ACCEPTANCE

This dissertation, THE IMPACT A GROWTH MINDSET PROFESSIONAL DEVELOPMENT HAS ON THE PERCEPTIONS AND ACADEMIC ACHIEVEMENT OF FOURTH GRADE STUDENTS IN READING IN A RURAL DISTRICT, was prepared under the direction of the candidate's Dissertation Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree of Doctor of Education in the School of Education, Concordia University Irvine.

Catherine Webb, EdD
Committee Chair

Sheryl Tecker, EdD
Committee Member

Kimberly Berman, PhD
Committee Member

The Dissertation Committee, the Dean, and Executive Director of the Doctor of Education Program of the School of Education, as representatives of the faculty, certify that this dissertation has met all standards of excellence and scholarship as determined by the faculty.

Kent Schlichtemeier, EdD
Dean

Dwight Doering, PhD
Executive Director

COPYRIGHT PERMISSION

Concordia University Library
1530 Concordia West
Irvine, CA 92612
www.cui.edu/library
librarian@cui.edu

I, Michelle Farrer, warrant that I have the authority to act on any copyright related matters for the work, THE IMPACT A GROWTH MINDSET PROFESSIONAL DEVELOPMENT HAS ON THE PERCEPTIONS AND ACADEMIC ACHIEVEMENT OF FOURTH GRADE STUDENTS IN READING IN A RURAL DISTRICT, dated 12.14.19 to be included in the Concordia University Library repository, and as such have the right to grant permission to digitize, republish and use the said work in all media now known or hereafter devised.

I grant to the Concordia University Library the nonexclusive worldwide rights to digitize, publish, exhibit, preserve, and use the work in any way that furthers the educational, research and public service purposes of the Concordia University.

This Agreement shall be governed by and interpreted in accordance with the laws of the State of California. This Agreement expresses the complete understanding of the parties with respect to the subject matter and supersedes all prior representations and

**ACCESS RESTRICTIONS**

My electronic thesis or dissertation can be made accessible via the Concordia University

☒ Option 1: Provide open access to my electronic thesis or dissertation on the

☐ Option 2: Place an embargo on access to my electronic thesis or dissertation for a given period from date of submission (select one):

**Permission Granted**

| | |
|---|---|
| Michelle Farrer | Michelle Farrer |
| | Signature of Candidate |
| 2160 Humboldt Road #312 | August 24, 2019 |
| Address | Date |
| michelle.farrer@eagles.cui.edu | Chico, CA 95928 |
| Phone Number or E-mail | City/State/Zip |

# VITA

Michelle Farrer

ADDRESS 1530 Concordia West
Irvine, CA 92612
michelle.farrer@eagles.cui.edu

EDUCATION

| | | |
|---|---|---|
| EdD | 2019 | Concordia University, Irvine<br>Educational Leadership |
| MA | 2015 | Concordia University, Irvine<br>Educational Administration |
| MA | 1999 | National University, San Jose<br>Cross Cultural Teaching |

PROFESSIONAL EXPERIENCE

| | |
|---|---|
| 2019-Present | Principal/Superintendent<br>Children's Community Charter School |
| 2017-2019 | Assistant Principal<br>Greenfield Union School District |

# THE IMPACT A GROWTH MINDSET PROFESSIONAL DEVELOPMENT HAS ON THE PERCEPTIONS AND ACADEMIC ACHIEVEMENT OF FOURTH GRADE STUDENTS IN READING IN A RURAL DISTRICT

by

Michelle Farrer

A Dissertation

Presented in Partial Fulfillment of
Requirements for the Degree of
Doctor of Education
in
Educational Leadership
December 14, 2019

School of Education
Concordia University Irvine

# ABSTRACT

This research investigated the relationship between the implementation of a growth mindset professional development and teacher mindset, student academic achievement, and student perception of intelligence. Fourth grade students ($n$ = 370) and fourth grade teachers ($n$ = 4) from four elementary schools from the Greenfield Union School District in a rural area in California participated in this study. In this mixed methods research project, quantitative and qualitative data were collected and analyzed using an exploratory sequential mixed methods design (Creswell, 2013). For the quantitative analysis, student pre- and post-intervention surveys were analyzed using a paired samples $t$-test. An analysis of variance (ANOVA) was used to compare the academic achievement in reading of the students in the intervention and the control student groups. A grounded theory approach was used which included three levels of qualitative analysis: (a) open coding, (b) axial coding, and (c) selective coding in order to determine student and teacher themes.

The study found that there was a statistically significant difference in student perceptions of intelligence between pre- and post-intervention. Through grounded theory, the study revealed a difference in teacher mindset after the professional development was delivered and teachers had taught explicit growth mindset strategies in their classes. The study also found no significant changes in academic achievement based on pre- and post- academic diagnostic assessments. Results showed an increase of academic achievement but not significant enough to warrant a connection. Further investigation using a longer intervention was suggested to see long term effects of a growth mindset intervention on academics.



*Keywords:* growth mindset, academic achievement, intelligence

# TABLE OF CONTENTS

Page

# LIST OF TABLES

# LIST OF FIGURES

# ACKNOWLEDGMENTS

This dissertation is dedicated to my amazing husband, Whitney Farrer, who encouraged me to further my education, reach for the stars, and gain knowledge. Whitney is by far my biggest fan. He sees into the future and has challenged me to become more than I ever thought I would become. I would never have thought I would be finishing a doctoral degree, but with Whitney's support and partnership I have been able to accomplish this giant feat. I must acknowledge my children who participated in this journey each step of the way. Thank you, Chelsea, Zachary, Sarah and Mikaela, for loving me and rooting for me along the way. I could not have done this three-year journey without the support of my family. Above all, I know this would not have been possible if God did not have a special anointing on this endeavor. I do not miss a day without thanking our heavenly father who has guided this path.

I also want to thank my Irvine 6 cohort. Having a group of friends to go through this process with has made it quite enjoyable. I will treasure the time spent, the learning and growing, the trips to Washington D.C. and China with my cohort. I am thankful to the wonderful professors who guided me along the way. At the top of my list, I want to thank my beautiful dissertation chair, Dr. Catherine Webb. Dr. Webb guided me throughout the whole process and cheered me up when I needed cheering and coached me and instructed me in the right direction. I am thankful to my other committee members, Dr. Kimberly Berman and Dr. Sheryl Tecker for providing insight and advice throughout the process.

# CHAPTER 1: INTRODUCTION

> If I have the belief that I can do it, I shall surely acquire the capacity to do it even if I may not have it at the beginning.
>
> - Mahatma Gandhi, *Forbes*

Pajares and Schunk (2002) state, "the beliefs that children create and develop and hold to be true about themselves are vital forces in their success or failure in all endeavors and, of particular relevance to educators, to their success or failure in school" (p. 2). The way a student views him or herself impacts academic success. Mastery-oriented qualities grow out of the way people understand intelligence, and there are two entirely different ways that people understand intelligence (Dweck, 2000). Some people view themselves with an intelligence that is fixed. Entity theory portrays intelligence as a fixed entity that dwells within us (Bandura & Dweck, 1988; Dweck & Leggett, 1988). A fixed entity or mindset can restrict student learning and increase self-consciousness, where students tend to take fewer risks to appear intelligent (Bandura & Dweck, 1988; Dweck & Leggett, 1988).

Conversely, students who believe they can cultivate intelligence through learning possess a philosophy aligned to the incremental theory. Students with this view take more risks, as opposed to being self-conscious, and put mastery learning as their priority (Bandura & Dweck, 1988; Diener & Dweck, 1978; Dweck & Sorich, n.d.; Elliott & Dweck, 1988; Hong, Dweck, Lin, & Wan, 1999; Leggett, 1985; Mueller & Dweck, 1998; Stone, 1998). Students who possess this trait show an incremental theory and are considered to have a *Growth Mindset* (Duckworth, Peterson, Matthews, & Kelly, 2007; Dweck, 2000, 2010). Duckworth (2007) states that students who persevere when faced with challenges and adversary have what she has coined as *grit*. Grit, combined with a growth mindset, can help foster the belief that one's intelligence can be developed with effort. Students who believe

they can grow their intelligence can sharpen their approach to overcoming obstacles encountered on their academic journey.

To truly understand and increase student learning, we need to take a deep look into the field of growth mindset to determine what non-cognitive skills, such as motivation, mindset, grit, self-efficacy, and perseverance are needed to increase student achievement. For decades, researchers have been studying behavior, motivation, and academic achievement (Claro, Paunesku, & Dweck, 2016). Examining leading scholars on the topic of mindset, grit, and self-efficacy in an effort to increase educators' awareness is vital to today's educational setting. Students who have beliefs about their ability to improve are more likely to put forth an effort, engage in opportunities to practice in areas where they need more development, and have higher achievement in comparison to grade-level peers who do not have these high beliefs (Dweck, 2010).

## Statement of the Problem

The achievement gap is wide for underserved students, specifically for Hispanic students (Muhammad, 2015). Dweck (2010) states that students with a fixed mindset lag far behind students with a growth mindset, particularly in mastering academic content. According to the Conditions of College Readiness results, ("ACT Score Results", 2017) United States high school graduate students who are defined as first generation in their family to attend college, come from low-income families or identify themselves as minority scored 9% proficient on the 2017 ACT assessment. In 2017, 60% of the nation's graduating high school class (2,030,038 students) took the ACT assessment (see Figure 1). The ACT assessment is a curriculum-based measure of college and career readiness, and students are assessed in English, math, reading, STEM, and writing. The educational system is well aware of the need to prepare students for success beyond the K-12 system. "While it's no surprise that underserved students fall behind their peers due to the inequities that exist, it is

extremely alarming and concerning to see how large this achievement gap really is," said ACT Chief Executive Officer Marten Roorda ("Underserved Learners Lag Far Behind…", 2017). "This gap presents a major risk to our nation's goals for postsecondary completion and economic competitiveness. We must work harder to ensure these students have access to quality coursework and information to assist them in planning for the future."

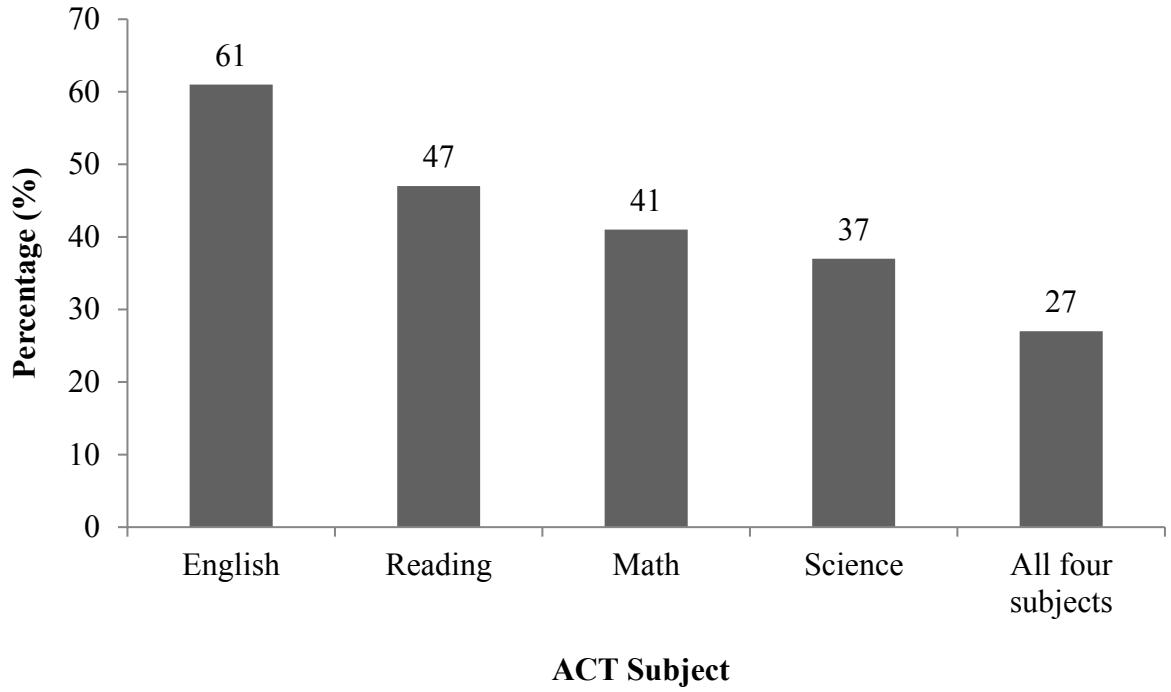



*Figure 1*. Attainment of college and career readiness by ACT-tested high school graduates meeting ACT college readiness benchmarks by subject. Adapted from "The Condition of College and Career Readiness 2017."

To close the achievement gap, analyzing trend data in high school, middle school, and at the elementary level can help researchers and educational leaders put systems in place to offer support to the underserved. Further analysis of academic achievement can be uncovered by exploring the 2017 Nation's Report Card of elementary school fourth graders. Only 37% of fourth graders in 2017 were proficient or advanced on the reading portion of the National Assessment of Educational Progress (NAEP). The National School Lunch Program (NSLP) indicator results state that 22% of students qualifying for free and

reduced lunch scored at or above the NAEP assessment. Looking further, trend data showed that fourth grade NAEP English language learners (ELL) resulted in an 8% at or above proficient level in reading and Hispanic students ranked 23% proficient or above (The Nation's Report Card, n.d.).

At the elementary level, the California Smarter Balanced Assessment (SBAC) standardized test of 2017 shows that state-wide 45% of fourth grade students met or exceeded standards in English Language Arts (California Department of Education, n.d.). For economically disadvantaged fourth grade Hispanic or Latino students in California, 208,489 or 29% scored proficient or above in English Language Arts. This percentage indicates that 71% of Hispanic or Latino fourth grade students did not meet State Standards according to the Smarter Balanced Assessment (SBAC). Within the district, this study was conducted in, only 27% of Hispanic or Latino fourth grade students did meet State Standards according to the Smarter Balanced Assessment (SBAC). This percentage indicates that 73% of Hispanic or Latino fourth grade students did not meet State Standards according to the Smarter Balanced Assessment (SBAC) (see Figure 2).

Several factors contribute to the achievement gap; changing mindsets may contribute to narrowing the gaps and increasing student academic achievement (Muhammad, 2015). Educators publicly state that equal academic outcomes for all United States students should be a right. Unless proponents of mindset non-cognitive interventions are heard, supported and fostered, the gap may continue.

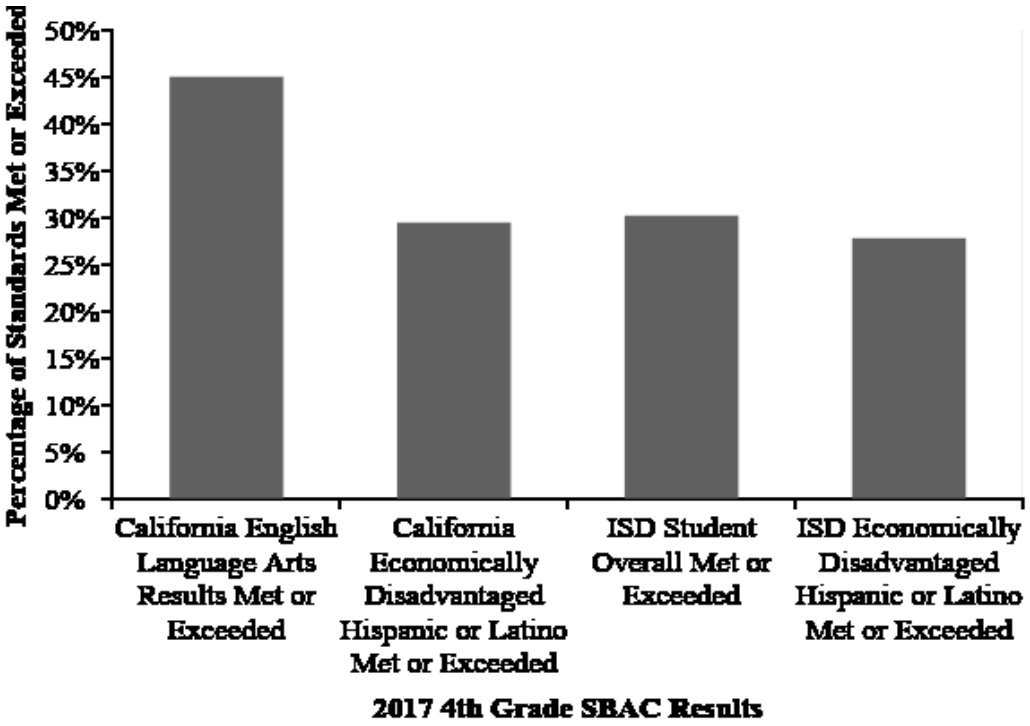



*Figure 2*. 2017 SBAC results of fourth grade students who met or exceeded standards in English Language Arts.

Research shows that transitioning from elementary school to middle school is difficult for students. Two studies of 373 seventh graders explored the role of entity theory and incremental theory in adolescents' mathematics class. Research shows that when students believe intelligence is malleable (incremental theory), an upward trajectory in achievement occurs, while a belief that intelligence is fixed (entity theory) predicted a flat trajectory (Blackwell, Trzesniewski, & Dweck, 2007). This longitudinal study consisted of exposing students to learning goals, positive beliefs about effort, and teaching incremental theory to seventh grade students. Students in the control group continued on a downward academic slide while students who participated in the intervention group increased in academic achievement. The study predicted an increase in grades when students are exposed to incremental theory's causal attributions and strategies such as growth mindset. To close the achievement gap of low socioeconomic Hispanic or Latino students, a growth mindset intervention needs to be explored before students' transition from elementary to middle

school. Low socioeconomic, English language learner (ELL) Hispanic students are trailing behind their white counterparts on the United States ACT assessment, according to the Nation's Report Card, and to the 2017 California Smarter Balanced Assessment (SBAC).

Although there have been various research studies in the field of growth mindset intervention, there have not been many attempts at establishing the connection between growth mindset and the phenomenon of professional development and the impact a growth mindset professional development has on students' perceptions of their academic abilities. In an effort to create an intervention that would be feasible on a large scale, without the involvement of researchers who tailor the materials for each school site, and provide extensive training to the participating faculty, and exert close control over the context and timing of the intervention delivery, an alternative form of accessible professional development is an avenue to be studied. Exploring growth mindset professional development online and the implementation of growth mindset strategies may provide valuable information for educators committed to closing the achievement gap.

The gap can be seen in a rural district in central California. This district is the site for this research. The students from this district scored even lower than the state of California's average. The percent of all fourth graders in this district scored 30% met or exceeded standards in 2017, whereas the percent of economically disadvantaged Hispanic students who demonstrated proficiency was only 27% (CAASPP, n.d.). Clearly, fourth grade socioeconomically disadvantaged ELL Hispanic students in this district are trailing behind the California average academic achievement score in English Language Arts (see Figure 3). It is up to educators to provide the right interventions and resources to close the achievement gap.

Research shows that when students, especially economically disadvantaged Hispanic students, transition from elementary school to middle school, academic achievement declines.

The transition from elementary to middle school is difficult for many youths (Gordon, 2011). On average, students report a decline in grades, academic effort, self-esteem and sense of belonging to the school, and demonstrate an increase in anxiety and depression as they transition to middle school (Anderman, 2003; Seidman, Allen, Aber, Mitchell, & Feinman, 1994). Students' academic motivation and their achievement are directly linked to their mindsets and how they determine their intelligence (Dweck, 1999). Dweck (1999) argues that students who believe that their intelligence can grow through effort (a growth mindset) have been shown through research to perform better than those who demonstrate that they believe their intelligence is stable (a fixed mindset). A student with a growth mindset is more likely to understand that effort is important for academic success and is more likely to pursue challenging tasks that can help him to learn, and is more likely to accept feedback that could help him or her to grow (Blackwell et al. 2007; Dweck & Leggett, 1988; Mangels, Butterfield, Lamb, Good, & Dweck, 2006; Mueller & Dweck, 1988).

Fourth grade academic achievement scores based on CAASPP results show a large achievement gap between Hispanic students with low socioeconomic status as compared to their White counterparts. This research study attempts to contribute to the understanding of this issue by shedding light on the implementation of professional development in the area of growth mindset and the perceived awareness of cognitive abilities for fourth grade students in reading. Furthermore, this research sheds light on the relationship between professional development for fourth grade teachers on the topic of growth mindset and academic achievement in reading for fourth grade students.

While there is research on how growth mindset affects motivation, goal setting and achievement (Aronson, Fried, & Good, 2002; Good, Aronson, & Inzlicht, 2003), there are critical limitations as to how these growth mindset interventions are implemented as they often require that researchers be extensively and personally involved at school sites to ensure

appropriate delivery or fidelity of the intervention (Yeager & Walton, 2011). This study explores the impact of an easily accessible professional development delivered online, that requires little researcher oversight. To sustain and replicate a growth mindset intervention, the intervention needs to be easy for teachers to access and implement in the classroom. Exploring a growth mindset intervention may provide valuable information for educators interested in closing the achievement gap. Due to the low academic achievement scores from students, particularly low socioeconomic, Hispanic English learner students, further exploration of the learned helplessness and fixed mindset phenomenon needs to be examined. Dweck's (2015) research shows that teaching students a growth mindset changes their motivation and achievement. Students who learn that they can grow their brains (make new, stronger neural connections when they stretch themselves to learn hard things) then show greater motivation to learn. As a result, students with a growth mindset may attain increasingly higher grades and achievement scores on summative assessments. Delivering a growth mindset professional development for fourth grade teachers and their implementation of growth mindset strategies within their classroom, may help improve student academic achievement.

## Purpose of the Study

What are the driving forces that lead students to either redouble their efforts to succeed, or give up in the face of a challenge? Research in educational psychology has uncovered that students may hold different theories about the nature of their intelligence (Dweck, 1999). In the mindset realm, there are a set of beliefs that state that intelligence is not fixed but can be changed and enhanced over time through one's own effort (Dweck & Leggett, 1988; Dweck et al., 2011). Students who display characteristics of a fixed or unchangeable mindset hold an entity theory of intelligence viewpoint while others who hold an incremental theory viewpoint see their intelligence as malleable. Students who hold an

entity theory are more likely to strive towards a performance goal orientation in an effort to affirm their intelligence, and as challenge arises, they are likely to avoid tasks that might uncover their academic deficiencies (Dweck & Leggett, 1988; Dweck et al., 2011). In contrast, incremental theorists are more learning-goal oriented and tend to view failure as a lack of effort (Blackwell et al., 2007). Schools that seek to foster incremental growth mindset such as the belief that one's intelligence can be acquired or developed, display an increase in academic achievement (Dweck, 2010).

This study was designed to explore the implementation of an online growth mindset professional development for fourth grade teachers and the impact it has on fourth grade students' perception of their own academic achievement. Furthermore, the study was designed to explore the implementation of an online growth mindset professional development for fourth grade teachers and the impact it has on individual teacher philosophy. A second purpose was to ascribe meaning to the connections between a growth mindset professional development for fourth grade teachers, its implementation of growth mindset strategies in the classroom, and fourth grade student academic achievement in English Language Arts. To replicate and sustain an intervention, accessibility and function need to be present.

The purpose of this two-phase, exploratory sequential mixed methods study was to explore the perceptions of fourth grade students before and after the implementation of a growth mindset intervention. The first phase was a qualitative exploration of growth mindset by collecting interview data from fourth grade students at the intervention school site. Themes from this qualitative data were then used to establish the focus of the growth mindset professional development and the survey questions. Perceptions of students' intelligence and academic achievement data as measured by iReady, the district's assessment tool, were collected prior to and following the intervention.

This study sought to describe how student perception of intelligence and student academic achievement in English Language Arts changes with the implementation of growth mindset strategies acquired through an online growth mindset professional development delivered to fourth grade teachers. A mixed methods design was used. A mixed method design requires qualitative and quantitative data to be collected in parallel, analyzed separately, and then merged. In this study, interview and survey data were used to test the theory of growth mindset instruction that could predict an increase in fourth grade students' perceptions of academic abilities and could predict an increase in fourth grade students' academic achievement. This study explored connections between growth mindset professional development for fourth grade teachers and the implementation of growth mindset strategies in the classroom and the impact it has on student perceptions of their academic abilities and the impact of individual teacher philosophies. A secondary purpose was to describe how growth mindset professional development for fourth grade teachers and the implementation of growth mindset strategies impacted fourth grade students' academic achievement reading. The reason for collecting both quantitative and qualitative data is to use quantitative research and quantitative research together to gain a more complete understanding of the data (Creswell, 2013)

Through an online growth mindset professional development, teachers had the opportunity to learn that people with a growth mindset had more active brains than people with a fixed mindset when they got feedback that could help them learn (Dweck, 2006). Valuable lessons can be drawn from research conducted in the country of Chile; the research study showed that students who had a growth mindset were three times more likely to score in the top 20% of students nationally, while students with a fixed mindset were four times more likely to score in the bottom 20% of students (Claro et al., 2016).

In this study, fourth grade teachers participated in seven online professional development modules. After each learning session, the teachers committed to implementing the strategies they learned in their respective classroom. Prior to the beginning of the intervention, a convenience sample of fourth grade students were interviewed to determine the direction of the professional development. The main strategies the fourth-grade teachers used were developed based on the results of this initial interview and survey with the sample of fourth grade students. The interview determined the professional development focus. Participating fourth grade teachers completed a bi-monthly online open-ended survey where they indicated areas of success, wonderings, and areas to grow as they implemented their mindset instruction intervention in their classroom.

The current research study used an exploratory sequential design (Creswell, 2013) and started with a qualitative data collection of interview questions posed to fourth-grade students. These same students participated in a survey which contributed to the quantitative results. The results of the interview and survey drove the professional development focus of the intervention. Prior to and immediately following the intervention, all fourth-grade students participating in the intervention were given a pre and post survey on their perceptions of their academic abilities. These results were analyzed within the intervention group. A convenience sample of the intervention fourth grade students ($n$ = 13) was interviewed about their thoughts on growth mindset after the classroom interventions had been delivered. The participating teachers ($n$ = 4) who conducted the growth mindset intervention were also interviewed after all growth mindset modules were completed and all growth mindset strategies had been implemented in each perspective classroom.

Academic achievement diagnostics were given in September 2018 and again in January/February of 2019. Scores of the intervention groups were again analyzed using an ANOVA statistic design within the intervention group, as well as between other fourth grade

students within the district who did not participate in the intervention (control group). Control groups consisted of all fourth-grade classrooms, and their students in the district which did not participate in the intervention ($n$ = 229). Intervention groups consisted of all fourth-grade teachers who participated in the five-month professional development and their classroom students ($n$ = 141). The interpretation of the data and results of this study were based on the qualitative interviews, and quantitative survey and achievement assessment results. The goal was to understand how growth mindset professional development for fourth grade teachers affects fourth grade students' perceived academic abilities and academic achievement in English Language Arts. A secondary goal was to understand how the implementation of a growth mindset intervention affects fourth grade teacher mindsets and teaching philosophy.

## Research Questions

1. In what ways does the implementation of growth mindset strategies, based on an online professional development for fourth grade teachers, impact fourth grade students' perceptions of their academic abilities as measured by pre and post surveys?
2. In what ways does the implementation of a growth mindset intervention affect fourth grade teacher mindsets as measured by ongoing journal entries during the intervention and post intervention interviews?
3. In what ways does the implementation of growth mindset strategies, based on an online growth mindset professional development for fourth grade teachers, impact fourth grade student academic achievement in reading as measured by iReady?

The hypothesis is that the online growth mindset professional development and the implementation of growth mindset strategies in the classroom, will enhance students' perceptions of their intelligence and drive students to perform better academically in reading

as measured by the iReady Reading Diagnostic assessment. It is also hypothesized that teacher mindsets will be affected in a way that enhances awareness of non-cognitive interventions in the classroom.

## Theoretical Framework

Frameworks help us understand how abstract ideas interact with one another and make things that are difficult to describe more rational and more easily analyzed (Muhammad, 2015). To understand a phenomenon such as perception of intelligence, the identification of a theoretical framework is necessary.

According to Thompson (2001):

> Reality is too complex to fully capture in abstractions. Every study selects particular aspects of the world to emphasize, necessarily leaving the rest in a shadowy background. In other words, we must choose what is generally called theoretical frameworks to guide our analysis. (p. 46)

Learned helplessness is the belief that one's behavior does not influence behavior and that one's behavior does not affect outcomes or results. An example of learned helplessness with students would look like this, "If I study hard for this test, I will get a good grade." Conversely, a student with learned helplessness might say, "No matter how hard I try, I will fail the test." In 1967, Martin Seligman conducted classical conditioning research, or the process by which an animal or human associates one thing with another. Learned helplessness theory was originally developed on the basis of laboratory experiments with dogs. Dogs, which had first learned to press a lever in a harness in order to escape shock, showed normal attainment of escape/avoidance behavior in a shuttle box. In contrast, yoked, inescapable shock in the harness produced interference with future escape in the shuttle box. Initial experience with escape in the shuttle box led to more panels pressing during inescapable shock in the harness and prevented interference with later responding in the

shuttle box. Inescapable shock in the harness and the failure to escape the shuttle box produced interference with escape responding after a 7-day rest. Due to the connection of escape response and learned "helplessness", results were interpreted as the two variables being correlated. The research concluded that the dogs failed to escape because they had learned that the termination of shock was independent of responding (Overmier & Seligman, 1967; Seligman & Maier, 1967). Seligman and Maier's (1967) research showed that learned helplessness can also be seen in humans. For instance, students who achieve low marks on a math or science assignments might make a connection that all math or science related assignments will relate in a sense of failure or a sense of helplessness. In today's classroom, many teachers encounter students who show signs of this attribute of helplessness.

