THE EFFECTS OF A GROWTH MINDSET INTERVENTION ON SELF-EFFICACY AND

MOTIVATION OF ADOLESCENT SPECIAL EDUCATION STUDENTS

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Abstract

The purpose of this study was to investigate whether a growth intervention would improve adolescent special education students' self-efficacy and motivation. The research was conducted in a middle school in the Northeast from January 2016 to June 2016. The convenience sample for this study comprised of sixth, seventh, and eighth grade students receiving special education services in the area of reading. The study was quasi-experimental in design and included both a comparison group and a treatment group. Both groups received a pretest and a posttest in the form of a survey. While only the treatment group received a growth mindset intervention. Upon completion of the study, the survey results of the comparison and treatment groups were compared. The instruments were used to measure whether there were differences in the mean scores for self-efficacy and motivation in reading. Results suggested that a growth mindset intervention had a significant difference in motivation of adolescent special education students.

APPROVAL PAGE

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DEDICATION

To my parents, Mary and George Chaber, you have focused your lives around fostering my success. You have sacrificed much so I could have all the best in my life. I can never repay you for all you have done for me, but I only hope this dissertation represents a "thank you" for all you have done that has led me to where I am now.

To my husband, Anthony, we had only started dating when I brought up the idea of going back to school for my sixth year. When I mentioned possibly changing my focus to the doctoral program, you did nothing but support me through the application process and the program. You never once complained about putting finances aside for tuition, having Wednesday nights without me, and spending countless hours taking care of the house and our daughter while I wrote my dissertation. Thank you for that.

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Last but not least, to my thoughtful, loving, and witty daughter, Samantha: I began the proposal for my research study while I was pregnant with you, and I had to do the most time-consuming portion of my research study and dissertation during your first 2 years of life. You won't remember these years, but I have to thank you for being my delightful distraction when I needed a break from typing. Your smiles and your hugs were all the motivation I needed at times to persevere and push onward. I would do anything to give you the same opportunities my parents afforded me. Your future is filled with such potential and promise. I love you with all my heart.

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CHAPTER ONE: INTRODUCTION TO THE STUDY

The University of New Hampshire's Institute on Disability (2013) documented that 78,653 students who identified as needing special education services dropped out of school in the U.S. in the 2010–2011 school year. The National Assessment of Educational Progress results and high-school dropout rates have unmistakably confirmed that not all students achieve in school (Uline & Johnson, 2005), and this factor is particularly true for special education students. Thus far, identifying the causes of nonsuccess has been extremely difficult because low academic performance among students with special needs is influenced by several different factors (Rumberger, 2001).

Students who repeatedly fail to achieve become fearful of new challenges and devastated by setbacks (Dweck, 2006). Therefore, finding alternative methods to improve self-efficacy and motivation while facilitating the academic success of special education students may decrease the dropout rate. Dweck's (2006) research indicated that students' beliefs in fixed intelligence might raise their concerns about aptitude while also increasing their anxiety when being challenged. As a result, students believe that their failures are a measure of their intelligence, which reinforces a defensive and helpless behavior that worsens their performance. Students with a fixed-intelligence mindset may feel threatened at the idea of their flaws being unmasked because they believe their flaws make them failures, therefore they might be unwilling to attempt challenging tasks (Dweck, 2006). Alternatively, a belief that intelligence is malleable and can improve with effort creates a desire for learning, and obstacles are thus viewed as a natural part of learning (Dweck, 1999).

Educators must find interventions that will help students develop a growth mindset for success because a fixed mindset can overwhelm a student's motivation, learning, and

achievement. Improving the mindset of special education students may have a positive, long-lasting impact on students' learning and performance (Dweck, 2006).

Rationale for Selecting the Topic

Because of the rigorous expectations associated with the Common Core State Standards and high-stakes standardized assessments, all students are required to successfully master difficult concepts. However, for special education students, academic success can be an enormous challenge due to a range of possible learning disabilities. The purpose of this study was to investigate the effect of a growth-mindset intervention on reading self-efficacy and motivation on students identified with a specific learning disability or dyslexia.

Statement of the Problem

Following the implementation of the Common Core State Standards, the gap has widened between students who already had reading difficulties and their peers. According to Burris and Aja (2014), students with disabilities who were of all nationalities, income levels, and backgrounds saw their scores plunge in 2012. In fifth grade, 75% of students with disabilities scored "Below Standard" on the ELA Common Core tests. In other words, all students are facing higher academic standards; however, these challenges continue to widen the gap for special education students rather than help them to meet academic standards.

Not only are academic outcomes being affected by the rigorous expectations currently implemented in schools, but, in addition, Tabassam and Grainger (2002) found that students with disabilities scored drastically lower scores in academic self-efficacy than peers without a disability. Therefore, not only are special education students not meeting academic expectations compared to their typical peers, they also have lower self-efficacy, which can possibly cause a cyclical pattern of low academic achievement.

Students with special needs frequently assign their failure to internal causes (Bryan, 1986). In educational contexts, success is often attributed to high capability and hard work, and failure is credited to low capability and lack of trying (Weiner, 1985). As a result, students with special needs may feel that lack of success in school indicates an inability to succeed academically or proof that they did not try hard enough to achieve.

Though researchers have examined the relationship between self-efficacy, motivation, and achievement after a student receives a growth-mindset intervention (Saunders, 2013), there is limited research on how a growth-mindset intervention can help adolescent special education students. Further research is needed to examine the extent to which a growth-mindset intervention can benefit students with special needs.

Potential Significance of the Research

The researcher investigated a growth-mindset intervention at the middle-school level with a treatment and comparison group to examine whether adolescent special education students who received services in the area of reading had a significant difference in their self-efficacy and motivation scores after participating in an eight-week growth-mindset intervention. This research may assist educators in developing instructional interventions that can improve students' reading motivation and self-efficacy by reinforcing the growth mindset theory within their classrooms.

Definitions of Key Terms

The following terms will be used throughout the research study.

1. *Adolescence* has been defined as a stage of development occurring between roughly the ages of 12 and 18 (Erikson, 1994).

2. *Attribution Theory* has focused on how and why people have rationalized events as they have (Weiner, 1985).

3. *Brainology* is an "online program that teaches brain science and study skills to students. In the program, students develop a growth mindset, the core belief that abilities, rather than being fixed, are developed over time" (Dweck, 2012, p. 1).

4. A *fixed mindset* has been defined "as the belief that traits such as intelligence are fixed or uncontrollable" (Dweck, 2006, p. 7).

5. *A growth mindset* has been defined "as the belief that traits such as intelligence are malleable and can increase with effort" (Dweck, 2006, p. 7).

6. *Motivation* has been defined as being "*moved* to do something … someone who is energized or activated toward an end is considered motivated" (Ryan & Deci, 2000, p. 55).

7. *Self-efficacy* has been defined as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391).

8. *Special education students* are individuals whose learning needs could not be met by general education teachers in general education classrooms without additional support (The American Heritage Dictionary, 5th Ed., 2016). For the purpose of this study,

special education students have been defined as students who have a specific learning disability, dyslexia, or goals specific to the area of reading.

9. *Typical peers*, for the purpose of this study, were any students who did not require special education services in the area of reading.

Methodology Overview

Setting and Subjects

The participants in this quasi-experimental study were special education students in the sixth, seventh, and eighth grades from two middle schools. The student and teacher participants were from a large urban city in the Northeast. All 126 special education students who received services in the area of reading were asked to participate in this study. Out of all the students qualifying for special education services in the sixth, seventh, and eighth grades, 70 students agreed to participate in the study, and 68 students completed the study. There were a total of 23 students in the sixth grade, 23 students in the seventh grade, and 22 students in the eighth grade who chose to participate in the research study. The treatment was delivered by sixth, seventh, and eighth grade special education teachers. This was a sample of convenience.

Instrumentation

Data were recorded using two instruments: The Reader Self-Perception Scale 2nd Edition (Melnick, Henk, & Marinak, 2009), the Motivation for Reading Questionnaire (Wigfield & Guthrie, 1997) and Brainology, online mindset intervention.

The Reader Self-Perception Scale 2nd Edition (RSPS-2). Researchers have used the RSPS-2 to measure students' reading efficacy and self-perceptions in the intermediate grades up to 10th grade (Henk & Melnick, 1992; Henk, Melnick & Marinak, 2013). Henk & Melnick found four factors that explain how reader self-perceptions are made: a) Observational

Comparison, b) Social Feedback, c) Physiological States and d) Progress (Henk, Melnick & Marinak, 2013). Those four factors are scales on the RSPS-2 used to measure self-efficacy of reading (Henk, Melnick & Marinak, 2013).

For educators, information acquired from the RSPS-2 has been useful for both whole group and individual assessment, giving them awareness of how the school environment affects students' self-efficacy in reading. Also, through the RSPS-2, educators have observed changes in students' self-perception over time (Melnick, Henk, & Marinak, 2009). There are 33 items for students to complete, which they responded to on a scale of 1 "strongly disagree" to 5 "strongly agree." The evaluator had to calculate the scores for each of the subscales, by adding each of the item responses that were in each category. A total of 80 points can be allotted to Progress, 45 points to Observational Comparison, 45 points to Social Feedback and 60 to Physiological States.

The internal reliability for each scale measured within the range of .87 to .95, an appropriate level for an effective measure, which should have a minimum of .70 (Melnick, Henk, & Marinak, 2009). The RSPS-2 "provides evidence of construct validity through principal components analysis of the factor structure" (Melnick, Henk, & Marinak, 2009, p. 2).

Motivation for Reading Questionnaire (MRQ). The MRQ had 53 questions with responses based on a Likert-type scale of 1 ("very different from me") to 4 ("a lot like me"). The subscales on the MRQ were: (a) self-efficacy, (b) challenge, (c) work avoidance, (d) curiosity, (e) involvement, (f) importance, (g) recognition, (h) grades, (i) competition, (j) social and (k) compliance. A total score was calculated by, "…summing the scores of all the items, with the exception of Work Avoidance items" (Wigfield, Guthrie, & McGough, 1996, p. 10). Separate scaled scores could have been computed by summing the Likert responses for each item within a

subscale; then, divided the sum by the total number of items within a scale (Wigfield, Guthrie, & McGough, 1996). The MRQ had internal consistency reliabilities for reading motivation ranging from .43 to .81 (Baker & Wigfield, 1999).

Brainology Intervention. Brainology is a computer-based program intended to teach students how to have more of a growth mindset. As part of the program, students watched cartoon-like characters as they complete five instructional units. The units taught students that their brain is constantly changing and that they can alter their intelligence, with specific emphasis on how students could apply the growth-mindset theory to their schoolwork. Two and a half hours of computer-based instruction were broken into five sections, an introduction, and four instructional units. There were additional resources and exercises that are available if needed. The program also offered up to 10 hours of supplementary materials focusing on the growth mindset (Snipes et al., 2012).

Research Question

In this study, the effect of a Brainology growth-mindset intervention on the dependent variables—self-efficacy and motivation in reading—was examined. The researcher analyzed the data to determine if there was a significant difference between participants who received the growth-mindset intervention and participants who did not. The researcher used a systematic approach to explore the following question:

Was there a significant difference in reading self-efficacy and motivation between middle-school special education students who participated in the growth-mindset program and those who did not?

Design and Analysis

This quasi-experimental study used a pretest-posttest design for the research question. The RSPS-2 and MRQ were analyzed quantitatively to measure student self-efficacy and motivation in reading, respectively, using a multivariate analysis of variance (MANOVA) for the RSPS-2 and an independent-samples *t*-test (*t*-test) for the MRQ.

Data Collection Procedure and Timeline

Permission. The school district's deputy superintendent granted permission for the research in September 2014 (Appendix B). In August 2015, the researcher met with the special education director and the assistant director to finalize details of the study. Middle-school principals and teacher participants then granted permission in August 2015 (Appendix C and D). In September 2015, parental consent forms and student assent forms (Appendix E and F) were distributed to all sixth, seventh, and eighth-grade students who were receiving special education services in the area of reading. Parental consent and student assent forms were collected in mid-September. These 40 student participants became part of the treatment group. Due to a small number of student participants agreeing to be part of the study, the researcher was granted permission in January 2016 to obtain student participants for the comparison group from another middle school within the district. In January 2016, parental consent and student assent forms were distributed to students in the comparison group who were receiving special education services in the area of reading. Consent was collected at the end of March. These student participants became part of the comparison group.

Procedures and professional development. The study started upon receipt of the signed parental consent forms; the researcher conducted a two-hour professional-development session with the three teacher participants ($n = 3$) who were giving the intervention to the

treatment group. The researcher gave an overview of Brainology, the computer-based growth-mindset intervention, and allotted time for the teacher participants to use the program and ask questions for clarification. In addition, the researcher reviewed the directions for the administration of the RSPS-2 and MRQ instruments and handed out the script the teacher participants were to read to the student participants prior to commencing the Brainology program. No additional professional development took place.

However, the researcher met with the teacher participants once a week to discuss the progress of the study and to be sure the teacher participants were consistent in the implementation of the intervention. In addition, the researcher had given the teacher participants contact information, therefore that the researcher could be contacted whenever needed, by the teacher participants.

Pretest. Before receiving the growth-mindset intervention, pretest data was used to establish a baseline for the treatment and comparison groups. All study participants in the treatment group were given a pretest for the RSPS-2 and MRQ on January 11, 2016. All study participants in the comparison group were given a pretest for the RSPS-2 and MRQ on April 11, 2016. Teacher participants read the directions and test items aloud to student participants therefore that students' reading levels would not interfere with their ability to complete answer items.

Treatment. The treatment group began the growth-mindset intervention, Brainology, on January 20, 2016, after taking the RSPS-2 and the MRQ. Brainology is an online program that allows students to independently complete lessons about a growth mindset. It has been most successfully implemented with students in Grades 5–9. The program's audio component prevents students' reading level from interfering with their ability to complete the program.

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Brainology lessons focus on how the brain functions and learns with the aim of showing students that they are in control of their learning and development. Most important, Brainology teaches students how to apply the lessons in their academic work. Consequently, the Brainology program may help students learn that they can improve academically if they attempt tasks with persistence and use failures as opportunities to improve.

For this study, each student participant completed the intervention on their own computer with their own set of headphones; therefore, they could move through the lessons at their own pace. The lessons guided the student participants through quests where they performed experiments and conquered challenges. Implementation time and schedules were flexible and were adjusted to fit the users' needs. The program included a short introduction and four instructional units that took 2.5 hours to complete, with 8 additional hours, for a total of 10.5 hours worth of mindset activities that students completed.

For this study, the intervention took place during participants' advisory period therefore that they did not miss instructional class time. Students went to a computer lab 5 days per week for 16 minutes a day over the course of 8 weeks in order to complete the 10.5-hour intervention.

CHAPTER TWO: REVIEW OF THE LITERATURE

Chapter Overview

In current educational contexts, there has been a demand for teachers to promote rigorous learning standards and high expectations for all their students by challenging them with a higher level of thinking skills. According to Blackburn and Williamson (2009), "[s]ince the release of *A Nation At Risk* (National Commission on Excellence in Education, 1983) the debate about the quality of America's schools has grown exponentially" (p. 1). This debate has resulted in educators being expected to implement rigorous expectations for their students. The No Child Left Behind Act of 2001, educators have also been held accountable for the success of every single student.

However, with increasing expectations placed on students to demonstrate their abilities on standardized tests, teachers have felt the overwhelming demand for their students to perform well on these assessments (Ballard & Bates, 2008). These standardized tests have been perceived as a measurement of how well teachers educate their students (Ballard & Bates, 2008). Moreover, many states have linked standardized tests scores to teachers' evaluations (Piro, Wierners, & Shutt, 2011). Often, these demands have resulted in teachers perceiving they are not in control of their teaching (Ballard & Bates, 2008). If their students lacked the motivation or self-efficacy to attempt challenging and thought-provoking tasks, teachers may have deemed that they could instruct their students to do therefore, as they believed that only their students could alter motivation and self-efficacy (Hardré & Sullivan, 2009).

Most teachers believe they are adept at instructing their students; yet, many also express frustration about their incapability to influence students' motivation (Hardré & Sullivan, 2009). This outcome may result from teachers becoming therefore focused on meeting the high

expectations of standardized assessments that they concentrate more on students' scores or academic abilities. This practice may result in teachers devaluing the importance of students' self-efficacy and motivation in academic success. According to Scott (1996), teachers frequently assess students' aptitude only when predicting achievement, disregarding that students' sense of self-efficacy also has a significant function in achievement.

Using students' ability as the primary predictor for achievement in middle school while disregarding motivation, self-efficacy, and mindset is detrimental to students because adolescent students tend to become more "performance-oriented and less mastery-oriented than they were in elementary school" (Anderman & Mueller, 2010, p. 206). Moreover, focusing exclusively on achievement measures is particularly perilous to students who receive special education services because, for many of these students, it can lead to a downward spiral of academic failure (Carnegie Council on Adolescent Development, 1995). Adverse academic occurrences during adolescence may have detrimental consequences on students' drive to be academically successful (Anderman & Mueller, 2010). Below Table 1 lists all the research studies referred to in Chapter Two.

Chapter Two consists of a review of the literature relevant to the theories of mindset, self-efficacy, motivation, attribution, and adolescence. In addition, this chapter will review empirical research related to these theories. Furthermore, the end of each section will review how the theories of self-efficacy, motivation, and attribution are interconnected with the theory of mindset and special education. The purpose of Chapter Two is to provide a theoretical and empirical foundation for the current research. Figure 1 depicts the theories reviewed from the literature.

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                    ┌─────────────┐
                    │  Motivation  │
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  ┌─────────────┐          │          ┌─────────────┐
  │ Self-Efficacy│         ▼          │  Attribution │
  │              │                    │    Theory    │
  └──────┐       │    ╭─────────╮     │       ┌──────┘
         ▼       │    │ Mindset  │    │       ▼
                 │    ╰─────────╯    │
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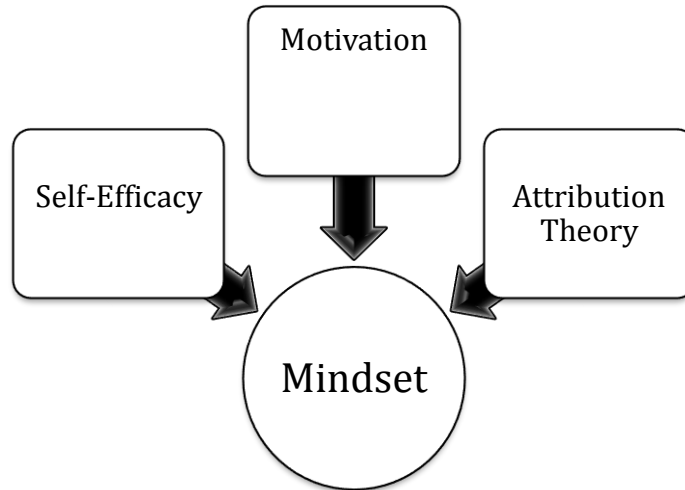
Figure 1. Theories/research reviewed in Chapter Two: Review of the Literature.

Review Process

At the beginning of the literature review process, the researcher considered full text articles and peer-reviewed articles with the related words applied in a search of ProQuest: "mindset," "self-efficacy," "middle school" and "motivation." The results numbered 9. The researcher substituted the words "middle school" with "adolescents" and the results numbered 23. The researcher removed the word "adolescent" and conducted a search with "mindsets," "motivation" and "self-efficacy." The results demonstrated 357 applicable articles corresponding to this study's focus. When the words "middle school" and "adolescents" were eliminated, the researcher performed an overview of the titles and abstracts of all remaining articles to determine which of the articles pertained to this research study.

To confirm the search for related literature was exhaustive, the researcher also used the same search parameters in Google Scholar. Using the same terms that had led to the research articles in ProQuest, the researcher used Google Scholar to gather full text literature. The results numbered 11,800. To narrow the focus, the researcher inserted the word "adolescent," which resulted in no matches. The researcher replaced the word "adolescent" with "middle school."

The results numbered 9,790. To reduce the search to the most significant outcomes, the researcher added the term "education." The results numbered 3,200.

The researcher reviewed the titles of the articles to determine their relevance to the current research study. Articles that were not relevant to the study were not examined (for example, teacher mindset; teacher self-efficacy; a focus on a particular nationality; and homework). However, the researcher focused on articles that might have relevance to the research study (for example, research that focused on mindset, motivation, and/or self-efficacy at the graduate level, secondary education level, and the elementary level).

Next, the researcher examined relevant research articles to clarify their significance and connection to the current research study. Both qualitative and quantitative research articles were included in this literature review. The review process informed the researcher about the established research and how the current research might add to that body of knowledge.

After the data analysis for this study was completed, the related literature was re-examined to ensure that the most up-to-date research was included in the current study's literature review. This re-examination was significant especially for motivation, since this study found that there was a significant difference between motivation and students who received a growth mindset intervention and those who did not. This final literature review was informed by the study's topic, theories, and for Chapter Five, the significance of the study.

Theory of Mindset

Dr. Carol Dweck (1999) explored why certain students enjoy learning, even though the work is difficult, while other students are anxious or unwilling to attempt tasks that appear challenging. She created a theory of mindset with a spectrum ranging from the fixed mindset to the growth mindset. The spectrum illustrated how people could have different mindsets—fixed

or growth—toward varying areas within their lives. For example, students with a fixed mindset toward their ability to complete academic tasks may simultaneously have a growth mindset toward their ability to play baseball, as can be seen in Figure 2.
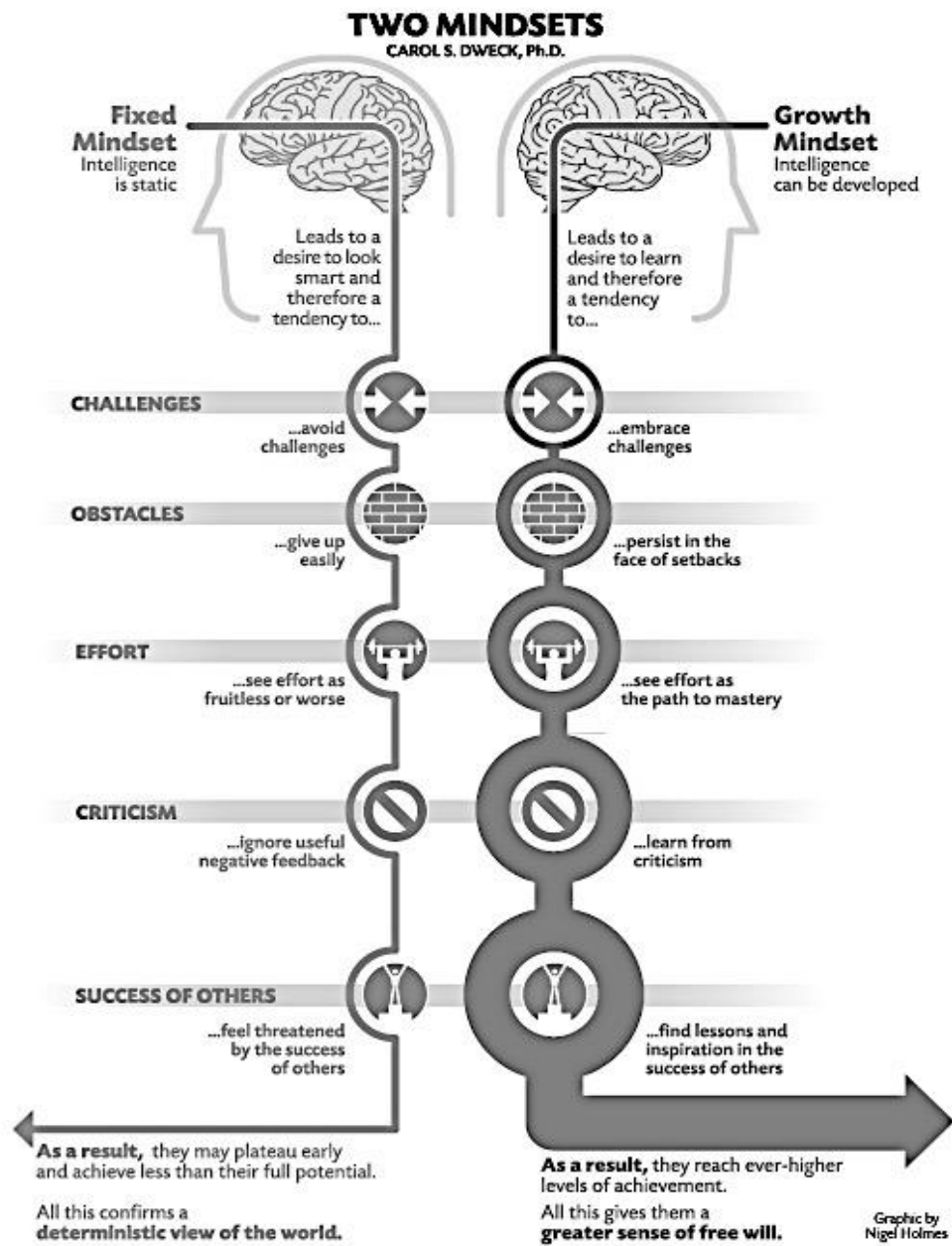
Figure 2. Differences in fixed and growth mindsets. Reprinted with permission from the illustrator, Nigel Holmes.

