. Participants performed the LCT over a 5-day time span. Students accessed the articles with the school computer devices during their English Language Arts class chosen through the Newsela educational platform. The LCT took approximately 15 minutes to complete. Students read a different article of their choice each day and answered four to five select comprehension questions based on the text. Students read a standard set of directions explaining the meaning of Lexile levels before their text selection on days three through six.

On the seventh and final day of the LCT, students experienced one of two sets of directions that were presented to them before selecting an article. Students were randomized into two groups. One group received the following directions intended to encourage a growth mindset in choosing more challenging text in addition to the standard directions given the previous four days explaining the function of Lexile Levels: "*A growth mindset shows that you want the challenge of choosing a more difficult text to read so that your brain will experience more development. It shows awareness that with challenge, you can learn and grow at higher levels. Each article you choose from has a different Lexile level. Lower Lexile levels for an article have easier vocabulary and*

*simpler sentences. Articles with higher Lexile levels have more detailed information and contain higher levels of challenging vocabulary*." The control group of students received the same directions they had received on the previous days of the study. "*Each article you choose from has a different Lexile level. Lower Lexile levels for an article have easier vocabulary and simpler sentences. Articles with higher Lexile levels have more detailed sentences and contain higher levels of vocabulary."* Students then selected their Lexile level from the drop-down menu and proceeded with the article study. Following the reading, students answered four to five comprehension questions. Analysis of data proceeded upon completion of procedures.

**Data Analysis**

To answer research question one about construct validity of the adapted mindset measure, Pearson's correlation was conducted to determine the relationship between the designed measure of the TCRS and established survey of growth mindset. The reliability of the Growth Mindset Survey and the TCRS was determined using Cronbach's alpha. To answer question two to examine the relationship between the complexity of students' text selection and students' growth mindset, a correlation between the Lexile averaged across student article choices of the LCT and the overall scores from the students' mindset surveys was conducted. Additionally, a T-test was performed to ascertain outcomes of text selection under the two conditions of directions given before the LCT: The standard directions with Lexile levels and alternative directions explaining the benefits of Growth Mindset and selecting more rigorous texts. To answer question three, in order to understand the relationship between growth mindset and reading comprehension, student

scores of the GMRT-4 as well as their Growth Mindset Survey scores were used to examine correlations between growth mindset and reading achievement. To answer research question number 4, a t-test was conducted to determine if there were group differences on the LCT between students who received the growth mindset directions and those who did not.

# Chapter IV

## RESULTS

**Table 2**

*Descriptive Statistics*

| Measure | *n* | Mean (*m*) | Standard Deviation *(sd)* |
|---|---|---|---|
| Text Complexity Reading Survey | 63 | 49.69 | 4.31 |
| Growth Mindset Survey | 63 | 28.27 | 2.79 |
| GMRT-4 | | | |
| Vocabulary | 63 | 25.46 | 7.88 |
| Comprehension | 63 | 31.41 | 8.19 |
| Total Score | 63 | 56.87 | 14.81 |
| Lexile Choice Task | 63 | 5.92 | 1.79 |

To answer the first research question in determining construct validity of the new TCRS and growth mindset, a Pearson's correlation was conducted between the newly designed TCRS and the established Growth Mindset Survey by Dweck (1999). There was a significant relationship between the TCRS and Growth Mindset Survey, $r = .414$, $p < .01$ (Table 3), indicating that the measures are likely capturing similar constructs. To answer the first research question regarding reliability, Cronbach's Alpha was conducted in the SPSS software program. The measure showed adequate reliability, $\alpha$=.720.

Research question 2 explored the influence of growth mindset on the selection of complex text amongst students. A Pearson's correlation was conducted between the LCT and the TCRS. There was a significant correlation between the LCT and the TCRS, $r = -.36$, $p = .004$, indicating a negative relationship between students' text selection and their mindset towards text complexity. Students with higher growth mindset scores chose less

complex text. We hypothesized the opposite relationship, so this finding was surprising. In considering the relationship of the LCT and growth mindset, there was a negative relationship, $r = -.14$, $p = .276$ but it was not statistically significant.