Carol Dweck (2006) developed the Growth Mindset theory. Through her research, she determined that everyone has a mindset. People with a growth mindset believe that smartness increases with hard work, whereas those with a fixed mindset believe that one cannot change his or her basic level of intelligence. Students with a growth mindset who face challenges in school see their hurdles in their learning as challenges that they appreciate and look forward to solving. Their mentality is that they do not know something yet, but through practice and effort, they will gain the skills necessary for mastery of a learning goal. On the contrary, Dweck (2006) explains that students with a fixed mindset who are faced with the same challenges view the challenges as limitations or indicators of a threat to their intellect, talent, and ego. Students with a fixed mindset avoid challenges and try very hard to remain in the safe zone of not trying.

Angela Duckworth (2007) states that non-cognitive character traits (grit, growth mindset, self-discipline, dedication to task, etc.) are predictive of success. Duckworth's (2007) grit theory is defined by a formula she created for achievement.

Talent x Effort = Skill ⟹ Skill x Effort = Achievement

In her formula, effort appears twice whereas talent only appears once. Success in school or other areas of life depends more on skill than talent and/or intelligence. Duckworth (2007) argues that talent and intelligence are obviously important, but just as important (or maybe even more important) is a person's ability to stick with a task, job, or passion until it has been completed. Grit is consistency of effort over time and it is what contributes to achievement: effort in developing talent and then effort in using the developed talent to do something worthwhile are what grit is comprised of. Duckworth (2007) states that the people who are, for lack of a better word, *ambitious*—the kids who are not satisfied with a Grade A or even a Grade A+ , who have no limit to how much they want to understand, learn, or succeed—those are the people who are both talented and *gritty*.

## Significance of the Study

The existing body of research on the influence teachers have on students' mindset is limited. According to the work of Jo Boaler (1998, 2013), educators need to have the proper tools and proper level of education to promote a growth mindset in the classroom. Mindsets are critically important because they lead to different learning behaviors, which, in turn, create different learning outcomes. When students change their mindset and start to believe that they can learn to high levels, they change their learning trajectory (Blackwell et al., 2007) and achieve at higher levels. Studies have shown that interventions targeting a student's implicit theory of intelligence (academic mindset) can influence academic motivation and academic achievement (Blackwell et al., 2007; Dweck, Davidson, Nelson, & Enna, 1978; Dweck & Leggett, 1988; Farrington et al., 2012; Yeager & Walton, 2011; Walton, 2014). This study sought to determine if an online professional development on growth mindset classroom strategies promoted by Dweck (1999) has a positive impact on students' perceptions of self and student academic achievement, which would bolster the scant literature in the area of teacher influence on students' mindsets. Hence, this study has

strong practical significance and will contribute to the existing literature on the impact growth mindset has on student perceptions of intelligence and academic achievement.

The results of this study may be used to develop a sustainable format for providing professional development to teachers which, in turn, filters down to their students who may benefit from a change from fixed to growth mindset. As most of the growth mindset intervention research reveals, a close watch from the researchers is necessary to duplicate the results. This study strives to free up this critical limitation of researcher input and put the power into the teachers' hands by allowing them to learn online, the non-cognitive strategies and techniques necessary to bring about a growth mindset classroom. Growth Mindset interventions have the potential to change students' perceptions and increase academic achievement. The professional development platform used was a free online training website open to the public. The content of the professional development is aimed at increasing the awareness of growth mindset strategies. Because the training is free and online, teachers could learn the growth mindset concepts on their own, collaborate with colleagues during grade-level planning, and implement the strategies in the classroom, which could eventually benefit students.

Although there have been external researchers who have come into a research setting and conducted a study, this study specifically leverages the easier access of online professional development that practitioners desire to implement a growth mindset intervention within the scope of their daily instruction. Furthermore, few research studies using mixed methods designs have been directed toward the connection of professional development, reflection, student perception, and academic achievement. Hence, the current study also addresses a major research gap by using a mixed-methods design. A mixed method study is a type of study that focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is

that the combined use of quantitative and qualitative approaches to provide a better understanding of research problems than either approach alone (Creswell & Plano, 2018).

This study is significant because of the availability and accessibility of the online professional development intervention and the potential sustainability of the model in a school setting. It is also significant because, for an intervention to be successful, it has to be easily replicated, and this study, through an online professional development, addresses this issue. Not only do students benefit from growth mindset professional development, but teachers also benefit as they move deeper into a growth mindset and support students as they too develop a growth mindset. In Maree Flannery's Sabbatical Report, Dweck (2016) is quoted saying, "We are a mixture of growth mindset and fixed mindset, but dominant in one. It is like a continuum. Growth mindset is not about proclaiming you have it but taking the journey to get it and being part of the process" (p. 2).

## Definition of Terms

*Academic Behavior:* There are certain student behaviors that would qualify as being a good student. For example, students who show up to class prepared and ready to learn, limited absences, paying attention in class, and participating show academic behavior (Farrington et al., 2012).

*Academic Mindsets:* Students' attitudes, beliefs, perceptions, and dispositions regarding themselves, their academic potential, and their relationship to school (Dweck et al., 2011).

*Achievement Goal Theory:* Achievement goals function as a framework which enables the learners to interpret and react to events; consequently, they comprise reasons for the individuals' learning-related behavior (Dweck & Leggett, 1988).

*Entity Theory of Intelligence:* Belief that intelligence is fixed and uncontrollable, also referred to as the Fixed Mindset (Dweck, 2006).

*Fixed Mindset:* The belief that intelligence and academic ability are fixed qualities that students either possess or do not possess, and that cannot be changed through effort (Dweck et al., 2011). It is a dimension of academic mindsets and is also referred to as an entity theory of intelligence.

*Growth Mindset:* The belief that intelligence and academic ability are not fixed but are malleable and can be increased through effort and learning. It is a dimension of academic mindsets (Dweck, 2006). It is a dimension of academic mindsets and is also referred to as an incremental theory of intelligence.

*Incremental Theory of Intelligence:* Belief that intelligence is malleable, increasable, and controllable, also referred to as the Growth Mindset (Dweck, 2006).

*Mastery Goal Structure:* To have competency with a task, one would put learning goals with a purpose as the utmost of importance (Elliot, 2007).

*Mindsets:* The psychosocial beliefs and attitudes an individual has about learning (Farrington et al., 2012).

*Non-Cognitive:* Individual attributes and skills not considered intellectual or analytical such as motivation, perseverance, self-regulation, and others impacting academic and work success (Rosen, Glennie, Dalton, Lennon, & Bozick, 2010).

*Performance Avoidance:* The tendency to change behavior or hiding effort and avoiding academically challenging situations because of concerns of failure or embarrassment. The concept is related to a fixed mindset (Farrington et al., 2012).

*Performance Goal Structure:* To avoid looking incompetent, one holds onto ability or ego (Elliot, 2007).

*Smarter Balanced:* Annual state assessments administered to third-eighth and eleventh-grade students as a measure of progress towards college and career readiness (California Assessment of Student Performance and Progress, 2016).

## Limitations

Limitations have been considered:

1. All professional development was done on the individual's own time either alone or with colleagues online. Intervention teachers participated in an online professional development and committed to reflecting on their growth mindset intervention through a bi-weekly open-ended survey of what is going well and areas to grow concerning implementation of learned strategies.
2. Fidelity of implementation of the growth mindset strategies in the classroom is a limitation due to the online, self-paced, and self-interpreted professional development. Without accountability, it is difficult to measure the fidelity of implementation.
3. Creswell (2013) states, in phenomenological interviews, asking appropriate questions and relying on participants to discuss the meaning of their experiences require patience and skill on the part of the researcher. Fourth grade students were interviewed to seek understanding of their perceptions of growth mindset strategies and the effectiveness in raising awareness. It was the first time the counselor and academic coach on site conducted research interviews, although the researcher pilot-tested the interview questions for practice and to develop questioning skills, the lack of prior experience in conducting interviews can be a limiting factor.

## Delimitations

Delimitations limit the scope of a study based on the demographic characteristics of participants (McMillan, 2008). The research study was conducted with a rather homogeneous population within a specific public school in a rural school district in California called Greenfield Union School District. Most students in the study were Hispanic which helped researchers understand if growth mindset strategies presented in the classroom

support Hispanic students, and if presenting growth mindset strategies to a larger body of students would help the results be more generalizable.

This study was also delimited to the four elementary schools in this California district.

## Assumptions

The assumptions made in this study were:

1. Answers from participating children and teachers are honest and free from bias.
2. All teacher participants in the experimental group are implementing the online professional development strategies within their classroom despite minimal researcher input.
3. iReady provides an accurate measure of students' target academic reading levels.

## Organization of the Study

This research study is presented in five chapters. Chapter 1 includes the introduction to the study, background information, statement of the problem, purpose, and significance of the study, definition of terms, theoretical framework, research questions, limitations, delimitations, and assumptions. In Chapter 2, a thorough examination of the literature is presented, beginning with an overview of learned helplessness and following up with the ways in which grit and perseverance contribute to successful people. Implicit theories of intelligence and psychological interventions concerning growth mindset strategies are presented. Chapter 2 closes with a synthesis on the research on ways to bridge the achievement gap. Chapter 3 discusses the methodology that was used to collect and analyze data, including iReady results, validation measures, student interviews and surveys, and teacher bi-weekly open-ended surveys and reflections. Chapter 4 is an analysis of the findings and results of the quantitative and qualitative data. Finally, Chapter 5 discusses the research findings, implications for practice, recommendations for future research, and conclusions.

# CHAPTER 2: REVIEW OF LITERATURE

This chapter presents the rationale for researching the relationships between mindset interventions and changed behavior. Researchers have studied the constructs of learned helplessness and student achievement for several decades. Student perception of intelligence and increased academic achievement has been associated with mindset interventions. Understanding how students shut down is the first step to changing behavior. The following review of the literature represents the literature pertinent to this research study, namely, on theories of intelligence, mindset studies, self-efficacy, brain science, celebrating mistakes, praising the process, and grit.

In a critical literature review of the relationship between non-cognitive factors and academic performance, Farrington et al. (2012) developed a framework of how five specific factors interact to affect a student's academic achievement. The five factors include academic mindsets, social skills, academic perseverance, learning strategies, and academic behaviors. The authors agree that all factors may be mutually beneficial; however, academic mindsets stand alone as the only factor directly affecting each of the remaining non-cognitive factors associated with academic performance (2012). In addition to acquiring content knowledge and academic skills, students also need to be supported through non-cognitive training by enhancing their capacity to learn. The non-cognitive strategies, such as growth mindset, can be explicitly taught to students. These strategies provide students with the skills they need to achieve success and interact with the learning environment in a meaningful and positive way.

Psychological interventions or non-cognitive factors target what students believe about themselves. Psychological interventions do not teach students about academic content but focus on helping students to think in a positive light. The goal of psychological interventions is they aim, simply, to alter a specific way in which people think or feel in the

normal course of their lives to help them flourish. Psychological interventions have three components. To begin, psychological interventions target how students believe about themselves and their school setting. Next, they are administered in a precise way. Finally, they tap into recursive processes (Paunesku et al., 2015). In order to better understand why students might believe a certain way, it is important to get to the root of the problem; learned helplessness research explains why a student might shut down.

## Learned Helplessness

The theory of learned helplessness first came to light in the early 1960s while Seligman, Maier, and Overmeier were graduate students at the University of Pennsylvania and were studying the nature of avoidance learning (Overmier, 2002). Seligman and Overmeir (2002) coined the phenomenon *learned helplessness* because their subjects learned to be helpless during the course of their initial exposure of an experiment that constituted failure. The experiments consisted of using dogs and a system of shocking to reach conclusions. The experimenters used three sets of dogs: a control group that did not receive any treatment; and two experimental groups which were subjected to some aversive conditions, such as electrical shock (Overmier & Seligman, 1967) In one group, the dogs were put into gear used for controlling an animal (a harness), held in the gear for some time and then let go. The dogs in the second group were put in the same gear and were given electrical shocks. The dogs could escape the electrical shocks if they pressed their noses against a panel and then the shock would stop. The third group received the same shock and was exposed to the same harness but was not able to escape from the shock. The third group of dogs had shocks randomly given, and there appeared to be no control for the dogs to escape. The dogs were then placed in a shuttle box and the dogs from the first and second group learned that by jumping over the barrier, they would be free from the electrical shock. For the dogs in the third group, they did not make any attempt to escape the shocks, and they

laid down and waited out for the shocks to stop. The dogs had developed a mindset that nothing they did would prevent or stop the shocks. Seligman and Maier (2002) found that it was the perception of uncontrollability that caused the symptoms of helplessness - not the uncontrollability itself, but how the subject perceived it (Seligman & Maier, 1967).

Learned helplessness has been considered a form of meta-learning. It suggests that a learner's desire and/or confidence to learn is destroyed because of three deficits resulting from unpleasant and uncontrollable events; motivational, cognitive, and emotional deficits. Students with learned helplessness having a *motivational deficit* lack confidence in their learning process and lack the response to identify methods of escaping a negative situation. They have experienced failure and their way of handling situations is to quit or quit trying. A student with a *cognitive learned helplessness* fails to apply logical thinking and cognitive ability to the learning process, which consequently leads the student to think that his circumstances are uncontrollable. Finally, a student with *emotional deficit* is in a depressed state that comes when an individual is in a negative situation and feels he or she is not in control.

The animal experiments opened the doors for the use of human subjects instead of animals. In a 1974 study, human subjects were split into three groups (as in the dog experiment). The first group was subjected to loud and unlikable noise, but the human subjects were able to stop the noise by pressing a button four times. The second group was imperiled to the same noise, but their button was not operational. The third group was subjected to zero noise. The next phase of the experiment subjected all participants to the same loud noise and a box with a lever which, when manipulated, would turn off the annoying sound. Similarly, to the animal experiments, the participants who had no control over the noise in the first part of the experiment generally did not attempt to turn off the noise, while the rest of the participants generally learned to turn off the noise

In 1978, Diener and Dweck conducted a study with fifth grade and sixth grade elementary students. They identified two distinct reactions to failure: *helpless* and *mastery-oriented* patterns. In this study, the term helpless referred to how certain students view failure and how they react to failure in a way that demonstrates denigration of their intelligence, plunging expectations, negative emotions, lower persistence, and deteriorating performance (Diener & Dweck, 1978).

The students were put into two groups dependent upon a questionnaire which was developed by (Crandall, Crandall, & Katkovsky, 1965), which would likely show a helpless or a mastery-oriented response. The helpless students tracked as well as the mastery-oriented students until a roadblock happened and then the helpless students quickly started to denigrate with sayings like, "I guess I'm not very smart," "I never did have a good memory," and "I'm not good at things like this." Their results showed that more than a third of the students questioned their intellectual ability while none of the mastery-oriented students did so. Dweck (2000) states that not only did the children in the helpless group lose faith in their ability to succeed at the task in the future, but they also lost perspective on the success they had achieved in the past. The researchers noticed that the helpless students began to doubt their intelligence in the face of failure and even exaggerated their failures when in reality, they had more successes than failures, but stated the opposite. In an effort to cope, the helpless students resorted to behaviors like changing the subject to something they were good at, changing the rules of the task, or talking about a completely unrelated topic.

Diener and Dweck (1978) found that a mastery-oriented group issue self-motivating instructions to themselves like: "The harder it gets, the harder I need to try," or "I should slow down and try to figure this out," or "I've almost got it now," or "I love a

challenge," or finally "Mistakes are our friend." What the researchers noticed was the mastery-oriented students welcomed the chance to confront and overcome obstacles.

In another study, Licht and Dweck (1984) conducted a similar study with fifth grade students to determine if the helpless and mastery-oriented patterns affected students' learning in school. They started by identifying students who were likely to have the helpless response and those who were likely to have a mastery-oriented response by using a questionnaire. Through the use of a booklet that shared new material, they had the students read the booklet and answer seven questions in the back. To look for the helpless pattern, they added confusing patches to the text. They made two versions of the initial instruction booklet – one that contained difficulty and one that did not. The results showed when students received the booklets that had no confusion those who were prone to a helpless response did the same as those students who were prone to a mastery-oriented pattern. The results of this were in line with the previous 1978 study. However, when the students received the confusing passage, the mastery-oriented students stayed steady with a 72% correct answer rate, while the helpless group suffered and scored only about a 35% correct answer rate. The researchers found that the helpless pattern reacts with self-doubt and could hamper learning of new material in a classroom setting (Licht & Dweck, 1984).

## Theories of Intelligence

Afred Binet, a French psychologist, is best known for the development of the Intelligence Quotient or IQ test. Binet was commissioned by the French government to create a test which could permit distinctions among those students with average and above average abilities (Nettelbeck & Wilson, 2005). Along with his collaborator, Theodore Simon, he created the Binet-Simon Intelligence Scale which was later revised by Lewis Terman and used with subjects drawn from an American sample. It is now known as the Binet-Simon Intelligence Scale. It is clear that Binet believed that intelligence could be increased:

> A few modern philosophers seem to lend their moral support to these deplorable verdicts when they assert that an individual's intelligence is a fixed quantity which cannot be increased. We must protest against this brutal pessimism. With practice, training, and above all method, we manage to increase our attention, our memory, our judgment, and literally to become more intelligent than we were before (Siegler, 1992).

Howard Gardner says we are all born with the potential to develop a multiplicity of intelligence (Pal, Pal, & Tourani, 2004). Gardner proposed that there are eight intelligences, and has suggested the possible addition of a ninth known as existentialist intelligence. He essentially created a series of labels to define mental achievement such as: spatial, linguistic, logical-mathematical, bodily-kinesthetic, musical, interpersonal, and intrapersonal (Gardner, 1984). Gardner's work (1984) has helped to broaden the research realm beyond the narrow confines of Binet's IQ test.

During the 1970s and 1980s theories of intelligence began to overlap as similar ideas were fine-tuned. In (Elliott & Dweck, 1988) seminal work, the theory that students' goal orientation (performance or learning goals) toward academic tasks affects their ability was proposed. The authors (1988) studied fifth grade students, showing how performance and learning goals affected them. A performance goal suggests that students are achieving good grades or looking smart to win positive judgments. They want to look smart (to themselves or to others) and they want to avoid looking dumb. A learning goal suggests students see setbacks and challenges as stepping stones toward eventual learning, thus the goal of the learning goal is to increase student competence (Elliot & Dweck, 1988).

In Elliot and Dweck's (1988) study, they gave all the students the same task to work on. The study started with a series of success tasks and both groups (performance goal group and learning goal group) did equally well. Next, the tasks began to get more

difficult. In general, the students with the performance goal traits became frustrated and their problem-solving strategies deteriorated. On the contrary, the students who pursued the learning goal pattern did not worry about their intellect; they remained focused on the task, and they maintained their effective problem-solving strategies (Ames & Archer, 1988; Stipek & Kowalski, 1989). Questions were raised as to how students acquire performance goal patterns or learning goal patterns. Dweck (1988) continued this research and expanded on it to explore the nature of intelligence, to understand perceptions of intelligence and how perceptions affect learning.

In 1995, Dweck centered her work on understanding implicit theories about individuals' own intelligence (Dweck, Chiu, & Hong, 1995a). One with a performance goal mindset perceives intelligence to be a fixed entity. However, individuals who perceive their intelligence to have a malleable quality would be considered to have a mastery-oriented approach to learning. Implicit theories of intelligence can be considered roads toward goals; one road leads to an entity view of intelligence, while the other road leads to those seeking more challenging tasks and learning outcomes. In summary, Dweck's theory holds that "people's implicit theories about human attributes structure the way they understand and react to human actions and outcomes" (Dweck et al., 1995).

**The Fixed Mindset**

When people believe that their level of intelligence is fixed and cannot be changed, a variety of negative consequences usually follow. This implicit theory of intelligence has been coined by Dweck and Leggett (1988) as entity theory. Those who hold this theory view of intelligence as a thing that one either has or does not have, believe that there is nothing that can be done about it. As noted earlier, learned helplessness is prevalent in individuals who hold an entity theory viewpoint. The characteristics of learning that relate to ability rather than effort have been shown in multiple studies to have harmful effects on motivation for

learning, which, in turn, results in a learned helplessness response in individuals (Dweck et al., 1995a; Dweck & Leggett, 1988a). An individual with a fixed mindset can hinder motivation even further. Learners who have a fixed mindset tend to avoid challenges and taking risk to appear intelligent. Additionally, Dweck and Leggett (1988) showed that a belief that intelligence is fixed further impacts competence and performance evaluations. Students' theories of intelligence affect their achievement and their ability to cope effectively. Once students adopt a theory of intelligence lens, what they value, how they approach intellectual tasks, and how they interpret and respond to what happens to them are affected (Dweck, 2000).

**Growth Mindset**

In contrast to a fixed mindset, a growth mindset is held by students who believe that intelligence is mostly an attribute of effort can be said to possess a growth mindset. Dweck (1995) found that students who embrace an incremental theory of intelligence were more oriented towards mastery-oriented patterns and learning goals as opposed to holding an entity theory of intelligence and leaning towards performance goals. Children with a growth mindset tend to stay away from negative cognitive, affective, and behavioral responses typically displayed by entity theorists or those with a fixed mindset.

Blackwell's (2007) study found how implicit theories impact adolescents' mathematic achievement. The researchers conducted two longitudinal studies and an intervention with New York City students beginning in seventh grade and continuing over four consecutive years. The studies included 373 students of mixed races. Collectively, the sixth grade math tests placed all students in the 75$^{th}$ percentile nationally (on equal footing). At the beginning of the longitudinal study, students were given a questionnaire to assess goals, theory of intelligence, helplessness, effort, and mastery-oriented responses to failure. The results of the survey found that all variables were present in the children (Blackwell,

Trzesniewski, & Dweck, 2007). Results showed that as the students progressed through junior high school, the group believing in malleable intelligence had higher academic achievement, and the trajectory widened the gap between the incremental patterns (growth mindset) of behavior and the entity patterns (fixed mindset) of behavior.

In the last phase of the study, Blackwell et al. (2007) conducted an intervention to teach the students about malleable intelligence. Ninety-one seventh grade students participated in this last phase. The researchers gave the same baseline questionnaire as the first study. The intervention consisted of eight 25-minute periods, one time per week. The intervention and control groups received the same content instruction which included brain science, best practice concerning study skills, and learning about stereotyping. The intervention group, however, was given instruction on the malleability of the brain while the control group was given instruction on memory and they discussed what subjects were of interest to them. The results of the longitudinal study showed that three-fourths of the intervention group who learned about the malleability of the brain showed improved classroom motivation. Academic achievement in mathematics for the intervention group also showed growth (Blackwell, Trzesniewski, & Dweck, 2007).

In summary, there are many examples from research studies as mentioned that show evidence that learners' theories of intelligence (their mindsets) are a reliable predictor of their goal orientation. Students either lean towards a performance-oriented pattern (entity theory) or a mastery-oriented (incremental theory) pattern. Whatever goal the learner adopts has a profound and lasting impact on one's learning outcome. In general, performance goals are associated with a student decreasing achievement over time, while students who strive for mastery-oriented goals tend to increase in academic achievement (Dweck, 1998).

**Bandura's Theory of Self-efficacy**

Growth mindset and self-efficacy are both considered to be in the same structure as Social Cognitive Theory. Albert Bandura introduced his psychological theory of learning in the 1960s through a series of Bobo doll experiments. The results of the Bobo doll study conclude that individuals learn from what is observed and what is modeled (Newman & Newman, 2007). The study was significant because it showed that behavior is not always influenced by reinforcement or rewards, but rather behavior, when observed and modeled, is emulated. The children who were involved in the study received no encouragement or incentives to beat up the doll; they were simply imitating the adults who originally beat up the doll – they were executing what was modeled. Bandura (1977) termed this phenomenon *observational learning* and characterized the elements of observational learning as attention, retention reciprocation, and motivation. He demonstrated that children learn and imitate behaviors which they have observed in other people (Bandura, 1989).

The concept of self-efficacy is central to Bandura's social cognitive theory. According to Bandura (1986), a person's attitudes, abilities, and cognitive skills comprise what is known as the self-system. This system plays a large role in how individuals understand situations and what behaviors accompany them. Self-efficacy is an essential part of this self-system. Students who master a challenging task with limited assistance will increase their levels of self-efficacy, and people who have a high level of self-efficacy try challenging tasks more frequently and persist longer with them (Bandura, 1989.). Self-efficacy is central to a person's goal-setting, effort level, response to challenge and setbacks, and resiliency, which are all indicators of academic success. Social cognitive theory and self-efficacy go hand in hand with the growth mindset framework.

Understanding learned helplessness theory is essential to understanding mechanisms that cause helpless behaviors; however, the self-efficacy theory considers where the person is in his current state and elaborates on how to increase a sense of competence that leads to small successes and diminishes a sense of helplessness. Thus, the two theories tend to complement one another. A better understanding of learned helplessness theory as related to self-efficacy theory and growth mindset theory may contribute to the identification of more effective strategies to increase and sustain a positive sense of self.

**Mindset Interventions**

Growth mindset interventions are designed to instruct participants with the message that intelligence is malleable and that challenge and/or struggle is an opportunity for growth. Research has shown that growth mindset interventions have shown small to medium effect sizes (Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013). There have been relatively brief social-psychological interventions targeting students' thoughts, feelings, and beliefs about school and have shown evidence of increased academic achievement (Farrington et al., 2012; Yeager et al., 2016). Methodology of mindset interventions has varied from one researcher to another. Gregory Walton's (2014) studies have shown that specific psychological processes contribute to major social problems. Walton states these processes act as levers in complex systems that give rise to social problems. He has coined these interventions as *wise interventions*. Wise psychological interventions are informed by a deep understanding of the target population's social world, and successful interventions are based on the precise psychological theory (Walton, 2014). Yeager and Walton (2011) state that precise psychological theory, combined with social-psychological interventions must account for the treatment population's context. Non-cognitive interventions are not intended to replace education reforms, they must be designed in ways that complement and support

educational systems (Yeager & Walton, 2011). What Yeager and Walton (2011) confirm, is that social-psychological interventions should be integrated into the normal course of business for students and the school.

Additionally, another hindrance to a growth mindset has been identified by researchers as *stereotype threat*. Stereotype threat refers to being at risk of conforming to a negative self-characteristic stereotype of one's social group (Stoessner & Good, n.d.). The existence of such a stereotype can be reinforced and made more plausible based on anything one does, particularly if any of one's features conform to it (Steele & Aronson, 1995). An intervention that sought to integrate growth mindset was implemented and reported (Steel & Aronson, 1995). Undergraduate students believed that they were volunteering as mentors for at-risk youth when, they were in fact, the subjects of a research study intended to reduce effects of stereotype threats. The research intervention manipulated the subject's implicit theories of intelligence or entity theory.

Seventy-nine Stanford undergraduate students participated in the study. The study consisted of 42 African American students and 37 White students who were randomly assigned to one of three conditions. The participants were informed they were to become long-distance mentors for younger, academically at-risk students by being their pen pal. To prepare for their assignment, the Stanford students participated in a training that consisted of three one-hour laboratory sessions. In the treatment condition (i.e., the malleable pen pal condition), participants took part in several training activities designed to convey the message that intelligence is malleable. Specifically, participants in the treatment condition were asked to convey the following in their letters (Steel & Aronson, 1995):

> Because intelligence is malleable, humans are capable of learning and mastering new things at any time in their lives. This message is especially important to get across to young, struggling students. If these students view intelligence as a fixed

> quantity, they may feel that they are incapable of learning if they encounter difficulty with their school work. If, however, students can be convinced that intelligence expands with hard work, they may be more likely to remain in school and put effort into learning. (p. 117)

Participants assigned to the first control group (i.e., the control pen-pal condition) took part in training activities related to theories of multiple intelligences (Gardner, 1983). Participants in the second control condition (i.e., non-pen pal condition) did not take part in the intervention. At the end of the intervention, participants completed a survey related to implicit theories of intelligence. The results of a two (race: African American or Caucasian) by three (condition: malleable pen pal, pen pal control, or non-pen pal control) analysis of covariance (ANCOVA), revealed a significant effect of the treatment condition. An ANCOVA analysis showed significant longer-term effects for the treatment condition on the belief that intelligence is malleable. African American students in the treatment condition reported greater enjoyment of the academic process in college, increased academic engagement, and earned higher undergraduate GPAs (grade point averages) than their counterparts in the two control groups (Aronson et al., 2002). Though this study did not attempt to link academic mindsets directly with academic motivation, the findings in this study revealed increased academic engagement, a construct associated with stereotyping and academic motivation.

Building on the previous study examining the relationship between academic mindsets, stereotype threat, and academic achievement, Good, Aronson, and Inzlicht (2003) developed a similar mentor/mentee intervention with 138 seventh grade students from a rural school district in Texas during one academic year. In this study, the seventh grade mentees were the targets of the intervention. Demographically, Hispanic and African American students comprised 80% of the population, 45% was female, and 70% qualified

for free or reduced lunch. Students were randomly assigned to one of four experimental conditions: incremental condition, attribution condition, combined condition, and an anti-drug (control) condition.