Fixed Mindset

Students with a fixed mindset deem intelligence as something that cannot be changed (Dweck 2006). Normally, students with a fixed mindset see their failures, whether academic or not, as a reflection of their intelligence. Even worse than failure is the concept of exerting effort and still enduring failure—for this leaves the students with no other excuse for their failure except lack of intelligence (Dweck, 2006).

For example, if students with a fixed mindset have struggled in math and failed an assessment, the students might believe that there is nothing they can do to change that failure and that, no matter how much effort is exerted, they will never succeed at math. Also, students with a fixed mindset characteristically ignore constructive feedback and feel threatened by the success of their peers (Saunders, 2013). They will additionally blame outside factors for their failure. For instance, if they fail a test, they might blame teachers by saying, "They did not teach us that," or, "That was not on the study guide." As a result, students with a fixed mindset believe that their failure is not due to their lack of skill or determination but rather the result of other people's actions (Dweck, 2006).

Growth Mindset

Conversely, students with a growth mindset believe that intelligence is malleable and can change, and, through their failures, they learn and grow. Belief in the importance of effort permits students with a growth mindset to view failure as a motivator that drives them to continue learning (Blackwell, Trzesniewski, & Dweck, 2007; Plaks & Stecher, 2007). Eventually, students' persistence and desire to persevere resulted in success (Dweck, 2006). Furthermore, students with a growth mindset use constructive feedback to improve, and they are willing to learn from the success of others (Saunders, 2013). Studies have shown student

improvement even when the feedback is negative (Dweck, 2006). Therefore, if students with a

growth mindset have struggled in math and failed an assessment, for example, they will believe

that they can do better in the future by studying more and working harder. Students with a

growth mindset do not blame outside factors for their failures, and they look for ways to improve

on the next assessment (Dweck, 2000). Table 1 illustrates the research examined in the literature

review about mindsets through varying academic levels.

Table 1

Research Studies on Mindsets with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Graduate	100 first-year law school students ($n = 100$)	Sperling and Shapcott (2012) examined causes of law students' varied responses to critical feedback on assessments.	Over a third of the law school students had a fixed mindset, which led to negative reactions when given critical feedback by instructors.
Undergraduate	2 computer science undergraduates ($n = 2$)	Murphy and Thomas (2008) examined perceptions of mindset on students' academic success.	Students with a growth mindset were eager to take risks and appreciate constructive feedback from teachers and peers.

(continued)

Table 1

Research Studies on Mindsets with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Middle school	373 secondary-school students in the seventh grade ($n = 373$)	Blackwell, Trzesniewski, and Dweck (2007) examined whether academic performance was impacted by students' beliefs about intelligence.	Academic performance was increasingly impacted by students' beliefs about intelligence ($p < .05$).
Elementary school	4 student participants ($n = 4$) (2 from fourth grade and 2 from fifth grade)	Hartmann (2013) examined the effects of a growth-mindset intervention on students with learning disabilities.	Students with specific learning disabilities responded to a growth mindset intervention.

Table 1

Research Studies on Mindsets with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Elementary school	412 fifth-grade students ($n = 412$)	Mueller and Dweck (1998) examined the effects of praising students on their intelligence.	This study demonstrated a significant difference ($p < .001$) in how the students, given praise for intelligence and effort, attempted and persevered through tasks during the study.

Mindset and Praise

In the past, teachers believed that boosting their students' self-esteem through praise would improve students' motivation and academic success; however, Dweck (2006) suggested that this was not true. Feedback from teachers can "convey messages that affect students' opinion of themselves, their motivation, and their achievement" (Dweck, 2006, p. 207). For example, if a teacher tells students that they are bright when they do well on an assessment, those students may perceive that they are not intelligent when they do poorly on an assessment. In addition, if a teacher praised students for completing a simple task, the students might be afraid to try anything challenging and possibly fail. Furthermore, the praise might be interpreted as an indication that their teacher does not think students are capable of doing more (Dweck, 1999).

To examine the effects of praising students on their intelligence, Mueller and Dweck (1998) conducted a study with 412 fifth-grade students ($n = 412$) from a Midwestern town and a

large Eastern city, with varied backgrounds. The students were given a puzzle that they could all complete without difficulty. A third of the students were praised on their intelligence, another third of the students were praised on their performance, and the last third of the students were praised on their effort.

Mueller and Dweck's (1998) study demonstrated a significant difference ($p < .001$) in how students given praise for intelligence and effort attempted and persevered through tasks during the study. The group of students praised for intelligence solely chose puzzles that they knew they could complete easily and successfully. In an interview with *The New York Times*, Dweck (1998) also shared that these students were mostly concerned with the ways that other students performed on the same tasks, rather than discovering how other students were successful or learning strategies that helped those students succeed. In contrast, 90% of the students praised for their effort chose increasingly challenging puzzles. Dweck (1999) explained, "When we praise students for their intelligence we are telling them, look smart; don't risk making mistakes. On the other hand, when we praise students for their effort, they are not diverted from the task of learning with a concern of how smart they might—or might not—look" (Dweck, 1999, p. 2).

Mindset and Achievement

This section discusses literature aimed at achievement in mindset. Since more research has been conducted at the higher education level, this section commences with higher-education literature and closes with elementary-education literature. Research has revealed that mindsets can have a profound effect on achievement and how students perceive praise at all educational levels. For example, a study conducted by Sperling and Shapcott (2012) examined the causes of law students' varied responses to critical feedback. Because of the students' lack of success on

assessments, Sperling and Shapcott (2012) suggested that some stakeholders considered that educators were not giving their students enough feedback to help them practice law effectively. However, educators believed that they were giving their law students plenty of feedback; yet, their students were reacting negatively. Some students became defensive or dejected; therefore, they could not further advance their capabilities (Sperling & Shapcott, 2012). As a result, Sperling and Shapcott (2012) suggested that legal educators must attempt to understand why students had such varied reactions to critical feedback.

One hundred first-year law students ($n = 100$) participated in Sperling and Shapcott's (2012) study by completing Dweck's Implicit Theory of Intelligence Scale. The results indicated that the majority of the law students had a fixed mindset toward learning and that one third of those students began their law classes with a fixed mindset (Sperling & Shapcott, 2012). When students with fixed and growth mindsets were achieving, they both had high levels of motivation and confidence. However, when the students with a fixed mindset experienced challenges or critical feedback, they blamed outside forces for their uncontrollable failure. No matter how considerate the constructive criticism, students with a fixed mindset reacted in disadvantageous ways (Sperling & Shapcott, 2012).

Sperling and Shapcott (2012) concluded that mindsets must be addressed in legal education. The problem would only continue to exacerbate if law schools continued to increase the amount of assessments and educators continued to give feedback to their students without addressing the students' mindsets. Not only would the initial one third of students with a fixed mindset remain in fixed mindsets, but it is also probable that, as students continued to progress through their legal education, an increasing number of students would have a fixed mindset (Sperling & Shapcott, 2012). Furthermore, this research at the higher-education level suggested

that mindsets needed to be addressed at the lower-education level therefore that students would learn to accept constructive criticism and learn from their mistakes by the time they attend higher education.

In their case study, Murphy and Thomas (2008) examined the perceptions of mindset on students' academic success when enrolled in a higher-education computer science program. The study documented the actions and self-perceptions of two students ($n = 2$). One student's objective was to finish assignments or tasks, even if he learned very little during the process. Murphy and Thomas described this student's experience:

> The student was easily frustrated by the error messages and incorrect output endemic to traditional CS1 programming. Despite extra help from his instructor and the lab assistant, when errors persisted, Joe became almost angry, his face turning red and his jaw tightening. (p. 271)

The other student, however, was willing to accept help from instructors and peers, worked harder when setbacks arose, and took challenging tasks in stride. During the study, "[s]he struggled with early lab assignments and answered nearly half the questions incorrectly on her first quiz" (Murphy & Thomas, 2008, p. 272). However, instead of dropping the class or becoming frustrated by her failures, she completed her reading and assignments immediately when they were assigned and often met with her instructor to address questions. And, compared to the first student, "[w]hen error messages scrolled across her screen she calmly and deliberately debugged each one, often with a smile on her face" (Murphy & Thomas, 2008, p. 272). The student who had more of a growth mindset felt tested when she came across a problem, but this sense of being tested motivated her to persist, and, most importantly, she enjoyed the challenge.

Murphy and Thomas's (2008) results suggested that interventions devised to incite a growth perspective of intelligence may help computer science students become more resilient when faced with a challenge and become more eager to take risks. Furthermore, the study recommended that future research should examine the effects of self-efficacy on student learning. This study demonstrated that there could be a correlation between self-efficacy and academic achievement and that, consequently, future research studies should delve into this topic further.

Likewise, research has shown that students' own views on intelligence, whether fixed or malleable, influence how they respond to academic challenges, even when they have equal intellectual ability (Blackwell, Trzesniewski, & Dweck, 2007). In a study by Blackwell, Trzesniewski, and Dweck (2007), 373 student participants ($n = 373$) from middle schools in New York City completed a motivational questionnaire "assessing theory of intelligence, goals, beliefs about effort, and helpless versus mastery-oriented responses to failure" (p. 249). The study investigated whether students had more of a growth or fixed view toward intelligence and whether they thought effort or intelligence alone would lead to success. The researchers also collected mathematics test results from the previous school year and continued to collect scores for two subsequent years.

The researchers found that academic performance was increasingly impacted by student participants' beliefs about intelligence ($p < .05$) as they progressed through the middle school years (Blackwell, Trzesniewski, & Dweck, 2007). Students who believed that intelligence is unchanging had a descending trajectory of academic achievement scores, while students who believed that intelligence is malleable had an ascending trajectory of academic achievement scores (Blackwell, Trzesniewski, & Dweck, 2007).

Additionally, Dweck (2006) examined participants' achievement records and found that students generally had similar scores in grade school. When they moved into middle school level, however, the achievement gap began to widen. Dweck (2006) explained the challenges of junior high school, stating, "The work gets much harder, the grading policies toughen up, and the teaching becomes less personalized" (p. 57). As a result of this research, Dweck (2006) discovered that the academic grades of students who had a fixed mindset suffered during this transition to the middle grades. In contrast, the academic grades of students who had a growth mindset improved over the same two-year period.

Mindset and Special Education Students

This section discusses literature concerning special education students and mindset. Hartmann (2013) suggested that special education students tend to have a more fixed mindset compared to their typical peers. Students requiring special education assistance for a specific learning disability do not achieve with the same propensity as their typical peers (Frederickson, Simmonds, Evans, & Soulsby, 2007). These students are accustomed to receiving failing or otherwise unacceptable grades (Hartmann, 2013). When educators or parents instill in students the idea that they are measured by their accomplishments, the students may also surmise that they are measured by their failures and tend to focus on their performance rather than on knowledge (Hartmann, 2013).

Hartmann (2013) conducted a study examining the relationship between mindset and students with specific learning disabilities. There were four student participants—two fourth-graders and two fifth-graders—all of whom, according to their educators, exhibited indicators of having a fixed mindset. The study took place in a special education resource room at the student participants' elementary school.

The student participants of Hartmann's (2013) study attended eight 30-minute growth mindset-learning sessions that employed the growth-mindset computer-based program Brainology. The student participants worked with the researcher individually or in groups of two. The study required a total of 5–6 hours over a period of 6 weeks in the spring of 2013. In order to identify each student's mindset as either growth or fixed, Hartmann administered a pretest and posttest to all four students using the Assessment of Implicit Theories.

The results of this experimental study suggested that students with specific learning disabilities responded to growth-mindset intervention (Hartmann, 2013). Pre-intervention results indicated that Student A and Student D had growth-mindset beliefs prior to the intervention, while Student B and Student C had fixed-mindset beliefs. Post-intervention results revealed that Student A, Student C, and Student D responded to the Brainology intervention by exhibiting more of a growth mindset or by shifting from a fixed mindset to a growth mindset. Student B reported no growth after the mindset intervention; however, this student demonstrated some knowledge about mindset concepts prior to the intervention (see Figure 3). The next section will review mindset interventions that have been used in previous studies.
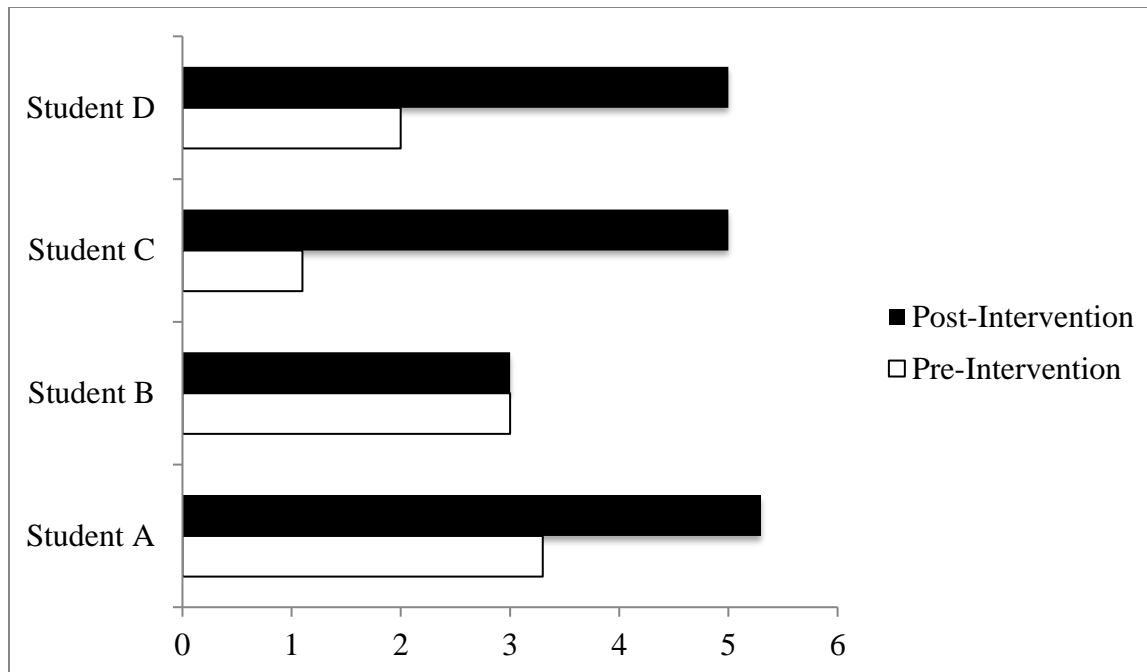
Mindset scale: fixed mindset (1–3), borderline mindset (3–4), growth mindset (4+).

Figure 3. Results show the difference in mindset before and after the growth-mindset intervention for students A, B, C, and D.

Mindset Interventions

This section discusses literature concerning mindset interventions. Over the past few years, many types of interventions have focused on changing an individual's mindset from a fixed mindset to a growth mindset. Snipes, Fancsali, and Stoker (2012) collected data on four growth-mindset interventions. All of the interventions exhibited some ability to transform a student's mindset into more of a growth mindset. Of the four interventions, two were workshops, one was a mentoring program, and one was a pen pal program; some were computer-based, while others were curriculum-based. The results of these four interventions implied that feedback and instruction that impart the message that intelligence is malleable can improve students' mindset and affect academic achievement (Snipes, Fancsali, & Stoker, 2012). In past studies, adolescent students who embraced more of a growth mindset as a product of a growth-

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mindset intervention had better grades and higher levels of determination in comparison to students who had more of a fixed mindset (Blackwell et al., 2007).

Workshop on brain malleability. This workshop, focused on teaching students how their brain worked and the different types of mindsets, was studied by Blackwell, Trzesniewski, and Dweck (2007). The workshop consisted of eight sessions and taught low-achieving and low-income seventh-grade students about the brain and how it functioned. Afterward, the students read about how the brain is malleable and constantly changes. In addition, the workshop included discussions about how learning strengthens neural connections and creates new ones (Snipes et al., 2012). The study found that the growth-mindset workshop had encouraging effects on the students' academic performance. At the end of a year, the average grade point average (GPA) scores of the students in the treatment group were almost half a point higher than those of the students in the control group (Snipes et al., 2012).

Mentoring focused on brain malleability and persistence. Snipes et al., (2012) examined another mindset intervention conducted through a mentoring program. As part of the program, a university provided college advisors with a 3-hour training session on intelligence and the anatomy and malleability of the brain. The advisors then mentored seventh-grade students over two 90-minute sessions at the beginning of the school year (Snipes et al., 2012). The seventh-grade students helped their mentors create posters and ads promoting the concept of a growth mindset, which necessitated students to reiterate the messages themselves, thus assisting them in internalizing the information (Snipes et al., 2012).

Pen pals focusing on growth mindset intervention. In this growth mindset intervention, Stanford University students who were pen pals with younger students from an impoverished community were given short videos showing them how the brain changes and

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grows. When the college students began writing to their pen pals, they were instructed to "write letters offering encouragement to the younger students" (Snipes et al., 2012, p. 12). The older students wrote letters to the younger students that promoted a growth mindset by asserting that effort and persistence were important factors for success.

The results of this intervention were that students in the intervention group earned higher grades compared to students in the control group. The students in the intervention group also shared that they enjoyed and valued academics more than before because they learned that they have control over their performance (Aronson, Fried, & Good, 2002). The mean GPA among African-American students in the control group was 3.05, compared to African-American students in the intervention group, who had a mean GPA of 3.32. Likewise, the mean GPA for white students in the control group was 3.34, compared to white students in the intervention group, who had a mean GPA of 3.55 (Aronson et al., 2002).

Interactive, computer-based growth-mindset program. Brainology is a computer-based program intended to teach students how to have more of a growth mindset. As part of the program, students watched cartoon-like characters as they complete five instructional units. The units taught students that their brain is constantly changing and that they can alter their intelligence, with specific emphasis on how students could apply the growth-mindset theory to their schoolwork. Two and a half hours of computer-based instruction were broken into five sections, an introduction, and four instructional units. There were additional resources and exercises that are available if needed. The program also offered up to 10 hours of supplementary materials focusing on the growth mindset (Snipes et al., 2012).

In a study conducted in Scotland, a group of students were unsystematically chosen and given the opportunity to participate in the Brainology program for 6 weeks, while another group

of students were randomly chosen to take a pre-survey and a post-survey without having a growth-mindset intervention (Snipes et al., 2012). The treatment group had higher scores on reading achievement assessments than the students who did not participate in the intervention (Paunesku, Goldman, & Dweck, n.d.). In another study, researchers found that Latino adolescent students in the Northwest who completed the Brainology program achieved a 0.21 increase in their final grades (Romero, Master, Paunesku, Dweck, & Gross, 2014). Furthermore, the researchers observed fewer work avoidance behaviors (Romero, Master, Paunesku, Dweck, & Gross, 2014).

The next section will discuss the theory of self-efficacy and how it relates to achievement, adolescents, special education students, motivation, and mindsets.

Theory of Self-Efficacy

Psychologist Albert Bandura (1985) described self-efficacy as a belief in one's own ability to be successful in particular circumstances. Self-efficacy attitudes can govern how prospects and hindrances are observed and can affect not only people's choices but also how much they are willing to strive and persist until they are successful (Bandura, 1997). An individual's self-efficacy is built upon past successes, especially ones that were challenging and overcome with abundant effort. Otherwise, failures can easily shatter an individual's sense of self-efficacy, especially if the individual has only achieved accomplishments effortlessly (Bandura, 1995).

In addition, Bandura (1995) suggested that, if individuals, with a growth mindset, have observed others succeeding at a task, they perceive that they have the potential to be successful as well. Also, if educators have used encouragement and verbal persuasion to highlight individuals' potential to be successful, these individuals may strive harder to attempt a

challenging task. Yet the impression taken from peers being successful and the feedback given goes both ways. If individuals with a fixed mindset observed others failing at a task or if individuals were given negative verbal feedback about their ability to achieve, these individuals would more than likely put forth less effort or not even attempt the task at hand (Bandura, 1995).

Considering Bandura's (1995) notions of self-efficacy, academic self-efficacy could significantly affect students' success are at the secondary level and in higher-education coursework. Zimmerman (2000) asserted, "Self-efficacy beliefs have shown convergent validity in influencing such key indices of academic motivation as choice of activities, level of effort, persistence, and emotional reactions" (p. 86). Therefore, students who have greater levels of academic self-efficacy are more likely to work harder to complete a challenging task. In various studies, students with high academic self-efficacy tended to be eager to participate in an activity, persevere through trials, and have fewer emotional frustrations or negative feelings when they were not successful than were students who had lower academic self-efficacy (Zimmerman, 2000). Table 2 below summarizes all the major research studies on self-efficacy from the undergraduate level to elementary that will be examined in this section.