Research question 3 examined the relationship between growth mindset and reading comprehension amongst students. A Pearson's correlation was conducted to determine the relationship between these variables (See Table 3). Likewise, there was also a statistically significant and negative relationship between student reading comprehension (GMRT-4) and general mindset about intelligence (Growth Mindset Survey), $r = -.42$, $p < .001$, indicating that students with higher growth mindset tended to have lower comprehension scores. There was no significant relationship between reading comprehension (GMRT-4) and student growth mindset in reading (TCRS), $r = -.10$, $p = .422$. Although it wasn't an official research question, it is interesting to note that reading comprehension (GRMT-4) and students' text selection (LCT) were positively related, $r = .33$, $p < .01$, indicating that students with higher comprehension scores tended to select more complex text. For research question 4, a t-test was also conducted to assess the two groups of students on the final day of the LCT: one group under the condition of receiving standard directions, while the other group received directions explaining the advantages of having a growth mindset and the selection of complex text. On average, participants exposed to growth mindset directions selected more rigorous text ($M = 5.59$, $SE = 0.29$), than those without growth mindset directions ($M = 5.23$, $SE = 0.32$). This difference was not significant $t(61) = 0.84$, $p = .405$; however, it did represent a small effect size, $d = .21$.

**Table 3**

*Correlations for Study Variables*

| Variables | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. GMRT-4 | - | | | |
| 2. Lexile Choice Task | .328** | - | | |
| 3. Text Complexity Reading Survey | -.103 | -.362** | - | |
| 4. Growth Mindset Survey | -.424** | -.139 | .414** | - |

** $p < .01$

# CHATPER V

## DISCUSSION

This study focused on the effects of a growth mindset on the complex text choices of adolescent students. This chapter will provide the core findings of each research question, reference other studies with comparable research questions, as well as address any limitations and future directions of this research.

The first question sought to determine the construct validity of the newly constructed TCRS by analyzing a correlation with an established measure (i.e., Growth Mindset Survey; Dweck, 1999). After a Pearson's correlation was conducted, it was determined that there was a significant relationship with both assessments. This finding is consistent with various studies that have used Dweck's Growth Mindset survey to design similar instruments which assessed the influence of growth mindset on reading performance and overall achievement (Petscher, 2017; Solotruk, 2013; Tecker, 2017). Petscher et. al (2017) study on growth mindset and reading correlation designed a similar measure, also modifying Dweck's growth mindset survey to add items measuring a reading mindset on a Likert scale. The reliability for this instrument was $\alpha = .76$, very close to the reliability for this study.

The second research question explored the relationship between students' reported mindset about reading and the complexity of texts they select. In this study along with others, there were parallels when it came to mindset and the outcome of improved reading perspectives. Unexpectedly, this study revealed that students with higher growth mindset chose easier texts. Other studies have found mixed results for the

relationship among growth mindset, academic achievement, and behavioral tasks. Saia (2016) discovered students with negative attitudes toward literacy had developed an increased work time as well as positive attitudes in reading after experiencing lessons on growth mindset. Similarly, Zhu's study, also with a secondary age group, revealed a higher percentage of students learning about growth mindset selecting more difficult challenges than those not exposed to mindset criterion (2019). In addition, De Koning (2021) had results reflecting similar outcomes, as the treatment group for more complex academic conditions had an increased growth mindset in comparison to participants without challenging circumstances. As mentioned earlier, Sisk et al. (2018) in a meta-analysis of growth mindset studies found no significant relationship between students' growth mindset and changes in behavior, suggesting that fostering a growth mindset alone may not lead to observable improvements in student behavior, such as increased effort or better self-regulation.

Challenges of attaining a growth mindset have also been arguably present amongst students considered gifted or academically advanced (Dweck, 2012b). This tendency may be attributed to their classification as gifted and the frequent praise they receive for their intelligence from parents and teachers (Dweck, 2007b). Mofield and Parker Peters (2018) examined this issue by comparing the achievement attitudes of advanced and typical students in grades six through eight. Their findings indicated that advanced students did not take on higher fixed mindset beliefs compared to their peers; however, there was variability in the data. Esparza et al. (2014) also had similar results when examining the beliefs of gifted students on the malleability of intelligence. While

fewer gifted students fell into the fixed mindset range than typical students, results displayed room for improvement toward a growth mindset. As for the second phase of the study, it was revealed that gifted students changed their perception of their own intelligence once gaining awareness of learning strategies and how the brain functions. These findings suggest there is opportunity to further enhance and strengthen growth mindset amongst advanced students.