Participants were randomly paired with college mentors from the University of Texas, all of whom were trained to convey each of the four experimental messages. In the incremental condition, mentors taught participants that intelligence is malleable. In the attribution condition, mentors taught participants that many students tend to struggle initially when transitioning to the seventh grade but that they often see improvement. In the combination condition, mentors taught participants about the malleability of intelligence and about the temporarily difficult transition to seventh grade. Participants in the control group learned about the dangers of drug usage.

To deliver these experimental messages, mentors met with the seventh grade participants in person for 90 minutes in mid-November and again in January, with email communication throughout the academic year. During these meetings, mentors helped the seventh grade participants develop websites promoting the experimental message in their own words, ostensibly for the benefit of other students who were struggling in school. This follows the method used by Aronson et al. (2002), in which attitude change was fostered by asking participants to advocate from a particular position.

Participants in the incremental condition learned about the anatomy of the brain and how neural connections are made stronger with effort. Phrases such as, “The mind is a muscle; the more you use it, the stronger it grows” were used to convey the message that intelligence is malleable. Students at risk of stereotype threat (African American, Hispanic, and female students) saw increased standardized test scores relative to the control group in the incremental condition, attribution condition, and combined condition (Good et al., 2003, p. 654). These studies collectively show that interventions targeting implicit theories of

intelligence among minority populations have been effective in boosting academic achievement.

Extending this research to the classroom context, Blackwell et al. (2007) conducted a two-part study to explore the connection between academic mindsets and mathematics achievement among adolescents. In doing so, the authors tested the longer-term trajectory of academic performance as well as the mediating factors between theories of intelligence and academic outcomes. The first part of the study, which tested how motivational processes mediate the impact of theories of intelligence on academic performance, was discussed previously. The second part of the study used the same measures from the first part of the study to determine whether a growth mindset intervention would yield increased academic motivation and subsequent academic achievement among middle school mathematics students.

Participants were 91 seventh grade students from a New York City public school. Pre-existing advisory groups were randomly assigned to the experimental condition (growth mindset) or the control condition. Students were told they would be participating in an eight-week workshop focused on study skills and how the brain works. For eight weeks, students in both groups were led by undergraduate research assistants trained to deliver the appropriate messages according to assigned conditions. For 25 minutes each week, participants learned about the basic structure and function of the brain, study skills, and anti-stereotypic thinking. Within the eight-week study, activities in sessions 1, 2, 5, and 6 were the same for both conditions. In sessions 3, 4, 7, and 8, however, students in the growth mindset condition were taught that intelligence is malleable through the use of vivid images, stories, and analogies (e.g., the brain is like a muscle that gets stronger when it is used). For example, in sessions 3 and 4, students in the treatment condition took turns reading aloud an age-appropriate article that described how the brain creates newer and stronger connections

as a result of learning. Students then engaged in a discussion in which they were asked to describe things they had learned to do well and how their brains changed as a result of practice. In sessions 7 and 8, students in the treatment group were asked to discuss times when they had struggled learning something new but experienced success through trial and error. The discussion ended with the message that everything you learn makes you smarter, which means being smart is a choice that you make. The mediational analysis conducted in the first study was used again in the second, showing that general motivational beliefs mediated the relation between theories of intelligence and mathematics grades. Data showed declining mathematics grades among students in the control group, whereas a significant effect was observed among students in the treatment group whose downward trajectories were reversed (Blackwell et al., 2007).

Connecting implicit theories of intelligence and motivational processes, Sevincer, Kluge, and Oettingen (2014) conducted a two-part study examining the connection between implicit beliefs in ability and motivational focus by studying how goal pursuit is affected by people's perceptions about present reality versus the future. The researchers evaluated four forms of thinking identified by Oettingen, (2000) and related to how people approach an important goal: indulgence, mental contrast, dwelling, and reverse contrast. With an approach based on indulgence, people think only about a desired future. An approach based on mental contrast begins with thoughts of the future and is followed by reflections on the present reality that constitutes a barrier to the wish. Dwelling is thinking only about present reality while reverse contrast focuses first on the present reality and is followed by thoughts of the future.

Of the four modes of thinking about an important goal, Sevincer et al. (2014) identified mental contrast as the most appropriate way to examine self-regulation and goal pursuit. The authors believed that when given the choice to elaborate on a desired future

versus present reality, those with an incremental theory of intelligence would engage in greater levels of future-focused, self-regulatory motivational focus than those with an entity theory of ability.

The study was conducted in two phases. In the first phase of the study, 100 students from a German university were randomly assigned to one of two conditions (i.e., entity *v.* incremental). Participants in the entity condition were asked to read passages supporting the notion that intelligence is fixed, while participants in the incremental condition read passages supporting the notion that intelligence is malleable. Students' comprehension was tested using a three-item questionnaire initially developed by Dweck (1999, as cited in Sevincer et al., 2014) to check the manipulation of the assigned condition. Participants responded to questions related to their perceptions of intelligence on a six-point scale from 1 (*strongly agree*) to 6 (*strongly disagree*). Ninety-two participants answered the questions correctly according to their assigned condition. The eight participants whose scores were not aligned to their assigned condition were removed from the remaining portion of the study.

In the second phase of the study, participants were asked to identify their most important academic goal, followed by the perceived likelihood of attainment and importance of the goal. Participants then identified four future outcomes associated with the realization of their goal and four present obstacles associated with not reaching their goal. Finally, participants were asked to elaborate on the first four aspects that came to mind among the eight to determine if the motivational focus was considered future-focused or present-focused. Seventy-six percent of the incremental theorists elaborated on future-focused, self-regulatory aspects whereas just 44% of the entity theorists elaborated on the same (Sevincer et al., 2014). These findings support earlier statements about the relationship between implicit theories of intelligence, goal-orientation, and SRL (self-regulated learning).

With a growing body of intervention research related to implicit theories of intelligence, Paunesku et al. (2015) examined the efficacy of a scaled approach to psychological intervention. Noting that previous academic mindset research was delimited to in-person, single-site studies, the authors tested a multi-site intervention by implementing an online mindset intervention with 1,594 students across 13 high schools. Participants took part in two 45-minute sessions spaced roughly two weeks apart. Students who participated in the study were randomly assigned a group. They were put in a treatment group, a growth mindset intervention group, or a combination of the intervention group. The growth mindset intervention drew directly from the work of Aronson et al. (2002) in terms of content and procedures. Students read an article focused on the neuroscience of learning, and the way struggle and setbacks provide opportunities to learn and grow. This activity was followed by two writing exercises, one that asked students to put their understanding of the article in their own words and another that asked students to write a letter of encouragement to a fictitious struggling student. The sense-of-purpose intervention helped students understand how homework could help foster broader life goals.

Participants completed a pre- and post-intervention survey using two growth mindset items from Blackwell et al. (2007). Measures of academic performance included students' letter grades in core classes. Linear regression showed that the growth mindset treatment led to a malleable view of intelligence. Of the 367 students identified as academically at-risk, students in the growth mindset treatment earned satisfactory grades in 87 more courses than what might have been expected when compared to the control group, a 6.4% difference (Paunesku et al., 2015).

Contextual considerations notwithstanding, successful academic mindset interventions include two noteworthy commonalities: they are subtle and recursive. Brief social-psychological interventions are successful because they are subtle or "stealthy"

(Yeager & Walton, 2011). The act of outwardly and explicitly targeting a specific population for the purpose of an education intervention not only risks the possibility students will display a negative reaction but may create additional obstacles to academic achievement in the form of stereotype threat (Steele & Aronson, 1995). A subtler approach, on the other hand, affords students the opportunity to attribute academic success to themselves rather than an externally created intervention. Self-attribution facilitates the second element, which is the recursive nature of social-psychological interventions (Yeager & Walton, 2011). Kenthirarajah and Walton (2013) as described in Scott, Kosslyn and Buchman (2015), say interventions targeting a specific element of the social cognitive theory as holding the capacity to change not just a moment in time but a process that grows over time. Students who experience academic success as a result of believing their intelligence grows with effort are more likely to invest time, energy, and effort in the next academic task. Similar to a self-fulfilling prophecy, students who believe they can be academically successful are more likely to persevere when faced with obstacles, develop effective learning strategies, and engage in academic behaviors promoting success (Farrington et al., 2012).

The success of these academic mindset interventions can be attributed to the effective transmission of the theoretically precise message that intelligence is malleable (Yeager & Walton, 2011). Each of the previously mentioned studies demonstrates that when students believe, and understand that their brain is like a muscle that grows with effort, academic motivation, and subsequent achievement follow. Similar to the way athletes are motivated by the goals they set (Spray, Wang, Biddle, & Chatzisarantis, 2006), individuals with an academic growth mindset perceive challenges and obstacles as opportunities for growth and development.

Despite the lack of a universally accepted intervention model, a number of small, relatively brief social-psychological interventions targeting students' thoughts, feelings, and

beliefs about school have shown positive, sustained effects on academic achievement (Yeager & Walton, 2011). These interventions are psychologically precise (Walton, 2014), contextually developed, subtle, and recursive (Yeager & Walton, 2011). When students come to understand that their brain is like a muscle that gets stronger with use (i.e., that intelligence is malleable), it has been shown that academic motivation and academic achievement are more likely to follow (Blackwell et al., 2007; (Haimovitz & Corpus, 2011).

With these findings in mind, an intervention targeting academic mindsets among high school football players was developed. Sproull's (2016) study focused particularly on low-income and minority high school football players and was thus situated within broader studies related to college access and achievement gaps targeting those populations. His findings showed that although there was a relatively small growth mindset intervention, the qualitative data shed light that indeed, the growth mindset interventions suggested an important connection between the experience of being a student-athlete and the principles associated with having a growth mindset (Sproull, 2016).

In Sproull's study (2016), pre- and post- intervention data were collected from a treatment group and a comparison group. The participants were 102 high school football players from two high school in Indiana. The primary objective of the study was to examine the extent to which participation in a growth mindset intervention affected participants' implicit theories of intelligence and in effect, their academic motivation. Rooted deeply in the work of several researchers (Dweck, 2006; Walton, 2014; Yeager & Walton, 2011), the intervention focused on targeting a student's implicit theories of intelligence. Although the findings within the quantitative data were weak, the qualitative data did show a gain in increased awareness of the brain's malleability and a raised awareness of implicit theories of intelligence. Sproull (2016) suggests since many student-athletes practice the application of social cognitive theories (e.g., goal-setting, performance monitoring, adjustment, belief in

ability, etc.) in the context of their athletic development (Spray et al., 2006), the NCAA (National Collegiate Athletic Association) should consider drawing on the connection between implicit theories of intelligence and athletic strength and conditioning through the incorporation of growth mindset practices in its education efforts. They should specifically target instruction in growth mindset strategies such as praising the process, celebrating mistakes, brain science, and being cognizant of one's fixed mindset to increase perceptions of intelligence.

**Brain Science**

In a study by Maguire et al. (2000), licensed London taxi drivers were studied and compared with those of control subjects who did not drive taxis. According to Maguire (2000), the role of the hippocampus is to facilitate spatial memory. The hippocampus is a part of the brain that specializes in acquiring and using complex spatial information. From previous studies (pre-Maguire) it was impossible to know whether differences in brain anatomy are predetermined, or whether the brain is capable of plastic changes. The goal of the Maguire et al. study (2000) was to examine whether structural changes could be detected in the brain of people with extensive experience of spatial navigation such as the London taxi drivers.

Every black cab driver in central London has to undergo a grueling test called The Knowledge, which shows the taxi drivers have memorized over 25,000 streets and landmarks. It takes about four years to complete with the average person retaking the exam up to 12 times (Brown, 2011). The researchers used MRI (magnetic resonance imagining) to assess structural change. Sixteen right-handed male London taxi driver were the subjects of the study. All drivers had been driving for at least 1.5 years. The control group consisted of 50 healthy right-handed men who did not drive taxis in order to provide a comparison. The mean age did not differ between the groups.

The results of the study showed the posterior hippocampi of taxi drivers were significantly larger relative to those of the control group. Hippocampal volume correlated with the amount of time spent as a taxi driver. Increased grey matter was found in the brains of the taxi drivers in the posterior (rear) hippocampus. The results suggest extensive practice with spatial navigation affects the hippocampus (Maguire, Nannery, & Spiers, 2006). According to Boaler (2015), the studies conducted with Black Cab drivers, of which there have now been many, showed a degree of brain flexibility, or plasticity, that stunned scientists. They had not previously thought that such brain growth was possible. This led scientists to shift their thinking about ability and the possibility of the brain to change and grow.

Around the same time as the Black Cab study, another study emerged that showed the brain could show signs of neural plasticity. Cameron Mott began having seizures at the age of three. She was diagnosed with Rasmussen's Encephalitis, which causes the destruction of one's hemisphere of the brain. At the age of six, she underwent a hemispherectomy, a surgery to remove of all of one hemisphere of the brain, to prevent the seizures and further damage to her cognitive abilities (de Bode, Fritz, Weir-Haynes, & Mathern, 2009). Results of Cameron's recovery show brains have the capability for neural plasticity. Children who have undergone hemispherectomies are often able to regain the ability to talk and walk, although fine motor control of the contralateral side remains impaired (Johnston, 2009).

The implications of the brain studies offer educators a platform from which to teach children that the brain is capable of growing. Some teachers might find teaching about brain research is too complex for students to understand. However, providing messages that illustrate the brain is a muscle and not fixed and can grow with practice can help students to understand the concept (Blackwell et al., 2007).

In one study, researchers induced either a fixed or growth mindset in students by teaching them that brain is malleable or that it is not malleable. The results showed that students who learned that the brain was malleable showed an increase in academic achievement over time and a positive increase in classroom motivation.

**Celebrate Mistakes**

> It is well to cultivate a friendly feeling towards error, to treat it as a companion inseparable from our lives, as something having a purpose which it truly has
>
> - Maria Montessori

Research has shown that mistakes are important opportunities for learning and growth, but students generally regard mistakes as indicators of their low ability (Dweck, 2000). Dweck (2010) proposes that every time a student makes a mistake in mathematics, new synapses are formed in their brain. When students think about why something is wrong, new synaptic connections are grown which, in turn, causes the brain to grow. The growing connections suggest that students and teachers should value mistakes and move from viewing them as learning failures to looking at them as learning successes. Students with a fixed mindset or entity theory want to produce correct pages of math worksheets. The brains of the students producing correct math worksheets provide little opportunity for brains to grow and opportunities for development are missed. Students should be working on challenging work that results in mistakes; their mistakes should be valued for the opportunities they provide for brain development and learning.

**Praising the Process**

Regardless of a personality inclination, research has shown that the kind of feedback children get from adults can directly cause patterns of thinking. In a series of experiments (Kamins & Dweck, 1999) and (Mueller & Dweck, 1998) found that criticism and praise from adults can directly create mastery-oriented (growth mindset) or helpless vulnerability.

The researchers designed experiments in which children worked on tasks and were given certain types of feedback. Each child was given only one type of feedback, and they evaluated how that feedback affected his or her ability to cope with later setbacks. Results showed that no matter what the tendencies children enter a situation with if the situation is powerful, it can mold their patterns of reaction. It can make them, for the moment, more helpless or more mastery-oriented in their reactions.

Dweck (2000) suggests providing praise that steers clear of fostering an entity theory, performance goals, and helpless responses. Instead of praising a child for being so talented or so smart, one would foster praise through an incremental lens. Praising students that emphasizes challenge, effort, strategies, skills, and knowledge are beneficial to students. Dweck (2000) suggests praising students for effort and strategy.

**Grit**

According to Angela Duckworth (Duckworth, n.d.), she defines grit as passion and perseverance for long term goal. Duckworth states grit is about having what some researchers call an ultimate concern or goal one cares about so much that it organizes and gives meaning to almost everything you do. A study by (Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011), found that gritty kids triumphed at the Scripps National Spelling Bee. The researchers wanted to understand how children improve an academic skill. They learned that there are three different kinds of activities that helped students perform well during Spelling Bees. First, reading for pleasure and playing word games like Scrabble helped students improve academic ability. Second, getting quizzed by another person or a computer game helped students improve and third, unassisted solitary spelling practice, including memorizing new words from the dictionary, reviewing words in a spelling notebook, and committing to memory Latin, Greek and other word origins helped. And fourth, students who deliberately practiced by setting aside intentional time showed that it

helped. Only this third category of activity met the criteria for deliberate practice (Duckworth, 2016). When they analyzed their data, they found grittier spellers practiced more than less gritty spellers. Digging deeper into the data, they found deliberate practice predicted advancing to further rounds in final competition far better than any other kind of preparation. To measure grit, Duckworth created a Grit Scale. The assessment consists of ten questions and has a Likert scale to answer the questions. Grit has two components: passion and perseverance.

In a 2007 study, Duckworth et al. (2007), looked at the dropout rate of West Point cadets and determined that the non-cognitive trait of grit, as defined by perseverance and passion for long-term goals, was an indicator of whether a student stayed in the program. Prior to this study, the U.S. Army had been asking the very same question for the last 50 years – who spends two years trying to get into a program then drops out within the first two months? To be admitted into West Point, applicants must have top SAT and ACT scores, start the application process in the eleventh grade, and secure a nomination from a member of Congress, a senator, or the vice president of the United States (Duckworth, 2016). Each year more than 14,000 applicants begin the process of admissions. Only 12,000 students are admitted and enrolled each year.

The cadets are scored on a Whole Candidate Score, which is West Point's single most important factor in admission. The Whole Candidate Score consists of a weighted average of SAT or ACT exam scores, high school rank adjusted for the number of students in the applicant's graduating class, expert appraisals of leadership potential, and performance on objective measures of physical fitness. According to the researchers (2007), the grit scores of the cadets bore no relationship to the Whole Candidate Scores that had been so painstakingly calculated during the admissions process. During the study, 71 cadets dropped out. Grit turned out to be the reliable predictor of who made it through or not (Duckworth et al., 2007).

Research competencies related to persistence in reaching academic goals, as well as literature in grit and growth mindset related to learning and persistence help college students to persevere through online courses (Hochanadel & Finamore, 2015). The findings from this study indicate that non-cognitive psychological interventions are beneficial to college students.

Growth Mindset is changing a student's thinking that intelligence is fixed or stagnant to a mindset that is open to learning and growing. Teaching students about grit and weaving grit education into an academic setting can help students learn how to achieve long-term high level goals. Duckworth and Dweck (2007) collaborated and determined that having a growth mindset could develop grit. Educators should not focus on just pushing students in achieving good grades, but should challenge and teach them to create a solution in the face of challenges. It was suggested to teach Growth Mindset and grit strategies to support college students in achieving their goals (Duckworth et al., 2007).

# CHAPTER 3: RESEARCH METHODOLOGY

This research aimed to first examine how an online growth mindset professional development affects fourth grade students' perceived intelligence when teachers implement the growth mindset strategies into the classroom. Additionally, the research aimed to examine how teachers are affected by participating in an online growth mindset professional development. The second research question focused on how a growth mindset professional development delivered to fourth grade teachers impacted students' academic achievement in reading. Through grounded theory, the researcher explored how the implementation of growth mindset strategies impacted students' perceptions and academic achievement (Dweck, 1998). A grounded theory design is a systematic, qualitative procedure used to generate a theory that explains, at a broad conceptual level, a process, an action, or an interaction about a substantive topic (Creswell, 2013). It also uses multiple stages of data collection and the refinement and interrelationships of categories of information (Charmaz, n.d.). Several studies have shown that interventions targeting a student's implicit theory of intelligence (academic mindset) can influence academic motivation and academic achievement, (Blackwell et al., 2007; Dweck et al., 2011; Walton, 2014; Yeager & Walton, 2011). However, there is little empirical research on growth mindset professional development and the relationship it has to academic achievement in reading and students' self-perceptions of intelligence particularly for economically disadvantaged fourth grade Hispanic English Learners. Exploring a growth mindset intervention may provide valuable information for educators interested in closing the achievement gap and increasing students' perceptions of intelligence. This study's sample is large. The study was open to all fourth grade students in the district ($N = 370$) in four elementary schools.

A study conducted by Good, Aronson, and Inzlicht (2003) looked at 138 middle school participants and found an increase in higher state test scores for all students in reading

and girls in math thanks to a growth mindset intervention. Similarly, Blackwell et al. (2007) conducted a Growth Mindset intervention with 373 seventh grade students and found an increase in math grades. While these studies measured growth mindset and stereotype in middle school children, the current study implemented an online growth mindset professional development (PD) for fourth-grade teachers and examined the impact the PD had on student academic achievement and students' perceptions of their intelligence.

This study used an exploratory sequential mixed methods design (see Figure 3).

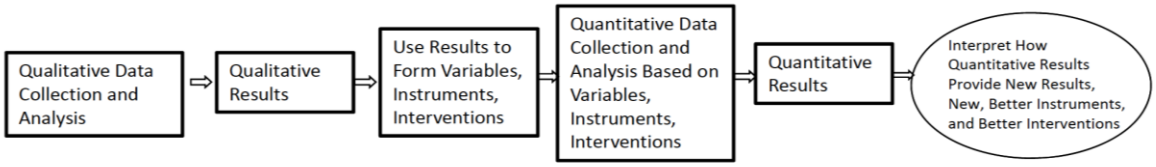



*Figure 3.* Exploratory sequential mixed methods design. Adapted from "Steps in Conducting a Scholarly Mixed Methods Study," by J. C, Creswell, 2013, *Discipline-Based Research Group Speaker Series*, 48.

Equal weight is given to both the quantitative and qualitative methods (Creswell, 2013). Specifically, this study used the exploratory sequential mixed method design (Creswell, 2013; Lochmiller & Lester, 2017). The design was completed in two phases, where the results of a qualitative interview were collected first and the intervention design was then developed based on the results of the interview responses. The collection and analysis of quantitative data (student survey results and achievement data) were then used to determine the effectiveness of the intervention. Fourth grade students, whose teachers participated in the online professional development and implemented growth mindset strategies into the classroom, were categorized as the intervention group. Fourth grade students within the district whose teachers did not participate in the growth mindset professional development were categorized as the control group.

The first research question is: In what ways does the implementation of growth mindset strategies, based on an online professional development for fourth grade teachers, impact fourth grade students' perceptions of their academic abilities as measured by pre and post surveys? Additionally, in what ways does the implementation of a growth mindset intervention affect fourth grade teacher mindsets as measured by on-going journal entries during the intervention and post intervention interviews, to answer the first research question, the researcher sought to understand the connections between non-cognitive instruction such as growth mindset intervention and students' perceptions of their intelligence. Students' perceptions of intelligence before and after the implementation of growth mindset strategies used by teachers who participated in the online growth mindset professional development were then compared using the results from a Likert-scaled survey (see Appendix B). In addition to the survey results, teachers reflected on their use of growth mindset strategies in the classroom through an online journal platform. Themes from this data were extracted and analyzed to determine whether or not the implementation of growth mindset strategies impacted students in the classroom, and also if it impacted teacher instruction and mindset.

The second research question is: In what ways does the implementation of growth mindset strategies, based on an online growth mindset professional development for fourth grade teachers, impact fourth grade student academic achievement in reading as measured by iReady. To answer this second research question, iReady reading scores from fourth grade students in the intervention group before and after the growth mindset intervention were compared. In addition, reading scores from students in the intervention group were compared to reading scores from students in the control group. iReady, is a nationally normed computer-adaptive program and a tool of quantitative measurement. iReady supports students through individualized reading and math and is aligned to the Common Core State

Standards (Bjorklund-Young, 2016). Journal reflections and interviews were used to assess the growth mindset intervention and the affect it had on fourth grade teachers' philosophy.

## Participants

This research study took place in a small, rural school district located in central California, with approximately 3,500 students in attendance. English Language Learners make up 62% of the student population, and 93% of the students qualify for free and reduced lunch. In this district, 98% of the students are predominately Hispanic (Ed Data, n.d.). The participants in this research study were fourth grade students ($n$ = 141) and fourth grade teachers ($n$ = 4).

All fourth grade teachers in the district were asked to participate in the study. Only the teachers who elected to participate in the online growth mindset professional development were included in the research study. These teachers were considered the teacher intervention group ($n$ = 4). Students whose teachers participated in the growth mindset professional development were invited to participate in the study ($n$ = 141). The students whose teachers participated in the growth mindset intervention were considered the student intervention group while the students whose teachers did not participate in the growth mindset professional development were considered the student control group. The teacher and student control groups consisted of nine teachers and 229 students.

## Sampling Procedures

A convenience sample of participants was chosen based on the researcher's access to students. Fourth-grade students were selected to participate in this study because the 2017 English Language Arts (ELA) performance in the district was low: 30.22% of students met or exceeded standards in ELA achievement on the California Smarter Balanced Assessment (SBAC). Statewide, 45% of fourth graders met or exceeded standards in ELA achievement (California Department of Education, n.d.). The evidence shows that the intervention district

is trailing the State by almost 15%. There is a need to close the achievement gap. It is hoped that the implementation of a growth mindset intervention will improve students' perceptions of their intelligence and academic achievement.

According to the Harvard Achievement Gap Initiative (Muhammad, 2015), the achievement gap is defined as:

> the disparity in academic performance between groups of students. The achievement gap shows up in grades, standardized-tests scores, course selection, dropout rates, and college-completion rates, among other success measures. It is most often used to describe the troubling performance gaps between African-American and Hispanic students, at the lower end of the performance scale, and their non-Hispanic white peers, and the similar academic disparity between students from low-income families and those who are better off. (p. 14)

## Instrumentation

Five students from each fourth grade class at the intervention site ($n$ = 20) participated in the initial interview to determine the growth mindset needs. The results from this initial interview were used to determine the focus of the online growth mindset professional development. To answer the first research question: In what ways does the implementation of growth mindset strategies, based on an online professional development for fourth grade teachers, impact fourth grade students' perceptions of their academic abilities as measured by pre and post surveys? Additionally, in what ways does the implementation of a growth mindset intervention affect fourth grade teacher mindsets as measured by on-going journal entries during the intervention and post intervention interviews, the instrument used was a survey which was administered online to the fourth grade students and teachers pre- and post-intervention (see Appendix B). The constructs being measured were demographics, fixed *v* growth mindset (intelligence), and attributes of growth mindset strategies. To address the

second research question: In what ways does the implementation of growth mindset strategies, based on an online growth mindset professional development for fourth grade teachers, impact fourth grade student academic achievement in reading as measured by iReady, inferential statistics were used. The dependent variables were the iReady Reading Diagnostic scores. The independent variables were selected growth mindset intervention strategies implemented into the participating teachers' classrooms (Dweck, 1998). Reading scores for fourth grade students were compared before and after the growth mindset strategies were implemented in the classroom.

**Interview Questions**

The qualitative interview questions administered to each of the five randomly selected students from the participating classrooms ($n$ = 20) were based loosely on the PERTs Mindset questions. The questions were asked at the beginning of the study, prior to the pre-student survey. These interview questions were the start of the exploratory sequential mixed methods study and were used to determine the focus of the online growth mindset professional development (see Appendix A). To ensure validity, each survey was administered to five students, the dissertation chair, and site counselor to check for understanding, clarity, and precision of language before answers were solicited.

**Mindset Survey Adapted from PERTS Mindset Meter**

An adaptation of the PERTS Mindset Meter questions was used to address the perceptions of intelligence of participating fourth graders for both the pre- and the post-survey. The questions were based on a Likert scale. Likert-type or frequency scales use fixed choice response formats and are designed to measure attitudes or opinions (Bowling, 1997; Burns & Grove, 1997). The scale included a five-point anchor. Anchors of scale were 1 (*completely agree*), 2 (*agree*), 3 (*neutral)*, 4 (*disagree*), and 5 (*completely disagree*). There were specific constructs and questions each participating fourth grader was assessed on

including Intelligence, Self-Efficacy, Celebrating Mistakes, and Praising the Process (Dweck, 2006). To ensure validity, each survey was administered to five students, the dissertation chair, and site counselor to check for understanding, clarity, and precision of language.

## iReady Reading Diagnostic

Computer-adapted responses and the Rasch item response theory drive the iReady assessment and help to ensure a valid inference as reported on the iReady diagnostic assessment (The Science Behind iReady's Adaptive Diagnostic, n.d.). Computer-adaptive response theory was developed in 1960 by Georg Rasch. Using the Rasch item response theory model, it is possible to calculate the probability of success that a student of a certain ability would have with an item of a specific difficulty level. The iReady diagnostic assessment uses both adaptive testing and item response to determine the ability level of the student (iReady & Smarter Balanced Assessment Consortium [SBAC], n.d.). It also assesses numerous skill areas in reading including: Phonological Awareness, Phonics, High Frequency Words, Reading Comprehension, and Vocabulary. According to the iReady technical manual, the diagnostic is considered a computer-adaptive test (CAT) in which items presented to each student vary depending on how the student responds to previous items, thereby targeting the individual estimated student ability with more accuracy (Curriculum Associates, 2014.). After a student completes each item, the student's estimated ability level is recalculated, and the new level is used to determine the next best test item to deliver. When an item is missed, an easier item is presented; when an item is answered correctly, a more difficult item is presented (Curriculum Associates LLC, 2012).