Table 2

Research Studies on Self-Efficacy with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Undergraduate Level	261 undergraduate students from a large public university in Western Canada ($n = 261$)	Klassen, Krawchuk, and Rajani (2008) explored the relationships among academic procrastination, self-regulation, academic self-efficacy, self-esteem, and self-efficacy for self-regulation.	Results revealed that, although other self-variables are related to procrastination, self-efficacy for self-regulation is most predictive of procrastination tendencies ($p < .001$).
Undergraduate Level	195 undergraduate students from a large public university in Western Canada ($n = 195$)	Klassen, Krawchuk, and Rajani (2008) examined academic and motivation characteristics of	he 25% of 195 participants in Study 2 who were classified as negative procrastinators

(continued)

Table 2

Research Studies on Self-Efficacy with Varying Populations

Level of Education	Participants	Purpose of Research	Results
		''negative procrastinators.''	had significantly lower GPAs, higher levels of daily and task procrastination, lower predicted and actual class grades, and lower self-efficacy for self-regulation. Self-efficacy for self-regulation had a significant effect ($p <$ .01.

Table 2

Research Studies on Self-Efficacy with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Elementary Through High School	N/A	Bergen (2013) searched current research on self-efficacy and special education students for themes.	There were three main themes: (a) miscalibration; (b) teacher and task effect on self-efficacy; and (c) self-efficacy, motivation, and content areas.
Elementary	1,163 elementary-school student participants ($n = 1,163$)	Fast et al., (2010) examined the relationship between students' math self-efficacy and their scores on standardized math assessments.	Math self-efficacy was significantly related to the students' math achievement scores ($p < .001$). Students with higher levels of math self-efficacy achieved higher scores on year-end performance exams.

(continued)

Table 2

Research Studies on Self-Efficacy with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Elementary	172 elementary school students ($n =$ 172)—Some student participants had a learning disability, and some were typical peers.	Tabassam and Grainger (2002) examined self-efficacy scores of students with a learning disability compared to typical peers.	Students with a learning disability had significantly lower scores ($p <$ .001) regarding academic self-efficacy beliefs than their typically achieving peers.

Self-Efficacy and Adolescent Achievement

In these studies, self-efficacy attitudes characteristically deteriorated as students progressed through the grade levels, from elementary to secondary school and from secondary to higher education (Pintrich & Schunk, 1996). Of course, this factor could be related to the numerous challenges that emerged such as additional norm-referenced assessments, a decrease in teacher attentiveness, an increase in independently performed work, or an increase in pressures associated with adolescence. These challenges could have reduced students' self-efficacy, particularly in students who were incapable of handling the progressively more difficult academic tasks (Pajares & Schunk, 2001). Pajares and Schunk (2001) found that adolescents commonly did not have the expertise to understand what is needed to be successful when attempting a novel task. As students had additional practice at the task, their precision

progressed and self-efficacy tended to improve. However, if these students did not perceive what they need to improve or change in order to be successful, their self-efficacy could have decreased because they could not successfully complete a task (Pajares & Schunk, 2001). Hence, instruction that conveys clear evidence about children's abilities or progress could raise self-efficacy (Schunk, 1981; 1995). In addition, praise and instruction that focuses on academic success through attempting tasks multiple times and learning through errors may increase academic self-efficacy (Dweck, 2006).

Specifically, with the start of adolescence, there is an overwhelming shift in expectations, especially regarding students' ability to take responsibility for their learning and academic performance (Zimmerman & Cleary, 2006). During middle school, students accomplish a substantial amount of academic work outside the school, including reading assigned texts, writing papers, and studying for exams. If adolescents are unable to adapt to this challenging academic environment successfully, their academic performance and achievement may suffer (Zimmerman & Cleary, 2006). As a result, this could lead to decreased self-efficacy in academic achievement (Zimmerman & Cleary, 2006).

In one study, Fast, Lewis, Bryant, Bocian, Cardullo, Rettig, and Hammond (2010) examined the relationship between students' math self-efficacy and their scores on a standardized math assessment. The study participants included elementary-school students ($n = 1,163$) from a suburban school district in Southern California. The study took place during the 2005-2006 and 2006-2007 school years. The researchers accessed participants' California Standards Test for Mathematics scores through the district's database from the 2005–2006 and 2006–2007 school years. Then, participants were given the Student Motivation Questionnaire (SMQ), which is a five-point Likert-type scale. Four items on the SMQ were used to assess the

students' self-efficacy in mathematics (Fast et al., 2010). The study revealed that math self-efficacy was significantly correlated to the students' mathematics scores ($p < .001$) and that students with greater levels of math self-efficacy achieved better scores on year-end math performance (Fast et al., 2010). Therefore, students who lacked self-efficacy could perform poorly on academic assessments even though they possessed the ability to be successful.

Self-Efficacy and Special Education Students

For students with special education needs, low self-efficacy can be a barrier to academic success. Past performance is considered the most powerful element in fostering self-efficacy; consequently, special education students who experience repeated academic failures or difficulties are likely to have lower self-efficacy due to past performance (Hampton, 1996). In turn, special education students with low self-efficacy may be less willing to attempt a challenging task and unlikely to keep trying until they are successful (Hampton, 1996). This outcome may reinforce the poor perceptions that special education students have about their academic abilities.

Special education students dedicate significantly more time and effort to achieve the same results as their typical peers. As a result, when students who have a learning disability observe that they must put in extra effort, they may experience a lowered sense of self-efficacy (Bergen, 2013). Having both low self-efficacy and a disability is a "dangerous dynamic" because it is essential for special education students to have increased perseverance in order to meet the same standards as their typical peers (Bergen, 2013, p. 1).

Bergen (2013) conducted a study in which she examined all the research regarding self-efficacy and special education students in kindergarten through 12th grade. She looked for

common themes throughout the research and found three: (a) miscalibration; (b) teacher and task effect on self-efficacy; and (c) self-efficacy, motivation, and content areas.

According to Bergen (2013), children with a learning disability are more likely to inaccurately gauge their self-efficacy, meaning that students' supposed ability and aptitude to confront an academic undertaking are not aligned with their actual abilities. As a result, students who received special education services for math and who required additional time and visuals to support their work did not realize that they had the ability to be academically successful since they required accommodations that their typical peers did not require (Bergen, 2013).

On the other hand, Klassen (2007) studied the calibration of special education students and found that, while adolescent special education students in the study were highly confident in their performance in a specific academic domain, they were completely unaware that they were actually doing very poorly in the class. As a result of this study, students with learning disabilities could hold misperceived notions about their actual abilities. However, Klassen (2007) asserted that teachers could address miscalibration and low self-efficacy to help students understand ways to be successful.

Bergen's research (2013) about teacher and task effect on students' self-efficacy, which is when a teacher models how to complete a task to students, found that by quickly and flawlessly executing a task, teacher and task effect can impact students' self-efficacy. Students who struggled academically, such as those with learning disabilities, believed they would never attain the same skill as the teacher, therefore they presumed there was no purpose in attempting the task (Bergen, 2013). Also, a teacher modeling how to complete a task could be helpful when teaching the students how to solve a mathematical problem, but it did not help build students' self-efficacy (Bergen, 2013). If teachers took time to discuss past performance with students,

examine their strengths and weaknesses, and share with them what they could have done to improve, the students could have experienced increased self-efficacy (Bergen, 2013).

The final theme Bergen (2013) found in her research was that motivation (Zimmerman, 2000) and self-efficacy within a content area (Klassen, 2007; Lackaye, Margalit, Ziv, & Ziman, 2006; Zimmerman, 2000) were significant predictors of students' academic performance. Helping special education students calibrate correctly by focusing on their strengths and weaknesses could lead to improved self-efficacy, increased motivation, and eventual academic success (Bergen, 2013). Bergen (2013) suggested that, when teachers relayed feedback that fostered effort and persistence, students' self-efficacy in learning and academics could change.

Tabassam and Grainger (2002) conducted a study comparing special education, elementary-school students diagnosed with a learning disability and/or an attention deficit disorder to their typical peers ($n = 172$). Using the Academic Self-Efficacy Beliefs Scale for assessment, these researchers reported that students receiving special education support had significantly lower scores ($p < .001$) in self-efficacy beliefs about education and learning than did their typical peers. This effect may have been due to the fact that students who receive special education support tend to be less successful academically than their peers. Consequently, after repeated failures, these students believe they are unable to accomplish certain academic tasks, even if they have the ability to succeed. Thus, it is imperative that future researchers create and discover interventions that can increase special education students' academic self-efficacy in order to improve their chances of being college and career-ready.

Self-Efficacy and Motivation

Past research (Pajares & Schunk, 2009) has demonstrated that self-efficacy is an essential component to students' ability to complete daily classroom activities, perform well on

standardized assessments, and succeed overall in school. Pajares and Schunk (2009) explained, "Compared with students who doubt their learning capabilities, those who feel efficacious for learning or performing a task participate more readily, work harder, persist longer when they encounter difficulties, and achieve at a higher level" (p. 2–3). Therefore, students with low self-efficacy are more likely to lack effort or not even attempt difficult tasks.

At a time when students are expected to use higher-level thinking skills to meet the demands of academic rigor, low-self efficacy could lead to academic failure. Self-efficacy "makes a difference in how people feel, think and act" (Schwarzer, 2014, p. 1). For instance, low self-efficacy can cause feelings of depression and anxiety as well as an overall feeling of helplessness (Schwarzer, 2014). In addition, Klassen, Krawchuk, and Rajani (2008) found that undergraduate students with lower self-efficacy had significantly lower GPAs and higher tendencies to procrastinate on daily academic work. Therefore, Klassen et al., (2008) affirmed that students' self-efficacy must increase to make them college- and career-ready after graduating high school.

Self-Efficacy and Mindset

Dweck (2009) implied that students with more of a growth mindset characteristically have higher levels of self-efficacy than students with more of a fixed mindset. Furthermore, students with a growth mindset are usually willing to participate and persevere in a task and to put forth additional effort when they deem that they can be successful at a task (Urdan & Turner, 2007). Thus, students with a growth mindset are likely to have high academic self-efficacy and persist through challenging tasks, resulting in academic achievement (Dweck, 2009).

In addition, encouragement or praise from others is likely to increase a student's self-efficacy. As mentioned briefly in the literature review, under the section Mindset and Praise,

researchers found the significance of praise on encouraging or diminishing the development of students' self-efficacy to be crucial (Mindset for Accomplishment, 2015). When praise focuses on effort, strategies, and overcoming obstacles, students learn to believe they can accomplish challenging tasks (Dweck, 2009).

Furthermore, the ways educators discuss success, failure, and challenges with students can also have a strong effect on increasing self-efficacy (Mindset for Accomplishment, 2015). In other words, if educators describe failure and difficult tasks as positive aspects of learning, while at the same time emphasizing the importance of persisting through these challenges, they can help build students' self-efficacy. The next section will discuss the theory of motivation and how it relates to achievement, the changes in motivation during years of development, special education students, and mindsets.

Theory of Motivation

Clinkenbeard (2012) suggested that one of the most challenging experiences for an educator is students with great intellectual ability and promise who never seem to reach or strive for a level of success that they are capable of achieving. Most often, educators believe that lack of motivation keeps capable students from meeting their potential. One definition of motivation is "the process whereby goal-directed activity is instigated and sustained" (Schunk, Pintrich, & Meece, 2008, p. 4). In other words, there is a focus on a certain outcome or end result, and perseverance is present in trying to attain that goal. Another definition for motivation is being "*moved* to do something…someone who is energized or activated toward an end is considered motivated" (Ryan & Deci, 2000, p. 55, italics in original quote). Table 3 below summarizes all the major research studies on motivation, from the undergraduate level to the secondary level, examined in this section.

Table 3

Research Studies on Motivation with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Undergraduate Level	45 freshman college students ($n = 45$)	Griffin, MacKewn, Moser, and VanVuren (2013) researched whether learning skills and motivation correlate with superior academic performance.	The results showed that the single area that statistically correlated with GPA was motivation ($r = .404$, $p = .006$).
High School	1,522 high school students ($n = 1,522$)	Hodis et al. (2011) investigated patterns of evolution in students' achievement trajectories in relation to initial achievement, student motivation, and key demographic characteristics.	Findings provided support for the use of a simple motivation measure that can enhance identification of risk for school failure and inform interventions for different risk patterns.

(continued)

Table 3

Research Studies on Motivation with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Secondary Level	450 students from secondary schools ($n = 450$)	Tella (2007) investigated the impact of motivation on students' achievement in mathematics in secondary schools.	Results indicated significant differences when extent of motivation was taken as variable of interest on academic achievement in mathematics, based on the degree of their motivation.

Motivation and Achievement

Motivation is a primary reason for discrepancy in achievement and is considered a possible predictor of how a student will perform academically (Hodis, Meyer, McClurre, Weir, & Walkey, 2011). Researchers also have found that students with high academic motivation are likely to be academically successful (Hodis, Meyer, McClurre, Weir, & Walkey, 2011).

However, after the transition to middle school, motivation and academic achievement drastically change (Ryan, 2001). For some students adolescence launches a downward movement in achievement and motivation due to the increase in academic demands and

expectations (Ryan, 2001). There are two main types of motivation—intrinsic and extrinsic. Clinkenbeard (2012) observed that students who were intrinsically motivated to learn were fascinated, inquiring, and usually focused on the task itself rather than just the end result. On the other hand, students who were extrinsically motivated were concerned with the end results (e.g., grades, prizes) more than the task-completion process (Clinkenbeard, 2012). These students required some consequence to encourage them to undertake an activity. As a result, extrinsically motivated students derived a sense of satisfaction from the extrinsic consequential outcome of the activity, not from the activity itself (Clinkenbeard, 2012).

Motivation can change based on the situation and the task at hand. Clinkenbeard (2012) stated, "Most of us are motivated by a combination of intrinsic and extrinsic reasons that may vary according to the task" (p. 624). In other words, there might be internal reasons to persist through a task in addition to an external reason, such as a final grade that inspires perseverance through a difficult task. Yet Clinkenbeard (2012) added, types of motivation have time and again been considered as individual traits. Therefore, if students are extrinsically motivated in one situation, they are more than likely extrinsically motivated in other situations, and the same can be said for intrinsically motivated students.

McDermott and Barik (2014) indicated that motivation changes with age, based on individuals' needs, because needs or desires differ throughout all stages of development. According to McDermott and Barik (2014) the change of motivation in education during adolescence, over time parallels Maslow's Hierarchy of needs. Maslow's Hierarchy of Needs suggested that there are basic needs that humans must have satisfied before others can be contemplated. Items lowest on the hierarchy must be met first. For instance, environmental safety needs must be met before considering the need to achieve or be accepted by others.

Furthermore, when extrinsically motivated students enter adolescence, their lack of intrinsic motivation can affect achievement (McDermott & Barik, 2014). In one study conducted by Tella (2007), a substantial disparity in the achievement of intrinsically and extrinsically motivated students was discovered. Middle-school students vary considerably in their academic achievement depending on their source of motivation. The results revealed that intrinsically motivated students are academically more successful than externally motivated students (Tella, 2007). In other words, students are more academically successfully when they are interested in the academic task and not just the end result or the grade. Subsequently, researchers must find interventions that can help students become more intrinsically motivated.

Motivation could also aid and support academic achievement and success (Weiner, 1985). For instance, if students are motivated to complete a task and continue to persist until they are successful, they will most likely experience academic success. Then, motivation is increased further after attaining success (Weiner, 1985), possibly leading to a beneficial sequence of high intrinsic motivation and high academic achievement. On the other hand, if students are not motivated to complete a task and experience academic failure, they could experience an undesirable sequence of low motivation and low achievement. Students with low academic motivation predictably have lower achievement and exert less energy toward completing their work than their motivated counterparts (Urdan & Turner, 2007).

Consequently, the cyclical nature of motivation can help highly motivated students achieve academic success, while students with low motivation can continue to spiral downward. Students who experience constant academic failure will feel increasingly less motivated to attempt their academic work as it reinforces the idea that more effort only leads to more failure.

Stanovich (1986) asserted that this "initiates a causal chain of escalating negative side effects" (p. 364).

Griffin, MacKewn, Moser, and VanVuren (2013) researched whether learning skills and motivation correlate with superior academic performance among freshman college students ($n = 45$). The participants completed the Learning and Study Strategies Inventory, which measures what strategies students use when learning and what skills they believe they possess and use when attempting to learn a skill. The results showed that the single factor that statistically correlated with GPA was motivation, $r = .404$, $p = .006$ (Griffin, MacKewn, Moser, & VanVuren, 2013), indicating that the most significant predictor of high academic achievement was students' level of intrinsic motivation. This positive correlation suggests that academic achievement is fueled by students' motivation toward learning. Not surprisingly, higher motivation leads to better academic performance.

Motivation Through the Years

While motivation is significant during all stages of life in relation to academics, it is crucial throughout the adolescent years because, developmentally, adolescence is a critical time in an individual's life (Erikson, 1994a; 1994b). Most adolescent students experienced a waning in motivation and deterioration in achievement scores (Dweck & Master, 2009). A decline in motivation typically occurred as children transition to middle school (Otis, 2005). However, this can be detrimental to many students because motivations in these years were crucial in determining a path for achievement outside of academics (McDermott & Barik, 2014). In other words, if students were extrinsically motivated during their adolescent years, they would likely be extrinsically motivated throughout their lives.

Turner and Johnson (2003) examined motivation in young children and found that it was strongly influenced by their relationship with their parents. For instance, young children might do well in school because they know it will please their parents and that they will receive positive feedback from their parents. Young children looked for comfort and love from their parents and consequently expected to be rewarded with love or comfort after doing work (McDermott & Barik, 2014). Therefore, students at a young age tended to be extrinsically motivated.

Then, when students entered adolescence, their motivational influences changed. Adolescents were less influenced by their parents and began thinking about their own desires. According to McDermott and Barik (2014), adolescence marked "the few years before a child embarks out on his own and into the real world. Therefore, at this age one began thinking for himself and questions if school is important, thus separating the achievers from nonachievers" (p. 3). Stated differently, adolescence is when students either continue to be mostly extrinsically motivated or become more intrinsically motivated toward academics.

Motivation and Special Education Students

Motivation is a critical component for academic success in all students (Christensen, Johnson, & Horn, 2008). But, students who have learning disabilities or difficulties in school often have a devalued sense of self-confidence, which, in turn, reduced their motivation to participate in and persist through academic challenges, creating a revolving cycle of low motivation and low achievement (Morgan, Fuchs, Compton, Cordray, & Fuchs, 2008).

Students who have difficulty in school often believed that outside factors controlled their academic success, and external motivators can eventually decrease students' independence and self-determination. When students deemed that outside factors were in control, they then

accepted less accountability for their achievements or failures (Jordan, 2010). On the other hand, students with internal motivators had a sense that they were able to succeed academically and that they were in control. As a result, students who had internal motivators tend to take responsibility for their own achievements and failures (Jordan, 2010). Furthermore, special education students who struggled the most with academic success were also at an increased probability for reduced levels of intrinsic motivation (Jordan, 2010).

The difficulty with motivation in students who had a learning disability is that, in order to be placed into special education, students must have exhibited a substantial gap or discrepancy in achievement compared to their typically performing peers. In order to ascertain that a learning disability existed, these students experienced possibly several years of academic failure in the regular education classroom (Levine, 1996). During those years of academic failure, many occurrences could negatively affect students' motivation (Levine, 1996). For example, students with a learning disability may have developed a cynical outlook about education and learning. Besides academic failures, students may have also experienced negative feedback from educators about their failures (Putnam, Markovchick, Johnson, & Johnson, 1996), which only reinforced students' beliefs in their inability to succeed and could feasibly have led to even poorer academic motivation (Putnam et al., 1996).

Motivation and Mindset

Many students face challenging situations and failure daily outcome, yet some continued to persist and attempted difficult tasks while others give up in frustration. This is because motivation has two underlying components: task persistence and self-evaluation (Zentall & Morris, 2010). Students who have negative self-evaluations might make a comment such as "I am not good at math." As a result, prior to even attempting a task, these students perceived that

they would not be successful, leading to a lack of task persistence. Furthermore, these students would most likely choose an easy task in order to hide their inability or to prevent negative results (Dweck, 1986). These perceptions might also lead to lower self-efficacy regardless of success at the task (Dweck, 1986).

Students with a fixed mindset in relation to academics eventually developed what Dweck (2006) called "low-effort syndrome" (p. 58). In order to protect their egos, students with low-effort syndrome stop attempting challenging tasks because, if they did not attempt a task, they would not fail. As a result, low-effort syndrome could lower students' motivation to learn and lead to a decline in their overall academic achievement (Dweck, 2006). In contrast, students with a growth mindset would be resilient and continue to attempt perplexing tasks because they viewed challenge and even failure as an opportunity to learn (Dweck, 2006). Dweck (2006) crucially asserted that a person's mindset could change in any area, even academically. Mindsets could be changed and could vary within different aspects of a person's life. The next section will discuss the theory of attribution and how it relates to achievement, motivation, and mindsets.

<div align="center">Theory of Attribution</div>

Weiner (1985) used attribution theory to explain an individual's perceived reasons for failures or successes. According to the theory, students assigned their academic successes to one or more of the following characteristics: effort, luck, task difficulty, and ability (Weiner, 1985). The most significant component of attribution theory is effort, which highly correlated with academic achievement (Covington, 1992). Attribution theory may help clarify the difference in motivation of students who struggled academically compared to students who did not. Weiner (1985) and his colleagues recognized certain characteristics of students who evidently had low or high achievement motivation. This section addresses the theory of attribution as it relates to the

present study. Table 4 below summarizes all major research studies on self-efficacy, from the undergraduate to the secondary level, examined in this section.

Table 4

Research Studies on Attribution Theory with Varying Populations

Level of Education	Number of Participants	Purpose of Research	Results
Undergraduate	99 university students	Laherand and Putnina (2009) explored differences in students' attribution patterns.	Results concluded that students made more internal (63) than external (58) causal attributions for their failure.
Secondary Level	N/A	Brophy (1996) stated some students who have experienced an ongoing history of failure lack the ability to feel successful.	It is important for students with low achievement motivation to receive training that changes how they interpret failure.

Students with high intrinsic motivation are inclined to have high achievement motivation and to be interested in high-achievement activities (Laherand & Putnina, 2009). Furthermore, they also typically persist with great effort when they encounter failure. Laherand and Putnina (2009) described intrinsically motivated students in the following way. "The belief in unstable-controllable causes such as effort causes the person to assume that the outcome depends on will. Therefore, these individuals perform with great intensity on achievement tasks" (p. 1). Hence, students with high achievement motivation tended to believe that their high ability and high effort could earn success.

Students with low achievement motivation tended to divert from activities that focused on achievement, and they were inclined to abandon a task when they encountered failure and to put forth less effort when attempting a difficult task (Laherand & Putnina, 2009). These students had a "belief in stable and uncontrollable causes, such as ability or mood, [which] does not motivate the person to perform with intensity, since there is no belief in having control over causes of success or failure" (Laherand & Putnina, 2009, p. 1). Therefore, students with low achievement motivation perceived failure as being due to a lack of ability and as unchangeable.

Some students who experienced an ongoing history of failure lack the ability to feel successful. This history may then affect motivation and self-efficacy when attempting certain academic tasks. Students with low achievement motivation need to receive training that changes how they interpret failure (Brophy, 1996). According to Brophy (1996), "[t]his involves bringing about changes in students' tendencies to attribute failure to lack of ability and instead to a remediable cause, such as insufficient effort or use of an inappropriate strategy" (p. 1). In other words, these students learned that their failures were not due to their lack of intelligence but to other factors such as effort or persistence (Brophy, 1996).