The third research question analyzed the relationship between growth mindset and reading comprehension. Results of this experiment revealed a significant negative relationship between the two factors. This finding is opposite of some studies with a comparable age group that found strong and positive correlations of mindset survey results and formal reading assessments (Petscher et al., 2017; West et al., 2016). There were, however, studies that did not find the same outcome. For instance, although Solotruk (2013) reported some achievement after the growth mindset intervention, there was still a weak correlation between the growth mindset factor and reading scores. Additionally, Wilson (2016) concluded there was no relationship after analysis of results amongst fourth and fifth graders. Likewise, with adolescent studies, Saunders (2013) found no effect on reading outcomes and growth mindset. Martinez (2020) also found weak correlations of mindset and reading achievement.

Conversely, similar studies have found positive outcomes with growth mindset and overall academic achievement. Studies have shown the growth mindset intervention to have a significant effect on overall academic performance (Panunesku et al., 2015) or have shown the intervention to help increase success in mathematics, reading, and

science subjects (Schmidt et al., 2016). Additional studies show advanced levels of academic achievement with relationship to growth mindset (Blackwell et al., 2007; Claro et al., 2016; Kimberly Sue Forsythe, 2016). Other studies found mindset to have a strong association with grades and assessment scores and to have an increased influence on persisting through academic challenges (Laursen, 2015; O'Rourke et al., 2014).

The fourth research question examined if students would select more complex text when given directions that encourage a growth mindset. Results of this study revealed that students exposed to growth mindset directions selected more complex text than those without directions in growth mindset. However, the results were not statistically significant. These results are similar to other studies such as De Koning study (2021) which had a similar design for the experimental condition, incorporating reading and writing tasks related to growth mindset. Students in the control condition had traditional tasks that didn't mention the malleability of the brain. It was expected that students in the experimental group would report a higher cognitive load, however growth mindset and cognitive load were not significant, indicating a weak relationship between growth mindset and rigorous tasks (De Koning, 2021). Instructions on growth mindset were also presented in the Suanders (2013) study. Students in the experimental group completed weekly computer modules that reviewed how the brain works, as well as encouraged growth mindset and hard work. Results showed that instruction did not have an effect on mindset and reading scores. Additionally, Paunesku et al. (2015) conducted specific research with teachings on brain malleability and how challenges create learning

opportunities. It was determined that the experimental group under these conditions produced no effect on academic achievement. [OBJ]

The variables of reading comprehension and Lexile choice are notable due to negative correlations with growth mindset. This may be a result of student attitudes toward achievement. While higher performing students in reading may display some actions and thoughts reflecting a growth mindset, more motivation may have been directed toward practical goals of academic achievement. For instance, higher ability students may have been more focused on tasks they were confident they would succeed in as it pertains to scores and letter grades. Likewise with Lexile level choices, the students were given explicit information on what Lexile levels represent before each independent reading choice task: "*Lower Lexile levels for an article have easier vocabulary and simpler sentences. Articles with higher Lexile levels have more detailed sentences and contain higher levels of vocabulary."* With this in mind, higher ability students may have seen more value in choosing lower Lexile levels to ensure higher achievement on the quiz assessment following each reading task.

**Limitations**

This research study aimed to unravel impacts on growth mindset particularly within the adolescent stage, as research indicates a decrease in motivation within this age group (Saunders, 2013) and an urgency to increase rigor in text complexity performance (Budd, 2015; Quinn 2015). While this study captured the performance of adolescents on the sixth-grade level, students in the seventh and eighth-grade levels on the research site

did not participate in this study also due to logistical challenges. This in turn may reduce the level of generalization of this research toward adolescent students.

Contrary to prior studies that focused on specific groups in education such as at-risk learners, or learners susceptible to less than advantageous outcomes due to circumstances such as social and emotional behaviors, academic failure, or low-income families (Solotruk, 2013; Baybard 2020), this research did not examine the impact of growth mindset on students with unique learning situations. Instead, this research focused on results geared to all student participants regardless of an at-risk, English language learner, or special needs status. As a result, effects of growth mindset on at-risk students or other groups with distinct learning characteristics cannot be generalized from this study.