The validity and reliability of the iReady instrument were reviewed by well-known experts and adheres to the Standards of Psychology and Testing (American Educational Research Association [AERA], 1999). The Educational Research Institute of America conducted a research study evaluating the relationship between iReady Diagnostic assessment

and the 2016 Smarter Balanced Assessment Consortium. The research found a high correlation between iReady Diagnostic assessment scores and the Smarter Balanced Assessment Consortium scores. iReady was also shown to accurately predict end-of-year proficiency rates (iReady & SBAC, n.d.). Strong correlations between the Spring 2016 iReady Diagnostic and the 2016 Smarter Balanced Assessment Consortium (SBAC) in New York found overall correlations of .85 for ELA/Literacy and .88 for Mathematics for all students across third through eighth grades.

The iReady diagnostic tool measures how much a student grows academically from fall to spring. Fourth grade students from the intervention and control groups reading scores were compared prior to and following the growth mindset intervention.

## Data Collection

All fourth-grade students and teachers within the district were categorized into two groups. The control group consisted of: teachers who did not receive the growth mindset intervention professional development and students who did not receive the implementation of growth mindset strategies. The intervention group included teachers who participated in the growth mindset professional development and their students who received growth mindset strategies implemented into their classroom.

Research Question 1 asked: In what ways does the implementation of growth mindset strategies, based on an online professional development for fourth grade teachers, impact fourth grade students' perceptions of their academic abilities as measured by pre- and post-surveys? Additionally, in what ways does the implementation of a growth mindset intervention affect fourth grade teacher mindsets as measured by on-going journal entries during the intervention and post intervention interviews? To answer the first research question, an initial interview was administered to five students from the intervention group per fourth grade class ($n$ = 20). Based on their feedback about intelligence, self-efficacy,

celebrating mistakes, and praising the process, an online professional development series was organized for teachers to implement growth mindset strategies in their classroom that would best suit student needs. The online professional development on growth mindset strategies is offered for free by the Project for Education Research that Scales (PERTs) website. Prior to the intervention (the implementation of growth mindset strategies into the classroom), pre-growth mindset surveys were administered to all fourth grade students whose teachers agreed to participate in the growth mindset professional development and whose guardians signed the consent form to participate in the study. Following the intervention, the students were administered the same survey again. In addition, teacher reflection journals used by teachers in the intervention group were used to identify themes and to determine if the growth mindset professional development affected teacher mindsets. Data were analyzed to determine if a change in students' perceptions took place.

Research Question 2 asked: In what ways does the implementation of growth mindset strategies, based on an online growth mindset professional development for fourth grade teachers, impact fourth grade student academic achievement in reading as measured by iReady? To answer the second research question, data was collected to determine how a growth mindset intervention affected students' academic growth in reading based on the iReady Reading Diagnostic test. Students in the intervention group received growth mindset intervention strategies delivered by their teacher in their classroom. Students in both the intervention and control groups were asked to set goals based on their iReady scores and were also asked to implement an action plan to increase their iReady scores based on their set individualized goal. As part of a district-wide iReady Diagnostic assessment, all fourth grade students took the assessment in class in September 2018. The benchmark assessment measured Reading components such as Phonological Awareness, Phonics, High Frequency Words, Reading Comprehension, and Vocabulary. The researcher compared student scores

from the fall of 2018 to the winter of 2019. Scores of students from the intervention classes ($n$ = 141) prior to and following the intervention were compared to scores of the students in the control classes ($n$ = 229) prior to and following the intervention. Data were analyzed to determine if academic achievement in reading was impacted by the implemented growth mindset strategies, and if there was a significant difference between student scores from the intervention group and those from the control group.

Teachers participated in seven online professional development sessions which focused on growth mindset strategies. After each session, teachers were asked to answer questions related to their learning through an online Google Form platform in an effort to create accountability. Teachers reflected on the learning and made plans for teaching a strategy in class. After teachers taught a growth mindset strategy, they recorded their reflections in an online reflection journal designed on Google Form.

## Validity and Reliability

Before analyzing the qualitative portion of the study, the procedure included gaining permissions, implementing a good qualitative sampling strategy, developing means for recording information both digitally and on paper, storing the data, and anticipating ethical issues that may arise (Creswell, 2013).

Creswell (2013) referred to validation in qualitative research as being an attempt to assess the accuracy of the findings, as best described by the researcher and the participants. With this stance, he shares that any report of research is a representation by the author. Creswell and Miller (2001) report eight validation strategies to be considered when practicing qualitative research:

- Prolonged engagement and persistent observation.
- Triangulation – multiple sources, methods, investigations, and theories to provide corroborating evidence.

- Peer review or debriefing – external check much like interrater reliability in quantitative research.
- Negative case analysis – evidence needs to be reported and not all evidence is either positive or negative; sometimes it is both.
- Clarifying researcher bias.
- Member checking – Lincoln & Cuba (1985) state this is the most critical technique to establish validity. It is taking data, analysis interpretations, and conclusions back to the participants so that they can judge the accuracy and credibility of the account.
- Rich, thick description allows readers to make decisions regarding transferability and interconnectedness.
- External audits allow for an external consultant or auditor to assess accuracy.

Creswell (2013) advises engaging in at least two strategies to validate findings. Procedures such as triangulating among different data sources, writing with detailed and thick descriptions, and taking the entire written narrative back to participants in member checking are all reasonably easy procedures to conduct (Creswell, 2013). Analysis for this study included triangulation, rich description of interviews as well as accurate interview transcriptions which were submitted for member checking.

Similarly, Maxwell (2013) has his own set of validation strategies. Maxwell (2013) suggests writing a validity matrix as a way to ward against validity threats. Taking the time to think through the ways in which the possible conclusions to research could go wrong is an important process when checking for validity. A validity matrix was used in the current study; creating a validity matrix can help the researcher to address validity threats that might arise during the research. This helps the researcher to truly contemplate what could possibly be a validity threat and plan strategies for dealing with them. Instead of addressing validity

as a “to do” in the research proposal, a validity matrix can help the researcher to think deeply through any possible threats. Maxwell (2013) suggests that researchers should consider these strategies to address validity:

- Intensive long-term involvement
- Rich data
- Respondent validation – member checking
- Intervention
- Searching for discrepant and negative cases – you need to rigorously examine both the discrepant data and the supporting data to assess whether it is more plausible to retain or modify the conclusion.
- Triangulation
- Numbers
- Comparison

In summary, the validation strategies selected for this study included triangulation, member checking, and rich descriptions of interviews. Research Question 1 was: In what ways does the implementation of growth mindset strategies, based on an online professional development for fourth grade teachers, impact fourth grade students’ perceptions of their academic abilities as measured by pre and post surveys? Additionally, in what ways does the implementation of a growth mindset intervention affect fourth grade teacher mindsets as measured by on-going journal entries during the intervention and post-intervention interviews?

The researcher used triangulation to increase validity. In particular, triangulation refers to the application and combination of several research methods in the study of the same phenomenon (Triangulation (social science), 2018). The researcher analyzed teacher

reflections and student survey results and provided rich descriptions which provides triangulation, thus increasing validity.

The researcher also participated in member checking which increases validity of the findings for both research questions: In what ways does the implementation of growth mindset strategies, based on an online professional development for fourth grade teachers, impact fourth grade students' perceptions of their academic abilities as measured by pre and post surveys? Additionally, in what ways does the implementation of a growth mindset intervention affect fourth grade teacher mindsets as measured by on-going journal entries during the intervention and post intervention interviews? and In what ways does the implementation of growth mindset strategies, based on an online growth mindset professional development for fourth grade teachers, impact fourth grade student academic achievement in reading as measured by iReady? The researcher took data, analysis interpretations, and conclusions back to the teachers so that they could verify the accuracy and credibility of the data.

The researcher was a vice principal of a large rural elementary school in the intervention district; hence her bias and influence were acknowledged. In an effort to increase validity, the researcher clarified her bias through the narrative portion of this study and to the teachers who participated in the study throughout the research process. Finally, rich descriptive detail in the narrative section of the study provides validation by exposing the data analysis process. By using triangulation of multiple sources and corroborating evidence such as student and teacher interviews, teacher reflection journals, student pre- and post-surveys, and assessment scores, triangulation is present. All of the validity techniques helped to hold the researcher accountable and promote transparency about her findings.

## Role of the Researcher

Creswell (2013) views validation as a distinct strength of research. Validation is carried out in this study through extensive time spent in the field, detailed thick descriptions, and the closeness of the researcher to participants in the study. All add to the value of the study. Although the researcher was not the facilitator for the growth mindset professional development, nor the classroom teacher implementing growth mindset strategies, the researcher was involved. As the vice principal of one of the elementary schools at which the intervention was carried out, the researcher had access to classrooms and made classroom walk-through observations to identify growth mindset behaviors. The researcher is a third-year elementary school administrator who started teaching in 1995. Throughout her many years of education, she saw a pattern of those who were successful students. She was curious why some students flourished, and others did not. As a student who felt shamed by not understanding math as fast as other students, she decided as a young girl to avoid math in an effort not to look unintelligent. She learned to hide her inabilities, but she also learned that through perseverance or grit, a student could overcome obstacles. Dweck's (2006) growth mindset research opened up new strategies of teaching children showing that they are not stuck in a cycle of learned helplessness. The researcher believes all children should receive mindset psychological interventions during the regular school day in the hope that students would learn that intelligence is not fixed.

## Data Analysis

The present study was designed to explore the connections between the implementation of growth mindset strategies, based on an online growth mindset professional development, and fourth grade students' perception of intelligence and student academic achievement in reading. The purpose of this study was to describe how student perception of

intelligence and student academic achievement would increase with the implementation of growth mindset strategies in their classroom.

For the first and second research questions: In what ways does the implementation of growth mindset strategies, based on an online professional development for fourth grade teachers, impact fourth grade students' perceptions of their academic abilities as measured by pre and post surveys? Additionally, in what ways does the implementation of a growth mindset intervention affect fourth grade teacher mindsets as measured by on-going journal entries during the intervention and post-intervention interviews? Interview responses of randomly selected fourth grade ($n$ = 13) students in the intervention group were coded through open, axial and selective coding to discover themes from the data collected which, in turn, set the focus of the growth mindset professional development for teachers (Creswell, 2013). All intervention fourth grade students then participated in a pre- and post-intervention survey that measured intelligence, self-efficacy, celebrating mistakes, and praising the process. This quantitative data were analyzed using statistical methods. A paired samples *t*-test analysis was used to determine if a relationship exists between the growth mindset intervention (dependent variable) and students' perceptions of their intelligence (independent variable). In quantitative research, a paired samples *t*-test is an analytical tool that can be used to determine whether there is a statistically significant difference between individuals' pre-survey and post-survey mean scores following an intervention. If the mean difference is zero, this indicates that is no statistically significant difference in the scores.

Teachers who participated in the growth mindset professional development and implemented the strategies into their classroom reflected bi-weekly on their experiences. Teachers answered open-ended questions centered on their reflective practices of implementing growth mindset strategies. Students and teachers were also interviewed post-intervention. This qualitative data (teacher reflections, student and teacher interviews) were

analyzed through open coding, axial coding, and selective coding to determine a visual model or theory (Creswell, 2013).

A quasi-experimental design was used to answer Research Question 2: In what ways does the implementation of growth mindset strategies, based on an online Growth Mindset professional development for fourth grade teachers, impact fourth grade student academic achievement in reading as measured by iReady? A one-way analysis of variation (ANOVA) was used to compare the change in the fall and winter iReady Diagnostic assessments in the intervention group as well as compare the difference in the iReady diagnostic assessments between the intervention and control groups. A one-way ANOVA is used when comparing more than two means, or more specifically, when two or more categorical variables are present, and only one independent variable is present.

## Narrative Structure

Through data collection of student academic benchmark achievement scores, pre- and post- surveys, and teacher reflections of implementing a growth mindset intervention, data were examined and thoughtfully described as to the real experiences of how a growth mindset professional development impacts student achievement, teacher philosophy, and students' perceptions of intelligence. Chapter 5 of the dissertation will shed light on the data analysis and findings.

## Ethical Issues

Weis and Fine (2000) catalogue possibilities of ethical issues. They claim that the researcher must embrace roles as insiders/outsiders to the participants by (a) assessing issues that they may be fearful of disclosing; (b) establishing supportive, respectful relationships without stereotyping and using labels that participants do not embrace; (c) acknowledging whose voices will be represented in the final study; and (d) writing the researcher into the study by reflecting on who the researcher is and the people being studied. Prior to

conducting the study, an IRB approval and site authorization were gained. Informed consent from the participating teachers was obtained (see Appendix F). Student assent and parental consent in the fluent language of the participant/parent/guardian were obtained (see Appendix F). While collecting data, the intervention site was disrupted as little as possible. Analyzing data was done in an authentic, truthful manner without disclosing confidential information collected during the study. There was no falsifying evidence, data, findings, or conclusions during the study. The published study included documentation of compliance with ethical issues and a lack of conflict of interest was transparent (Creswell, 2013, p. 59). The instruments used were adequately piloted and permission from PERTs to use the growth mindset professional development and survey questions were obtained (see Appendix G**).**

**Preliminary Pilot Findings**

The researcher ensured that the following steps were carried out in the preliminary pilot:

- Completed initial interview questions of fourth grade students to determine gaps in mindset;
- Completed pre- and post-intervention surveys from fourth grade students;
- Completed bi-weekly open-ended surveys from fourth-grade teachers participating in the intervention;
- Completed student post-intervention interview questions;
- Completed teacher post-intervention interview questions;
- Data analysis of iReady benchmark Fall and Winter Diagnostics scores;
- Teachers completed seven professional development online seminars;
- Teachers implemented most high-needs growth mindset strategies in the classroom instruction on a regular basis;

- Classroom observations walk-throughs demonstrating visible growth mindset strategies.

The researcher found that there was an:

- Increase in student achievement by the intervention classrooms as measured by the district benchmark iReady reading scores for fourth graders as compared to non-intervention classrooms;
- Increase in awareness on brain science, growth mindset strategies, and goal setting by fourth grade students.

## Summary

The goal of this chapter was to provide information about the research methods that were used to answer the three research questions. A discussion of the methodology was provided along with information about who the participants were, how the sampling procedures were carried out, which instruments were used, how the data was collected, and how validity and reliability were ensured. Chapter 4 provides the intervention results.

# CHAPTER 4: RESULTS

This study aimed to investigate the relationship between the implementation of a professional development on growth mindset, student academic achievement, and student perception of intelligence. In this mixed methods study, quantitative and qualitative data were collected and analyzed using an exploratory sequential mixed methods design (Creswell, 2013). This chapter contains the quantitative results from the pre- and post-intervention student survey, the results from the pre- and post-intervention student academic achievement assessment in reading, and a comparison of academic achievement between the intervention group from one school and four control groups, each from a different school. For the quantitative analysis, student pre- and post-intervention surveys were analyzed using a paired samples *t*-test. An analysis of variance (ANOVA) was used to compare the academic achievement of the students in the intervention student group and the control student groups in reading. This chapter also contains the qualitative results from student pre-intervention interviews, student/teacher post-intervention interviews, and teacher journal entries. A grounded theory approach was used, which included three levels of qualitative analysis: (a) open coding, (b) axial coding, and (c) selective coding. At each level of qualitative analysis, constant checking, rechecking, and comparison were used to investigate the data further until themes appeared. Included in this chapter are tables and figures used to present detailed data, as well as extracts from interview and journal entries from individual students and teachers to illustrate the key themes.

## Participants

The participants in this study included a total of 370 fourth grade students. Student academic achievement scores were compared between the intervention group ($n$ = 141) and the control groups ($n$ = 229). Five fourth grade teachers were interviewed for this study, four of whom were included in the intervention group.

Table 1

*Details of Pre-Intervention Interview*

| Data Collection | Constructs Measured | Participants | Mode of Administration | Administered |
|---|---|---|---|---|
| Interview by school counselor | Growth Mindset<br>Fixed Mindset<br>Self-Efficacy<br>Learning Goals | Five Students Per Class | Interviews typed and housed in a Google Form | Pre-Intervention |

In the intervention district, English Language Learners make up 62% of the student population and 93% of the students qualify for free and reduced lunch. In this district, the students are predominately Hispanic at a rate of 98% (Ed Data, n.d.). The participants in this research study were fourth grade students ($n$ = 141) and fourth grade teachers ($n$ = 4). Four teachers participated in the online professional development, the implementation of the intervention, completion of bi-weekly journal entries, and a post-intervention interview. Twenty students from the intervention group were interviewed before the start of the intervention. Thirteen students were interviewed after the intervention was complete. One hundred two students from the intervention group participated in a pre- and post-intervention survey that measured the perception of intelligence. The criterion for participating in the survey was the submission of completed parent and student consent forms.

## Quantitative Results

Research Questions 1 and 2*:* In what ways does the implementation of growth mindset strategies, based on an online professional development for fourth grade teachers, impact fourth grade students' perceptions of their academic abilities as measured from pre- and post- surveys? Additionally, in what ways does the implementation of a growth mindset intervention affect fourth grade teacher mindsets as measured by on-going journal entries during the intervention and post-intervention interviews?

**Student Pre- and Post-Intervention Survey Results**

Inferential statistics were used to address Research Question 1. A paired samples *t*-test was conducted using a computer software program called Statsplus using survey data which measured students' perceptions of intelligence before and after a growth mindset intervention. The paired-samples *t*-test uses a formula that generates a number, and this number is used to determine the probability level (*p* level) of rejecting the null hypothesis (Lunenburg & Irby, 2008). One hundred and two fourth grade students participated in the pre- and post-intervention growth mindset survey from the intervention group. Results of the *t*-test showed that the fourth grade students scored higher on perceptions of intelligence in the post-test ($M = 49.69$, $SD = 6.42$) than in the pre-test ($M = 47.35$, $SD = 5.72$), $t(101) = 3.30$, $p < .001$. The data further indicated that there was a statistically significant difference between the pre-intervention and the post-intervention student perceptions of intelligence. This result demonstrates that a five-month growth mindset intervention based on a teacher online professional development increased students' perceptions of their intelligence. The results are presented in Table 2.

Table 2

*Descriptive Statistics of Pre- and Post-Intervention Growth Mindset Surveys Measuring Students' Perception of their Intelligence (n = 102)*

| Administration Time | *M* | *SD* |
|---|---|---|
| Pre-intervention | 47.35 | 5.72 |
| Post-intervention | 49.69 | 6.42 |

**Individual Teacher Performance Pre- and Post-Intervention Survey Results**

Individual teacher performance in training students on growth mindset strategies was evaluated by contrasting student improvement in growth mindset across all four teachers. Improvement in growth mindset was calculated by subtracting the pre-test score of students

on growth mindset from the post-test score; a positive difference indicates an improvement in score, whereas a negative value indicates a decline. There was no statistically significant difference in student improvement in growth mindset across the four teachers at the $p < .05$ level, $F(3, 97) = 0.56$, $p = 0.639$. The results are presented in Table 3.

Table 3

*Comparison of Intervention Teachers' Pre- and Post- Growth Mindset Intervention Survey Results*

| Source of Variation | *d.f.* | *SS* | *MS* | *F* | *p* |
|---|---|---|---|---|---|
| Between Groups | 3 | 88.43 | 29.48 | 0.5 | 0.639 |
| Within Groups | 97 | 5,059.80 | 52.16 | | |
| Total | 100 | 5,148.23 | | | |

## Qualitative Results

Students participated in an interview before the growth mindset intervention was administered in class. This study used an exploratory sequential mixed methods design.

### Student Pre-Intervention Interview

The first stage of this mixed methods study was the preliminary qualitative data collection which was carried out through student interviews followed by the qualitative coding of interview transcripts. A convenience sample of five students was selected. Five students per class were interviewed. The interviews with all the students were individually or collectively conducted by the school counselor and the school academic coach as mentioned in Chapter 3. The main interview questions were:

1. Do you believe you can grow your intelligence?
2. Do you believe you can meet all your learning goals for your class in reading?
3. Do you feel safe sharing your mistakes in your class?
4. Do you ever feel like giving up?

MAXQDR was used to analyze the data through open coding and looking for themes. Grounded theory methodology was used throughout the data collection part of the research project. After the initial open coding took place, axial coding was then carried out. Finally, selective coding was used to determine the themes that resulted from the previous coding rounds. The researcher used consistent procedures throughout the coding rounds. The next four sections are organized by the selective codes that emerged through the initial analysis of the qualitative data collected: grow intelligence, learning goals, making mistakes, and motivation.

**Grow Intelligence**

Student pre-intervention interview Question 1 asked students if they believed they could grow their intelligence. This question explored how much they knew about growth and fixed mindsets. It thus helped determine if they leaned towards learned helplessness and if they had an understanding of brain science, the importance of working through challenges, and setting goals (see Figure 4).

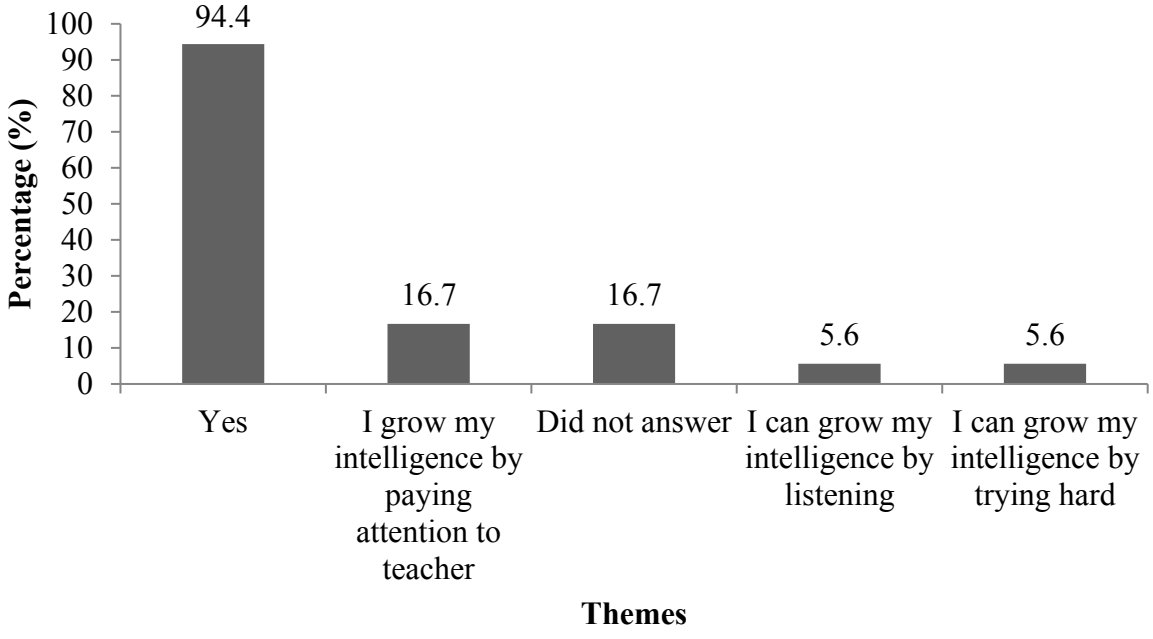



*Figure 4.* Themes from pre-intervention interview Question 1 on growing intelligence.

Students, during the pre-intervention interview, answered Question 1 with a collective yes; they believed they could grow their intelligence. While digging a little deeper into their responses, however, it became clear that they did not know how growing intelligence could be done. One student said, "Ya - My brain grows more bigger because if you think your brain gets energy and exercise when you grow, and my mind can get the right or wrong answer." Another student stated, "Yes. I don't have any thoughts." Another student said, "Yes. I think that it could grow because I can get better at things." However, on the other end of the spectrum, some students did understand the concept of growing intelligence. One student said, "Yes. Because when you listen to the teacher, and you focus - you learn how to do it on your own so you could do it." The results from the pre-intervention qualitative interviews shaped the focus of the professional development. Based on the answers to Question 1, it was determined that teachers needed to focus on explicitly teaching students about what a growth mindset and a fixed mindset are.

**Learning Goals**

Student pre-intervention interview Question 2 asked students to consider if they could meet their learning goals in reading. This question was posed to determine if students understood the importance of goal setting, working towards a goal, and trying. The themes that emerged from the responses and their percentages are shown in Figure 5.

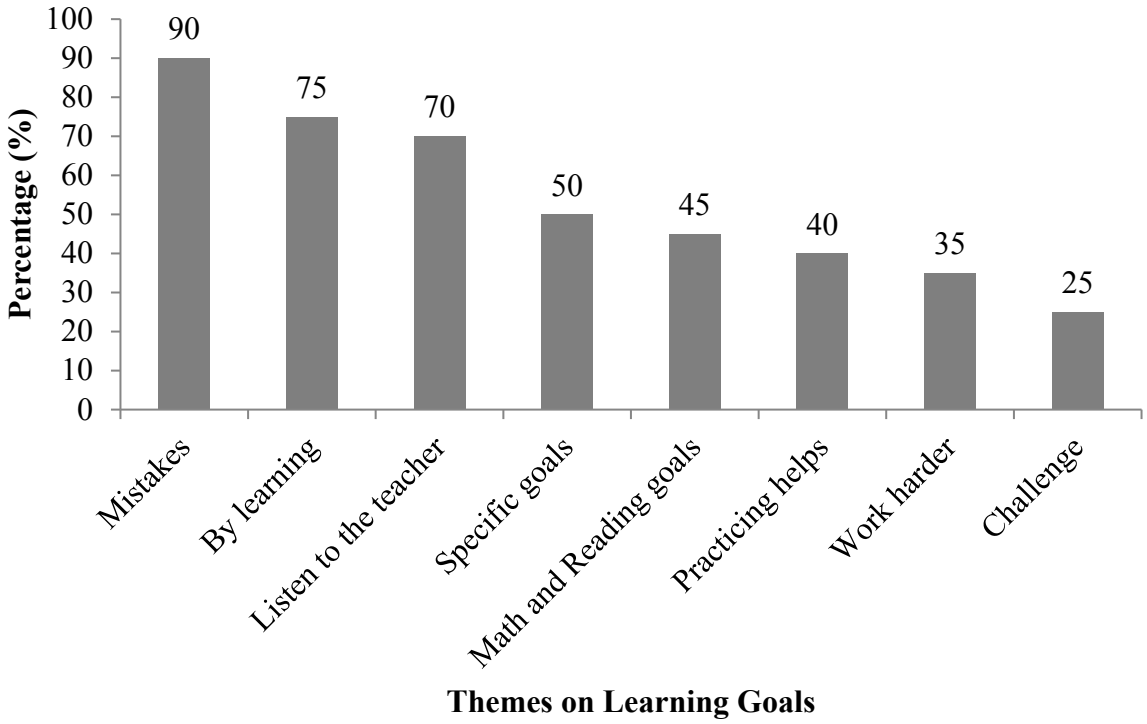



*Figure 5*. Themes from pre-intervention interview Question 2 on learning goals.

Student responses varied from being very clear to being vague. One student did not feel successful at reading and said, "No. Because I'm not a good reader and there are hard words that I cannot read." Another student stated not having any learning goals in reading, "I do not have any reading goals." While some students had a clear focus on reading goals, "Yes - Because I can keep learning and never give up. By learning - by listening to the teacher and paying attention to what she is saying - so even if I make mistakes, I can try again." Another student commented:

> Yes - I think that because when I was in third grade - I could read third and fourth grade levels and now I can read fifth and sixth grade levels. I can achieve by paying attention in class and reading 30 minutes each day.

Based on the interview feedback, it was clear that teachers would need to teach students explicitly about learning goals and to work towards goals with a growth mindset.

**Making and Sharing Mistakes**

Student pre-intervention interview Question 3 asked students if they felt safe sharing their mistakes in class. Of the 20 respondents, 80% ($n$ = 16) of the students stated that they felt safe sharing their mistakes in class (see Figure 6).

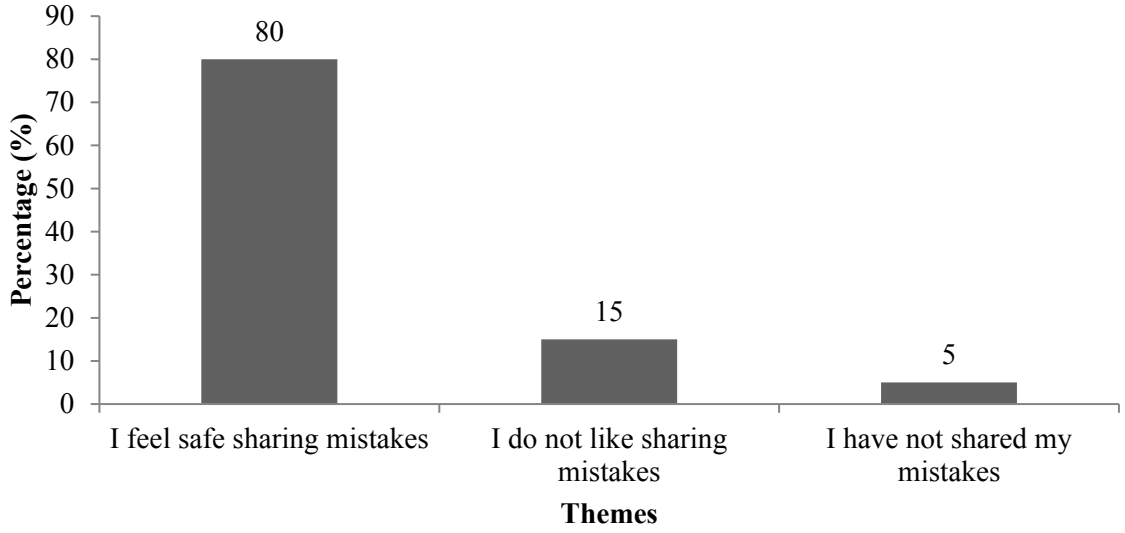



*Figure 6*. Results from pre-intervention interview Question 3 on sharing mistakes.