Some researchers implied that students will be motivated to attempt challenging tasks and will have more academic success in the future if they take ownership of their academic achievement and deem it as something they can govern (Covington, 1992; 2000; Urdan & Turner, 2007; Weiner, 1995). Furthermore, Urdan and Turner (2007) found that educators were essential in inspiring their students to take ownership of their achievements and failures by showing and discussing how past successes were partly due to the amount of effort exerted to accomplish those achievements. Dweck (2009) implied that educators' views control students' responses and opinions about the reasons for their failures. Therefore, if students realize that

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they have control over their failures, they will look at ways to improve their failures without blaming outside factors (Dweck, 2009). The next section will discuss the theory of adolescence and how it relates to motivation, self-efficacy, achievement, and mindsets.

Adolescence

There is a decline in motivation, self-efficacy, and achievement during adolescence (Blackwell et al., 2007; Eccles, Midgley, Wigfield, Buchanan, Reuman, Flanagan, & Mac Iver, 1993). This decline is concerning, as adolescents tend to be in school for a substantial part of their day (Eccles & Roeser, 2009). As expected, some students struggled in the elementary grades; however, in middle school, an increasing number of students began to experience deteriorating academic scores and diminishing motivation (Blackwell et al., 2007; Eccles et al., 1993). Multiple reasons could make school difficult for many students during the adolescent years (Dweck & Master, 2009). Research mentioned previously in the literature review (Griffin, MacKewn, Moser, and VanVuren (2013); Hodis et al. (2011) & Tella (2007) suggested that deteriorating motivation and a decrease in achievement during these years were causes for concern because, during the adolescent years, achievement scores were strong predictors of educational accomplishment, such as completing high school and receiving a diploma (Eccles & Roeser, 2009).

Middle School

Most middle schools consist of Grades 6, 7, and 8 in the United States (Anderman & Mueller, 2010). The middle-school years are an important time to identify students who are at-risk or struggling academically and to intervene (Balfanz, 2009). For example, in middle school, students created a strong foundation or "launching pad" for high school and beyond (Balfanz, 2009). The academic environment in middle school should feature a nurturing and supportive

system that would help direct students to success, especially special education students and students struggling to meet academic standards at this young age (Anderman & Mueller, 2010; Byrnes & Ruby, 2007).

Middle-school students have been considered underperformers when compared to all educational levels (Balfanz, 2007), possibly due to the transition process and/or lower levels of achievement and motivation than are seen at the elementary school level. When students started middle school, they entered an environment that was immensely dissimilar from what they were used to in their younger years (Eccles & Roeser, 2009).

There are many changes that students experienced in middle school classrooms, such as: different classrooms, different social situations, and different teachers. As most teachers are required to be specialists in a particular area, such as language arts or mathematics. (Anderman & Mueller, 2010; Ruby, 2006). In contrast, students in elementary school typically had one academic teacher throughout the school year. Middle-school students were thus required to juggle many requirements throughout the school day, including transitioning between classes, establishing relationships with multiple teachers, interacting with their peers, and handling the different expectations from each set of people (Anderman & Mueller, 2010).

Furthermore, middle schools encouraged academic and social competition among peers at a time when all adolescents were more aware of and concerned with social differences (Wentzel, Wigfield, & Miele, 2009). Academic competition could incite students to adopt more achievement-based goals rather than mastery goals, which focused on learning and skill acquirement (Maehr & Midgley, 1996). As a result, students developed more of a fixed mindset, rather than a growth mindset, toward academic achievement (Mueller & Dweck, 1998). Consequently, if students developed a fixed mindset toward academics, they may have

experienced decreased task persistence, effort, and achievement (Blackwell et al., 2007). This downward spiral created a risk of failure for adolescent students who were struggling academically during middle school (Eccles & Roeser, 2009).

Conclusion

The research summarized in this chapter included a discussion on mindset, self-efficacy, motivation, and attribution theory and how they relate to adolescent students' academic achievement. Students' opinions of their intellect provide context for their motivation, self-efficacy, and academic success (Dweck & Master, 2009). Students who had more of a growth mindset usually persisted through difficult tasks and were willing to take academic risks and to seek necessary help in order to be successful (Dweck & Master, 2009). Students with more of a fixed mindset usually focused on academic grades and tended to shy away from much effort when attempting challenging tasks (Dweck, 2009). Students who believed intelligence is unchangeable could suffer from a downward spiral of decreased motivation and decreased effort after the constant torment of academic failures (Dweck, 2006).

Students who have different mindsets could have quite different achievement levels due to their divergent views of intelligence (Blackwell et al., 2007), which maybe even more concerning in relation to struggling students and special education students. Yet, studies have suggested that students could adopt a growth mindset when given the right praise and knowledge about how their brains worked (Mueller & Dweck, 1998). Helping students understand how their brains work and because of that they are in control of their success, they could improve students' self-efficacy and motivation in specific learning domains such as reading, which, in turn, might improve academic achievement.

While some research has shown that a growth mindset can influence academic achievement (Dweck & Master, 2009), there is currently limited research regarding the influence of a growth mindset on the self-efficacy and motivation of adolescent special education students in the sixth, seventh, or eighth grade. Thus, the purpose of this study was to investigate whether a growth mindset intervention would improve special education students' self-efficacy and motivation in reading.

This chapter discussed the research relating to mindsets, achievement, self-efficacy, motivation, special education students, and adolescence. Moreover, it discussed how each theory relates to one another. The information in Chapter Three will thoroughly address the methodology for this study.

CHAPTER THREE: METHODOLOGY

Chapter Overview

The purpose of this study was to measure the effects of a growth-mindset intervention on sixth, seventh, and eighth-grade special education students' self-efficacy and motivation in the area of reading. This chapter describes the methods and procedures used and includes descriptions of the setting, subjects, instrumentation, research questions, research design, treatment, and study timeline.

Setting and Subjects

The participants in the treatment and comparison groups were from an urban school district in Fairfield County, which is located in western Connecticut. At the time of the study, the city's population consisted of 80,893 residents. During the 2013–2014 school year, the per-pupil expenditure was $12,683. The median household income was $62,404. There were 16 schools in the district, with 3 of these schools being middle schools. According to the 2013–2014 Strategic School Profile, 18,770 students were enrolled in this school district over the age of 3. The district's student population was 41.9% Caucasian, 8.3% African-American, 40.1% Hispanic, 7.6% Asian or Pacific Islander, and .1% American Indian. In addition, over 45% of the students within this district were considered economically disadvantaged. The percentage of adults in the city who did not have a high school degree was about 23%, the percentage of adults with less than a ninth-grade education was 9.1%, and the percentage of families who did not speak English at home was 42.1%. The percent of families that were foreign born were 34.2%.

Out of the student population, 51.6% were eligible for free/reduced meals; .2% of the population was homeless; and 17.5% of students in the high school worked 16 or more hours per week. The graduation rate in 2012 was 76.8%, while the dropout rate for Grades 9 through 12

was 3.2%. After students graduated, 80.7% pursued higher education, while 8.0% went into the armed forces or gained civilian employment. Figure 5 is a pictorial representation of the statistics of the research district's population.

There were a total of 1,920 students in the middle schools in the study 264 of these students were receiving special education support. Out of the 264 special education students, only 126 met the criteria to be part of the study: (a) All special education students with a learning disability or dyslexia (b) who were receiving special education services and (3) with goals in the area of reading were given the opportunity to participate in this study. Out of the three grades, a total of 70 students met these criteria and agreed to participate in the study (23 students in the sixth grade, 25 in the seventh grade, and 22 in the eighth grade). A total of 68 students ($n = 68$) completed the study (23 students in the sixth grade, 23 in the seventh grade, and 22 in the eighth grade).

There were 12 males and 16 females in the comparison group. Teacher participants administered the pretest and posttest during the students' advisory period. For the duration of the study, these students continued to attend their classes as usual.

There were 21 males and 19 females in the treatment group. Teacher participants administered the pretest and posttest during the students' advisory period, similar to the comparison group. However, unlike the comparison group, the student participants in the treatment group were given the growth-mindset intervention during the time when they would usually be attending their advisory period. Table 5 represents a comparison of the sample to the population.

Table 5

Comparison of the sample to the population

	Meet Requirements to Participate	Participated	Percentage
Treatment School			
Teachers	7	3	42.00
Students	67	40	60.00
Comparison School			
Teachers	5	3	60.00
Students	59	30	51.00

Instrumentation

The researcher recorded data using two instruments: The Reader Self-Perception Scale 2nd Edition (Melnick, Henk, & Marinak, 2009), the Motivation for Reading Questionnaire (Wigfield & Guthrie, 1997), and Brainology, the growth mindset instrument. Table 6 contains a summary of the instruments used to collect information on self-efficacy and motivation of reading, the RSPS-2 and MRQ.

Table 6

Instrumentation Used in Research Study

	RSPS-2	MRQ
Purpose	A measure of self-efficacy in reading	A measure of motivation to read
Response Format	5-point Likert-type scale	4-point Likert-type scale
Items	33 items	53 items
Subscales	Progress, Observational Comparison, Social Feedback, Physiological States	Reading Efficacy, Reading Challenge, Reading Curiosity, Aesthetic Enjoyment of Reading, Importance of Reading, Reading Recognition, Reading for Grades, Social Reasons for Reading, Reading Competition, Compliance, Reading Work Avoidance
Age Level	Applicable to students in Grades 6 and above	Applicable to students in Grades 4–8

The Reader Self-Perception Scale 2nd Edition (RSPS-2)

The RSPS-2 has been administered to groups of students for the purposes of research, instruction, and assessment. This instrument has been administered to students in Grade 6 and above to gain knowledge on how they feel about themselves as readers. There are 33 items for students to complete, which they respond to on a scale of 1 "strongly disagree" to 5 "strongly agree." There are four scales: (a) Progress, (b) Observational Comparison, (c) Social Feedback,

and (d) Physiological States. Out of the 46 items, 16 items relate to Progress, nine relate to Observational Comparison, nine relate to Social Feedback, and 12 relate to Physiological States.

The items on the RSPS-2 have statements that contain elements of reading (Henk, Marinak, & Melnick, 2013). The Progress (PR) subscale has statements relating to how a student feels about their progress, while Observational Comparison (OP) has statements relating to how a student feels they compare to their peers. Social Feedback (SF) has statements relating to the feedback the student receives, and Physiological States (PS) has statements relating to how their progress makes them feel internally (Henk, Marinak, & Melnick, 2013). The sum of the raw scores for each of the four subscales is calculated. Table 7 represents what the raw scores represent.

Table 7

RSPS-2 Raw Score Interpretation

Range	Progress	Observational Comparison	Social Feedback	Physiological States
High	74 +	39 +	35 +	50 +
Above Average	66-73	34-38	31-34	44-49
Average	60-65	28-33	28-30	35-43
Low	59 -	27 -	27 -	34 -

Note. Excerpted from Henk, Marinak & Melnick, 2013.

The internal reliability for each scale measured within the range of .88 to .95 (see Table 8), an appropriate level for an effective measure, which should have a minimum of .70 (Melnick, Henk, & Marinak, 2009). The RSPS-2 "provides evidence of construct validity through

principal components analysis of the factor structure" (Melnick, Henk, & Marinak, 2009, p. 2).

Table 8 contains detailed information about the reliability of the RSPS-2.

Table 8

Internal Consistency Reliabilities for Each Scale of RSPS-2

Scale	Internal Reliability
Progress	.95
Observational Comparison	.92
Social Feedback	.87
Psychological States	.94

Note. Excerpted from Henk, Marinak & Melnick, 2013.

Motivation for Reading Questionnaire (MRQ)

The purpose of this instrument was to gain knowledge on various aspects of a student's motivation in the area of reading. There were 53 questions for each student to complete, which they responded to on a Likert-type scale of 1 "very different from me" to 4 "a lot like me." The subscales on the MRQ were: (a) self-efficacy, (b) challenge, (c) curiosity, (d) involvement, (e) importance, (f) recognition, (g) social (h) grades, (i) competition, (j) compliance and (k) work avoidance.

The subscales that were used to measure intrinsic motivation were: (a) Reading-efficacy subscale measured whether a student felt that one could read well, (b) Reading Challenge measured the satisfaction of reading challenging material, (c) Reading Curiosity measured the desire to read, (d) Reading Involvement measured the enjoyment of reading various types of text and (e) Importance of Reading measured how much one valued the importance of reading. While the following subscales were used to measure extrinsic motivation: (f) Reading

recognition which was measured by the gratification of receiving a tangible reward for reading, (g) Social Reasons for reading which was measured by social interactions with others due to reading, (h) Reading for grades which was measured by the desire to be favorably evaluated, (i) Competition in Reading which is measured by the desire to outperform others in reading, (j) Compliance which is measured by the requirement of reading. A subscale (k) Work Avoidance was measured by sharing what one disliked about reading.

A total score was calculated by, "…summing the scores of all the items, with the exception of Work Avoidance items" (Wigfield, Guthrie, & McGough, 1996, p. 10). Separate scaled scores could have been computed by summing the Likert responses for each item within a subscale; then, divide the sum by the total number of items within a scale (Wigfield, Guthrie, & McGough, 1996). The MRQ has internal consistency reliabilities for reading motivation ranging from .43 to .81 (Baker & Wigfield, 1999). Researchers (Unrau & Schlackman, 2006) have used the MRQ, which has an alpha coefficient at .76 for intrinsic motivation to read. Table 9 contains detailed information about the reliability of the MRQ.

Table 9

Internal Consistency Reliabilities for Each Scale of the MRQ

Scale	Reliability
Reading Efficacy	.68
Reading Challenge	.80
Reading Curiosity	.76
Aesthetic Enjoyment of Reading	.76
Importance of Reading	.52

(continued)

Table 9

Internal Consistency Reliabilities for Each Scale of the MRQ

Scale	Reliability
Reading Recognition	.69
Reading for Grades	.43
Social Reasons for Reading	.72
Reading Competition	.81
Compliance	.55
Reading Work Avoidance	.60

Note. Excerpted from Wigfield, Guthrie, & McGough, 1996.

Mindset Instrument

Brainology is a computer-based program intended to teach students how to have more of a growth mindset. As part of the program, students watched cartoon-like characters as they complete five instructional units. The units taught students that their brain is constantly changing and that they can alter their intelligence, with specific emphasis on how students could apply the growth-mindset theory to their schoolwork. Two and a half hours of computer-based instruction were broken into five sections, an introduction, and four instructional units. There were additional resources and exercises that are available if needed. The program also offered up to 10 hours of supplementary materials focusing on the growth mindset (Snipes et al., 2012).

In a study conducted in Scotland, a group of students were unsystematically chosen and given the opportunity to participate in the Brainology program for 6 weeks, while another group of students were randomly chosen to take a pre-survey and a post-survey without having a growth-mindset intervention (Snipes et al., 2012). The treatment group had higher scores on

reading achievement assessments than the students who did not participate in the intervention (Paunesku, Goldman, & Dweck, n.d.). In another study, researchers found that Latino adolescent students in the Northwest who completed the Brainology program achieved a 0.21 increase in their final grades (Romero, Master, Paunesku, Dweck, & Gross, 2014). Furthermore, the researchers observed fewer work avoidance behaviors (Romero, Master, Paunesku, Dweck, & Gross, 2014).

Research Question and Hypothesis

In this study, the effect of a Brainology growth-mindset intervention on the dependent variables—self-efficacy and motivation in reading—was examined. The researcher analyzed the data to determine if there was a significant difference between participants who received the growth-mindset intervention and participants who did not. The researcher used a systematic approach to explore the following question:

Is there a significant difference in reading self-efficacy and motivation between middle-school special education students who participate in the growth-mindset program and those who do not?

Non-directional hypothesis: There will be a significant difference in reading self-efficacy and motivation between middle-school special education students who participate in the growth-mindset program and those who do not.

Design and Analysis

The design for the study was a quasi-experimental pretest–posttest model (Table 10). The research question employed a pretest-posttest design comparing group means for self-efficacy and motivation in reading, for students participating in reading programs, with and without a growth mindset intervention, Brainology.

Table 10

Quasi-Experimental Research Study Design

Group	Pretest	Treatment	Posttest
Treatment Group (Intervention)	O	X	O
Comparison Group (No Intervention)	O		O

The independent variables were program type (growth-mindset intervention/no growth-mindset intervention). The dependent variables were the RSPS-2 and MRQ scores on the surveys. For the research question, a multivariate analysis of variance (s) for the RSPS-2 and an independent-samples *t*-test (*t*-test) for the MRQ between groups was implemented and analyzed at the .025 level of significance. The purpose of a MANOVA is to determine "whether the population means on a set of dependent variables vary across levels of a factor or factors" (Green & Salkind, 2011, p. 222). The purpose of an independent-samples *t*-test is to determine whether there is a significant difference between the means of the two variables (Green & Salkind, 2011). For this study, the researcher compared the means to see if there were significant differences between the reading self-efficacy and motivation of participants in the treatment and comparison groups, based on the interval data collected prior to and at the end of the study from the RSPS-2 and MRQ

Treatment

Teacher Participants

Prior to the treatment, the researcher met with all the teacher participants to review the administration of the RSPS-2 and MRQ and to answer any questions about administering and collecting the surveys. At this time, the teacher participants received the RSPS-2 and MRQ to administer to the student participants prior to the intervention.

The researcher then gave the three teacher participants ($n = 3$) working with the treatment group a short informational session on Dweck's theory of mindset, due to the fact that the teacher participants stated that they were not familiar with the theory of mindsets. Then the researcher modeled a tutorial of the intervention program that their students would be using during the 8-week intervention. Teacher participants then had the opportunity to complete a growth-mindset lesson that their student participants would complete as part of the intervention. The researcher also held a question-and-answer session for any issues to be clarified. The researcher also supplied headphones to the teacher participants, which they gave to the students who did not have their own set.

In addition, the researcher selected two teacher participants—one in the comparison group and one in the treatment group—as designated observers. These observers ensured that the intervention and study protocols were followed with fidelity. Throughout the study, the researcher conducted site visits once a week to see if the teacher participants had any questions or concerns pertaining to the study. The researcher also checked that the teacher participants were consistent in the implementation of the intervention. If any concerns or questions arose in between site visits, the researcher contacted the teacher participants through email.

Treatment Group

After the treatment group had been administered the RSPS-2 and MRQ pretests, and had been shared the purpose of participating in the Brainology program (Appendix J) rather than being in their advisory period. Subsequently, the student participants began the growth-mindset intervention, Brainology.

Brainology is an online computer program that allows students to go independently through lessons about a growth mindset. The program has an audio component, therefore students' reading levels did not interfere with their ability to complete the program. Brainology lessons focus on how the brain functions and learns, with the aim of demonstrating to students that they are in control of their own learning and development. Most important, Brainology teaches students how to apply the lessons in their academic work. According to Dweck (2012), "It [Brainology] gave them a practical set of skills and strategies for tackling academic challenges" (p. 1). A sample task that a student might be expected to complete would be to type in an e-journal (see Figure 4), which could be a response to a direct question or reflecting on what they learned about mindsets and the brain. In addition, students are given a "quest" or challenge to complete at the end of each unit to demonstrate what they learned (see Figure 5). If participants answer incorrectly, they have the opportunity to review the unit, look back in the e-journal, or attempt the challenge again.
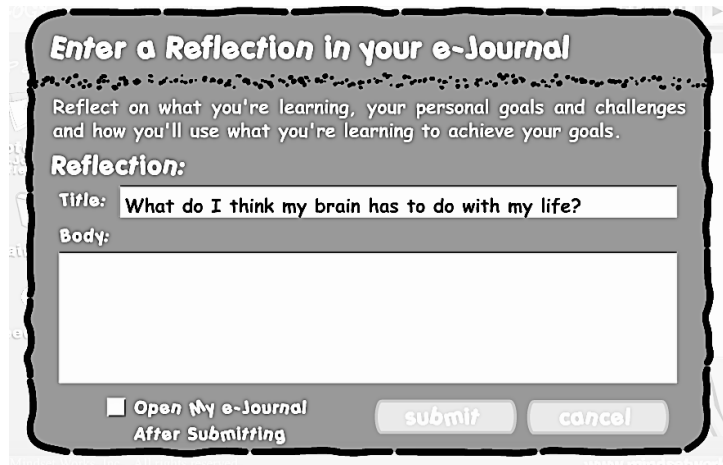
Figure 4. A screenshot of Brainology' s e-Journal that students use to share their thoughts and reflections of what they have learned.
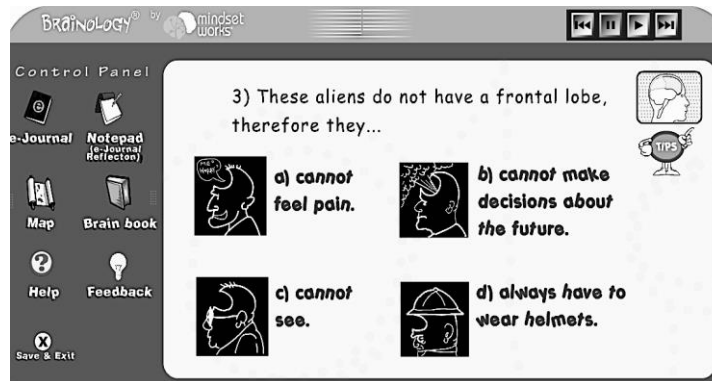
Figure 5. A screenshot of one of the challenge questions from Brainology Unit 1.

When the student participants used the Brainology program, they each had their own computer, along with a set of headphones, therefore they could move through the lessons at their own pace. The lessons guided the students through quests where they performed experiments and conquered challenges. Implementation time and schedules were flexible and were adjusted to fit the user's needs. The program included a short introduction and four instructional units that took a total of 2.5 hours to complete, with up to 8 hours of additional materials and resources. As part of the intervention, student participants went to a computer lab 5 days a week for 15 minutes a day over the course of 8 weeks in order to complete the 10.5-hour intervention.

Comparison Group

The RSPS-2 and MRQ were administered to all the student participants in the comparison group and took a total of 30 minutes to complete (15 minutes for each survey). The comparison group completed the RSPS-2 and MRQ on April 11, 2016; the treatment group received the growth-mindset intervention. Then, pretest data results from the RSPS-2 and MRQ were collected and analyzed to ensure that the groups were comparable.

While the treatment group received the growth-mindset treatment, the comparison group continued with their advisory period, receiving support from their special education teachers, without a growth mindset intervention.

At the conclusion of the intervention, the comparison group again took the RSPS-2 and MRQ surveys for posttest data. The researcher analyzed the results to determine if there was a significant difference between the treatment and comparison groups. If there were a significant difference between the comparison and treatment groups at the end of the study, the comparison group would be given the opportunity to take part in the growth-mindset intervention.

Data Collection Procedures and Timeline

Overview

The researcher began the study after gathering the parental consent forms during the 2015–2016 school year.

Preliminary Information

In August 2015, the researcher sought consent to conduct the study at one of the three middle schools in the district from the deputy superintendent, principals, and teacher participants. The researcher then sought parental consent and student assent from the treatment group in September 2015 and from the comparison group in January 2016.