With regard to text complexity, the level of text rigor options were limited to the selection within one educational platform, *Newsela.* While this is a distinguished and reputable resource amongst English educators, some may argue that a variety of sources and platforms should be explored in order to have a more extensive representation of text complexity for English Language Arts standards.

**Future Studies**

Upon reflection of results on the impact of growth mindset on reading comprehension, a closer analysis on incorporating different factors within research should be considered. Future research should consist of a larger sample size featuring a wide age group spanning from middle to high school grade levels. This in turn may provide a more accurate and extensive reflection of the effect of growth mindset on

complex text choices for adolescents. Additionally, specific instruction on the importance of increased text complexity during reading could be incorporated within growth mindset instruction.

Other considerations for future studies might be to include a variety of demographics within the sample inclusive of at-risk, special education, or English language learning backgrounds. Taking into account the impact growth mindset has had on at-risk students in previous research (Baynard, 2020; Paunesku et al., 2015), it could be beneficial to continue evaluating the extent of which growth mindset effects varying student groups. If indeed there are more observed effects for certain students in different learning scenarios, mindset instruction might be an even more effective learning tool within the educational environment.

**Conclusion**

The purpose of this study was to assess the relationship of growth mindset to reading comprehension and the selection of complex text, particularly with the adolescent age group. This research revealed a negative significant relationship of growth mindset and reading comprehension. This study also resulted in there being a negative significant relationship between growth mindset and complex text choices. Despite this, it was revealed that on average, students exposed to growth mindset teachings selected more rigorous texts (though the results were not statistically significant).

Results of this research invoke questions regarding growth mindset to still be examined. What additional factors may be needed within instruction to increase reading achievement when implementing growth mindset? How do we ensure consistency with

growth mindset effectiveness on text choices and overall reading performance? This study has presented inquiries that call for further exploration with future mindset studies in education. In addition, this analysis has added to the body of research on the possibilities of growth mindset to positively impact student achievement.

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# APPENDICES

# APPENDIX A

## Text Complexity Reading Survey

*4-point Likert scale 1 - Very Important, 2 - Important, 3 - Somewhat Important, 4 - Not Important (8 items)*

1.) I'm interested in the content of a book.
2.) I like the way a book cover looks.
3.) One of my friends suggests a book.
4.) My teacher, librarian, or parent suggest a book.
5.) I look at how hard the book is to read.
6.) The book is at the right level for me – not too easy, not too hard.
7.) I choose books that are easy to read.
8.) I choose books that are challenging for me to read.

*6-point Likert scale 1 - Strongly Disagree, 2 – Agree, 3 – Mostly Agree, 4 – Mostly Disagree, 5 – Disagree, 6 – Strongly Disagree (10 items)*

9.) No matter what your reading ability, you can always change it a great deal.
10.) It is hard to change one's reading ability because how smart you are matters.
11.) I enjoy texts that are more challenging to read, even if it means reading words that are difficult to understand.
12.) I like reading texts that I can understand easily with simple vocabulary.
13.) When I read texts that have challenging vocabulary or sentence structure, I'm motivated to understand it by asking questions and re-reading parts of the text that confused me.
14.) I like to stick with texts that I can understand without confusion or having to ask questions.
15.) I like to read texts that have deeper levels of meaning to explore.
16.) When I see texts that have complex wording or sentence structure, it makes me want to stop reading.
17.) When I am reading a text that is difficult, I want to work harder to understand it.
18.) When I experience frustration from reading difficult texts, it makes me feel like I am not smart.

# APPENDIX B

## Growth Mindset Survey

*6-point Likert scale 1 - Strongly Disagree, 2 – Agree, 3 – Mostly Agree, 4 – Mostly Disagree, 5 – Disagree, 6 – Strongly Disagree (6 items)*

19.) You have a certain amount of intelligence, and you really can't do much to change it.
20.) Your intelligence is something about you that you can't change very much.
21.) You can learn new things, but you can't really change your basic intelligence.
22.) No matter who you are, you can change your intelligence a lot.
23.) You can always greatly change how intelligent you are.
24.) No matter how much intelligence you have, you can always change it quite a bit.