The majority of students said that they felt comfortable making mistakes in class. One exception was from a student who said "When I did writing, we were reviewing and I made a mistake. I do not like sharing mistakes." Another student stated:

> No. Because if I make a mistake in my class - I feel embarrassed. When we were doing number talks - I wanted a turn, and when I got a turn, everyone said they didn't get what I did - so I tried to explain, and I felt like I was dumb.

However, sixteen other students felt confident sharing mistakes, indicating that teachers were mostly doing a good job in creating a safe place for students to grow. They should continue to foster a sense of safety within their classrooms and to embrace mistakes as learning opportunities. A student validated this finding by expressing the educational value he placed on making mistakes, "Yes. During math, we were doing math, and I answered the

question, and I got it wrong, and I shared it with the class - making mistakes helps you learn." Another student showed progress towards a growth mindset:

> Yes - on the first day of school - if you go 2+3 is 23, and I got them all wrong. I kept it private. I thought the other kids would laugh at me. Now I am okay with making mistakes because mostly it is okay.

And finally, showing a broader acceptance of mistakes within the whole class and a positive approach towards dealing with mistakes, another student pointed out:

> Yes - When I got a math problem wrong, I talked about it in front of the whole class and it made me nervous. My teacher made me go up to the board, and the students helped me work through the problem to get it.

**Motivation**

Student pre-intervention interview Question 4 asked students if they ever felt like giving up. This question was used to determine student efficacy. Responses indicated that most students in the convenience sample did not feel like giving up (see Figure 7).

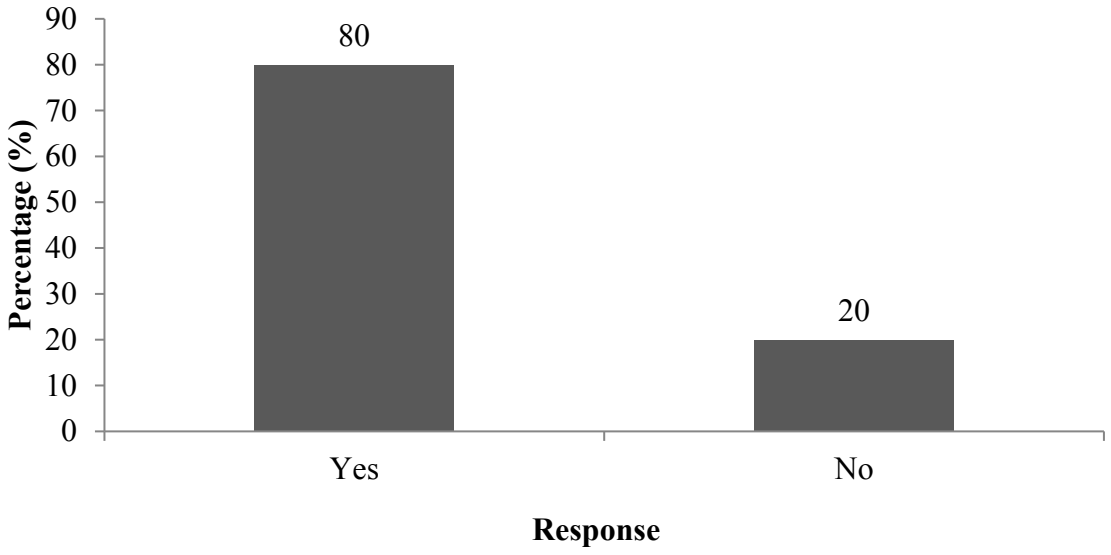



*Figure 7.* Results from pre-intervention interview Question 4.

When students were asked if they ever felt like giving up, the majority of students responded with positive answers. However, some students thought that they would give up.

One student said, “Yes. When it gets challenging a little bit. I ask my friends for help. Sometimes when it’s new to me, and everyone else already knows it I get disappointed.” Another student stated, “Sometimes. I do not give up, and I try.” indicating some confusion. Of the students who were interviewed before the start of the growth mindset intervention, one student answered, “No - Whenever school work is hard - I keep on trying my best. I have found success with that.” Further support for the motivation to not give up also came from another student who reported, “No - last year when we took the SBAC I thought it would be hard, but I did good. I didn't give up during the SBAC. I have the most challenge in math. I never give up.”

The results from the initial qualitative data collection analysis of this exploratory sequential mixed methods design showed that teachers needed to focus on teaching growth mindset instruction explicitly, instilling a sense of belonging, setting learning goals in reading, and creating a safe environment as the focal point of the online growth mindset professional development. Teachers were provided the student feedback results prior to beginning their online growth mindset professional development.

**Teacher Bi-Weekly Journal Entries**

Journal reflections were analyzed using open coding, axial coding, and selective coding, generating themes surrounding growth mindset implementation which focused on the impact that the growth mindset professional development had on fourth grade teachers’ mindsets. All journal entries and interview transcripts were analyzed through a computer software program, MAXQDA, for in-depth qualitative analysis. Journal entries and interview transcripts were first coded using open coding. The computer program determined word frequencies that put all data into categories. The categories were determined by the number of times certain words were used. The axial coding phase was then carried out; the researcher determined direct relationships between the codes obtained from the open coding

process to form axial codes. Selective codes were, in turn, formed from axial codes with the most relationships which determined the themes used to form the grounded theory on the impact of the growth mindset professional development.

During the growth mindset intervention phase, the fourth grade teachers receiving the intervention ($n$ = 4) journaled about how the growth mindset implementation was going. Teachers answered four questions after the implementation of each growth mindset strategy:

1. What growth mindset interventions did you implement in the past two weeks?
2. Share some positives areas of implementation from the past two weeks.
3. Share some areas to grow in your growth mindset implementation.
4. Share your wonderings about moving forward.
5. How is this professional development affecting your instruction and your personal mindset?

Through sequential processes of open coding, axial coding, and selective coding, broad themes were created. All qualitative data were analyzed after all journal entries were submitted. The journaling lasted five months, during which the growth mindset intervention was being delivered. Themes that surfaced were (a) intentional feedback; (b) growth and fixed mindset awareness; (c) specific strategies to grow; (d) wonderings; and (e) personal mindset.

**Intentional Feedback**

Journal Question 1 asked teachers to consider what growth mindset interventions were used over the last two weeks. As a reminder of the process, teachers were asked to participate in an online growth mindset module, reflect on their learning, and then implement the strategies in their classroom. After implementation, teachers would then journal their experience about the strategies they have learned and their effectiveness in the classroom. Figure 10 shows the results for the responses to Question 1. Teachers reported implementing

intentional feedback and positive praise in higher percentages as compared to other growth mindset strategies. The different themes that surfaced were filtered through a constant checking and rechecking of the qualitative data. The themes included intentional feedback, recognizing a growth and fixed mindset, promoting struggle is positive, changing a fixed mindset, and the fact that the professional development changed the personal lives of the teachers (see Figure 8).

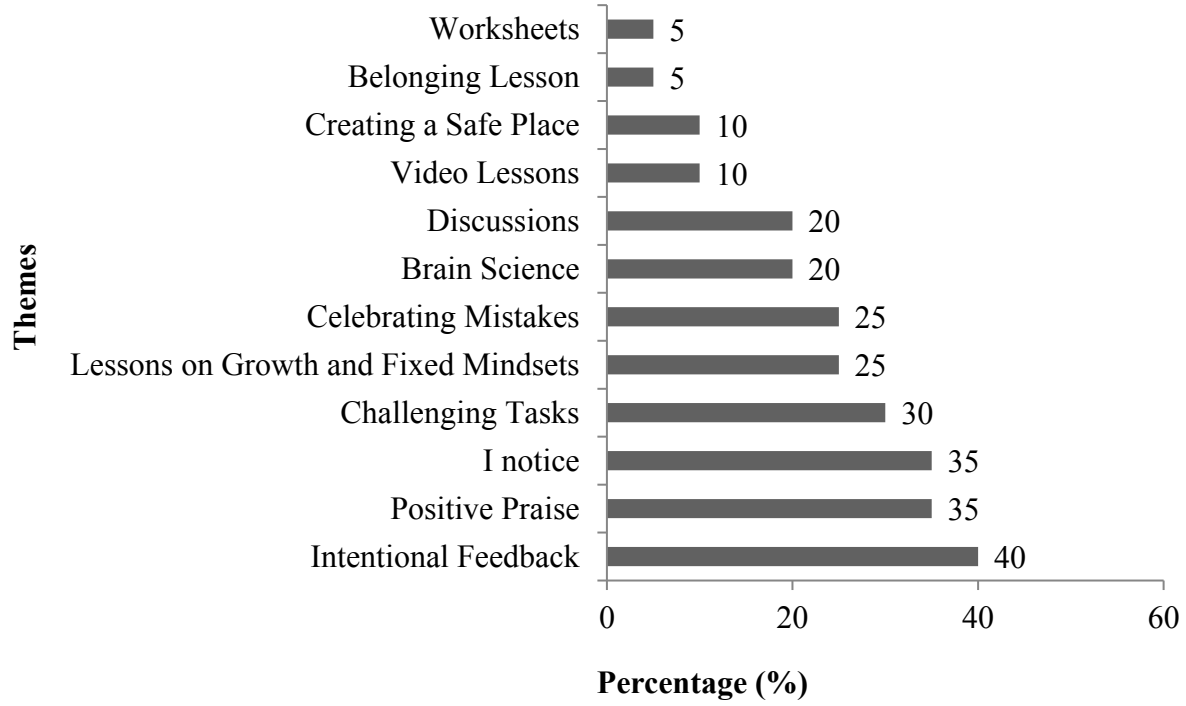



*Figure 8.* Themes from coded qualitative journal writings from teachers on growth mindset strategies that were implemented in the prior two weeks.

Teachers commented on intentional feedback the most. Teachers' reflections shed light on the strategies that were being used in the classroom. Teacher Heather (pseudonym) wrote:

> I found that I have to be very creative and specific with my praise as it required me to comment on their progress, rather than the end result. I praised students for how well students worked together, regardless if that group finished the activity or not.

Teacher Lucy (pseudonym) wrote about intentionality:

For the past month or so, since completing the Praise the Process Not the Person module, I have made it a point to be aware of and become more skillful with my use of praise for effort and strategies my students are using instead of their abilities and talents and/or achievements.

Teacher Susan (pseudonym) wrote, "This past week I implemented praising my students for the things they have done, and I tried to stay away from praising their intelligence. It was a lot harder than I expected."

**Growth and Fixed Mindset Awareness**

Journal Question 2 asked teachers to reflect on some positive areas of growth mindset implementation over the previous two weeks. Teachers reported being more intentional about their wording and noted that, together with their students, they were becoming more adept at recognizing growth mindset traits (incremental theorists) and fixed mindset traits (entity theorists). Figure 9 shows the results of Question 2.

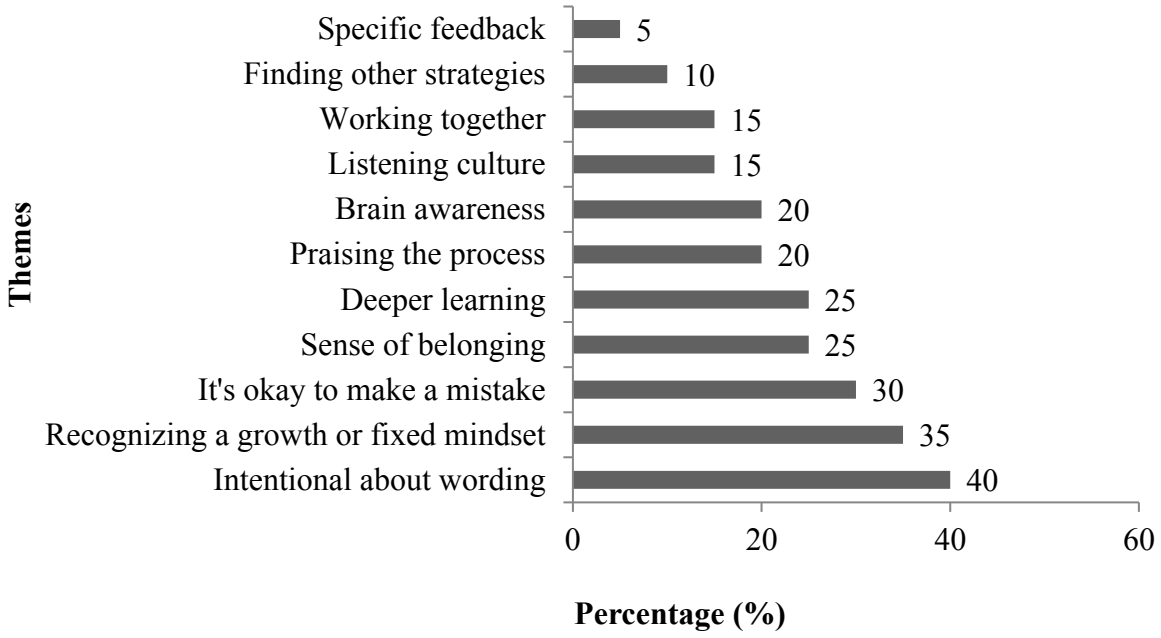



*Figure 9.* Themes from coded qualitative journal writings from teachers on positive areas of growth mindset strategies that were implemented in the prior two weeks.

Another theme that surfaced from Question 2, when teachers were asked to share some positives areas of implementation from the past two weeks was: being intentional about the words they were using in class. The growth mindset modules taught the teachers to speak in a certain way to develop a growth mindset in students (Dweck, 2006). Teacher Katie (pseudonym) stated:

> I made a praise poster for the classroom. Whenever I or my students spoke of or heard praise, we recognized it and wrote it on the praise board. There were several times my students recognized praise. I also noticed my students praising each other more. There has been a positive kind environment in my classroom with all the positive praise.

Bringing intentionality to words helped teacher Heather change student fixed mindsets. She writes, "My students know that in my class we do not say 'this is too hard.' We say that the 'H' word is a bad word. The students have been saying, 'This is challenging, but I can do it." The qualitative data indicated that the second-largest theme from the responses to Question 2 demonstrated the recognition of a growth or fixed mindset. Teacher Susan wrote:

> I have noticed that students will use the language that I use in class randomly. I will hear someone say, "This is too hard," and the other students say, "It's because your brain is growing!" I have also heard students say, "That's not a growth mindset" when someone says they are not smart or they cannot do something. I shared with them about the Taxi Cab study in London and they were very interested in it.

**Specific Strategies to Grow**

Question 3 of the bi-weekly journal reflection asked teachers to consider areas related to growth mindset implementation in which they felt a need to grow. Figure 10 shows that

teachers needed support in: (a) praising the process; and (b) finding the time to teach about growth and fixed mindsets.

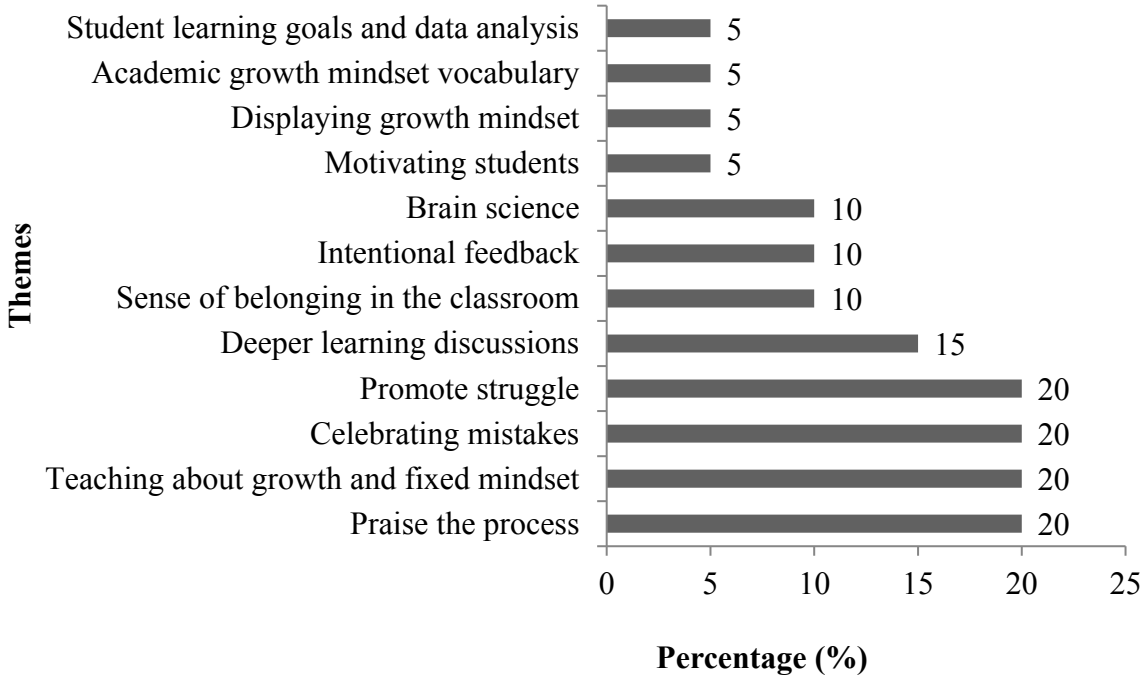



*Figure 10.* Themes from coded qualitative journal writings from teachers on areas for growth related to the growth mindset strategies that were implemented in the prior two weeks.

Four growth mindset strategies received equal scoring and were identified as the top areas to grow for all four teachers. They were: praising the process, teaching about growth and fixed mindsets, celebrating mistakes, and offering opportunities to promote academic struggle. Teacher Katie journaled about the importance of celebrating mistakes:

> With this lesson of celebrating mistakes and the encouragement of me and my own mistakes, students are still shy and embarrassed to share mistakes. I do believe this is due to them being kids and not wanting to be embarrassed in front of their peers. I would like to continue to show my students that it is okay for them to try. If you try, you might make a mistake, but you might not. I think it will be best to be very repetitive with this concept.

When teacher Susan reflected on potential areas for growth, she said:

I wish I had more time to do activities on the topic. I feel there is so much to do already, and it is hard to find the time to teach growth mindset on top of everything else. I do, however, see the value in it and I will continue to do as much as I can with my class. We didn't get to some of the other activities yet, but hopefully, we can later this week. For example, writing a letter to a future self or making a poster about our brains.

**Wonderings**

Question 4 of the journal reflections asked teachers to indicate what they wondered about as they moved forward with the growth mindset implementation. Figure 11 illustrates that teachers were most concerned with knowing how to change a fixed mindset.

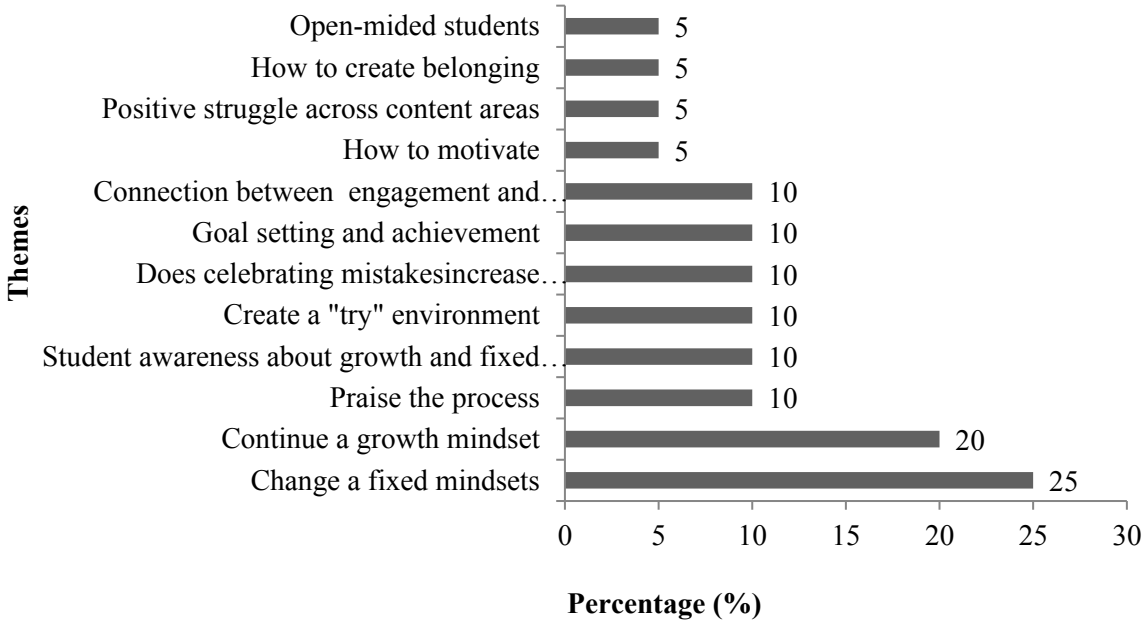



*Figure 11.* Themes from the coded qualitative journal writings from teachers on matters they wondered about related to the growth mindset strategies that were implemented in the prior two weeks.

Teachers contemplated how to change a student's fixed mindset to a growth mindset. Lucy ruminates over her students:

> I've noticed some of my students don't seem to want to or be able to focus when I am giving feedback about mistakes, and it's pretty obvious that they are the "fixed" mindset subjects whose brains do not show much activity when they are hearing the correct answer (which I heard about in one of the first growth mindset PDs). I wonder what more I can do to encourage them to show an interest in learning from mistakes. One thing that I have tried to do is point out whenever possible, when I catch somebody learning from a mistake. I'm hoping if I find enough opportunities to praise the process of other students, these fixed mindset students will start to change.

Teacher Susan writes about how she is still seeing fixed mindsets in her class even though growth mindset instruction is being delivered regularly. She reported:

> I don't mind spending more time doing this since the students are spending having collaboration and discussions with one another are time very well spent. I do wonder when the students who get frustrated easily will begin to develop a growth mindset. As it is right now, we have been learning about growth mindset for a while, and they still show signs of a fixed mindset. Susan continues in another journal entry: I wonder if I will be able to change the mindset of a couple of my students who have a fixed mindset still. A couple of students still want to give up right away when things get hard, or the call themselves dumb depending on how much they do in class, even after I correct them. I hope that eventually, their mindsets begin to change.

**Personal Mindset**

Question 5 of the teacher bi-weekly reflection journals asked teachers how the growth mindset professional development was affecting their personal mindsets and teaching instruction. Figure 12 shows what teachers were affected in different ways, with a greater percentage of teachers experiencing a growth mindset.

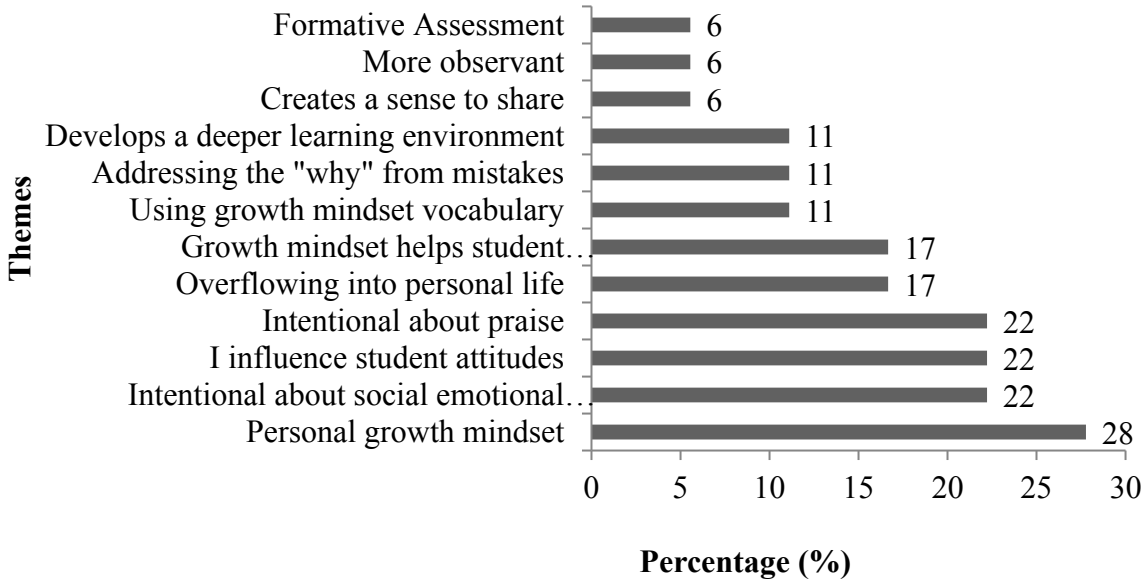



*Figure 12.* Analysis of coded qualitative journal writings from teachers concerning growth mindset strategies that were implemented in the prior two weeks.

The data indicates that teachers were mostly affected by how the professional development changed their mindsets. Teacher Heather writes:

> This professional development is opening up my mind about the learning process. It is teaching me that students should not be copying down a problem and then just regurgitating the answer. I want to create work that challenges my students' thinking process and gives them a deeper understanding.

Teacher Lucy's journal reflection shows that the social-emotional part of teaching was a driving force that should not be ignored. She wrote:

> It (*the PD*) makes me consider aspects of social-emotional development that I tend to overlook when I plan our days and weeks. I feel so driven to work on academic achievement that I forget to slow down and take time for the other aspects that affect learning. Growth mindset is definitely an important and powerful strategy. I am feeling more confident in my students' ability and my ability to deepen learning.

It was reported that the growth mindset professional development affected personal growth. Teacher Lucy penned:

> It really makes me think carefully about what I say to students and what they are struggling with and when they are successful. I think with practice, I will become better at it. In my personal life, it makes me think about the way I interact with my children and grandchildren to help them become the best people they can be.
>
> Teacher Susan recorded that she has grown personally. She journaled:
>
> I notice that my vocabulary has changed a bit. I am more aware, and therefore I think more about what questions I ask and what praise I give. I have lots of growth to make still but I have definitely developed a growth mindset.

**Student Post-Intervention Interviews**

Transcribed interviews with students were analyzed using open coding, axial coding, and selective coding to generate themes focused on the impact that the growth mindset professional development had on fourth grade students' perception of their intelligence,. Students in the intervention group participated in a five-month growth mindset intervention. The strategies were implemented in the classroom by their classroom teacher. A convenience sample of 13 students from all four intervention classes were chosen to participate in the post-intervention student interview. Students were interviewed by the school academic coach. All interview transcripts were uploaded into the computer software, MAXQDA, for in-depth qualitative analysis. Interview transcripts were first coded during the open coding phase. The computer program was able to determine word frequencies that put all data into categories. The axial coding phase was then carried out; the researcher determined direct relationships between the codes obtained in the open coding phase to create axial codes. Selective codes were subsequently formed from codes with the most relationships which determined the themes used to show the post-intervention impact on students. Students were asked four questions:

1. How would you describe a person with a growth mindset? Can you provide me with an example of a time you chose a growth mindset?
2. What are your thoughts on your brain growing? Do you believe you can grow your brain neurons and become smarter?
3. What are your thoughts on sharing your mistakes with your classmates and/or your teacher? Can you provide me with an example of a time you shared a mistake?
4. Do you feel motivated to do well in school?

Through open coding, axial coding, and selective coding, themes were identified. All qualitative data were analyzed after all interviews had been carried out. The intervention lasted five months, during which the growth mindset program was being delivered. Themes that surfaced from the post-intervention interviews were: (a) description, (b) brain, (c) mistakes, and (d) motivation.

**Description of Growth Mindset**

Interview Question 1 asked students to describe a person with a growth mindset. This question determined if students understood the difference between a person with a growth mindset and another with a fixed mindset. A majority of the students responded by saying that a person with a growth mindset does not give up (see Figure 13).

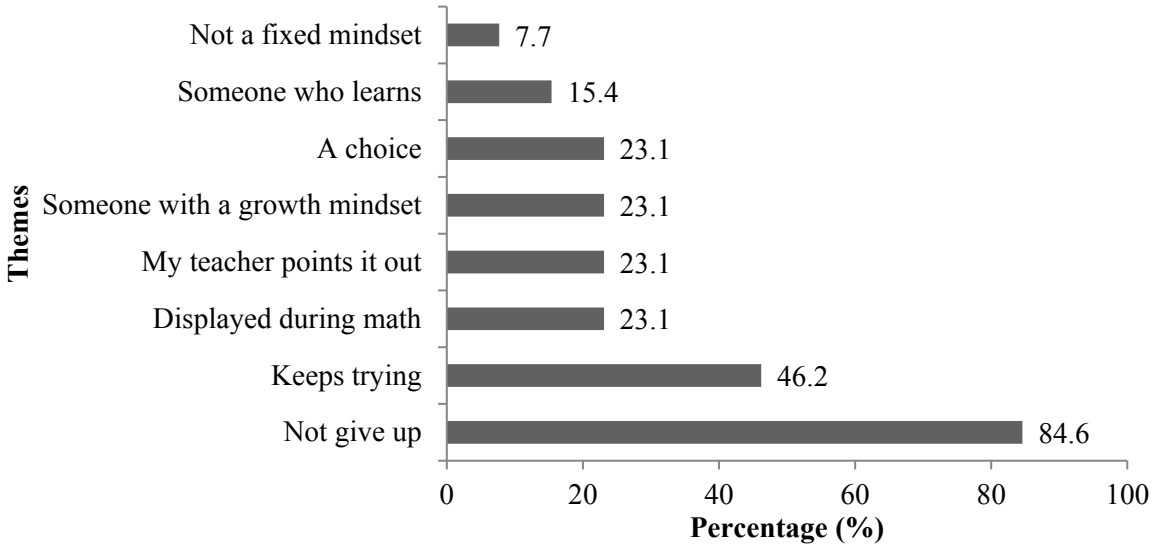



*Figure 13.* Themes from coded qualitative interview data from fourth grade students on the description of a person with a growth mindset.