Professional Development

In November 2015, teacher participants in the treatment group attended a 2-hour professional-development session at their middle school. The teacher participants in the comparison group attended a 1-hour professional-development session in March 2016 at their middle school. During these sessions, the researcher first reviewed the importance of ensuring against contamination between the treatment and comparison groups and of implementing the intervention and surveys with fidelity. The researcher shared with the teacher participants that, if the treatment group had significantly higher scores, the researcher would give the comparison group the opportunity to have the growth-mindset intervention once the study had been completed. The researcher reviewed the directions for distributing, administering and collecting the RSPS-2 and MRQ and the importance of keeping student participation confidential.

The teacher participants in the treatment group had an extra hour of professional development to review the intervention. The researcher shared Dweck's theory of mindset with the teacher participants in the treatment group. The researcher also demonstrated how the computer-based growth-mindset intervention, Brainology, operated. Teacher participants then had the opportunity to explore the program themselves and to ask any questions. In addition, the researcher reviewed the directions for the administration of the RSPS-2 and MRQ instruments and handed out the script the teacher participants were to read to the student participants prior to commencing the Brainology program and headphones for students who were in need. Finally, the researcher held a question-and-answer session during which any additional concerns were addressed, as well.

Research Study

The research study commenced on January 11, 2016 for the treatment group and on April 11, 2016 for the comparison group. The student participants performed the RSPS-2 and MRQ for the pretest data during their advisory period at their designated middle school. The intervention for the treatment group began on January 20, 2016, followed by my collection of the posttest surveys for the treatment group on April 15, 2016, and for the comparison group June 8, 2016.

Spring 2015		August 2015		November 2015		January 2016
Signed consent from superintendent, principals, and teacher participants	➡	Signed consent from parents and signed assent from student participants	➡	2-hour professional development for teacher participants	➡	Pretests administered to student participants

January 2016		April 2016		April 2016		May 2016
Began growth-mindset intervention with treatment group	➡	Finished growth-mindset intervention with treatment group	➡	Posttests administered to student participants	➡	Analyzed data from pretests and posttests

Figure 6. Timeline of the treatment group.

Spring 2015		January 2016		March 2016		April 2016
Signed consent from superintendent, principals, and teacher participants	➡️	Signed consent from parents and signed assent from student participants	➡️	1-hour professional development for teacher participants	➡️	Pretests administered to student participants

June 2016		June 2016
Posttests administered to student participants	➡️	Analyzed data from pretests and posttests

Figure 7. Timeline of the comparison group.

Culmination of the Study

All students who finished the study took the RSPS-2 and MRQ posttests. Student participants in the treatment group ($n = 40$) completed the posttests on April 15, 2016, and the student participants in the comparison group ($n = 28$) finished the RSPS-2 and MRQ on June 8, 2016. Teacher participants then collected the posttests and delivered them to the researcher for data analysis. The data collected were fed into the SPSS statistical software to analyze the information utilizing a MANOVA and an independent-samples *t*-test transcript.

<div align="center">

Summary

</div>

This chapter described the methods and procedures used to conduct a study that examined the effects of a growth mindset on self-efficacy and motivation of adolescent special education students receiving support in the area of reading. The setting/subjects,

instrumentation, research question, design, and timeline were presented. Chapter Four will

discuss the data-cleaning process as well as the assumptions that were addressed. Furthermore,

the researcher will share the data-analysis procedure in depth and address the results of this

study.

CHAPTER FOUR: ANALYSIS OF THE DATA

Chapter Overview

The purpose of this quasi-experimental pretest–posttest study was to determine the relationship between a growth-mindset intervention and reading self-efficacy and motivation for reading of adolescent special education students. Chapter Four presents the findings of this quantitative study from the pretest and posttest data of the RSPS-2 and MRQ from the treatment and comparison groups. The research question addressed was the following: Is there a significant difference in reading self-efficacy and motivation for reading between middle-school special education students who participate in the growth-mindset program and those who do not? First, procedures for data cleaning, as well as an inspection of outliers, are presented, followed by a report of the descriptive statistics, analysis, and results for the research question.

Description of the Data

The data analysis for this study used quantitative data on self-efficacy and motivation for reading from the RSPS-2 and MRQ subscale pretest and posttest surveys. The survey' statements to which the student participants responded based on a Likert-type scale. The RSPS-2 had statements regarding students' self-efficacy toward reading, while the MRQ had statements regarding students' motivation toward reading. The RSPS-2 had a Likert-type scale of 1 "strongly disagree" through 5 "strongly agree." The MRQ had a Likert-type scale rating on a scale of 1 "very different from me" through 4 "a lot like me." The researcher collected quantitative data (pretest and posttest) from the surveys to answer the research question.

The independent variables for this research study were the program type (no intervention or mindset intervention). The dependent variables were the scaled scores of the RSPS-2 and the total scores of the MRQ surveys. The scores for the RSPS-2 were based on the amount of points

a student participant had in each scaled area. Those scales were: Progress, Observational

Comparison (OC), Social Feedback (SF) and Physiological States (PS). The scores for the MRQ

were based on the total points students received on all the scaled areas, except for work

avoidance: Reading Efficacy (RE), Reading Challenge (RCH), Reading Curiosity (RC),

Aesthetic Enjoyment of Reading (AER), Importance of Reading (IR), Reading Recognition

(RR), Reading for Grades (RG), Social Reasons for Reading (SRR), Reading Competition

(RCOM), Compliance (C).

Coding and Cleaning of the Data

Data Cleaning of the Pretests

Coding of Data. The researcher used a codebook to ensure constancy and correctness in

the coding process (Meyers, Gamst, & Guarino, 2013). The researcher coded the data to protect

the confidentiality of the student participants. For student participants, each student received a

coded number between "1" and "68."

To address the assumption of the independent and dependent variables, the researcher

coded the variables. The independent variable was program type, which were coded as "1" for

student participants in the treatment group and "0" for student participants in the comparison

group. The independent variables were coded as interval data. There should be at least two

dependent variables in a multivariate analysis of variance (Meyers, Gamst, & Guarino, 2013).

For this study, those dependent variables were the four sub-scales in the RSPS-2 pretest and

posttest scores.

The researcher coded the pretests and posttests scores for the RSPS-2 and MRQ as

interval data. This coding included the range of scores made by student participants on both

pretest and posttests. The RSPS-2 and MRQ pretest and posttest scores were calculated for each student participant and were input into SPSS.

The researcher created a Microsoft Excel spreadsheet to record all quantitative data collected from the pretests and posttests. Information about program type was also stored on the Excel spreadsheet. The researcher then transferred this information to the Statistical Package for the Social Sciences v. 18 (SPSS, Inc., 2009).

Missing Value Analysis. Then, to improve the quality of the data, the researcher cleaned the data to uncover and eliminate or modify any inaccuracies (Dasu & Johnson, 2003). The data cleaning process helped prevent inaccurate or inconsistent data from depicting incorrect assumptions (Dasu & Johnson, 2003).

The researcher visually scanned all of the student participants' survey scores to view for any missing values. Scores at the lowest or highest end were recalculated to ensure accurate computation of the scores for those student participants. Furthermore, the researcher ran descriptive statistics to be sure that all the data was input into the SPSS data sheet.

Independence of Observations. In a quantitative study, there can be no relationship between the comparison and treatment groups (Meyers, Gamst, & Guarino, 2013). To ensure against relationships between the student participants in the treatment and comparison groups, the researcher conducted the study at two separate middle schools. One school had the treatment group, and the other school had the comparison group. The school with the treatment group had three teacher participants and 40 student participants who completed the growth mindset intervention in three separate classrooms during their advisory period. While, the comparison group had two teacher participants and 30 student participants who continued to attend their advisory period in two separate classrooms.

Sample Size. In a quantitative study, there should be more participants in each group than the number of dependent variables being analyzed (Meyers, Gamst, & Guarino, 2013). To ensure that the research study had an adequate sample size, the researcher included all special education students as potential student participants if they received services in the area of reading and attended either middle school. To increase the sample size, the researcher sent parental consent forms, followed up with the teacher participants regularly to discuss ways to obtain more consents, and met with possible student participants to answer any questions or concerns they might have had about the study. The study included a total of 68 student participants, 40 in the treatment group ($n = 40$) and 28 in the comparison group ($n = 28$). This sample size was not ideal, due to the fact that there were an unequal number of participants in each group.

After the researcher had coded the data and input all the pretest scores into SPSS, the researcher then examined the pretests for the RSPS-2 and MRQ separately prior to running the data analysis to be sure there was equalization among the treatment and comparison groups.

RSPS-2 Pretest Data Analysis

Assessing for Univariate Outliers. First, the researcher searched the data for univariate outliers, which are data with extreme scores on a particular value (Meyers, Gamst, & Guarino, 2013). In addition, the researcher examined the normality by observing the skewness and kurtosis values for each dependent variable with respect to each independent variable (Meyers, Gamst, & Guarino, 2013). To assess the quantitative data for outliers, the researcher ran the dependent and independent data in the SPSS statistical software program using descriptive statistics on each of the surveys' pretest scores. The results showed that the data had a realistic, normal dispersal on each of the scales, with no univariate outliers. A box plot for the RSPS-2 pretests can be seen below in Figure 8.
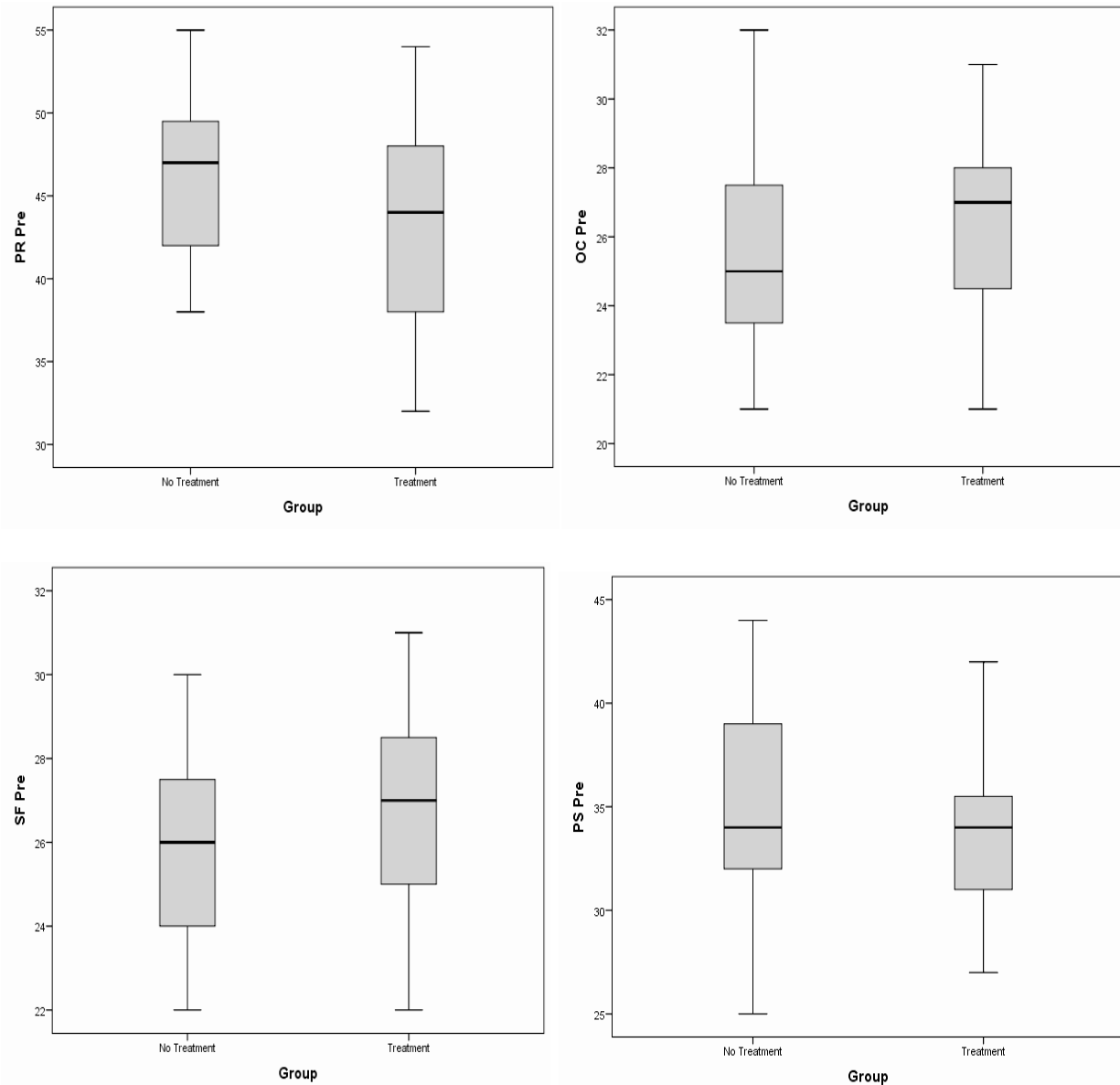
Figure 8. Box and whiskers plot for the treatment and comparison groups' RSPS-2 pretests, based on groups.

Multivariate Outliers. Next, the researcher checked the data for multivariate outliers. This process is a technique to gauge how much a case's values on selected variables vary from the average of all cases (Meyers, Gamst, & Guarino 2013). To accomplish this process, the researcher calculated the Mahalanobis distance for each data set (Meyers, Gamst, & Guarino, 2013). A large Mahalanobis distance would suggest a data set with an extreme value on one or

more of the variables (Meyers, Gamst, & Guarino, 2013). The researcher ran a linear regression procedure to attain a Mahalanobis distance for each data set. The researcher assessed the magnitude of the Mahalanobis distance by examining the *Table of Critical Values* for chi-square at an alpha level of $p < .001$ (Meyers, Gamst, & Guarino, 2013). After executing a linear regression, no extreme outliers were found or were identified as surpassing the chi-square value of 18.47 with 4 degrees of freedom (Meyers, Gamst, & Guarino, 2013) using the four subscales of the RSPS-2. See Table 11 presents the Mahalanobis distance on the RSPS-2.

Table 11

Mahalanobis Distance on the RSPS-2 Pretest

		Extreme Outliers	
		Case Number	Value
Highest	1	9	8.60
	2	19	8.49
	3	36	8.39
	4	40	7.50
	5	58	7.50
Lowest	1	34	0.30
	2	68	0.11
	3	56	0.30
	4	46	0.49
	5	43	0.58

Assessing Normality. The skewness and kurtosis of the RSPS-2 data were in the

acceptable range because they were within the ±1.00 range (Meyers, Gamst, & Guarino, 2013).

Table 12 presents the skewness and kurtosis of the RSPS-2 pretest scores, by group.

Table 12

Skewness and Kurtosis for RSPS-2 Pretests

Scale	Skewness	Kurtosis
Treatment (*n* = 40)		
Progress	-.27	-.89
Observational Comparison	-.32	-.63
Social Feedback	-.06	-.80
Physiological States	.26	-.25
Comparison (*n* = 28)		
Progress	.15	-.63
Observational Comparison	.44	.04
Social Feedback	.10	-.43
Physiological States	-.04	-.69

To examine the data for normality, the researcher used the Shapiro-Wilk test of normality

because it uncovers extreme deviations from normality by combining the skewness and kurtosis

coefficients to produce one value (Meyers, Gamst, & Guarino, 2013). The Shapiro-Wilk test has

been found to be the prevailing test in most circumstances when examining normality (NCSS,

n.d.). The results for the Shapiro-Wilk test of normality with a P value greater than .05 indicated

normal distribution. Table 13 presents the Shapiro-Wilk test results for the RSPS-2 pretests.

Table 13

Shapiro-Wilk Test of Normality for RSPS-2 Pretests

	Scale	Statistic	*Df*	Sig.
Treatment (*n* = 40)				
	Progress	.96	40	.11
	Observational Comparison	.96	40	.14
	Social Feedback	.97	40	.28
	Physiological States	.96	40	.15
Comparison (*n* = 28)				
	Progress	.96	28	.30
	Observational Comparison	.96	28	.28
	Social Feedback	.97	28	.57
	Physiological States	.97	28	.49

Assessing Linearity. To assess linearity of the data, the researcher examined scatterplots for each group of variables. Scatterplots that are egg or oval shaped are evocative of linearity among variables (Meyers, Gamst, & Guarino, 2013). As demonstrated in Figure 9, the scatterplot depicts enough linearity in the relationships of the variables to proceed with analysis.
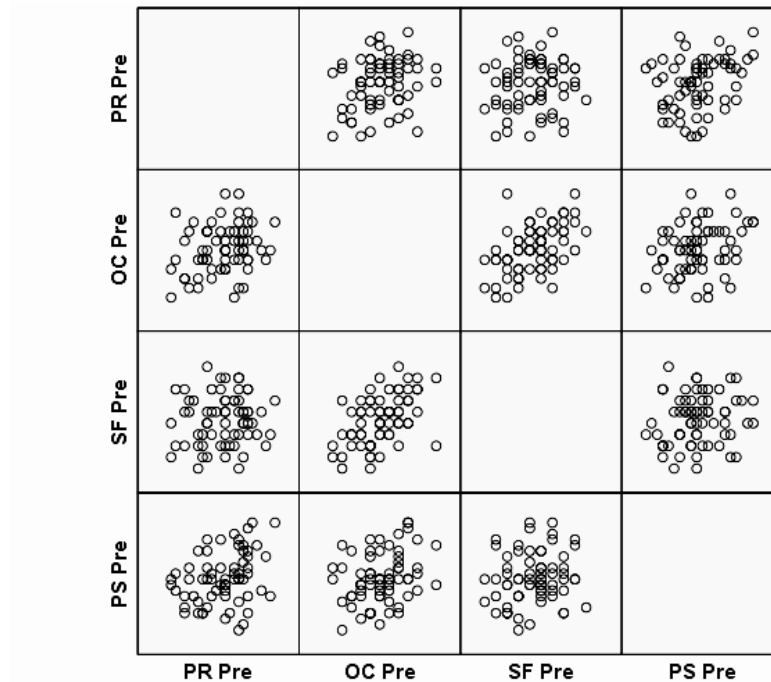
Figure 9. Shows the linearity of the variables. The plot depicts enough linearity in the relationships of the variables to proceed with analysis.

Homogeneity. The researcher examined the homogeneity of variance–covariance matrices of the independent variables to determine if the variance with each of the populations was equal (Meyers, Gamst, & Guarino, 2013). To accomplish this test, the researcher used the General Linear Model Multivariate procedure. If there is statistical significance ($p < .05$), the procedure indicates that there has been a violation of the assumption (Meyers, Gamst, & Guarino, 2013). Table 14 indicates that Box's Test of Equality of Covariance Matrices for the RSPS-2 was not statistically significant $p = .24$ ($p < .05$), thus suggesting that there is equality of variance–covariance matrices and homoscedasticity (Meyers, Gamst, & Guarino, 2013).

Table 14

Box's Test of Equality of Covariance Matrices for RSPS-2 Pretests

Box's M	11.94
F	1.11
df1	10
df2	15823.11
Sig.	.35

Analysis for No Multicollinearity. When two dependent variables correlate strongly, they are considered to have collinearity. When more than two dependent variables correlate strongly, they are considered to have multicollinearity (Meyers, Gamst, & Guarino, 2013). Based on Table 15 Coefficients Output, it can be concluded that there are no multicollinearity symptoms, since the variance inflation factor (VIF) values are between 1 and 10. Multicollinearity is indicated for a variable if the VIF measures at levels of 10 or greater; the data of this study are considered not to display evidence of multicollinearity as the levels are within these guidelines (Meyers, Gamst, & Guarino, 2013).

Table 15

RSPS-2 Pretest Coefficients Output

	Collinearity Statistics	
Scales	Tolerance	VIF
Progress	.62	1.61
Observational Comparison	.75	1.33
Social Feedback	.58	1.72
Physiological States	.82	1.21

Descriptive Statistics for the Pretest. Tables 16 the descriptive statistics for the pretest scores for the RSPS-2 (comparison and treatment). Descriptive statistics are summaries of distributions of values, which researchers can obtain "[b]y examining the mean and standard deviation" (Meyers et al., 2013, p. 63).

Table 16

Descriptive Statistics for RSPS-2 Pretest Scores by Group

Subscale		Mean	Standard Deviation	Minimum	Maximum
Treatment (*n* = 40)					
	PR	42.55	5.83	32.00	54.00
	OC	27.00	2.34	21.00	30.00
	SF	26.45	2.26	22.00	31.00
	PS	33.45	3.77	27.00	42.00
Comparison (*n* = 28)					
	PR	45.07	4.68	38.00	55.00
	OC	26.04	2.78	21.00	32.00
	SF	26.11	2.03	22.00	30.00
	PS	35.21	5.20	25.00	44.00

Pretest Data Analysis and Results. With the assumptions having been met, the researcher then conducted a one-way multivariate analysis of variance (MANOVA) using pretest scores from the RSPS-2. The dependent variable was the student participants' pretest scaled scores on the RSPS-2. The independent variables were the program type (intervention or no intervention). Meyers et al., (2013) wrote, "By convention, scores in this 5% region are said to be relatively rare occurrences, rare enough for us to use -.05 criterion as our default indicator of statistical significance" (p. 27). However, the researcher set the alpha level at .025 (*a* = .025) for this research study due to the fact that the student participants data were being used in two sets of analyses, a MANOVA for the RSPS-2 and an independent-samples *t*-test for the MRQ.

There was not a statistically significant difference in reading self-efficacy scores, Wilks'

$\lambda = .91$ $F(4,63) = 1.56$; $p = .20$, partial $\eta^2 = .090$, trivial. The results of the one-way MANOVA

for the RSPS-2 pretest scaled scores indicated no significant main effect for program type for

Progress, $F(1,66) = 3.60$, $p = .06$, partial $\eta^2 = .052$, trivial, Observational Comparisons, $F(1,66)$

$= .09$, $p = .76$, partial $\eta^2 = .001$ trivial, Social Feedback, $F(1,66) = .41$, $p = .52$, partial $\eta^2 = .006$,

trivial, and Physiological States, $F(1,66) = 2.64$, $p = .11$, partial $\eta^2 = .038$, trivial. These results

indicated that there was equalization between the comparison and treatment groups prior to the

intervention. Table 17 presents the pretest one-way MANOVA results.

Table 17

One-way MANOVA Results for Mean RSPS-2 Pretest Scores

Source	Type III Sum of Squares	*df*	Mean Squares	*F*	Sig.	Partial Eta Squared
PR	104.71	1	104.71	3.60	.06	.052
OC	.59	1	.59	.09	.76	.001
SF	1.94	1	1.94	.41	.52	.006
PS	51.27	1	51.27	2.64	.11	.038

Note. $p = .025$

A procedure similar to what was conducted with the RSPS-2 pretest data was conducted

with the posttest data. The researcher tested the assumptions for a one-way MANOVA through

an examination for (a) outliers, (b) independence of samples, (c) multivariate normality, (d)

linearity, (e) homogeneity, and (f) no multicollinearity.

RSPS-2 Posttest Data Analysis

   Assessing for Univariate Outliers. First, the researcher searched the data for univariate outliers, which are data with extreme scores on a particular value (Meyers, Gamst, & Guarino, 2013). In addition, the researcher examined the normality by observing the skewness and kurtosis values for each dependent variable with respect to each independent variable (Meyers, Gamst, & Guarino, 2013). To assess the quantitative data for outliers, the researcher ran the dependent and independent data in the SPSS statistical software program using descriptive statistics on the RSPS-2 posttest scores. It showed that the data had a realistic, normal dispersal on each of the scales, with no univariate outliers. A box plot for the RSPS-2 posttests can be seen below in Figure 10.
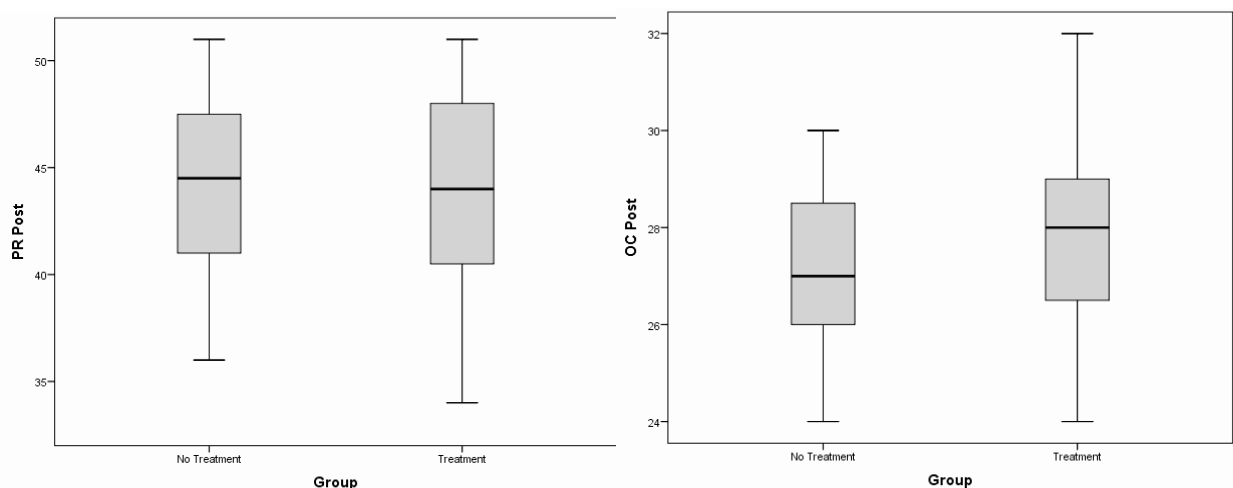
Continued
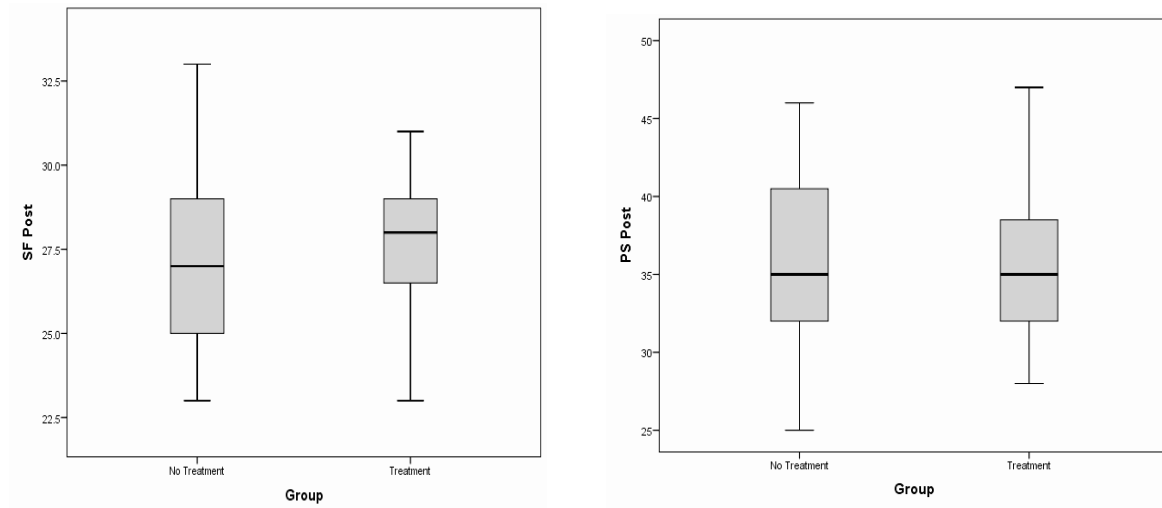
Figure 10. Box and whiskers plot for the treatment and comparison groups' RSPS-2 posttests, based on groups.

Multivariate Outliers. Next, the researcher checked the data for multivariate outliers. This process is a technique to gauge how much a case's values on selected variables vary from the average of all cases (Meyers, Gamst, & Guarino 2013). To accomplish this process, the researcher calculated the Mahalanobis distance for each data set (Meyers, Gamst, & Guarino, 2013). A large Mahalanobis distance would suggest a data set with an extreme value on one or more of the variables (Meyers, Gamst, & Guarino, 2013). The researcher ran a linear regression procedure to attain a Mahalanobis distance for each data set. The researcher assessed the magnitude of the Mahalanobis distance by examining the *Table of Critical Values* for chi-square at an alpha level of $p < .001$ (Meyers, Gamst, & Guarino, 2013). After executing a linear regression, no extreme outliers were found or were identified as surpassing the chi-square value of 18.47 with 4 degrees of freedom (Meyers, Gamst, & Guarino, 2013). See Table 18 presents the Mahalanobis distance on the RSPS-2.

Table 18

Mahalanobis Distance on the RSPS-2 Posttests

		Extreme Outliers	
		Case Number	Value
Highest	1	16	11.60
	2	68	10.26
	3	64	8.77
	4	14	8.63
	5	11	8.17
Lowest	1	4	0.44
	2	43	0.49
	3	32	0.61
	4	47	0.74
	5	34	1.14

Assessing Normality. The skewness and kurtosis of the RSPS-2 data were in the acceptable range because they were within the ±1.00 range (Meyers, Gamst, & Guarino, 2013). Table 19 presents the skewness and kurtosis of the RSPS-2 posttest scores, by group.

Table 19

Skewness and Kurtosis for RSPS-2 Posttests

Scale	Skewness	Kurtosis
Treatment (*n* = 40)		
Progress	-.40	-.78
Observational Comparison	-.22	-.61
Social Feedback	-.20	-.50
Physiological States	.50	-.40
Comparison (*n* = 28)		
Progress	-.18	-.78
Observational Comparison	-.08	-.87
Social Feedback	.25	.03
Physiological States	.18	-.82

To examine the data for normality, the researcher used the Shapiro-Wilk test of normality because it uncovers extreme deviations from normality by combining the skewness and kurtosis coefficients to produce one value (Meyers, Gamst, & Guarino, 2013). The Shapiro-Wilk test has been found to be the prevailing test in most circumstances when examining normality (NCSS, n.d.). The results for the Shapiro-Wilk test of normality with a P value greater than .05 indicated normal distribution. Table 20 presents the Shapiro-Wilk test results for the RSPS-2 posttests.

Table 20

Shapiro-Wilk Test of Normality for RSPS-2 Posttests

	Scale	Statistic	*df*	Sig.
Treatment (*n* = 40)				
	Progress	.95	40	.07
	Observational Comparison	.95	40	.06
	Social Feedback	.96	40	.17
	Physiological States	.96	40	.14
Comparison (*n* = 28)				
	Progress	.97	28	.45
	Observational Comparison	.93	28	.07
	Social Feedback	.97	28	.55
	Physiological States	.96	28	.29

Assessing Linearity. To assess linearity of the data, the researcher examined scatterplots for each group of variables. Scatterplots that are egg or oval shaped are evocative of linearity among variables (Meyers, Gamst, & Guarino, 2013). As demonstrated in Figure 11, the scatterplot depicts enough linearity in the relationships of the variables to proceed with analysis.
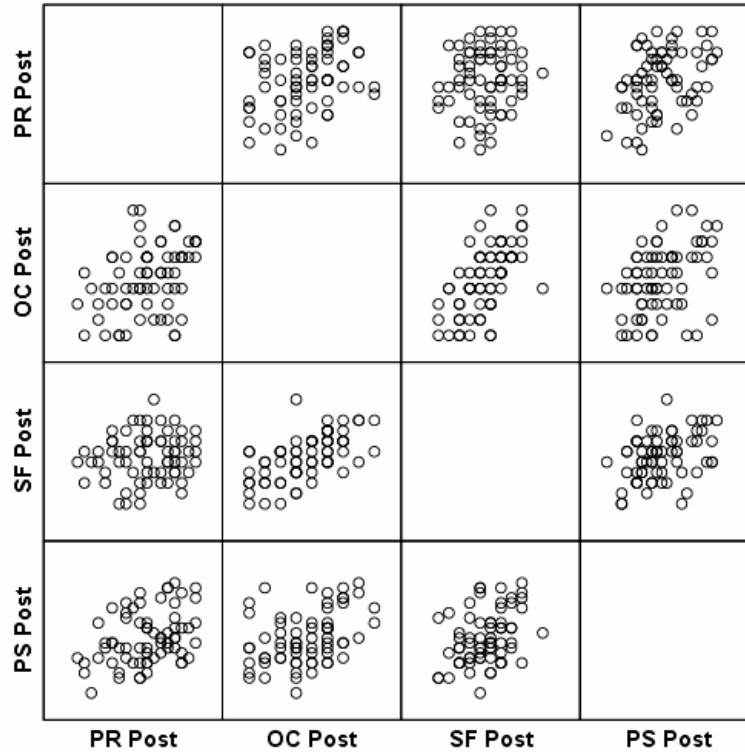
Figure 11. Shows the linearity of the variables for the RSPS-2 posttests. The plot depicts

enough linearity in the relationships of the variables to proceed with analysis.

Homogeneity. The researcher examined the homogeneity of variance–covariance

matrices of the independent variables to determine if the variance with each of the populations

was equal (Meyers, Gamst, & Guarino, 2013). To accomplish this test, the researcher used the

General Linear Model Multivariate procedure. If there is statistical significance ($p < .05$), the

procedure indicates that there has been a violation of the assumption (Meyers, Gamst, &

Guarino, 2013). Table 21 indicates that Box's Test of Equality of Covariance Matrices for the

RSPS-2 was not statistically significant $p = .34$ ($p < .05$), thus suggesting that there is equality of

variance–covariance matrices and homoscedasticity (Meyers, Gamst, & Guarino, 2013).

Table 21

Box's Test of Equality of Covariance Matrices for RSPS-2 Posttests

Box's M	11.77
F	1.10
df1	10
df2	15823.11
Sig.	.36

Analysis for No Multicollinearity. When two independent variables correlate strongly, they are considered to have collinearity. When more than two independent variables correlate strongly, they are considered to have multicollinearity (Meyers, Gamst, & Guarino, 2013). Based on Table 22 Coefficients Output, it can be concluded that there are no multicollinearity symptoms, since the variance inflation factor (VIF) values are between 1 and 10. Multicollinearity is indicated for a variable if the VIF measures at levels of 10 or greater; the data of this study are considered not to display evidence of multicollinearity as the levels are within these guidelines (Meyers, Gamst, & Guarino, 2013).

Table 22

RSPS-2 Posttests Coefficients Output

	Collinearity Statistics	
Scales	Tolerance	VIF
Progress	.82	1.21
Observational Comparison	.58	1.72
Social Feedback	.62	1.61
Physiological States	.75	1.33

Descriptive Statistics for the RSPS-2 Posttests. Tables 23 the descriptive statistics for the posttest scores for the RSPS-2 (comparison and treatment). Descriptive statistics are summaries of distributions of values, which researchers can obtain "[b]y examining the mean and standard deviation" (Meyers et al., 2013, p. 63).

Table 23

Descriptive Statistics for RSPS-2 Posttest Scores by Group

Subscale		Mean	Standard Deviation	Minimum	Maximum
Treatment (*n* = 40)					
	PR	43.48	4.71	34.00	51.00
	OC	28.00	2.17	24.00	32.00
	SF	27.78	2.06	23.00	31.00
	PS	35.78	4.78	28.00	47.00
Comparison (*n* = 28)					
	PR	44.43	4.19	36.00	51.00
	OC	27.07	1.92	24.00	30.00
	SF	27.07	2.37	23.00	33.00
	PS	36.32	5.93	25.00	46.00

Posttest Data Analysis and Results. With the assumptions having been met, the researcher then conducted a one-way multivariate analysis of variance (MANOVA) using posttest scores from the RSPS-2. The dependent variable was the student participants' posttest scaled scores on the RSPS-2. The independent variable was the program type (intervention or no intervention). Meyers et al. (2013) wrote, "By convention, scores in this 5% region are said to be relatively rare occurrences, rare enough for us to use this -.05 criterion as our default indicator of statistical significance" (p. 27). However, the researcher set the alpha level at .025 (a = .025) for this research study, due to the fact that the student participants were being used in two sets of data analyses.

There was not a statistically significant difference in reading self-efficacy scores, Wilks'

$\lambda = .91$ $F(4,63) = 1.66$; $p = .17$, partial $\eta^2 = .095$, trivial. The results of the one-way MANOVA for

the RSPS-2 posttest scaled scores indicated no significant main effect for program type for

Progress, $F(1,66) = .73$, $p = .40$, partial $\eta^2 = .011$, trivial, Observational Comparisons, $F(1,66) =$

3.30, $p = .07$, partial $\eta^2 = .048$ trivial, Social Feedback, $F(1,66) = 1.70$, $p = .20$, partial $\eta^2 = .025$,

trivial, and Physiological States, $F(1,66) = .18$, $p = .68$, partial $\eta^2 = .003$, trivial. Table 24

presents the posttest one-way MANOVA results.

Table 24

One-way MANOVA Results for Mean RSPS-2 Posttest Scores

Source	Type III Sum of Squares	df	Mean Squares	F	Sig.	Partial Eta Squared
PR	14.98	1	14.98	0.74	.40	.011
OC	14.20	1	14.20	3.30	.07	.048
SF	8.15	1	8.15	1.70	.20	.025
PS	4.92	1	4.92	0.18	.68	.003

Note. $p = .025$

MRQ Pretest Data Analysis

Assessing for Univariate Outliers. First, the researcher searched the data for univariate

outliers, which are data with extreme scores on a particular value (Meyers, Gamst, & Guarino,

2013). In addition, the researcher examined the normality by observing the skewness and

kurtosis values for each dependent variable with respect to each independent variable (Meyers,

Gamst, & Guarino, 2013). To assess the quantitative data for outliers, the researcher ran the

dependent and independent data in the SPSS statistical software program using descriptive statistics on each of the surveys' pretest scores. It showed that the data had a realistic, normal dispersal for both groups, with no univariate outliers. A box plot for the MRQ pretests can be seen below in Figure 12.
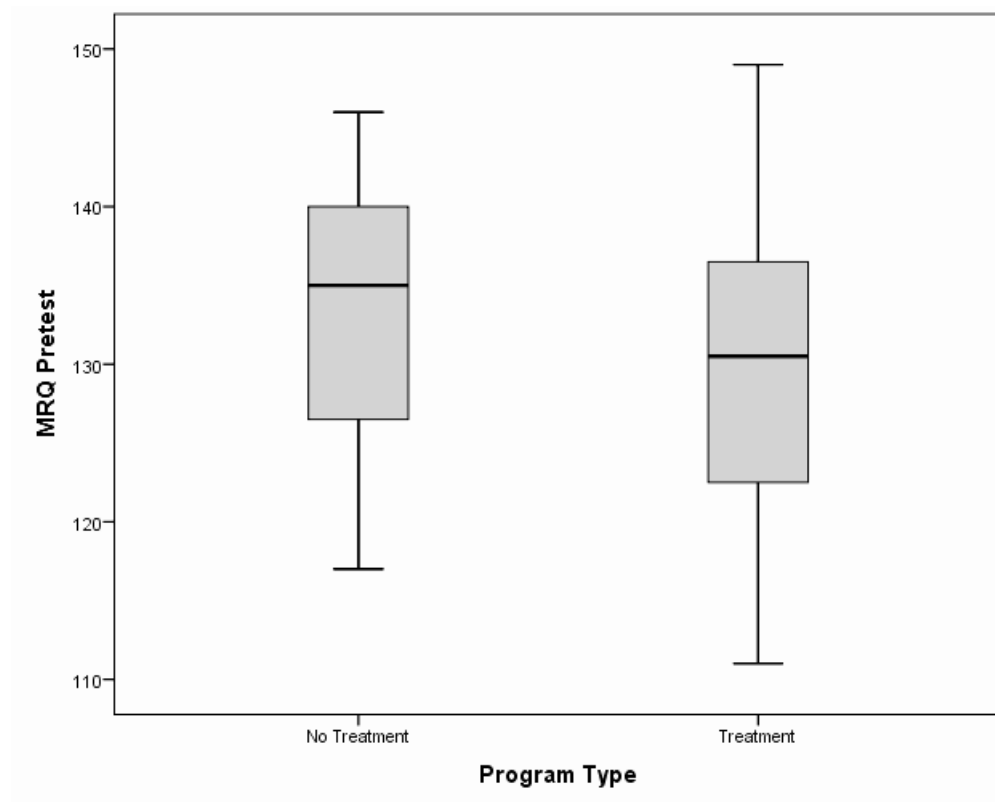
Figure 12. Box and whiskers plot for the treatment and comparison groups' MRQ pretests, based on groups.

Assessing Normality. The skewness and kurtosis of the MRQ data were in the acceptable range because they were within the ± 1.00 range (Meyers, Gamst, & Guarino, 2013). Table 25 presents the skewness and kurtosis of the MRQ pretest scores, by group.

Table 25

Skewness and Kurtosis for MRQ Pretests

Program Type	Skewness	Kurtosis
Treatment (*n* = 40)	.03	-.67
Comparison (*n* = 28)	-.31	-.97

To examine the data for normality, the researcher used the Shapiro-Wilk test of normality because it uncovers extreme deviations from normality by combining the skewness and kurtosis coefficients to produce one value (Meyers, Gamst, & Guarino, 2013). The Shapiro-Wilk test has been found to be the prevailing test in most circumstances when examining normality (NCSS, n.d.). The results for the Shapiro-Wilk test of normality with a P value greater than .05 indicated normal distribution. Table 26 presents the Shapiro-Wilk test results for the MRQ pretests.

Table 26

Shapiro-Wilk Test of Normality for MRQ Pretests

Program Type	Statistic	*df*	Sig.
Treatment (*n* = 40)	.98	40	.51
Comparison (*n* = 28)	.95	28	.21

Homogeneity. The researcher examined the homogeneity of variance of the independent variables to determine if the variance with each of the populations was equal (Meyers, Gamst, & Guarino, 2013). To accomplish this test, the researcher used the General Linear Model Univariate procedure. If there is statistical significance ($p < .05$), the procedure indicates that there has been a violation of the assumption (Meyers, Gamst, & Guarino, 2013). Table 27 indicates that Homogeneity of Variance for the MRQ was not statistically significant $p = .29$ ($p <$

.05), thus suggesting that there is equality of variance and homoscedasticity (Meyers, Gamst, &

Guarino, 2013).

Table 27

Test of Homogeneity of Variances for MRQ Pretests

Levene Statistic	*df1*	*df2*	Sig.
1.14	1	66	.29

Descriptive Statistics for the MRQ Pretests. Tables 28 shows the descriptive statistics

for the pretest scores for the MRQ (comparison and treatment). Descriptive statistics are

summaries of distributions of values, which researchers can obtain "[b]y examining the mean

and standard deviation" (Meyers et al., 2013, p. 63).

Table 28

Descriptive Statistics for MRQ Pretest Scores by Group

Program Type	Mean	Standard Deviation	Minimum	Maximum
Treatment (*n* = 40)	129.70	10.26	111.00	149.00
Comparison (*n* = 28)	133.61	8.17	117.00	146.00

Pretest Data Analysis and Results for the MRQ. With the assumptions having been

met, the researcher then conducted an independent-samples *t*-test to see if there were differences

in pretest scores from the MRQ between student participants with the growth mindset

intervention and those without the intervention. The dependent variable was the student

participants' pretest scores on the MRQ. The independent variable was the program type

(intervention or no intervention). Meyers et al., (2013) wrote, "By convention, scores in this 5%

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region are said to be relatively rare occurrences, rare enough for us to use this -.05 criterion as

our default indicator of statistical significance" (p. 27). However, the same student participants

were used in the analysis of the MANOVA for the RSPS-2, therefore; the researcher used a

Bonferroni adjustment and set the alpha level at .025 (a = .025) for this research study.

The results of the *t*-test for the MRQ pretest scores indicated no significant main effect

for program type, $t(66)$ = -1.68, p = .10. These results indicated that there was equalization

between the treatment (M = 129.70, SD = 10.26) and comparison groups (M = 133.61, SD =

8.17) prior to the intervention. Table 29 presents the pretest *t*-test results.

Table 29

T-test Results for MRQ Pretest Scores

	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	1.14	.29	-1.68	66.00	.10	-3.91	2.33	-8.56	.75
Equal variances not assumed			-1.74	64.82	.09	-3.91	2.24	-8.38	.57

Note. p = .025

A procedure similar to what was conducted with the MRQ pretest data was conducted

with the posttest data. The researcher tested the assumptions for an independent-samples *t*-test

through an examination for (a) outliers, (b) normality, and (c) homogeneity.

MRQ Posttest Data Analysis

   Assessing for Univariate Outliers. First, the researcher searched the data for univariate

outliers, which are data with extreme scores on a particular value (Meyers, Gamst, & Guarino,

2013). In addition, the researcher examined the normality by observing the skewness and

kurtosis values for each dependent variable with respect to each independent variable (Meyers,

Gamst, & Guarino, 2013). To assess the quantitative data for outliers, the researcher ran the

dependent and independent data in the SPSS statistical software program using descriptive

statistics on the MRQ posttest scores. It showed that the data had a realistic, normal dispersal,

with no univariate outliers. A box plot for the MRQ posttests can be seen below in Figure 13.
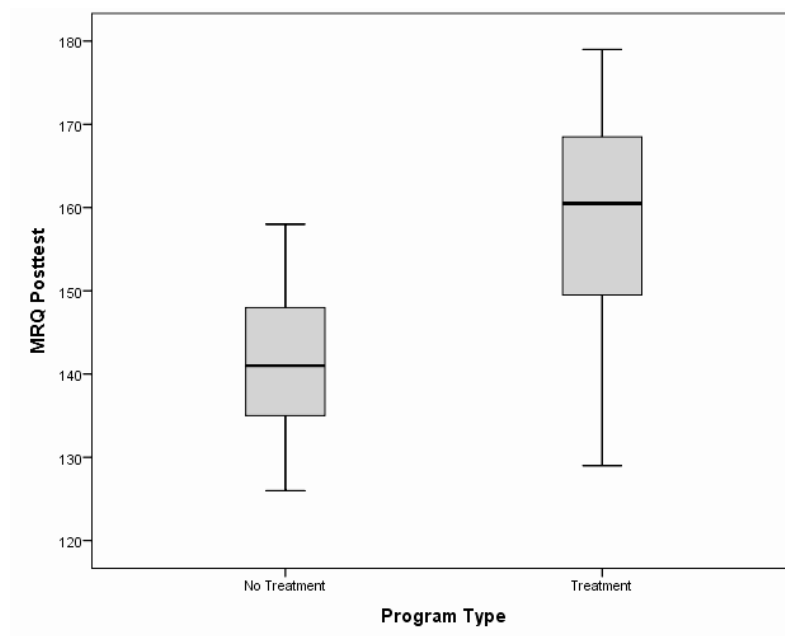
Figure 13. Box and whiskers plot for the treatment and comparison groups' MRQ posttests,

based on groups.