Students attributed a variety of characteristics to a person with a growth mindset. The data indicates that the students were able to discuss the traits of a person with a growth mindset. For example, one student summarized and said:

> He knows what to do, and he doesn't have a fixed mindset, and he knows what he is doing. A fixed mindset says he knows this and he doesn't need practice. During math, I didn't know how to do this one-word problem. My teacher said it would be tricky and it was. I didn't give up, and I had a growth mindset, not a fixed mindset.

Another student spoke clearly about growth mindset, highlighting the need to keep pushing oneself despite challenges:

> He or she keeps on trying and never gives up. He doesn't let go of what he is thinking about. When I was taking the third grade SBAC test, I was trying to calm down and not get too stressed out about it. I chose a growth mindset.

One student talked about what a person equipped with a growth mindset looks like at home:

> I would describe them not giving up and to keep trying. I chose a growth mindset because I remember when I was at my house, it was difficult for me because I was trying to get my dog to wear a jacket and it was really tough, but I got the jacket on, and I didn't give up.

In general, the students interviewed said that a person with a growth mindset is somebody who does not give up when faced with challenges. This data would indicate the students learned about growth mindset traits. This student captured the theory effectively in his response:

> That they never give up, they are always doing their best. I chose a growth mindset when it was about me doing my writing. I kept on getting it wrong and wrong and wrong. On the fourth try, I got it right, and I showed my teacher, and she was happy with me, and she took a picture of me and put it on the growth mindset wall.

**Brain**

Question 2 asked students to talk about their knowledge of the brain and how neurons work. This question was used to determine if students learned the brain science behind growth mindset and what happens to the brain when people are challenged intellectually. A majority of the students responded by saying that a person with a growth mindset has a brain that grows (see Figure 14).

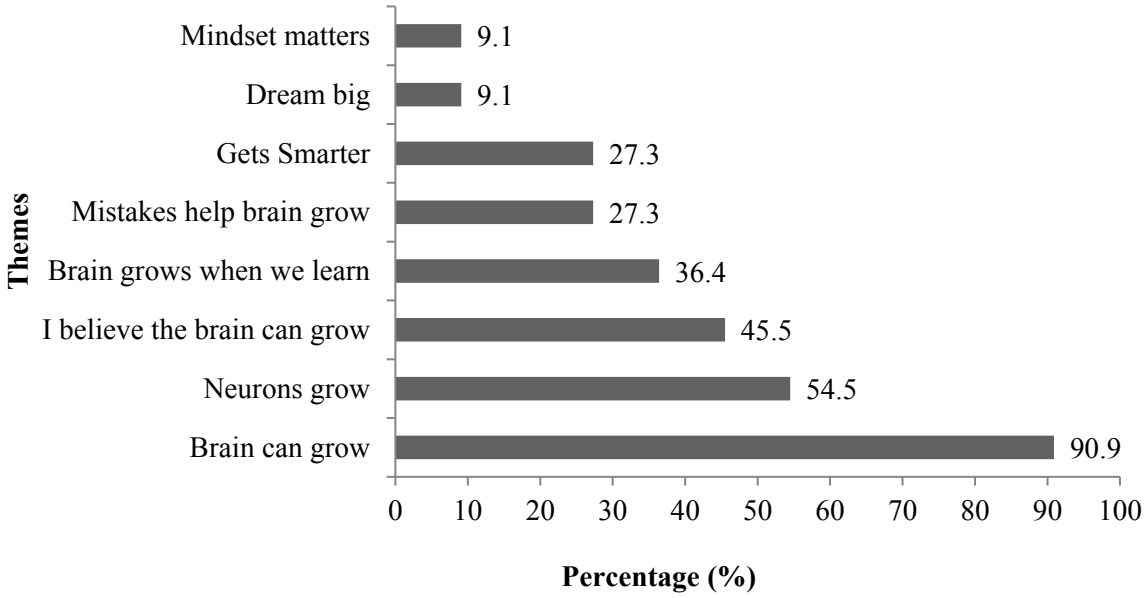



*Figure 14.* Themes from coded qualitative interview data from fourth grade students about their knowledge of the brain and how neurons work.

Almost all of the students who were interviewed talked about the brain growing. One student was very passionate about this subject:

> I think my brain can grow; even if it doesn't, I know that it will. I will do anything for my dream to grow so I want to have a growth mindset so I can get to my dream. I believe I can grow my brain neurons; if you are having a fixed mindset, you are not having a growth mindset. I want to follow my dream, so I have to have a growth mindset. In order to have a job or go to college, you have to have a growth mindset. I want to be a painter. If you always grow your brain, you are giving your brain a challenge. The point of going to school is to get smarter, and then you apply for a job.

On the contrary, one student said, “I don't remember.” and another student said nothing. However, the remaining students had a lot to say about the brain, indicating that students did learn about how the brain works during the five-month intervention. This student stated “I don't give up and I try my best. Yes, my brain could grow by

neuroplasticity. When I don't know something, my neuroplasticity works." And yet another student stated:

> My thoughts are good thoughts. I want to have my brain be a good brain. Yes, you can grow neurons by believing in yourself and having a growth mindset. A growth mindset can give you neurons like when you make mistakes, you learn. By having a growth mindset, you learn, and you should not stop thinking or believing.

**Mistakes**

Question 3 asked students to share how they feel about making mistakes in class and about sharing their mistakes with others. This question was used to determine if the growth mindset intervention helped create a safe learning environment where students take risks and share their mistakes. Results indicate that 100% of the students interviewed in the post-intervention interview felt safe sharing their mistakes in class (see Figure 15).

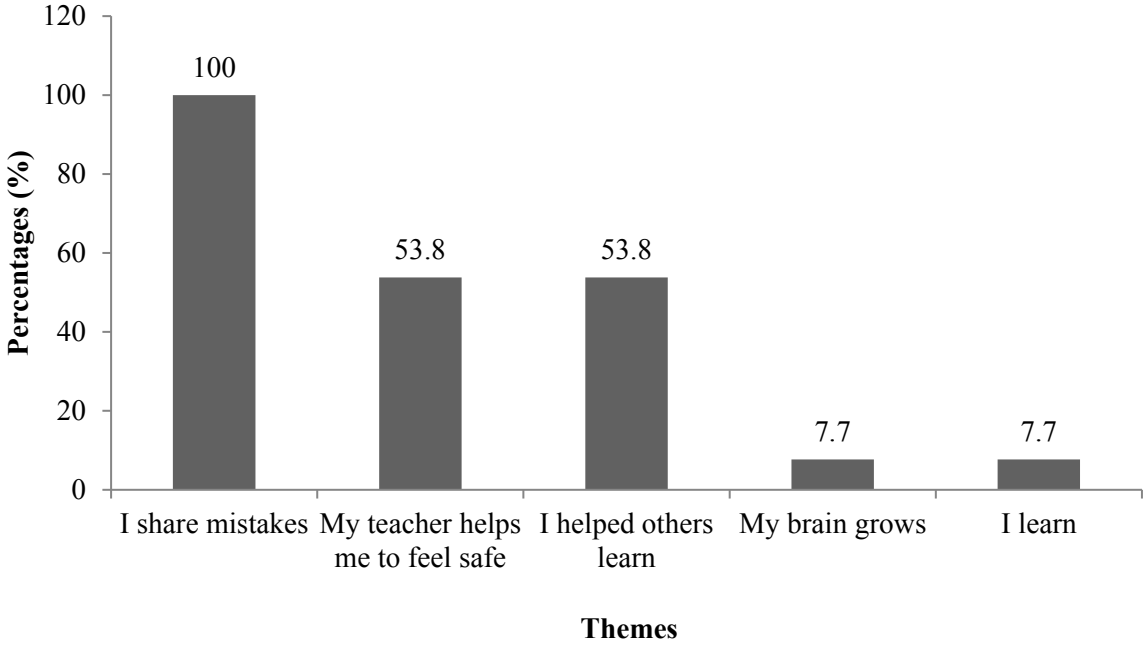



*Figure 15.* Analysis of coded qualitative interview data from fourth grade students concerning growth mindset strategies that were implemented during the five-month intervention.

One student provided a thoughtful answer about the satisfaction he derives in sharing mistakes:

> I share mistakes. I feel great. I want to share my mistakes so people with a fixed mindset see that they can challenge their brain and that is why I think it is good to share my thoughts to help others with a growth mindset. I shared my mistake about opinion writing. Everybody knew I wasn't getting it right. My teacher showed my mistakes so everyone could see and they learned from it. And I fixed my mistakes, and my teacher put my paper on the wall.

Another student replied: "I feel good about it because nobody is perfect. I shared it with my table - like a math or reading question - I told my table - did I do this wrong and they helped me by showing me."

Another student said that sharing mistakes might help others:

> Sometimes when you share your mistakes - they might help you with them. I would feel okay if the teacher shared my mistakes because maybe some students got the same mistakes, and they might fix it. In math, I did not get the right answer, and she explained it, and I understood.

**Teacher Post-Intervention Interviews**

The final phase of the intervention was to interview all four intervention fourth grade teachers to measure the impact that the growth mindset professional development had on each of them. Each interview was transcribed and similarly analyzed using open coding, axial coding, and selective coding processes to generate themes surrounding growth mindset implementation. All interview transcripts were uploaded into a computer software, MAXQDA, for in-depth qualitative analysis. Interview transcripts were first coded during the open coding phase. The computer program was able to determine word frequencies that put all data into categories. After the axial coding phase, themes that occurred were linked so

that codes from the open coding and the axial coding phase formed new broader codes as part of the selective coding process to create a grounded theory showing the impact of the intervention.

Teachers answered seven post-growth mindset intervention questions. The remainder of this chapter will describe the results by showing figures and providing teacher quotations. Question 1 of the post-growth mindset intervention teacher interview asked teachers to describe someone with a growth mindset (see Figure 16).

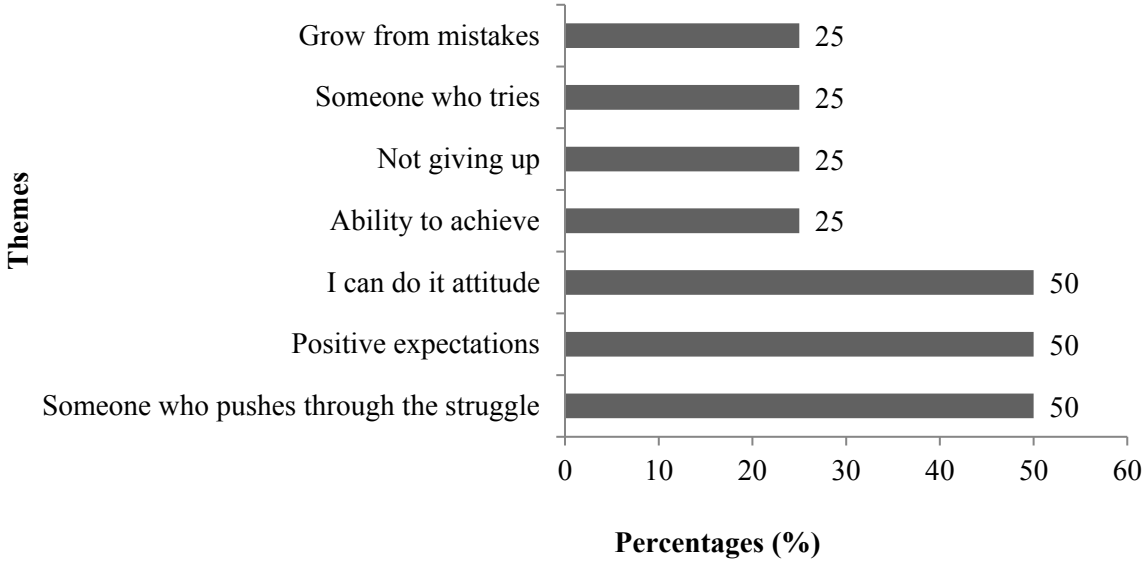



*Figure 16.* Themes from coded post-intervention qualitative interview data from fourth grade teachers concerning growth mindset strategies that were implemented during the five-month intervention.

All four teachers reported different characteristics of how a person with a growth mindset looks. Teachers reported, on an equal footing, the following three characteristics: (a) pushes through the struggles, (b) has positive expectations, and (c) has an "I can do it" attitude. Teacher Heather passionately stated:

> I would describe a person with a growth mindset as someone who does not give up when faced with a challenging task. Someone with a growth mindset will continue to work at their goal even if they do not succeed the first time. They will see this

mistake as something to grow from rather than shut down. Someone with a growth mindset views mistakes as something to learn from.

Teacher Katie commented on how she had to have a growth mindset when returning to America to finish her teaching credential:

> A person with a growth mindset would have a positive outlook on learning and their abilities. A person with growth mindset would constantly have an "I can do it attitude" about anything they are doing. They would probably not be too negative about their capabilities. Moving back to America and getting a job here in California after living overseas was really intimidating. I knew that I would be the best teacher, but I had been teaching in a different country. I had to take the risk to come back to America. In my current class, I have a growth mindset with student testing. Even though the students are the ones who take the test, I model how to have a growth mindset about testing, and they did the hard work, and they were able to be successful because of the work they had done. It was more about the process than the outcome. When I see my students working through the struggle, I know they display a growth mindset.

Question 2 of the post-growth mindset intervention teacher interview asked teachers to share what they think about the brain growing. The majority of the teachers talked about how it does not matter how old you are, a brain can continue growing with effort and it has been found true through scientific research (see Figure 17).

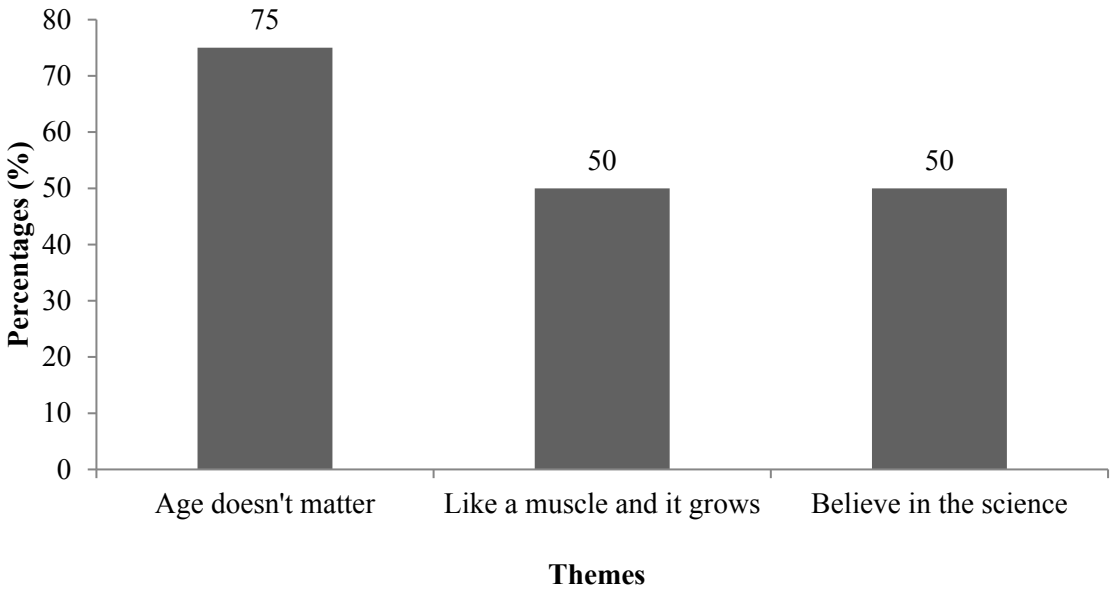



*Figure 17.* Themes from coded post-intervention qualitative interview data from fourth grade teachers about the growth of the brain.

Concerning belief in science, Teacher Lucy shared:

> I believe that people's brains can grow all the way until they stop breathing. I do believe it. I believe it scientifically. I believe that scientists have demonstrated that they can measure the neurons when people encounter challenging situations, and that they can see if there is a difference in the number of connections in the brain.

Teacher Heather continues to show her belief in the benefits of growth mindset by saying:

> I absolutely believe our brains can grow and that we can continuously learn more. If someone really wants to achieve something, they absolutely can, but it will take hard work, dedication, and learning from trial and error.

Question 3 of the post-growth mindset intervention teacher interview sought to understand how teachers felt about sharing their mistakes with colleagues. Their responses are illustrated in Figure 18.

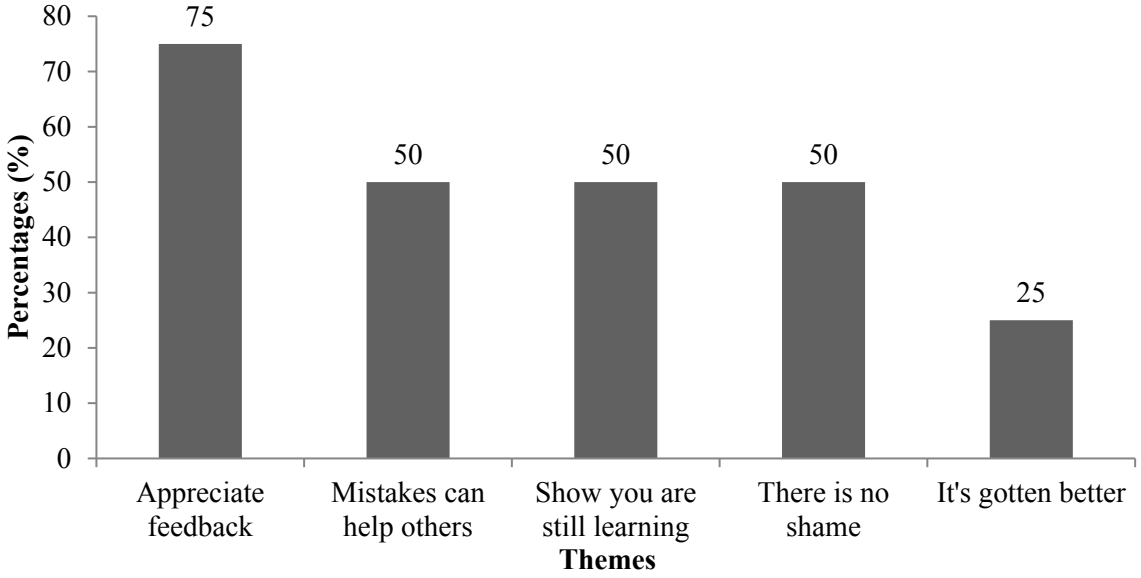



*Figure 18.* Themes from coded post-intervention qualitative interview data from fourth grade teachers about sharing mistakes.

The main answers that were given had to do with accepting feedback. Teachers talked about being comfortable with sharing mistakes. The district has gone through some educational initiatives over the last couple of years, and the teachers remarked on how these changes fostered a growth mindset. Teacher Susan summed it up by stating there was no shame in sharing mistakes:

> I think before we were a little more scared to share mistakes, but now with our Professional Learning Community (PLC) journey and our growth mindset journey, I don't mind because it's not about what you did wrong, but what did you do for somebody to help you. There is no shame.

Teacher Katie expressed a lot of enthusiasm for sharing mistakes. She said this was the part of the professional development that she was able to connect to the most:

> I always share my mistakes; maybe I share too much. I will be the first to admit that I am still learning. Anyone who thinks they have learned all that they need to learn - they are in denial. I learn from the teachers I coach, and I think they sometimes teach

me more than I teach them. Whenever we have to do an evaluation, I think about how would you have done it differently - I can always think of something I could have done differently. I am not afraid to hear I can do something better. I want to become better.

**Motivation in Students**

Question 4 of the post-growth mindset intervention teacher interview asked teachers to consider if their students were motivated to do well in school. The teachers collectively spoke about how each one of them had a pocketful of students who continued to display a fixed mindset amid a strategic growth mindset intervention. The majority of participants indicated that some students turned a corner (see Figure 19).

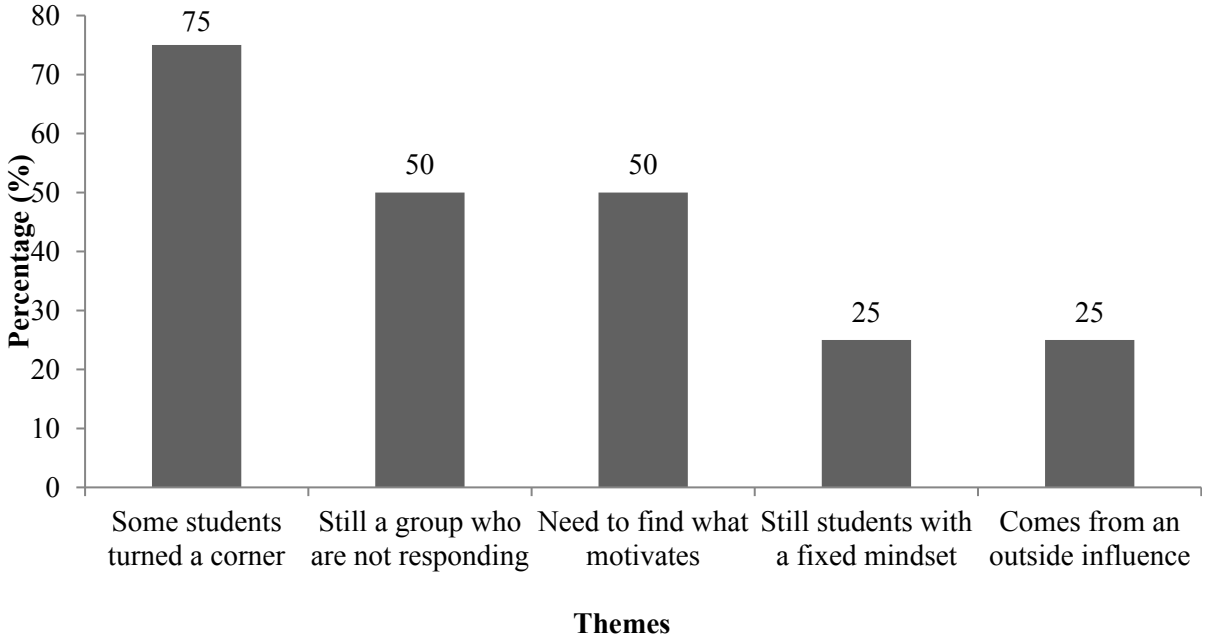



*Figure 19.* Themes emerging from post-intervention qualitative interviews of fourth grade teachers about growth mindset strategies that were implemented during the five-month intervention.

Teacher Susan pondered over the conundrum of how some of her students get frustrated and cry:

> These questions are hard because most them, they do, but I have a little bunch who, no matter how many lessons we do, they continue to have a fixed mindset. There are a few who get frustrated and cry, but I feel that the rest of them, they are motivated. They tell me, "I'm doing my best or I tried my best." Like Elohio, he switched and turned a corner. But some, they have not.

Teacher Lucy struggled with finding the motivating factors that would encourage students to do their best in school. She said:

> I think a lot of them do feel motivated. I'm often discouraged by how many don't seem to feel motivated. A lot of them are motivated, and some need more encouragement to be motivated, and they respond to feedback and to the data. The data shows them results, and that helps with motivation. I think that when I give them goals, they respond. I do think there are a few who are not in school to learn. It is a push to find something to make them want to learn. I think all of them are motivated at some time.

Teacher Katie talked about how she was perplexed that she still had students in her class that chose a fixed mindset even though she was practicing the strategies she learned from the growth mindset professional development. Teacher Katie reflected:

> That's a tough question. I feel like half of my students feel motivated to do well in school. I think the students who do not want to do well in school, it comes from an outside influence and/or a student's mentality. I feel like almost every classroom has a group of kids who do not want to do well kids in school. The growth mindset thing should help kids to increase their desire to do well in school. Even though I am implementing the growth mindset strategies, I still have a number of students who do not want to do well in school. I do have a decent number of students who from the

growth mindset strategies I implemented, might do well in school. Wow - that was a good question.

**Personal Philosophy**

Question 5 of the post-growth mindset intervention teacher interview asked each teacher to share how the professional development on growth mindset has affected their teaching instruction and their mindset and philosophy. All teachers talked about how the professional development has changed their mindset and the direction of their teaching, particularly about the way they speak to students. The language used was the theme that was mentioned most frequently (see Figure 20).

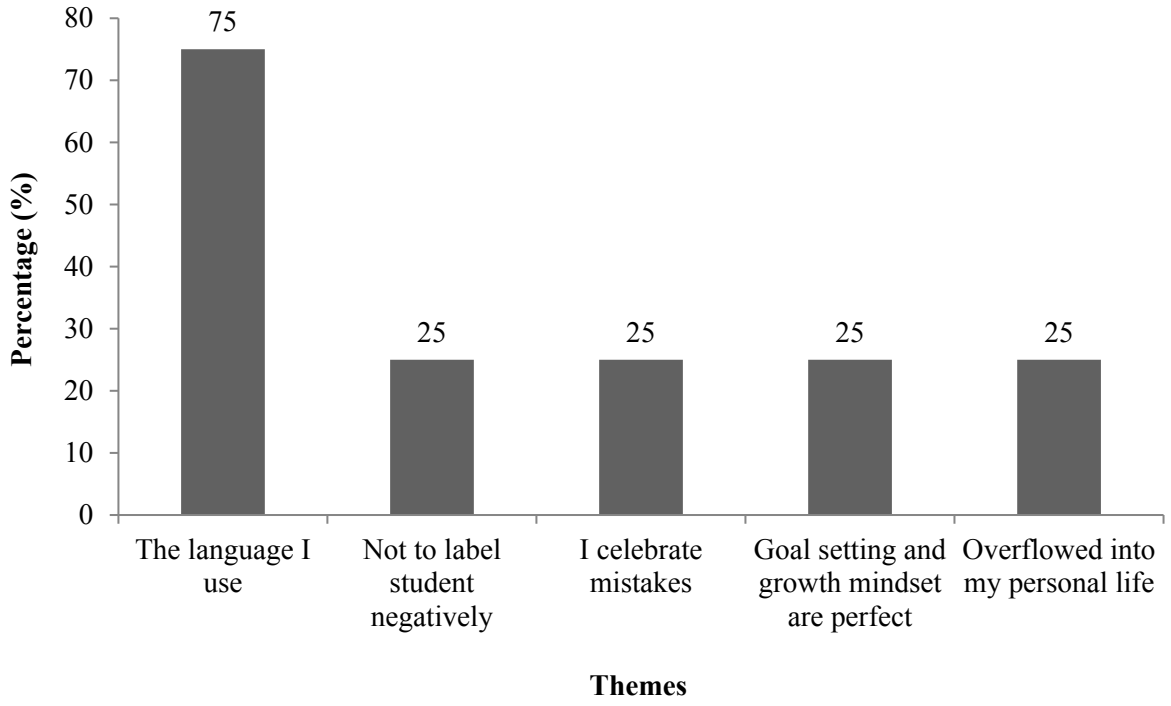



*Figure 20.* Themes from coded post-intervention qualitative interview data from fourth grade teachers concerning growth mindset strategies that were implemented during the five-month intervention.

Teacher Heather admits that the growth mindset intervention brought about many benefits to her students:

This intervention has helped my teaching philosophy by making me more aware of what I say and do in the classroom. It has been extremely important for me to choose words that encourage growth mindset and lift up my students.

Teacher Lucy brought to the fore the growth she has experienced in her mindset through the intervention:

> One thing that happens, sometimes I get an attitude that, I know it's not true, that some kids are not going to learn. Then I think there are some kids that are going to take longer or need more help. With this professional development, I have been more aware not to label them. You have to be very careful that you do not label some kids as smart and as not smart. You have to be really careful that you don't say, "Oh, you really are smart in math!" They say it about themselves as well. It's important how you talk to kids, how you communicate. I want my kids to master the essential standards, and if they don't master the essential standards, the outcome is important. I found myself saying, "Oh goodness, I'm going to have to find something harder for you." Lately, I have been able to celebrate mistakes, especially when you understand why you made the mistake. I tell the students that is how you learn. So, I kept telling my kids, "Oh - now you can see why you don't get it and you are really stretching your brain!" I have been seeing my kids asking more questions since I have delivered the growth mindset strategies. I think goal setting and growth mindset would be the perfect marriage. I am really happy that we came up with goal setting in our data chat.

Teacher Susan emphasized the change in the language she used in the classroom after participating in the intervention:

> This professional developed has changed the language that I use with my students. It has changed the way I teach. I'm not as focused on you all need to get this right now; I'm focused on how hard you are working. It has definitely changed my teaching.

Teacher Katie talked about how the professional development on growth mindset overflowed into her personal life:

> The growth mindset professional development has affected me very positively. With the growth mindset strategies, I have been doing it more frequently and more specifically, not like just a cheerleader. I am being more intentional as to why you can do it, and now you know you can do it too, and you know why you can do it. I see myself doing it in my personal life too, with my friends, family, and boyfriend. It is definitely in there. It's in me. I am doing it.

**Continue Teaching Growth Mindset**

Question 6 of the post growth mindset teacher interview asked teachers to share if they would continue to teach growth mindset strategies in the future. All the teachers responded with an enthusiastic yes (see Figure 21).