Assessing Normality. The skewness and kurtosis of the MRQ data were in the

acceptable range because they were within the ±1.00 range (Meyers, Gamst, & Guarino, 2013).

Table 30 presents the skewness and kurtosis of the MRQ posttest scores, by group.

Table 30

Skewness and Kurtosis for MRQ Posttests

Program Type	Skewness	Kurtosis
Treatment (*n* = 40)	-.07	-.80
Comparison ((*n* = 28)	-.40	-.52

To examine the data for normality, the researcher used the Shapiro-Wilk test of normality

because it uncovers extreme deviations from normality by combining the skewness and kurtosis

coefficients to produce one value (Meyers, Gamst, & Guarino, 2013). The Shapiro-Wilk test has

been found to be the prevailing test in most circumstances when examining normality (NCSS,

n.d.). The results for the Shapiro-Wilk test of normality with a P value greater than .05 indicated

normal distribution. Table 31 presents the Shapiro-Wilk test results for the MRQ posttests.

Table 31

Shapiro-Wilk Test of Normality for MRQ Posttests

Program Type	Statistic	*Df*	Sig.
Treatment (*n* = 40)	.97	40	.39
Comparison (*n* = 28)	.97	28	.60

Descriptive Statistics for the MRQ Posttests. Tables 32 the descriptive statistics for

the posttest scores for the MRQ (comparison and treatment). Descriptive statistics are

summaries of distributions of values, which researchers can obtain "[b]y examining the mean

and standard deviation" (Meyers et al., 2013, p. 63).

Table 32

Descriptive Statistics for MRQ Posttest Scores by Group

Subscale	Mean	Standard Deviation	Minimum	Maximum
Treatment ($n = 40$)	159.13	12.27	129	179
Comparison ($n = 28$)	141.64	8.27	126	158

Homogeneity. The researcher examined the homogeneity of variance of the independent

variables to determine if the variance with each of the populations was equal (Meyers, Gamst, &

Guarino, 2013). To accomplish this test, the researcher used the General Linear Model

Univariate procedure. If there is statistical significance ($p < .05$), the procedure indicates that

there has been a violation of the assumption (Meyers, Gamst, & Guarino, 2013). Table 33

indicates that Homogeneity of Variance for the MRQ was statistically significant $p = .03$ ($p <$

.05), thus suggesting that the assumption of homogeneity of variances was violated, as assessed

by the Levene's test for equality of variances (Meyers, Gamst, & Guarino, 2013). Since there

was an unbalanced design due to differences in sample size the researcher chose to use the

Welch t-test for analysis (equal variances not assumed) to interpret and report (Howell, 2010).

Table 33

Test of Homogeneity of Variances for MRQ Posttests

Levene Statistic	*df1*	*df2*	Sig.
5.29	1	66	.03

Posttest Data Analysis and Results. With the assumptions having been met except for homogeneity, as assessed by the Levene's test for equality of variances, the researcher then conducted an independent-samples *t*-test using posttest scores from the MRQ. The dependent variable was the student participants' posttest scores on the MRQ. The independent variable was the program type (intervention or no intervention). Meyers et al., (2013) wrote, "By convention, scores in this 5% region are said to be relatively rare occurrences, rare enough for us to use this -.05 criterion as our default indicator of statistical significance" (p. 27). However, the same student participants were used in the analysis of the MANOVA for the RSPS-2, therefore; the researcher used a Bonferroni adjustment and set the alpha level at .025 ($a = .025$) for this research study.

The results of the independent-samples *t*-test for the MRQ posttest scores indicated a statistically significant difference in mean MRQ posttest scores between program type, with the treatment group ($M = 159.13$, $SD = 12.27$) scoring significantly higher than the comparison group ($M = 141.64$, $SD = 8.27$), on the MRQ posttests, $p < .001$, $M = 17.48$, 95% CI [12.51 to 22.46], $t(65.93) = 7.02$, $p < .001$. Table 34 presents the posttest independent-samples *t*-test results.

Table 34

T-test Results for MRQ Posttest Scores

	F	Sig.	T	*df*	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	5.39	.03	6.56	66.00	.001	17.48	2.66	12.16	22.80
Equal variances not assumed			7.02	65.93	.001	17.48	2.50	12.51	22.46

Note. $p = .025$

Summary

Chapter Four presented an account of the statistical procedures used to examine the data collected for the study investigating the effects of a growth-mindset intervention on adolescent special education students. The researcher used a one-way MANOVA to analyze the pretest and posttest data for the RSPS-2. Results indicated that the pretest scores on the RSPS-2 did not vary significantly between the treatment and comparison groups. The researcher then conducted a MANOVA with the posttest data. The dependent variables were the subscales for the RSPS-2 posttest scores. The independent variable was the program type (growth-mindset intervention and no intervention). The results of the one-way MANOVA for the RSPS-2 posttest scaled scores indicated no significant main effect for program type, Wilks' $\lambda = .91$ $F(4,63) = 1.66$; $p = .17$, partial $\eta^2 = .095$, trivial. Progress, $F(1,66) = .73$, $p = .40$, partial $\eta^2 = .011$, trivial, Observational Comparisons, $F(1,66) = 3.30$, $p = .07$, partial $\eta^2 = .048$ trivial, Social Feedback,

$F(1,66) = 1.70$, $p = .20$, partial $\eta^2 = .025$, trivial, and Physiological States, $F(1,66) = .18$, $p = .68$, partial $\eta^2 = .003$, trivial.

For the MRQ pretests the researcher used independent-samples t-test to analyze the MRQ pretest and posttest data. Results indicated that the pretest scores on the MRQ did not vary significantly between the treatment and comparison groups. The researcher then conducted an independent t-test with the posttest data. The dependent variables were the scores on the MRQ posttests. The independent variable was the program type (growth-mindset intervention and no intervention). The results of the independent-samples t-test for the MRQ posttest scores indicated a statistically significant difference in mean MRQ posttest scores between program type, with the treatment group ($M = 159.13$, $SD = 12.27$) scoring significantly higher than the comparison group ($M = 141.64$, $SD = 8.27$), on the MRQ posttests, $p < .001$, $M = 17.48$, 95% CI [12.51 to 22.46], $t(65.93) = 7.02$, $p < .001$.

Discussion of Chapter Four

The results of the quasi-experimental pretest–posttest study suggested that a growth-mindset intervention had no statistical significance on the self-efficacy for reading of adolescent special education students in the treatment group when compared to the student participants in the comparison group, as measured by the RSPS-2.

The researcher noticed when examining the means of the RSPS-2 results that for the three subtests in the RSPS-2: (a) progress, (b) observational comparison, and (c) social feedback, that the student participants in both the treatment and comparison group scored in the low range on both their pretest and posttest scores, which possibly supports Bergen (2013) and Klassen (2007) research that special education students might under calibrate their self-efficacy. However, the

results might also support research (Klassen, 2002) that had found that special education students tend to have lower self-efficacy towards academics than their typically performing peers.

The independent-samples *t*-test results did suggest that a growth-mindset intervention had a statistically significant difference on mean scores for the treatment group when compared to the student participants in the comparison group, as measured by the MRQ. When the researcher took the mean score for the treatment group ($M = 159.13$) and divided it by the number of items on the MRQ (53 items), the average response was a "3" which is "a little like me," while the comparison groups' ($M = 141.64$) average response was between a "2" which is "a little different from me" and a "3" which is "a little like me."

Chapter Five offers a summary of the research, substantiation of how the findings of the study related to the literature reviewed, implications for educators, opportunities for future research, and limitations of the study.

CHAPTER FIVE: SUMMARY AND CONCLUSIONS

Overview of the Study

Because of higher expectations set for students following the implementation of the Common Core State Standards, the gap is widening between students who were already having reading difficulties and their typical peers (Burris & Aja, 2014). Students with disabilities of all nationalities, income levels, and backgrounds have seen their scores plunge on state standardized testing. In 2012, over 50% of students with disabilities scored "Below Standard" on the ELA Common Core tests (Burris & Aja, 2014).

These rigorous expectations are not only affecting academic grades, but students with disabilities also score drastically lower in academic self-efficacy than peers without a disability (Tabassam & Grainger, 2002). Special education students having lower self-efficacy compared to their typical peers, as well as not meeting their academic expectations, may lead to a cyclical pattern of low academic achievement (Dweck, 2006).

Research has also shown that students with special needs usually assigned their failure to internal causes (Bryan, 1986). In education, success is attributed to high capability and hard work, and failure is credited to low capability and lack of trying (Weiner, 1985). As a result, students with special needs may feel that their lack of success in school means they do not have the ability to succeed academically or that they did not try hard enough to achieve (Dweck, 2006).

Though studies have examined the relationship between self-efficacy, motivation, and achievement after a student received a growth-mindset intervention (Saunders, 2013), there is limited research on how a growth-mindset intervention can help adolescent special education

students. Therefore, the purpose of this study was to examine whether a growth-mindset intervention could affect self-efficacy and motivation of adolescent special education students.

The researcher used a sample of convenience and intact randomly assigned participating classrooms to either a treatment group (growth-mindset intervention) or a comparison group (no intervention). The study took place in two middle schools in one urban school district in the Northeast. The participants included 6 special education teacher participants and 70 special education student participants. Their participation proceeded after the researcher received consent and assent from the district's deputy superintendent, building principals, teacher participants, parents, and student participants. The data collected included pretest and posttests on students' self-efficacy in reading, using the RSPS-2, and students' motivation for reading, using the MRQ.

Research Question and Hypothesis

Is there a significant difference in reading self-efficacy and motivation between middle-school special education students who participate in the growth-mindset program and those who do not?

Non-directional hypothesis: There will be a significant difference in reading self-efficacy and motivation between middle-school special education students who participate in the growth-mindset program and those who do not.

Procedures

The researcher addressed the research question using an independent variable: program type (growth-mindset intervention or no intervention). The dependent variables were the pretest and posttest scores on the instruments: RSPS-2 and the MRQ, which were used to measure students' self-efficacy and motivation in reading. This was a quasi-experimental research

design, using a pretest and posttest. The researcher used the RSPS-2 and MRQ instruments as quantitative data.

The researcher invited teachers and students to participate in the study. The researcher took a sample of convenience from the sixth, seventh, and eighth grades from the middle schools involved in the study. A total of 264 student assent and consent forms were distributed, 70 of which garnered responses, for a 27% response rate. Two student participants did not take the posttest, therefore their scores were removed from the research study. The teacher participants ($n = 6$) and their corresponding intact classes were randomly assigned to either a treatment group ($n = 40$) or a comparison group ($n = 28$). All students were receiving special education services in reading at the start of the research study.

Findings for the Research Study

After testing assumptions for the pretest data, the researcher conducted a one-way MANOVA for the RSPS-2 pretest scores. The analysis indicated no significant main effect for program type for the RSPS-2 pretest scaled scores: Progress, $F(1,66) = 3.60$, $p = .06$, partial $\eta^2 = .052$, trivial, Observational Comparisons, $F(1,66) = .09$, $p = .76$, partial $\eta^2 = .001$ trivial, Social Feedback, $F(1,66) = .41$, $p = .52$, partial $\eta^2 = .006$, trivial, and Physiological States, $F(1,66) = 2.64$, $p = .11$, partial $\eta^2 = .038$, trivial. These results indicated that there was equalization between the comparison and treatment groups prior to the intervention.

In addition, the results of the independent-samples t-test for the MRQ pretest scores indicated no significant main effect for program type, $t(66) = -1.68$, $p = .10$. As a result, the researcher moved forward and analyzed the posttest scores because there appeared to be equalization between the treatment and comparison groups.

After testing assumptions for the posttest data, the researcher conducted a MANOVA with the posttest data. The results of the MANOVA indicated no significant main effect for program type on the RSPS-2 between the comparison and the treatment groups, Wilks' λ =.91 $F(4,63) = 1.66$; $p =.17$, partial $\eta^2 = .095$, trivial. Progress, $F(1,66) = .73$, $p = .40$, partial $\eta^2 = .011$, trivial, Observational Comparisons, $F(1,66) = 3.30$, $p = .07$, partial $\eta^2 = .048$ trivial, Social Feedback, $F(1,66) = 1.70$, $p = .20$, partial $\eta^2 = .025$, trivial, and Physiological States, $F(1,66) = .18$, $p = .68$, partial $\eta^2 = .003$, trivial. These results suggest that a growth mindset intervention, did not have a statistically significant effect on self-efficacy for reading of adolescent, special education student participants in the study.

For the independent-samples t-test indicated a statistically significant difference with the treatment group ($M = 159.13$, $SD = 12.27$) scoring significantly higher than the comparison group ($M = 141.64$, $SD = 8.27$), on the MRQ posttests, $p < .001$, $M = 17.48$, 95% CI [12.51 to 22.46], $t(65.93) = 7.02$, $p < .001$. These results suggest that a growth-mindset intervention, Brainology, had a statistically significant effect on the motivation for reading of adolescent, special education student participants in the study.

Comparison and Contrast of Findings Related to the Literature Review

Previous research has indicated a significant gap between special education students' self-efficacy (Klassen, 2002) and motivation (Hodis, Meyer, McClurre, Weir, & Walkey, 2011) when compared to their typical-performing peers. While some research reviewed in Chapter Two supported the findings in this study, other studies contrasted with these findings.

When examining research pertaining to self-efficacy and motivation, Pajares and Schunk (2009) found that, "[c]ompared with students who doubt their learning capabilities, those who feel efficacious for learning or performing a task participate more readily, work harder, persist

longer when they encounter difficulties, and achieve at a higher level" (p. 2-3). Therefore, students with low self-efficacy were more likely to lack effort or motivation to attempt difficult tasks. Pajares and Schunk's (2009) findings contradicted the findings of this study because, even though there was not a significant difference in self-efficacy between the student participants in the treatment and the comparison group in this study, there was a significant difference in the student participants' motivation scores in the treatment group. Therefore, the student participants might not have had high self-efficacy in the area of reading, but they had a higher level of motivation to attempt tasks pertaining to reading (Pajares & Schunk, 2009).

When examining research on self-efficacy as it related to special education students, Bergen (2013) found that children with a learning disability were more likely to inaccurately gauge their self-efficacy, meaning that students' supposed ability and aptitude to confront an academic undertaking was not aligned with their actual abilities. Meanwhile, Klassen (2007) observed that, although adolescent special education students were very confident about their performance in a specific academic domain, they were unaware that they were actually doing poorly academically in the class. As a result, both of these research studies suggested that special education students might not be the best judges of their own self-efficacy. This effect could be one possible reason why there was not a significant difference between the treatment and the comparison groups' scores on the RSPS-2.

Students receiving support in a specific academic subject, such as reading, might feel they were unable to be successful because they required accommodations and/or modifications to meet grade-level expectations. Alternatively , they might have been unaware of how wide the gap was between their performance and their typical peers' performance. The researcher noticed that for three subtests in the RSPS-2: (a) progress, (b) observational comparison, and (c) social

feedback, that the student participants in both the treatment and comparison group scored in the low range on both their pretest and posttest scores, which possibly supports Bergen (2013) and Klassen (2007) research that special education students might under calibrate their self-efficacy. However, these results might also support research that had found that special education students tend to have lower self-efficacy than their typically performing peers (Klassen, 2002). Below, Table 35 summarizes the comparison and contrast of the current study to the related research.

Table 35

Comparison and Contrast of Findings

Research	Previous Findings	Current Research
Pajares and Schunk (2009)	Students with low self-efficacy were more likely to lack effort or motivation to attempt difficult tasks.	Students scored significantly higher on motivation, based on the MRQ, but not on their self-efficacy, based on the RSPS-2.
Bergen (2013) and Klassen (2007)	Students with learning disabilities receiving special education support tended to over- or under-calibrate their self-efficacy and abilities toward a task.	The researcher found no significant difference in self-efficacy scores based on the RSPS-2 between students in the treatment and the comparison groups.

Implications for Future Educators

This study examined whether a growth-mindset intervention affected adolescent special education students' self-efficacy and motivation, using the pretest and posttest scores from the RSPS-2 and MRQ. While there was not a significant difference in the self-efficacy scores on the RSPS-2, there was a significant difference in the motivation scores on the MRQ.

It has been argued that the most important purpose of educators is to make certain that all students are given high expectations and that they are successful (Cotton, 2003), which includes all students receiving special education support. Furthermore, educators are obligated to ensure that students who require special education services receive interventions that assist them to achieve academically (Fuchs & Fuchs, 2009). As a result, these key findings have implications for educators. The findings of the current study can help educators to focus specific instruction around mindsets, motivation, and the influence of both theories when working with special education students who have low motivation and more of a fixed mindset toward academics.

Educators should consider not only attending to academic scores but also to how students perceive learning and influence their own achievement. Educators should consider emphasizing a curriculum that incorporates a growth-mindset model of instruction that focuses on persevering, utilizing constructive feedback to improve, and accentuating the flexibility of intelligence. While interventions, such as a growth-mindset intervention, can influence academic achievement (Walton & Cohen, 2011) the interventions must be aligned to the academic curriculum for the interventions to be effective (Saunders, 2013). As a result, a growth-mindset model of instruction should intertwine with the daily curriculum of the classrooms.

Teacher feedback to students should focus on the process and the effort put forth in a task; therefore, professional development for teachers and support staff should teach how to

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phrase questions and give constructive feedback that alters classroom language to more of a growth-mindset model. In addition, teachers and support staff should consider having students play an active role in establishing a growth-mindset attitude within the classrooms by giving them opportunities to discuss and share the process and difficulties they have encountered to achieve their end result.

While this study showed a significant difference in motivation for reading, there was no significant difference for self-efficacy in reading after the treatment group completed the growth-mindset intervention. However, over the past few decades, self-efficacy has surfaced as an extremely efficient predictor of students' achievement (Zimmerman, 2000). Students receiving special education support must work harder to attain the same results as their typical peers, which eventually affects students' self-efficacy (Bergen, 2013). With this current research in mind, teachers should consider giving surveys that measure motivation, and/or mindsets to students who are struggling academically to discern if these students would benefit from a growth-mindset intervention such as Brainology.

Suggestions for Future Research

There was a significant difference in the posttest scores from the student participants in the treatment group as compared to the student participants in the comparison group, on the MRQ. This result indicates opportunities for future research in the area of mindsets, self-efficacy, and motivation of special education students. When conducting a similar study, future researchers might introduce a qualitative component to the study by arranging one-on-one interviews with some of the student participants. Interview protocols might give interesting insight into the students' perceptions about the growth-mindset intervention, the role it might

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have played on increasing motivation, and why there was no significant effect on their self-efficacy.

If a similar study were to be conducted it would also be interesting to investigate whether a different self-efficacy instrument might be a more suitable alternative for assessing self-efficacy in adolescent special education students. Klassen (2002) found that students with learning disabilities tended to miscalculate their self-efficacy positively, therefore a survey like the RSPS-2 might not be the best measure of self-efficacy for special education students. There might be another instrument that would be a more accurate measure for this population.

Future research would also be justified to examine whether completing a growth-mindset intervention also affects achievement scores of adolescent special education students. Because previous research has indicated that motivation is a significant predictor toward achievement (Hodis, Meyer, McClurre, Weir, & Walkey, 2011), a growth-mindset intervention could have a significant effect on achievement scores as it did on motivation in this study.

Moreover, since the growth mindset program used in this study did not focus specifically on reading skills or having more of a growth mindset in reading, it would be interesting to explore if a growth mindset program that focused on a specific academic area, like reading, would have a significant effect on self-efficacy in reading or another academic area.

Finally, a study investigating professional development with teacher participants about mindsets, along with a growth-mindset intervention, would be intriguing. The purpose of the study would be to ascertain, through focus-group and individual interviews, the teachers' perceptions and attitudes toward the intervention and how the intervention influenced their instruction and their students. Table 36 provides a visual of the suggestions for future research.

Table 36

Suggestions for Future Research

Findings in This Study	Suggestions for Future Research
1) There was a significant difference in motivation scores of treatment group compared to comparison group.	1a) Would a growth-mindset intervention also generate a significant difference in achievement scores? 1b) Would one-on-one interviews with student participants and a focus group with teacher participants be an insightful addition to this research?
2) There was no significant difference in self-efficacy scores between the students in the treatment group when compared to the comparison group.	2) Would a different self-efficacy instrument show significant results when used with a growth-mindset intervention?

Limitations of this Study

This section addresses the limitations that may have affected the study. It also identifies the steps the researcher took to counterbalance these limitations and to minimize their effect on the research study, if possible.

Internal Validity

The researcher took steps to control for such variables as much as possible, particularly as applicable to a quasi-experimental design. As defined by Gall et al., (2007) internal validity is "the extent to which extraneous variables have been controlled by the researcher therefore that

any observed effect can be attributed solely to the treatment of the study" (p. 383). Certain variables can have an effect on a quasi-experimental study, such as subject selection, history, maturation, testing, instrumentation, compensatory rivalry by the comparison group, and resentful demoralization by the comparison group.

Subject selection. The subject-selection variable addresses whether the groups are similar or different prior to the start of the study (Gall et al., 2007). Intact special education advisory classrooms from the sixth, seventh, and eighth grades were randomly assigned to either a treatment group or a comparison group for this research study. The use of the pretest determined if differences existed prior to the study. Analysis for normalization and a MANOVA of the pretest data showed equalization among the groups.

History. Gall et al., (2007) defined the variable of history as the specific events that occur between the beginning and the conclusion of a research study. Due to issue of attaining enough student participants in the comparison group, the research study did not occur consecutively for the treatment and comparison groups. However, the length of the study was the same for both groups (8 weeks). At minimum, there was weekly communication between teacher participants and the researcher through email, in-person meetings, and phone calls. The researcher had an opportunity to adjust scheduling as needed due to disturbances that might have impacted student participants and the study. Due to snow days and the timeline difference between the treatment and the comparison groups, the researcher determined that such disturbances were a moderate threat to the research study.

Maturation. Maturation addresses changes that might have occurred within the student participants due to the passing of time (Gall et al., 2007). To address the variable of maturation, the researcher randomly assigned intact classrooms to either a treatment or a comparison group.

The two groups comprised of student participants who were similar in age, grade level, and special education needs. The researcher used the pretest to determine if differences existed between the treatment and the comparison groups.

Experimental Mortality. Gall et al., (2007) defined experimental mortality of the loss of participants during the research study. During the research study, two student participants in the comparison group did not partake in the posttest, which required removing their data from the research study analysis. Because the study was ending at the completion of the school year, there were no options for the student participants to complete the posttest at that time. As a result, the researcher considered experimental mortality a moderate threat.

Testing. Testing addresses the effects of taking the same survey at the beginning and the conclusion of the research study (Gall et al., 2007). This study took place over two separate 8-week periods consecutively for the treatment and the comparison groups. At the beginning of the 8-week research study, the pretest was administered. Then, at the end of the 8-week research study, the posttest was administered.

Instrumentation. This variable addresses changes that might have occurred in the instrument, such as administration of the instrument, which possibly could produce changes in the data (Gall et al., 2007). The RSPS-2 and MRQ were both the pretest and posttest for this research study. The researcher gave the teacher participants in the treatment group ,as well as in the comparison group, an in-person professional development on how to distribute, administer, and collect the instruments. The researcher allotted time for teacher participants to ask any questions they may have had about the instruments prior to administering them.

Compensatory rivalry by the comparison group. Since the treatment and the comparison groups were in separate middle schools, there was no major threat of rivalry among

the treatment and the comparison groups. However, the researcher chose to take steps to address this variable in case it were to arise during the research study. Prior to the study beginning, the researcher shared in the consent forms that the student participants in the comparison group would receive the same intervention as the treatment group if the study were found to be significant for students who received the growth-mindset intervention.

Resentful demoralization by the comparison group. Student participants in the comparison group might have felt resentful due to the fact that they were not chosen to partake in the intervention. These feelings could have led to lower scores on the pretest and posttest surveys or to maturation of student participants in the comparison group. As a result, the researcher emphasized to the teacher participants and the student participants that they would have the opportunity to partake in the growth-mindset intervention once the study was completed.

External Validity

Gall et al., (2007) asserted that external validity implicates to what extent the generalizability of the treatment and its outcomes can be replicated again. The researcher used numerous safeguards to lessen the impact of external threats on the initial research study therefore that it can be replicated in other districts with different teacher and student participants.

Population validity. Gall et al., (2007) explained that population validity is the scope to which the findings of a research study can be generalized to the population as a whole. The researcher regarded population validity as a moderate threat since student participants came from the same school district and were in intact classes. The intact classes had only special education students; however, since they came from separate middle schools, they possible imitated a larger sample population with similar demographics to the school in which the study occurred, such as

special education needs, socio-economic status, and age; yet they may not be demonstrative of a nationwide representation.

Ecological validity. Ecological validity is the degree to which another researcher could replicate what the researcher accomplished in a different setting with different participants (Gall et al., 2007). For this reason, the researcher accurately depicted the specifics of the research study. For example, earlier in this study, the researcher describe in detail the district and student participant demographics, methodology, instrumentation, data collection process, and analysis of the data. This ensures that the study can be replicated again in another setting.

Experimenter effect. Gall et al., (2007) explained that the experimenter effect is when an individual unknowingly affects the treatment's results. To avoid this threat, the researcher provided professional development for teacher participants on two occasions to the treatment and the comparison groups prior to the study beginning. The researcher shared all materials with teacher participants, including the RSPS-2 and the MRQ. The researcher also modeled the growth-mindset intervention and allowed time for the teacher participants in the treatment group to interact with the program independently. There was also a question and answer session allotted at the end of the professional development. In addition, the researcher was in constant communication with the teacher participants to address any issues during the duration of the research study.

<div align="center">

Summary

</div>

Chapter Five reviewed the current research study, presenting an overview of the research, procedures, key findings, and the study as it related to the literature reviewed. It also reflected on the implications for educators, suggested considerations for future research, and recognized the limitations of the study.

The study investigated the effect of a growth-mindset intervention on the self-efficacy and motivation of adolescent special education students. The study was theoretically grounded in Dweck's theory of mindsets and varying perceptions of self-efficacy and motivation. The research design included a treatment group and a comparison group determined by program type (intervention or no intervention). Both groups were given pretests and posttests to assess self-efficacy and motivation, using the RSPS-2 and MRQ.

Results from the study implied that there was no significant difference for program type on self-efficacy, based on the RSPS-2. The results of this study provided the opportunity for future research to look at different measures of self-efficacy and possibly to conduct a qualitative study to examine the perceptions of the teachers and students who take part in a growth-mindset intervention. The study's results suggested significant findings for program type as the posttest scores on the MRQ revealed a significant difference between the treatment and comparison groups. Student participants who took part in the growth-mindset intervention scored significantly higher on the MRQ posttests compared to the student participants in the comparison group. Further research is still needed to address whether a growth mindset can affect self-efficacy and achievement of adolescent special education students.

Conclusion

There has been a demand to close the achievement gap between special education students and their typical performing peers on district and state-level standardized assessments. Educators and researchers examined ways to achieve this goal, and to assist students with special education needs, thus producing success in the general education setting. Researchers have found self-efficacy and motivation to be two predictors with a significant impact on academic achievement (Hanushek, 2010). Therefore, it is pertinent for researchers and educators to

explore additional ways to help students with special education needs therefore students can thrive academically by learning about concepts like the growth mindset. In addition, researchers and educators can promote academic success by making growth-mindset-centered instruction and interventions accessible to the students that need it most.

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Appendix A:

Institutional Review Board (IRB) Permission

I.R.B. approval

Carol O'Connor

Mon 3/17/2014 12:01 PM

To:emily.chaber@hotmail.com <emily.chaber@hotmail.com>;
Cc:WCSU IRB <irb@wcsu.edu>; Karen Burke <BurkeK@wcsu.edu>;

Dear Emily,

I am pleased to inform you that your I.R.B. protocol number 1314-74 has been approved by full review. This email is documentation of your official approval to start your research. If you need a copy of this official approval for funding purposes, please let me know oconnorc@wcsu.edu. The WCSU I.R.B. wishes you the best with your research.

You have 1 year from the date of this email to complete your research; if you are still conducting that date, you will need to fill out a renewal application. When are you finished with your study please fill out and return via email a Termination/Completion Report (available here: http://wcsu.edu/irb/forms.asp) therefore we know your study is complete.

Thanks,

Carol O'Connor

Psychology/Philosophy Department Secretary
C.E.L.T
I.A.C.U.C.
I.R.B.
Warner Hall 304
Phone: 203-837-8470
Fax: 203-837-8905

Appendix B:

Letter and Consent Form (Superintendent)

Department of Education
and Educational Psychology
181 White Street
Danbury, CT 06810

December 2014

Dear (Superintendent):

I am currently enrolled in the doctoral program for Instructional Leadership at Western Connecticut State University. This program requires that I design and implement a dissertation research study. The purpose of this 10-week study, which will require approximately 24 minutes a day which may be completed in non-instructional time in a computer lab, is to determine the effects of a growth mindset intervention on special education students' motivation and self-efficacy in reading, in sixth, seventh, and eighth grade.

A total of two quantitative instruments will be used in this study. *The Reading Self-Perception Scale 2nd Edition* (RSPS2), which measures students' self-efficacy in the area of reading. The second instrument will be the *Motivations for Reading Questionnaire* (MRQ), which measures students' motivation in the area of reading. Students in both treatment and comparison groups will complete both of these assessments for both pretest and posttest data. All surveys will be administered via paper and pencil. Each assessment tool to be completed by the students will take approximately 15-20 minutes to administer 30 student-participants in the treatment and comparison groups will engage in the study, as well as 6 teacher-participants.

This research study has been reviewed and approved by Western Connecticut State University's Institutional Review Board. Participation in this study is completely voluntary. Students who agree to participate will submit all information to their teachers and the researcher will then collect it. Program participation will not impact a student's grades. Privacy will be protected. Student names will be numerically coded. All student identities will be maintained in a secure location to protect confidentiality. Results will only be reported in aggregate form.

Teachers who agree to participate in the inquiry curriculum model will receive a two-hour workshop and weekly coaching. Upon completion of the study, students who were not given the intervention will have the opportunity to partake in the intervention if the study finds there is a significant difference between students' motivation and self-efficacy in reading after having a growth mindset intervention.

I wish to thank administrators in the (name of school district) for considering participation in this study. If you have any questions, please feel free to contact me.

Sincerely,
Emily A. Rhew   Jody S. Piro, EdD.
                                       Associate Professor, EdD in Instructional Leadership

chaber019@connect.wcsu.edu   piroj@wcsu.edu

If you agree to have your school district participate in the study, please sign the attached statement below, return it to me by (date) and keep the attached copy for your records.
Thank you.

Emily Rhew, EdD. Candidate

Instructional Leadership

Western Connecticut State University

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I, _____, am the superintendent of (school district). I acknowledge that Mrs. Rhew has made clear to me the purpose of this research, identified any risks involved, and offered to answer any questions.

Printed Name of Superintendent: _____

Signature of Superintendent: _____Date:_____

Appendix C:

Letter and Consent Form (Principals)

Department of Education and
Educational Psychology
181 White Street
Danbury, CT 06810

December 2014

Dear (Principal):

I am currently enrolled in the doctoral program for Instructional Leadership at Western Connecticut State University. This program requires that I design and implement a dissertation research study. The purpose of this 10-week study, which will require approximately 24 minutes a day which may be completed in non-instructional time in a computer lab, is to determine the effects of a growth mindset intervention on special education students' motivation and self-efficacy in reading, in sixth, seventh, and eighth grade.

A total of two quantitative instruments will be used in this study. *The Reading Self-Perception Scale 2nd Edition* (RSPS2), which measures students' self-efficacy in the area of reading. The second instrument will be the *Motivations for Reading Questionnaire* (MRQ), which measures students' motivation in the area of reading. Students in both treatment and comparison groups will complete both of these assessments for both pretest and posttest data. All surveys will be administered via paper and pencil. Each assessment tool to be completed by the students will take approximately 15-20 minutes to administer 30 student-participants in the treatment and comparison groups will engage in the study, as well as 6 teacher-participants.

This research study has been reviewed and approved by Western Connecticut State University's Institutional Review Board. Participation in this study is completely voluntary. Students who agree to participate will submit all information to their teachers and the researcher will then collect it. Program participation will not impact a student's grades. Students may withdraw at any time in the study without penalty. Privacy will be protected. Student names will be numerically coded. All student identities will be maintained in a secure location to protect confidentiality. Results will only be reported in aggregate form.

The six teacher-participants who agree to participate in the inquiry curriculum model will receive a two-hour workshop and weekly coaching. Upon completion of the study, students who were not given the intervention will have the opportunity to partake in the intervention if the study finds there is a significant difference between students' motivation and self-efficacy in reading after having a growth mindset intervention.

I wish to thank administrators in the (name of school district) for considering participation in this study. If you have any questions, please feel free to contact me.

Sincerely,
Emily A. Rhew   Jody S. Piro, EdD.
                                                 Associate Professor, EdD in Instructional Leadership

chaber019@connect.wcsu.edu   piroj@wcsu.edu

If you agree to have your school participate in the study, please sign the attached statement

below, return it to me by (date) and keep the attached copy for your records.

Thank you.

Emily Rhew, EdD. Candidate

Instructional Leadership

Western Connecticut State University

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I, _____, am the principal of (school). I acknowledge

that Mrs. Rhew has made clear to me the purpose of this research, identified any risks

involved, and offered to answer any questions.

Printed Name of Principal: _____

Signature of Principal: _____Date:_____

Appendix D:

Letter and Consent Form (Teachers)

December 2014
Dear Teacher,

I am currently enrolled in the doctoral program for Instructional Leadership at Western Connecticut State University. This program requires that I design and implement a dissertation research study. The purpose of this 10-week study, which will require approximately 24 minutes a day which may be completed in non-instructional time in a computer lab, is to determine the effects of a growth mindset intervention on special education students' motivation and self-efficacy in reading, in sixth, seventh, and eighth grade.

A total of two quantitative instruments will be used in this study. *The Reading Self-Perception Scale 2nd Edition* (RSPS2), which measures students' self-efficacy in the area of reading. The second instrument will be the *Motivations for Reading Questionnaire* (MRQ), which measures students' motivation in the area of reading. Students in both treatment and comparison groups will complete both of these assessments for both pretest and posttest data. All surveys will be administered via paper and pencil. Each assessment tool to be completed by the students will take approximately 15-20 minutes to administer 30 student-participants in the treatment and comparison groups will engage in the study, as well as 6 teacher-participants.

This research study has been reviewed and approved by Western Connecticut State University's Institutional Review Board. Participation in this study is completely voluntary. Students who agree to participate will submit all information to their teachers and the researcher will then collect it. Program participation will not impact a student's grades. Students may withdraw at any time in the study without penalty. Privacy will be protected. Student names will be numerically coded. All student identities will be maintained in a secure location to protect confidentiality. Results will only be reported in aggregate form.

Teachers who agree to participate in the inquiry curriculum model will receive a two-hour workshop and weekly coaching. Upon completion of the study, students who were not given the intervention will have the opportunity to partake in the intervention if the study finds there is a significant difference between students' motivation and self-efficacy in reading after having a growth mindset intervention.

I wish to thank the teachers in the (name of school district) for considering participation in this study. If you have any questions, please feel free to contact me.
Sincerely,
Emily A. Rhew   Jody S. Piro, EdD.
                                                          Associate Professor, EdD in Instructional Leadership
chaber019@connect.wcsu.edu   piroj@wcsu.edu

If you agree to participate in the study, please sign the attached statement below, return it to me by (date) and keep the attached copy for your records.
Thank you!

Emily Rhew, EdD. Candidate

Instructional Leadership

Western Connecticut State University

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I, _____, am a teacher at (school). I acknowledge that

Mrs. Rhew has made clear to me the purpose of this research, identified any risks involved,

and offered to answer any questions.

Printed Name of Teacher: _____

Signature of Teacher: _____Date:_____

Appendix E:

Letter and Consent Form (Parental)

Department of Education and
Educational Psychology
181 White Street
Danbury, CT 06810

December 2014

Dear Parent,

I am currently enrolled in the doctoral program for Instructional Leadership at Western Connecticut State University. This program requires that I design and implement a dissertation research study. The purpose of this 10-week study, which will require approximately 24 minutes a day which may be completed in non-instructional time in a computer lab, is to determine the effects of a growth mindset intervention on special education students' motivation and self-efficacy in reading, in sixth, seventh, and eighth grade.

A total of two quantitative instruments will be used in this study. *The Reading Self-Perception Scale 2nd Edition* (RSPS2), which measures students' self-efficacy in the area of reading. The second instrument will be the *Motivations for Reading Questionnaire* (MRQ), which measures students' motivation in the area of reading. Students in both treatment and comparison groups will complete both of these assessments for both pretest and posttest data. All surveys will be administered via paper and pencil. Each assessment tool to be completed by the students will take approximately 15-20 minutes to administer 30 student-participants in the treatment and comparison groups will engage in the study, as well as 6 teacher-participants.

This research study has been reviewed and approved by Western Connecticut State University's Institutional Review Board. Participation in this study is completely voluntary. Students who agree to participate will submit all information to their teachers and the researcher will then collect it. Program participation will not impact a student's grades Privacy will be protected. Student names will be numerically coded. All student identities will be maintained in a secure location to protect confidentiality. Results will only be reported in aggregate form.

Teachers who agree to participate in the inquiry curriculum model will receive a two-hour workshop and weekly coaching. Upon completion of the study, students who were not given the intervention will have the opportunity to partake in the intervention if the study finds there is a significant difference between students' motivation and self-efficacy in reading after having a growth mindset intervention.

Your child is *not* enrolled in any class that I teach. His or her participation is completely voluntary and you may withdraw your child at any time without any negative consequences. The school's name and your child's name will be changed in my reports. The specific information that your child shares with me will be kept confidential.

I wish to thank the parents in the (name of school district) for considering participation in this study. If you have any questions, please feel free to contact me.

Sincerely,
Emily A. Rhew   Jody S. Piro, EdD.
                                          Associate Professor, EdD in Instructional Leadership
chaber019@connect.wcsu.edu   piroj@wcsu.edu

If you agree to have your child participate in the study, please sign the attached statement

below and return it to me by (date) and keep the attached copy for your records.

Thank you!

Emily Rhew, EdD. Candidate

Instructional Leadership

Western Connecticut State University

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I, _____, am the parent or guardian of the student named

below and am at least 18 years of age. I acknowledge that Mrs. Rhew has made clear to me

the purpose of this research, identified any risks involved, and offered to answer any

questions. I voluntarily grant permission for my child to participate.

Student's Name: _____

Printed name of Parent/Guardian: _____

Signature of Parent/ Guardian: _____Date:_____

Appendix F:

Letter and Assent Form (Student)

Department of Education and
Educational Psychology
181 White Street
Danbury, CT 06810

Student Information Form to Participate in a Research Study

December 2014

Dear Student,

I am in a doctoral program at Western Connecticut State University. I am doing an exciting research study about a growth mindset intervention. I would like you to be a part of my study. I will send a permission slip home with you. But first, I would like you to know more about my project.

The study is about the ways in which you think about reading. I will ask you to complete two surveys. These will include a questionnaire about self-efficacy for reading and a survey about motivation for reading. I will ask you complete this information two times during the year. I will be the only person scoring your questionnaires.

I will not use your name in the study; I will use numbers. The surveys will have nothing to do with report card grades and the ratings will not be reported to your parents or teachers. All of the information will be kept private. If you have any questions, please ask me.

If you would like to be in my study, please print and sign your name below:

_____
      Print student name

X_____
      Student signature

Thank you,
Emily A. Rhew   Jody S. Piro, EdD.
                               Associate Professor, EdD in Instructional Leadership
chaber019@connect.wcsu.edu   piroj@wcsu.edu

Appendix G:

Tables from the Literature Review

Table 1

Research Studies on Mindsets with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Graduate	100 first-year law school students ($n = 100$)	Sperling and Shapcott (2012) examined causes of law students' varied responses to critical feedback on assessments.	Over a third of the law school students had a fixed mindset, which led to negative reactions when given critical feedback by instructors.
Undergraduate	2 computer science undergraduates ($n = 2$)	Murphy and Thomas (2008) examined perceptions of mindset on students' academic success.	Students with a growth mindset were eager to take risks and appreciate constructive feedback from teachers and peers.

(continued)

Table 1

Research Studies on Mindsets with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Secondary school	373 secondary-school students in the eighth grade ($n = 373$)	Blackwell, Trzesniewski, and Dweck (2007) examined whether academic performance was impacted by students' beliefs about intelligence.	Academic performance was increasingly impacted by students' beliefs about intelligence ($p < .05$).
Elementary school	4 student participants ($n = 4$) (2 from fourth grade and 2 from fifth grade)	Hartmann (2013) examined the effects of a growth-mindset intervention on students with learning disabilities.	Students with specific learning disabilities responded to a growth mindset intervention.

(continued)

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Table 1

Research Studies on Mindsets with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Elementary school	412 fifth-grade students ($n = 412$)	Mueller and Dweck (1998) examined the effects of praising students on their intelligence.	This study demonstrated a significant difference ($p < .001$) in how the students, given praise for intelligence and effort, attempted and persevered through tasks during the study.

Table 2

Research Studies on Self-Efficacy with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Undergraduate Level	261 undergraduate students from a large public university in Western Canada ($n = 261$)	Klassen, Krawchuk, and Rajani (2008) explored the relationships among academic procrastination, self-regulation, academic self-efficacy, self-esteem, and self-efficacy for self-regulation.	Results revealed that, although other self-variables are related to procrastination, self-efficacy for self-regulation is most predictive of procrastination tendencies ($p < .001$).
Undergraduate Level	195 undergraduate students from a large public university in Western Canada ($n = 195$)	Klassen, Krawchuk, and Rajani (2008) examined academic and motivation characteristics of	he 25% of 195 participants in Study 2 who were classified as negative procrastinators

(continued)

Table 2

Research Studies on Self-Efficacy with Varying Populations

Level of Education	Participants	Purpose of Research	Results
		''negative procrastinators.''	had significantly lower GPAs, higher levels of daily and task procrastination, lower predicted and actual class grades, and lower self-efficacy for self-regulation. Self-efficacy for self-regulation had a significant effect ($p <$ .01.

(continued)

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Table 2

Research Studies on Self-Efficacy with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Elementary Through High School	N/A	Bergen (2013) searched current research on self-efficacy and special education students for themes.	There were three main themes: 1) miscalibration; 2) teacher and task effect on self-efficacy; and 3) self-efficacy, motivation, and content areas.
Elementary	1,163 elementary-school student participants ($n = 1,163$)	Fast et al., (2010) examined the relationship between students' math self-efficacy and their scores on standardized math assessments.	Math self-efficacy was significantly related to the students' math achievement scores ($p < .001$). Students with higher levels of math self-efficacy achieved higher scores on year-end performance exams.

Table 2

Research Studies on Self-Efficacy with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Elementary	172 elementary school students ($n = 172$)—Some student participants had a learning disability, and some were typical peers.	Tabassam and Grainger (2002) examined self-efficacy scores of students with a learning disability compared to typical peers.	Students with a learning disability had significantly lower scores ($p < .001$) regarding academic self-efficacy beliefs than their typically achieving peers.

Table 3

Research Studies on Motivation with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Undergraduate Level	45 freshman college students (n = 45)	Griffin, MacKewn, Moser, and VanVuren (2013) researched whether learning skills and motivation correlate with superior academic performance.	The results showed that the single area that statistically correlated with GPA was motivation (r = .404, p = .006).
High School	1,522 high-school students (n = 1,522)	Hodis et al. (2011) investigated patterns of evolution in students' achievement trajectories in relation to initial achievement, student motivation, and key demographic characteristics.	Findings provided support for the use of a simple motivation measure that can enhance identification of risk for school failure and inform interventions for different risk patterns.

(continued)

Table 3

Research Studies on Motivation with Varying Populations

Level of Education	Participants	Purpose of Research	Results
Secondary Level	450 students from secondary schools ($n = 450$)	Tella (2007) investigated the impact of motivation on students' achievement in mathematics in secondary schools.	Results indicated significant differences when extent of motivation was taken as variable of interest on academic achievement in mathematics, based on the degree of their motivation.

Table 4

Research Studies on Attribution Theory with Varying Populations

Level of Education	Number of Participants	Purpose of Research	Results
Undergraduate	99 university students	Laherand and Putnina (2009) explored differences in students' attribution patterns.	Results concluded that students made more internal (63) than external (58) causal attributions for their failure.
Secondary Level	N/A	Brophy (1996) stated some students who have experienced an ongoing history of failure lack the ability to feel successful.	It is important for students with low achievement motivation to receive training that changes how they interpret failure.

Appendix H:

Treatment Teacher Participants' Script

Teacher-Participant Script

(Treatment Group)

The Brainology program we will be working on over the next few weeks will teach us about how our brains work and about how a growth mindset can help us develop our brains and control our learning. When students have a growth mindset, they understand that intelligence can change and be developed. Students with a growth mindset focus on improvement instead of worrying about how smart they are. They work hard to learn more.

This can help us meet our own goals in reading because it will give us strategies to persist at challenging task. Also, it will teach us that we don't always have to have the right answer or learn something quickly to be successful at reading. I t is important to focus more on effort and improving our reading skills.