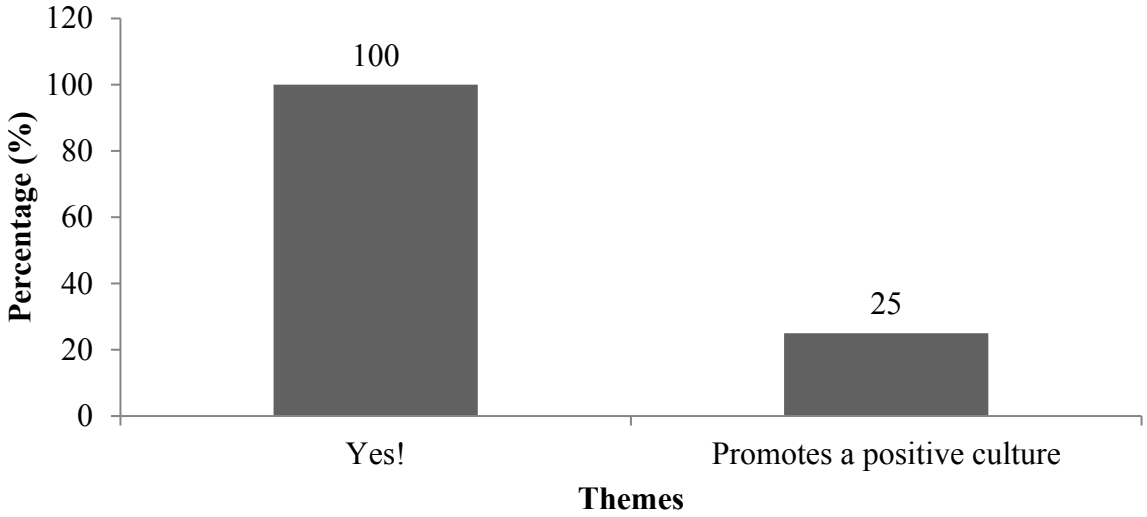



*Figure 21*. Themes from coded post-intervention qualitative interview data from fourth grade teachers about the willingness to continue teaching growth mindset ($n$ = 4).

Teacher Heather summed up the eagerness expressed by teachers in continuing to use growth mindset:

> Absolutely! I truly believe in growth mindset, and over the past few months of teaching it in the classroom, I believe that it promotes a positive culture, a belief in one's self, and an understanding that mistakes are inevitable and that we can grow from them.

**Feedback About the Professional Development**

Question 7 of the post-intervention growth mindset teacher interview asked each teacher to communicate feedback about the delivery of the professional development on growth mindset. As mentioned in Chapter 3, teachers participated in seven online professional development modules which focused on growth mindset strategies. After each session, teachers were asked to answer questions related to their learning through an online Google Form to create accountability. Teachers reflected on the learning and made plans for teaching a strategy in class. After teachers taught a growth mindset strategy, they recorded their reflections in an online Google Form reflection journal (see Figure 22).

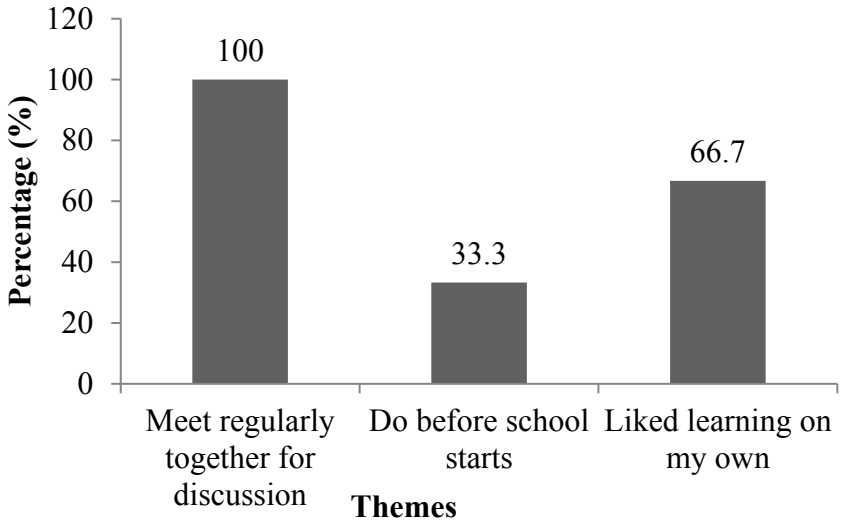



*Figure 22*. Themes derived from feedback of fourth grade teachers concerning growth mindset strategies that were implemented during the five-month intervention ($n$ = 4).

Teachers provided feedback about the delivery of the professional development. Teacher Lucy said:

> I think if I had my choice, I would have liked to do this before school starts and not have this being one more thing to do. I would have been better if time was set up for this. Maybe for me, it would have been better to do it on a Saturday with all the things we have to do. I like the idea, but it didn't work out very well. If we all met together, and we had certain time together it would have been better. If we had discussion time, it would have been better.

Teacher Heather provided feedback:

> I liked learning on my own at the convenience of my own time. I think it would have been better if we had met once a week to talk about the progress, but due to the after-school programs this year, we did not have time for it.

Teacher Susan said, "I liked learning on my own. It worked for me. I enjoyed learning about growth mindset. I think it would have been good for us to meet every once in a while to discuss our learning." And Teacher Katie articulated:

> I did like learning on my own. It made it easy and convenient because I could do it on my own. But I am flexible; I could have done it all together too. There was one that was a little confusing. It might have been okay to print the material. I think if we met twice a month on the same day and same time with focus is on growth mindset that would have been helpful.

## Quantitative Results

Research Question 3 was: In what ways does the implementation of growth mindset strategies, based on an online growth mindset professional development for fourth grade teachers, impact fourth grade student academic achievement in reading as measured by iReady?

**Academic Pre- and Post-Intervention Reading Results**

A one-way between subjects ANOVA was conducted to compare the academic Reading achievement scores between all four elementary schools, three control schools to which the intervention was not administered and one school in which the intervention was implemented in the targeted district. The academic pre-assessment in Reading was completed in September 2018, and the post-assessment was completed in January/February 2019. All fourth graders in the district participated in the iReady Reading Diagnostic, each with a greater number of participants ($n$ = 115) than the intervention school (see Table 4).

Table 4

*Comparison of Student iReady Pre- Diagnostic and Post- Diagnostic Assessment Results in Reading*

| School | *N* | *M* | *Minimum* | *Lower whisker* | *Q1* | *Mdn* | *Q3* | *Upper whisker* | *Maximum* |
|---|---|---|---|---|---|---|---|---|---|
| Intervention School M | 115 | 14.63 | -61 | -32 | 2 | 15 | 26.5 | 56 | 71 |
| Control School A | 84 | 14.07 | -73 | -44 | -1 | 12 | 30 | 68 | 97 |
| Control School C | 85 | 20.56 | -30 | -30 | 7 | 16 | 32 | 57 | 112 |
| Control School O | 87 | 10.24 | -101 | -38 | -1 | 13 | 27.5 | 51 | 95 |

There was no statistically significant difference in academic achievement between control and intervention schools at the $p < .05$ level $F(3, 367) = 2.38$, $p = 0.069$ (see Table 5). However, it should be noted that the result approached statistical significance and will be further discussed in Chapter 5.

Table 5

*ANOVA Table for Academic Achievement Between Control and Intervention Groups*

| Source of Variation | *d.f.* | *SS* | *MS* | *F* | *p* |
|---|---|---|---|---|---|
| Between Groups | 3 | 4,679.91 | 1,559.97 | 2.38728 | 0.07 |
| Within Groups | 367 | 239,817.06 | 653.45247 | | |
| Total | 370 | 244,496.97 | | | |

In addition to the one-way analysis of variance (ANOVA), boxplots were used to investigate the difference in academic achievement in reading of students from all four schools further in the targeted school district (see Figure 23). The boxplot indicates the presence of outliers in the achievement data for all four schools. It also shows that Control School C scored better than the rest of the schools, with the intervention school in a close second place. The boxes looked relatively similar in size, indicating that the schools were mostly comparable in academic achievement in reading. A deeper analysis of the data is presented in Chapter 5. The results of the ANOVA are presented in Table 4.

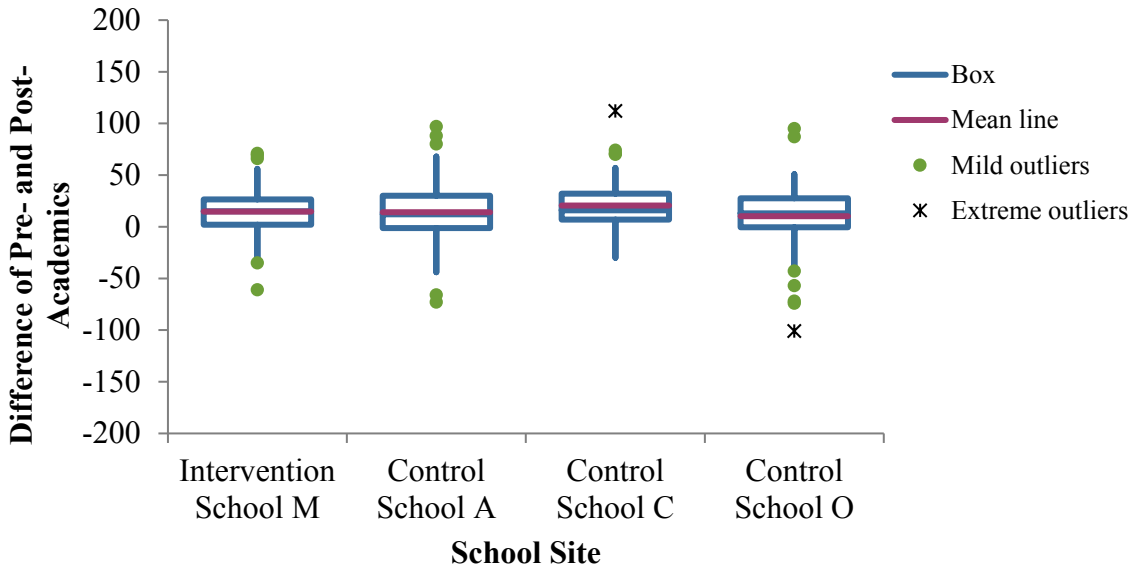



*Figure 23*. Boxplots showing academic achievement in reading at the four targeted schools.

## Summary

This chapter reported results of the quantitative and qualitative mixed methods analytical design procedures. Using descriptive and inferential statistics such as the *t*-test and using data from the pre-growth mindset and the post-growth mindset intervention survey, the researcher found that the mean scores of fourth grade teachers' and fourth grade students' perceptions of their intelligence had increased after teacher participation in the online professional development on growth mindset. The researcher used the grounded theory to

determine a secondary impact of teacher mindset alteration based upon a growth mindset professional development implementation. Journal entries and teacher interviews were coded to determine themes, and data were reported through figures and examples of teacher responses. Students' academic achievement results using ANOVA and boxplots were reported to determine if a growth mindset professional development of fourth grade teachers impacted fourth grade student academic achievement in reading. The results indicated no significant increase in student academic performance in reading. Chapter 5 will primarily discuss the findings in detail and present recommendations for more effective growth mindset implementation.

# CHAPTER 5: DISCUSSIONS

This mixed methods study focused on three main research questions. The first research question focused on the ways in which the implementation of growth mindset strategies for fourth grade teachers participating in an online professional development impact fourth grade students' perceptions of their academic abilities as measured by pre- and post-intervention surveys. A secondary question addressed: in what ways does the implementation of a growth mindset intervention affect fourth grade teacher mindsets as measured by on-going journal entries during the intervention and post-intervention interviews? The third research question was: in what ways does the implementation of growth mindset strategies, based on an online growth mindset professional development for fourth grade teachers, impact fourth grade student academic achievement in reading as measured by iReady?

## Summary of the Study

This study focused on fourth grade students and fourth grade teachers in a small rural district in California. The first and second research questions were: In what ways does the implementation of growth mindset strategies, based on an online professional development for fourth grade teachers, impact fourth grade students' perceptions of their academic abilities as measured by pre- and post- surveys? And, in what ways does the implementation of a growth mindset intervention affect fourth grade teacher mindsets as measured by on-going journal entries during the intervention and post-intervention interviews. They were addressed by using pre- and post-intervention student growth mindset surveys administered at the beginning of the intervention in September 2018 and at the end of the intervention five months later. The survey was analyzed using a paired samples *t*-test to examine whether there was a statistically significant difference in mean growth mindset score pre- and post-

intervention. The data indicate that there was a statistically significant difference between the pre-growth mindset intervention survey and the post-growth mindset intervention survey.

Student pre-intervention interviews were conducted to determine areas of focus for the growth mindset professional development. Results of the student pre-intervention interviews were analyzed using a grounded theory approach. The qualitative portion of the study was analyzed with the help of a computer program, MAXQDA, to ascertain open coding, axial coding, and selective coding. Participant responses were coded and analyzed to identify themes and patterns of perspectives. The student pre-intervention interviews determined areas that teachers needed to focus on: growing intelligence, learning goals, making mistakes, and motivation.

**Discussion of Pre-intervention Student and Teacher Interviews**

In Chapter 2, Dweck and Leggett (1988) explained that a belief that intelligence is fixed impacts competence and performance evaluations. Students' theories of intelligence affect their achievement and their ability to cope effectively. Once students adopt a theory of intelligence, it affects what they value, how they approach intellectual tasks, and how they interpret and respond to what happens to them (Dweck, 2000). The growing intelligence theme represented in the pre-intervention student interview delineates that students needed explicit instruction on what a fixed mindset looks like, which aligns with a previous study conducted by Dweck and Leggett (1988). Similarly, from pre-intervention student interview responses, it was clear that students also needed explicit instruction on what a growth mindset looks like.

In contrast to a fixed mindset, students who adopt a belief that intelligence is mostly an attribute of effort can be said to possess a growth mindset. Dweck et al. (1995) found that students who hold an incremental theory of intelligence were more oriented towards mastery-oriented patterns and learning goals as opposed to holding an entity theory of intelligence and

leaning towards performance goals. Children with a growth mindset tend to stay away from negative cognitive, affective, and behavioral responses typically displayed by entity theorists or those with a fixed mindset. For the growth mindset professional development, teachers concentrated on explicitly teaching students about growth mindset.

The student pre-intervention interview responses also determined that the growth mindset professional development should additionally focus on learning goals which bring about many educational benefits. A learning goal suggests that students see setbacks and challenges as stepping stones toward eventual learning. The objective of the learning goal is to increase student competence Dweck and Elliot (1988). During the 1970s and 1980s, theories of intelligence began to overlap as similar ideas were fine-tuned. In Dweck and Elliot's seminal work (1988), they proposed the theory that students' goal orientation (performance or learning goals) toward academic tasks affects their ability. Students want to look smart (to themselves or others), and they want to avoid looking dumb.

The third area of focus for growth mindset professional development identified from student pre-intervention interview responses were celebrating mistakes. Students felt relatively confident making and sharing their mistakes with their peers; however, there were a few students who were adamant about not sharing mistakes. Research has shown that mistakes are important opportunities for learning and growth, but students generally regard mistakes as indicators of their low ability (Dweck, 2000). Boaler (2013) proposes that every time a student makes a mistake in mathematics, new synapses are formed in their brain. Therefore, teachers needed to focus on the professional development module on celebrating mistakes to implement a growth mindset in their classes effectively.

The final pre-intervention student interview data responses also indicated that teachers would need to focus on increasing student motivation or self-efficacy. Self-efficacy is an essential part of this self-system. Students who master a challenging task despite limited

assistance will increase their levels of self-efficacy and people who have a high level of self-efficacy try challenging tasks more frequently and persist longer with them (Bandura, 1989). Self-efficacy is central to a person's goal-setting, effort level, response to challenges and setbacks, and resiliency, which are all indicators of academic success. Teachers needed to focus on engagement and motivation during their growth mindset professional development to deliver the strategies effectively.

### Research Questions 1 and 2

Research Questions 1 and 2 were: In what ways does the implementation of growth mindset strategies, based on an online professional development for fourth grade teachers, impact fourth grade students' perceptions of their academic abilities as measured by pre- and post-surveys? Additionally, in what ways does the implementation of a growth mindset intervention affect fourth grade teacher mindsets as measured by on-going journal entries during the intervention and post-intervention interviews. An ANOVA and grounded theory analyses of teacher and student interviews were carried out to address Research Questions 1 and 2. Journal entries were analyzed to address Research Question 3 which focused on the ways in which the implementation of growth mindset strategies, based on an online growth mindset professional development for fourth grade teachers, impacted fourth grade student academic achievement in reading as measured by iReady.

The ANOVA sought to determine which class grew the most in fourth grade students' perceptions of their intelligence. The data revealed that Teacher Heather's class had the most growth, whereas Teacher Lucy and Teacher Katie's classes came in second with a tie score. Teacher post-intervention interviews were conducted after the intervention was complete. The teacher post-intervention interviews resulted in four themes. Themes that surfaced were (a) intentional vocabulary, (b) safe learning environment, (c) growth mindset, and (d) fixed mindset. Post-intervention teacher interviews showed improvements in growth mindset at

both the teacher and student level. Teachers adopted a growth mindset in their philosophy. They also demonstrated awareness of the way they spoke in class. Regardless of a personality inclination, specific forms of feedback children get from adults can directly cause patterns of thinking. In a series of experiments, (Kamins & Dweck, 1999), as well as Mueller and Dweck (1998) found that criticism and praise from adults can directly create mastery-oriented (growth mindset) or helpless vulnerability. Teachers' awareness about the way they talk to their students is thus crucial as it is likely to encourage more thoughtful interactions which can positively impact students' growth mindsets. One concern that was disclosed during the post-intervention teacher interviews was how to change a fixed mindset. Post-intervention teacher interviews also indicated that teachers needed to set up their classrooms as a safe zone for deeper learning to take place.

Following the implementation of the growth mindset strategies in class, a convenience sample of the students in the intervention group participated in a post-intervention interview to answer Research Questions 1 and 2. The student post-intervention interviews resulted in four themes: (a) description of growth mindset, (b) brain, (c) mistakes, and (d) motivation. Thirteen students participated in the post-intervention interviews. Student responses aligned with research about growth mindset which suggests that psychological interventions with certain characteristics bring about better student outcomes such as recognizing a fixed mindset, recognizing mistakes which offer opportunities for struggle and neurons growing, and setting motivating goals to increase student achievement. Similar interventions that are psychologically precise (Walton, 2014), contextually developed, subtle, and recursive (Yeager & Walton, 2011) tend to improve students' academic motivation and academic achievement (Blackwell et al., 2007; Haimovitz et al., 2011) as students increasingly understand that their brain is like a muscle that gets stronger with use (i.e., that intelligence is malleable). One student recognized this connection from the brain science growth mindset

lessons. Another student shared how giving up was not an option, which was explicitly taught by teachers during in-class lessons.

During the five-month intervention, teachers journaled responses to questions that pertained to the growth mindset strategies they were implementing in the class. Entries in teacher journals were analyzed using a grounded theory approach with the help of a computer program, MAXQDA, to carry out open coding, axial coding, and selective coding. Participant responses were coded and analyzed to identify themes and patterns of perspectives. The study was based on the theoretical undertones that it may be necessary to offer students an alternative to the traditional growth mindset intervention if teachers find students leaning towards a learned helplessness mentality.

The qualitative journal data that were collected during the intervention revealed some major themes about teachers' implementation of growth mindset strategies and the changes they saw in their classrooms throughout the implementation. The data indicated that teachers were intentionally teaching growth mindset strategies. The data also indicated that teachers were mostly focused on changing the way they speak in class, particularly how they chose to praise students. The data also showed that teachers demonstrate a willingness to foster a safe learning environment by celebrating mistakes and creating a sense of belonging. This willingness has positive implications for students' motivation and behavior; Research highlights how teacher mindsets about the intelligence of their students and ability can, in turn, impact students' beliefs about intelligence, which can subsequently impact students' motivation and behavior positively (Lusk & Jones, 2011). The implementation of growth mindset strategies resulted in a safer classroom environment.

**Research Question 3**

The third research question was: In what ways does the implementation of growth mindset strategies, based on an online growth mindset professional development for fourth

grade teachers, impact fourth grade student academic achievement in reading as measured by iReady. The pre- and post-intervention assessment data of student academic achievement were analyzed using a one-way analysis of variance (ANOVA). A null hypothesis was developed concerning the impact a growth mindset professional development had on student academic achievement. The null hypothesis stated that there was no statistically significant relationship between the growth mindset professional development and student academic achievement in reading. The null hypothesis was accepted based on the results of the ANOVA. The data indicated that there was no significant increase in student academic achievement in reading.

## Implications for Practice

The achievement gap between underserved students, particularly Hispanic students and other students, is wide (Muhammad, 2015). Dweck (2010) states that students with a fixed mindset lag far behind students with a growth mindset, particularly in mastering academic content. The findings of this study have far-reaching implications for classroom teachers, administrators, students, and parents. The results and summary of the findings support: (a) non-cognitive specific interventions, specifically growth mindset strategies, as they increase students' perceptions of their intelligence; (b) participation in growth mindset professional development which enhances classroom culture and students' growth mindset; and (c) an online growth mindset professional development for teachers which is relatively easy to replicate, therefore creating a system of sustainability within schools for continuing the practice.

This study's findings emphasize the importance of classroom teachers' buy-in of the psychological intervention that was delivered. It provides fodder from which school leaders can draw from when implementing these types of interventions for their teachers' and students' benefit. The teachers in this study consistently reiterated the learning they gleaned

about growth mindset from the online professional development intervention and expanded on the way the intervention helped them to deliver growth mindset strategies that created a safe and positive culture in their classrooms. When teachers learn about topics such as belonging, growth mindset, fixed mindset, brain science, praising the process, tasks that promote a struggle, celebrating mistakes, and open-ended assessments, they increase their knowledge about growth mindset strategies. They are thus better trained to deliver effective lessons. The implication is that there is a connection between intentional growth mindset strategy implementation and an increase in student growth mindset.

For administrators who might consider using this model at their school site, this study shows that sustaining a growth mindset professional development is relatively easy to replicate. The online platform provides free and easy access to growth mindset research, video clips, and classroom activities that can be completed in class. The results of the analyses of the post-intervention teacher interviews indicated that, while participating in the professional development and delivering the growth mindset strategies, it would be helpful for teachers to have regular discussions as a means for collaboration and accountability. This study also reported that the impact of the growth mindset professional development trickled down into the teachers' personal lives as they increasingly adopted the growth mindset strategies beyond the confines of their classrooms, which is suggestive of the effectiveness of the program. Administrators might consider making growth mindset a theme and offering professional development opportunities to teachers, assemblies for students, high visibility exposure to growth mindset around the campus, and training to parents to support the psychological intervention at home.

## Limitations and Recommendations for Further Research

One limitation of this study was that the findings did not explain a comparison of students' academic achievement in reading between the intervention and control groups.

Future research concerning academic achievement might consider following a cohort of students over a longer period. This study was conducted over a six months. It would behoove a future researcher to analyze growth data over a whole school year or beyond. It would also be wise to implement this psychological intervention district-wide. Instead of an autonomous, individually-paced professional development, it would be beneficial to roll out a growth mindset professional development at the district level using a trainer of trainers' model which would allow trained professionals to, in turn, coach others. The training approach used in this study could be expanded to the district level, for example, to administrators and academic coaches, who could be trained on each online growth mindset module. They could then take the learning back to each respective school site and deliver a monthly professional development. However, teachers should be provided time to discuss the new learning and plan for implementation in their classes. Follow-up training sessions would include learning, planning, discussion, self-reflection, assessment of the implementation, and data analysis.

The benefits of implementing a growth mindset professional development outweigh the negative connotation of taking time away from other learning topics at the district and the site level; both teachers and students gain in growth mindset which translated into a safer and more trusting school environment. Additional recommendations for future research include: district-wide monitoring of the professional development through teacher journaling and teacher interviews, creating space on the calendar to train teachers, monitoring fidelity and accountability of implementation, extending the research time to the whole school and beyond, and then analyzing the data to see if there was an increase in student academic achievement. The researcher recommends a two-year case study analysis of the impact that a growth mindset professional development may have on teachers and students, specifically a longitudinal study that could examine a cohort more in-depth for a longer period. The

researcher also recommends a deeper examination of the teachers who deliver growth mindset strategies. The findings from this study indicated that Teacher Heather had the highest increase in students' perceptions of their intelligence. It would be of interest to look at the data over a two-year period and analyze the trend in Teacher Heather's implementation and the impact of growth mindset strategies over time. Time could be embedded within the school day for growth mindset instruction. This would provide a platform for teachers to learn from one another on the best teaching strategies to teach about growth mindset, creating an internal collaborative peer professional development.

## Conclusions

Addressing the whole child is imperative to the success of students. Beyond focusing merely on academics, teachers need to understand how to engage and motivate learners. In the realm of mindsets, there are a set of beliefs that state that intelligence is not fixed but can be changed and enhanced over time through one's effort (Dweck & Leggett, 1988; Dweck et al., 2011). Angela Duckworth (2013) states that non-cognitive character traits (grit, growth mindset, self-discipline, dedication to task, etc.) are predictive of success.

The findings of this study suggest that an online growth mindset professional development impacts students' and teachers' mindsets positively. It is reassuring to find that the delivery of growth mindset strategies in the classroom nurtured through a free online professional development can shape and mold a new paradigm for students and teachers. Educational leaders have the power and the opportunity to employ growth mindset strategies in the classroom; therefore, affecting change on an individual and broader institutional level.

## Summary

Within this chapter, a summary of the results of the study was discussed in detail. The findings related to each of the three research questions were discussed both quantitatively and qualitatively. Implications for practice were considered, and

recommendations for future research were provided. The research findings: (a) support non-cognitive specific interventions, specifically growth mindset strategies, which increase students' perceptions of their intelligence; (b) participation in growth mindset professional development which enhances classroom culture and students' growth mindset; and (c) an online growth mindset professional development for teachers which is relatively easy to replicate, therefore creating a system of sustainability within schools for continuing the practice.

# REFERENCES

ACT. (2017). Underserved learners lag behind peers in college & career readiness according to 2017 ACT score results. Retrieved from https://www.act.org/content/act/en/newsroom/underserved-learners-behind-peers-in-college-career-readiness.html

American Educational Research Association. (1999). *Standards for Educational & Psychological Testing*. Retrieved from http://www.aera.net/Publications/Books/Standards-for-Educational-Psychological-Testing

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology*, *80*(3), 260–267.

Anderman, L. H. (2003). Academic and social perceptions as predictors of change in middle school students' sense of school belonging. *The Journal of Experimental Education*, *72*(1), 5–22.

Aronson, J., Fried, C. B., & Good, C. (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of Experimental Social Psychology*, *38*(2), 113–125. doi:10.1006/jesp.2001.1491

Bandura, A. (1989). Social cognitive theory. In R. Vasta (6th Ed.), *Annals of child development: Six theories of child development* (pp. 1-60). Greenwich, CT: JAI Press

Bandura, M. M., & Dweck, C. S. (1988). *The relationship of conceptions of intelligence and achievement goals to achievement-related cognition, affect and behavior*. Unpublished manuscript, Harvard University, Cambridge, Massachusetts.

Bjorklund-Young, A. (2016). *Do formative assessments influence student learning?: Research on i-Ready and MAP.* Retrieved from the Johns Hopkins Institute for Education Policy website: https://edpolicy.education.jhu.edu/formative-assessments/

Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development*, *78*(1), 246–263. doi:10.1111/j.1467-8624.2007.00995.x

Boaler, J. (1998). Open and closed Mathematics: Student experiences and understandings. *Journal for Research in Mathematics Education*, *29*(1), 41–62. doi:10.2307/749717

Boaler, J. (2013). Ability and Mathematics: the mindset revolution that is reshaping education. *FORUM*, *55*(1), 143-152. doi:10.2304/forum.2013.55.1.143

Bowling, A. (1997). *Research methods in health: Investigating health and health services* (2nd ed.). Philadelphia, PA: Open University Press.

Brown, M. (2011, December 9). How driving a taxi changes london cabbies' brains. *WIRED*. Retrieved from https://www.wired.com/2011/12/london-taxi-driver-memory/

Burnette, J. L., O'Boyle, E. H., VanEpps, E. M., Pollack, J. M., & Finkel, E. J. (2013). Mind-sets matter: A meta-analytic review of implicit theories and self-regulation. *Psychological Bulletin*, *139*(3), 655–701. doi:10.1037/a0029531

Burns, N., & Grove, S. (1997). *The practice of nursing research: Conduct, critique and utilization* (3rd ed.). Philadelphia, PA: WB Saunders Company.

California Assessment of Student Performance and Progress (2016). *Test results for English Language Arts /Literacy and Mathematics.* Retrieved from http://caaspp.cde.ca.gov/sb2016/

California Department of Education. (n.d.). *California Assessment of Student Performance and Progress (CAASSP) results*. Retrieved from https://caaspp.cde.ca.gov/

Charmaz, K. (n.d.). Constructionism and the grounded theory, In J. A. Holstein & J. F. Gubrium (Eds.), *Handbook of constructionist research* (pp. 397-412). New York, NY: The Guildford University Press.

Claro, S., Paunesku, D., & Dweck, C. S. (2016). Growth mindset tempers the effects of poverty on academic achievement. *Proceedings of the National Academy of Sciences*, *113*(31), 8664–8668. doi:10.1073/pnas.1608207113

Crandall, V. C., Crandall, V. J., & Katkovsky, W. (1965). A children's social desirability questionnaire. *Journal of Consulting Psychology*, *29*, 27–36. doi:10.1037/h0020966

Crandall, Virginia C., Katkovsky, W., & Crandall, V. J. (1965). Children's belief in their own control of reinforcements in intellectual-academic achievement situations. *Child Development*, *36*(1), 91–109.

Creswell, J. W. (2013.). Steps in conducting a scholarly mixed methods study. *Discipline-Based Research Group Speaker Series*, 48. Retrieved from https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1047&context=dberspeakers

Creswell, J., & Plano, V. (2018). *Designing and conducting mixed methods research*. London, UK: Sage.

Creswell, J.W. (2013). *Qualitative inquiry & research design: Choosing among five approaches*. Thousand Oaks, CA: Sage.

De Bode, S., Fritz, S. L., Weir-Haynes, K., & Mathern, G. W. (2009). Constraint-induced movement therapy for individuals after cerebral hemispherectomy: A case series. *Physical Therapy*, *89*(4), 361–369. doi:10.2522/ptj.20070240

Diener, C. I., & Dweck, C. S. (1978). An analysis of learned helplessness: Continuous changes in performance, strategy, and achievement cognitions following failure.

*Journal of Personality and Social Psychology*, *36*(5), 451–462. doi: 10.1037/0022-3514.36.5.451

Duckworth, A. (2016). *Grit the power of passion and perservance*. New York, NY: Scribner.

Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, *92*(6), 1087–1101. doi: 10.1037/0022-3514.92.6.1087

Duckworth, A. L., Kirby, T. A., Tsukayama, E., Berstein, H., & Ericsson, K. A. (2011). Deliberate practice spells success: Why grittier competitors triumph at the National Spelling Bee. *Social Psychological and Personality Science*, *2*(2), 174–181. doi:10.1177/1948550610385872

Dweck, C. (1999). *Self-theories: Their role in motivation, personality, and development*. New York, NY: Psychology Press.

Dweck, C. S. (2006). *Mindset, The new psychology of success: How we can learn to fulfill our potential.* New York, NY: Ballatine Books.

Dweck, C. S. (2007). The perils and promises of praise. *Educational Leadership*, *65*(2), 34–39.

Dweck, C. S. (2010). Even geniuses work hard. *Educational Leadership*, *68*(1), 16-20.

Dweck, C. S. (2010). Mind sets and equitable education. *Principal Leadership*, *10*(5), 26-29.

Dweck, C. S. (2015). Carol Dweck revisits the growth mindset. *Education Week.* Retrieved from https://www.edweek.org/ew/articles/2015/09/23/carol-dweck-revisits-the-growth-mindset.html

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, *95*(2), 256–273.

Dweck, C. S., Davidson, W., Nelson, S., & Enna, B. (1978). Sex differences in learned helplessness: II. The contingencies of evaluative feedback in the classroom and III.

An experimental analysis. *Developmental Psychology*, *14*(3), 268–276. doi:10.1037/0012-1649.14.3.268

Dweck, C. S. (2000). *Essays in social psychology: Self-theories their role in motivation, personality, and development*. New York, NY: Psychology Press.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Bulletin*, 256–273.

Dweck, C. S., & Sorich, L. A. (n.d.). Coping: The psychology of what works. In C. R. Snider, *Mastery-Oriented thinking* (pp. 232-251). Oxford, UK: Oxford University Press doi: 10.1093/med:psych/9780195119343.003.0011

Dweck, C. S., Chiu, C., & Hong, Y. (1995). Implicit theories and their role in judgments and reactions: A word from two perspectives. *Psychological Inquiry*, *6*(4), 267–285. doi:10.1207/s15327965pli0604_1

Education Data [Ed Data]. (n.d.). Education parternship CDE/edsource. Retrieved from https://www.ed-data.org/

Elliot, A. J. (2007). A conceptual history of the achievement goal construct. In *Handbook of competence and motivation.* (pp. 52–72). New York, NY: The Guilford Press.

Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance achievement goals and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology*, *70*(3), 461–475. doi:10.1037/0022-3514.70.3.461

Elliott, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology*, *54*(1), 5–12. doi:10.1037/0022-3514.54.1.5

Farrington, C. A., Roderick, M., Allensworth, E., Nagaoka, J., Keyes, T. S., Johnson, D. W., & Beechum, N. O. (2012). *Teaching adolescents to become learners: The role of noncognitive factors in shaping school performance--A critical literature review*.

Retrieved from the University of Chicago Consortium on School Research Website: https://consortium.uchicago.edu/publications/teaching-adolescents-become-learners-role-noncognitive-factors-shaping-school

Gardner, H. (1984). *Frames of mind: The theory of multiple intelligences* (3rd ed.). New York City, NY: Basic Books.

Good, C., Aronson, J., & Inzlicht, M. (2003). Improving adolescents' standardized test performance: An intervention to reduce the effects of stereotype threat. *Journal of Applied Developmental Psychology*, *24*(6), 645–662. doi: 10.1016/j.appdev.2003.09.002

Haimovitz, K., & Corpus, J. H. (2011). Effects of person versus process praise on student motivation: Stability and change in emerging adulthood. *Educational Psychology*, *31*(5), 595–609. https://doi.org/10.1080/01443410.2011.585950

Hochanadel, A., & Finamore, D. (2015). Fixed and growth mindset in education and how grit helps students persist in the face of adversity. *Journal of International Education Research*, *11*(1), 47-50.

Hong, Y., Dweck, C. S., Lin, D. M. –.S, & Wan, W. (1999). Implicit theories, attributions, and coping: A meaning system approach. *Journal of Personality and Social Psychology, 77*(3)*,* 588-599.

Johnston, M. V. (2009). Plasticity in the developing brain: Implications for rehabilitation. *Developmental Disabilities Research Reviews*, *15*(2), 94–101. doi:10.1002/ddrr.64

Kamins, M. L., & Dweck, C. S. (1999). Person versus process praise and criticism: Implications for contingent self-worth and coping. *Developmental Psychology*, *35*(3), 835–847.

Leggett, E. L. (1985, March). *Children's entity and incremental theories of intelligence: Relationships to achievement behavior*. Paper presented at the annual meeting of the Eastern Psychological Association, Boston.

Licht, B. G., & Dweck, C. S. (1984). Determinants of academic achievement: The interaction of children's achievement orientations with skill area. *Developmental Psychology*, *20*(4), 628–636. doi:10.1037/0012-1649.20.4.628

Lochmiller, C. R., & Lester, J. N. (2017). *An introduction to educational research: connecting methods to practice*. Thousand Oaks, CA: Sage.

Lunenburg, F. C., & Irby, B. J. (2008). *Writing a successful thesis or dissertation*. Thousand Oaks, CA: Corwin Press.

Maguire, E. A., Nannery, R., & Spiers, H. J. (2006). Navigation around London by a taxi driver with bilateral hippocampal lesions. *Brain: A Journal of Neurology*, *129*(11), 2894–2907. doi:10.1093/brain/awl286

Mangels, J. A., Butterfield, B., Lamb, J., Good, C., & Dweck, C. S. (2006). Why do beliefs about intelligence influence learning success? A social cognitive neuroscience model. *Social Cognitive and Affective Neuroscience*, *1*(2), 75–86. doi:10.1093/scan/nsl013

Maxwell, J. (2013). *Qualitative research design: An interactive approach*. Thousand Oaks, CA: Sage.

McMillan, J. H., (2008). Student self-assessment: The key to stronger student motivation and higher achievement. *Educational Horizons, 87(1)* 40-49.

Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychologu*, *75*(1), 33–52. doi:10.1037/0022-3514.75.1.33

Muhammad, A. (2015). *Overcoming the achievement gap trap: Liberating mindsets to affect change*. Bloomington, IN: Solution Tree Press.

Nettelbeck, T., & Wilson, C. (2005). Intelligence and IQ: What teachers should know. *Educational Psychology*, *25*(6), 609–630. doi:10.1080/01443410500344696

Newman, B. M., & Newman, P. R. (2007). *Theories of human development*. Mahwah, NJ: Lawrence Erlbaum Associates.

Oettingen, G. (2000). Expectancy effects on behavior depend on self-regulatory thought. *Social Cognition*, *18*(2), 101–129. doi:10.1521/soco.2000.18.2.101

Overmier, J. B. (2002). On learned helplessness. *Integrative Physiological & Behavioral Science*, *37*(1), 4–8. doi:10.1007/BF02688801

Overmier, J. B., & Seligman, M. E. (1967). Effects of inescapable shock upon subsequent escape and avoidance responding. *Journal of Comparative and Physiological Psychology*, *63*(1), 28–33. doi:10.1037/h0024166

Pajares, F., & Schunk, D. (2002). Self and self-belief in psychology in psychology and education: A historical perspective. In J. Aronson (Ed.), *Improving Academic Achievement* (pp. 1-31). New York, NY: Academic Press.

Pal, H. R., Pal, A., & Tourani, P. (2004). Theories of intelligence. *Every Man's Science*, *45*(3), 181–192.

Rosen, J., Glennie, E., Dalton, B., Lennon, J., & Bozick, R. (2010). *Noncognitive skills in the classroom: new perspectives on educational research.* Research Triangle Park, NC: RTI Press.

Seidman, E., Allen, L., Aber, J. L., Mitchell, C., & Feinman, J. (1994). The impact of school transitions in early adolescence on the self-system and perceived social context of poor urban youth. *Child Development*, *65*(2), 507–522.

Seligman, M. E., & Maier, S. F. (1967). Failure to escape traumatic shock. *Journal of Experimental Psychology*, *74*(1), 1–9. doi:10.1037/h0024514

Siegler, R. S. (1992). The other Alfred Binet. *Developmental Psychology*, *28*(2), 179–190. doi:10.1037/0012-1649.28.2.179

Spray, C., Wang, J., Biddle, S., & Chatzisarantis, N. (2006). Understanding motivation in sport: An experimental test of achievement goal and self-determination theories. *European Journal of Sport Science, 6*(1), 43-51. doi:10.1080/17461390500422879

Sproull, N. (2016). *A mixed methods study examining the effects of a growth mindset intervention targeting high school football players* (Doctoral dissertation). Retrieved from https://jscholarship.library.jhu.edu/bitstream/handle/1774.2/40333/SPROULL-DISSERTATION-2016.pdf?sequence=1&isAllowed=y

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychologu*, *69*(5), 797–811.

Stipek, D., & Kowalski, P. (1989). Learned helplessness in task-orienting versus performance-orienting testing conditions. *Journal of Educational Psychology*, *81*(3), 384-391. doi:10.1037/0022-0663.81.3.384

Stoessner, S., & Good, C. (n.d.). *Stereotype Threat: An overview* [Pdf]. Retrieved from the University of Arizona website: https://diversity.arizona.edu/sites/default/files/stereotype_threat_overview.pdf.

The Nation's Report Card. (n.d.). NAEP report cards - Home. Retrieved from https://www.nationsreportcard.gov/

Curriculum Associates (2014). *The Science Behind i-Ready's Adaptive Diagnostic*. Retrieved from the Curriculum Associates website: https://www.curriculumassociates.com/-/media/mainsite/files/i-ready/iready-science-behind-iready-adaptive-diagnostic-2014.pdf?la=en&hash=08DAC3D14006DBD6F46A8A9797E38AF1.

Thompson, E. P., & Thompson, D. (2001). *The essential E.P. Thompson*. New York, NY: The New York Press.

Triangulation. (2018). In *Wikipedia*. Retrieved from https://en.wikipedia.org/w/index.php?title=Triangulation_(social_science)&oldid=827965374

Walton, G. M. (2014). The new science of wise psychological interventions. *Current Directions in Psychological Science*, *23*(1), 73–82. doi:10.1177/0963721413512856

Weiner, B. (1990). History of motivational research in education. *Journal of Educational Psychology*, *82*(4), 616–622. doi:10.1037/0022-0663.82.4.616

Weis, L., & Fine, M. (2000). *Speed bumps: A student friendly guide to qualitative research*. New York, NY: Teachers College Press.

Yeager, D. S., & Walton, G. M. (2011). Social-psychological interventions in education: They're not magic. *Review of Educational Research*, *81(2)*, 267. doi:10.3102/0034654311405999

Yeager, D. S., Romero, C., Paunesku, D., Hulleman, C. S., Schneider, B., Hinojosa, C., … Dweck, C. S. (2016). Using design thinking to improve psychological interventions: The case of the growth mindset during the transition to high school. *Journal of Educational Psychology*, *108*(3), 374–391. doi:10.1037/edu0000098

# APPENDICES

## Appendix A

### Pre-Intervention Student Interview Questions

The qualitative interview questions will be administered to each of the five students from the participating classrooms ($n$ = 20) (Intervention Group) are based loosely on the PERTs Mindset questions. These interview questions are the start of the exploratory sequential mixed methods study and will be used to determine the focus of the professional development to implement Growth Mindset strategies.

These questions have been validated by giving the questions to five students and five teachers and my dissertation chair to review for clarity, precise language, and to obtain the desired understandable outcome.

1. Do you believe you can grow your intelligence?

a. Tell me more about why you think that.

2. Do you believe you can meet all your learning goals for your class in reading?

a. Tell me more about why you think that. b. What would help you to achieve your learning goals in reading?

3. Do you feel safe sharing your mistakes in your class?

a. If so, what would be an example of a mistake you shared in class?

b. If not, what would help you to feel comfortable sharing your mistakes in your class?

4. Do you ever feel like giving up when school work gets challenging?

a. Tell me more about what that looks like.

# Appendix B

## Pre-/Post-Intervention Student Survey

An adaptation of the PERTS Mindset Meter questions will be used to address the intelligence of fourth graders. The questions will be based on a Likert Scale consisting of *completely agree, agree, neutral, disagree, completely disagree.*

Likert-type or frequency scales use fixed choice response formats and are designed to measure attitudes or opinions (Bowling, 1997; Burns & Grove, 1997).

The scale includes a five-point Likert-type questions. Anchors of scale were 1 (*completely agree*), 2 (*agree*), 3 (*neutral*), 4 (*disagree*), and 5 (*completely isagree*).

There are specific constructs and questions each participating fourth grader will be assessed on:

Intelligence

1. The more I learn, the smarter I become.
2. I can change how intelligent I am through hard work.
3. I have a certain amount of intelligence and I can grow my intelligence.

Self-Efficacy

4. I can do well on tests, even if they are difficult.
5. I can master the hardest topics in this class,
6. I can meet all the learning goals my teacher and I set for this class.

Celebrating Mistakes

7. In my class, making mistakes helps us to learn.
8. In my class, I am okay with sharing my mistakes because it can help my classmates learn.
9. In my class, we celebrate mistakes.

Praising the Process

10. When I struggle with school work, that means I am not smart.

11. I believe that trying hard helps me to work through challenging assignments.

12. Even though the work may be difficult, I will not give up.

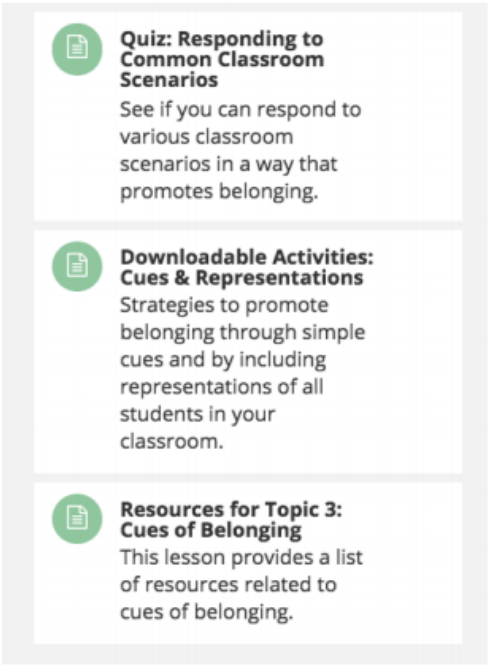
# Appendix C

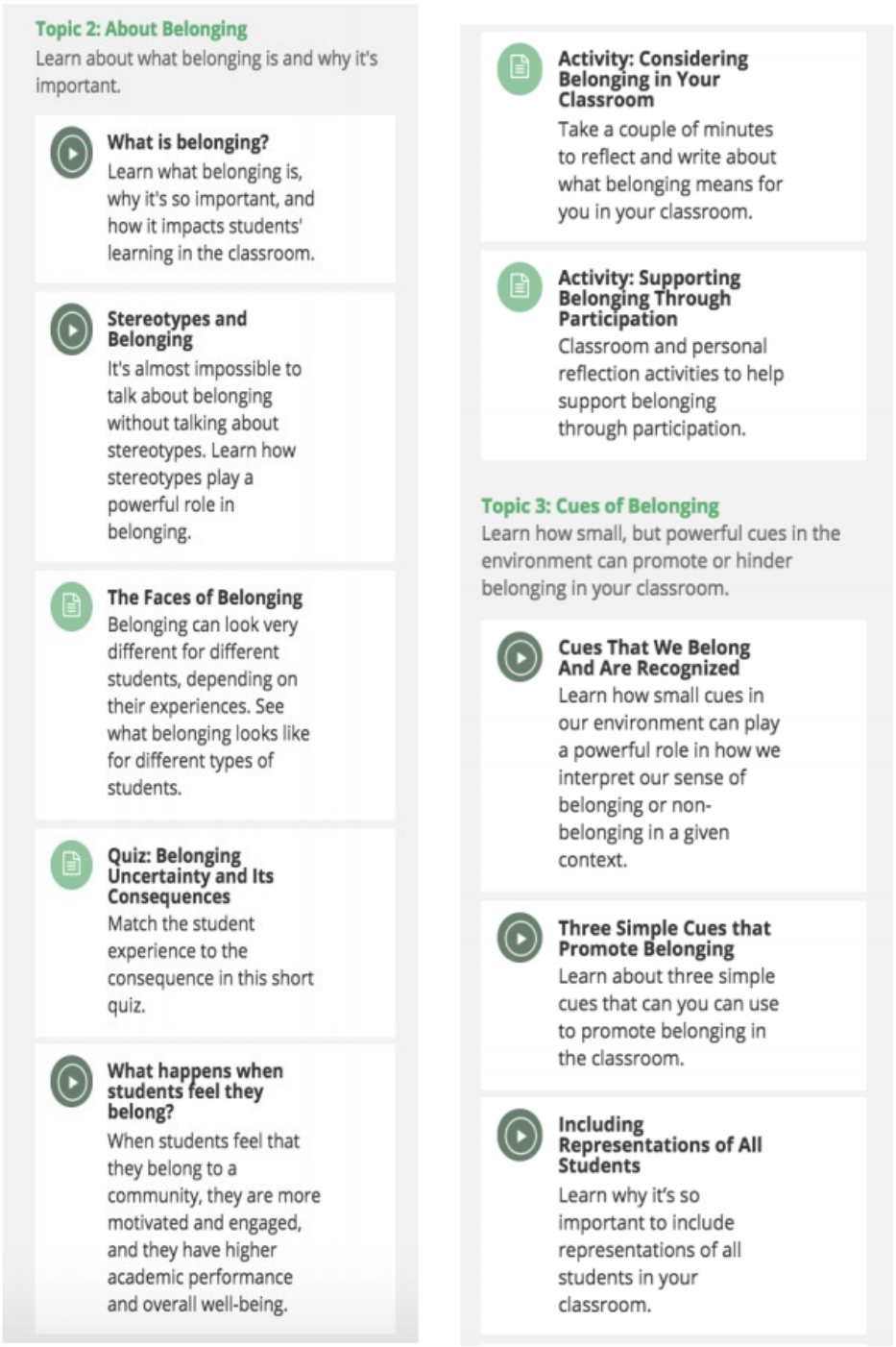
## Seven Professional Development Online Sessions

Teachers will access an online professional development (https://www.mindsetkit.org/) and complete 7 modules consisting of: Belonging for Educators, Growth Mindset, Teaching Growth Mindset, Praise the Process - Not the Person, Celebrating Mistakes, Give Tasks that Promote Struggle and Growth, and Assessments for a Growth Mindset.

See examples of the 7 module topics below.

Note: Approval was given to the researcher to use the module lessons, website for training, and student questions. See Appendix for approval.



**Topic 2: About Belonging**

Learn about what belonging is and why it's important.

**What is belonging?**
Learn what belonging is, why it's so important, and how it impacts students' learning in the classroom.

**Stereotypes and Belonging**
It's almost impossible to talk about belonging without talking about stereotypes. Learn how stereotypes play a powerful role in belonging.

**The Faces of Belonging**
Belonging can look very different for different students, depending on their experiences. See what belonging looks like for different types of students.

**Quiz: Belonging Uncertainty and Its Consequences**
Match the student experience to the consequence in this short quiz.

**What happens when students feel they belong?**
When students feel that they belong to a community, they are more motivated and engaged, and they have higher academic performance and overall well-being.

**Activity: Considering Belonging in Your Classroom**
Take a couple of minutes to reflect and write about what belonging means for you in your classroom.

**Activity: Supporting Belonging Through Participation**
Classroom and personal reflection activities to help support belonging through participation.

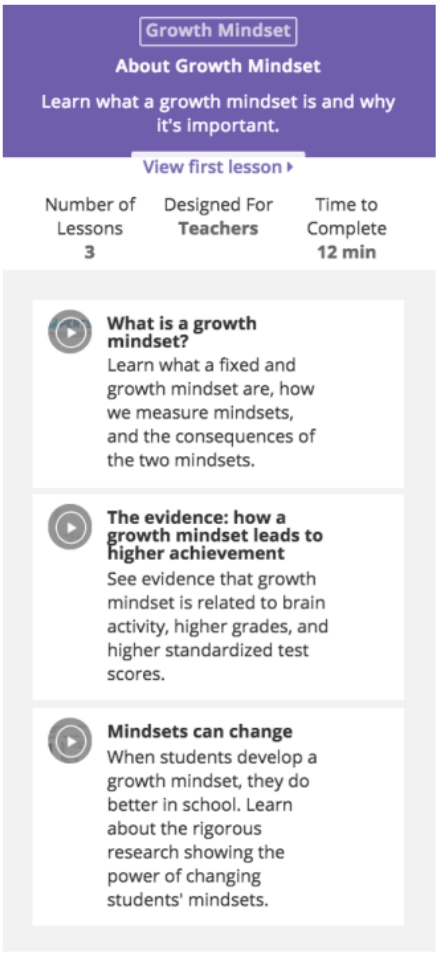
**Topic 3: Cues of Belonging**

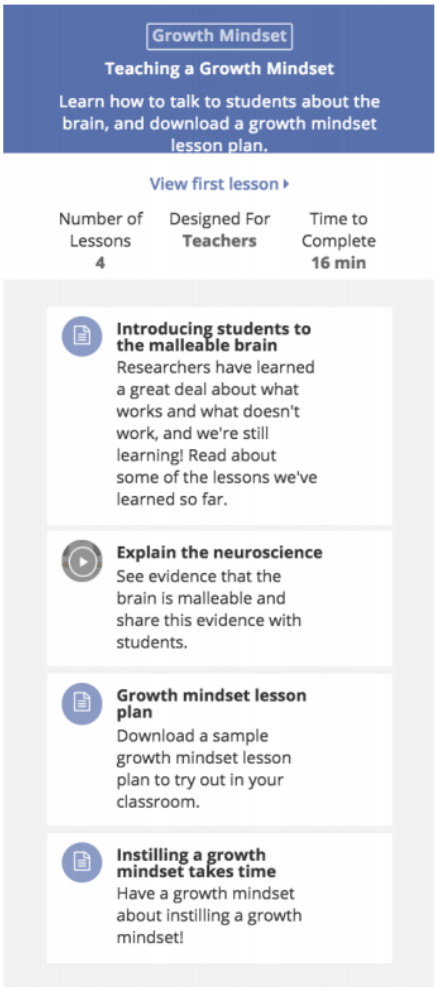
Learn how small, but powerful cues in the environment can promote or hinder belonging in your classroom.

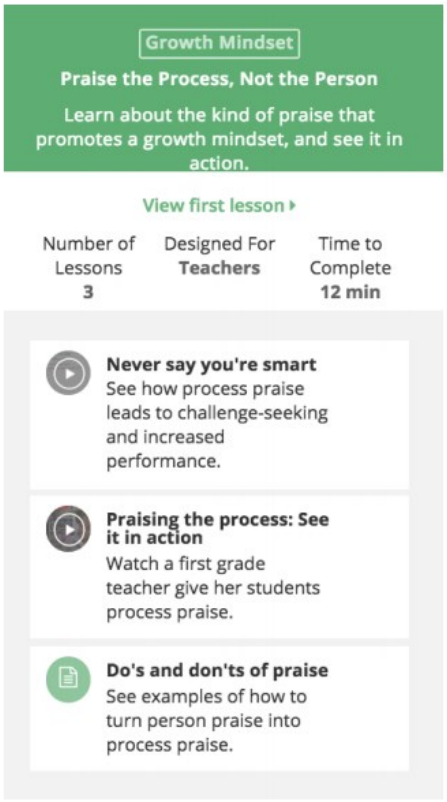
**Cues That We Belong And Are Recognized**
Learn how small cues in our environment can play a powerful role in how we interpret our sense of belonging or non-belonging in a given context.

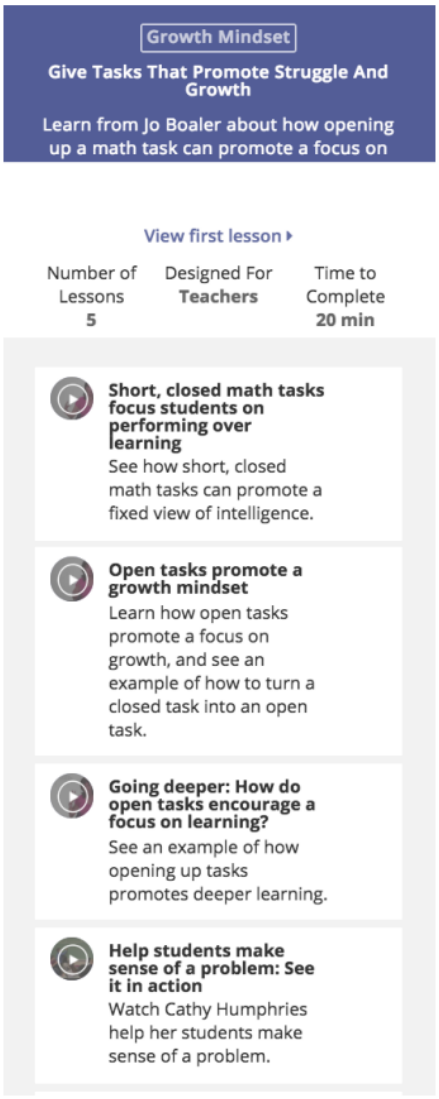
**Three Simple Cues that Promote Belonging**
Learn about three simple cues that can you can use to promote belonging in the classroom.

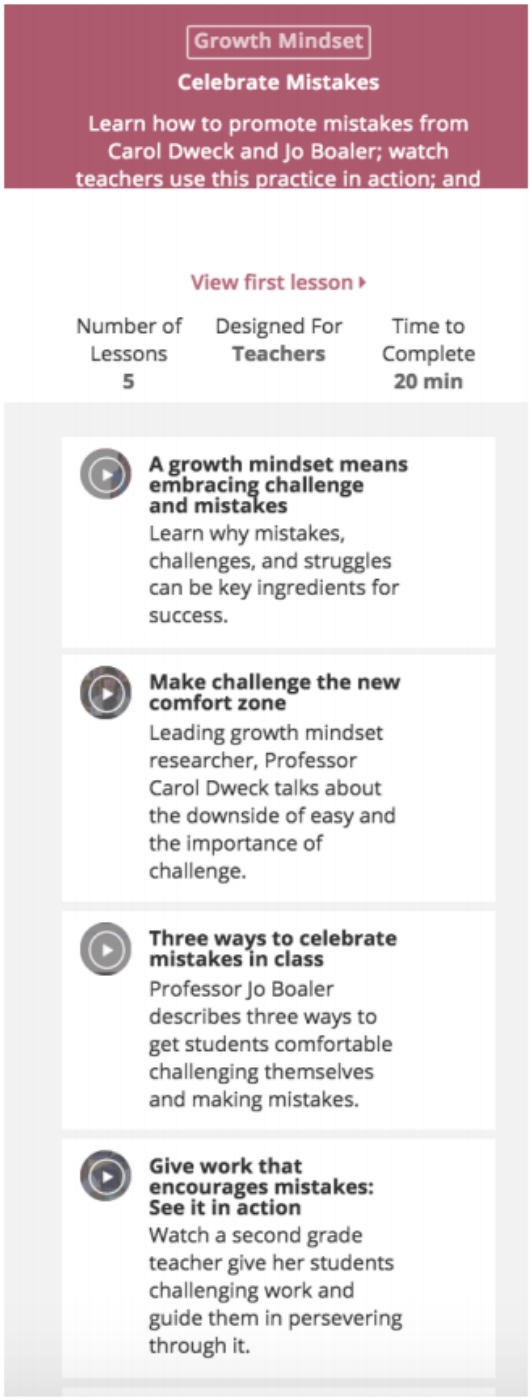
**Including Representations of All Students**
Learn why it's so important to include representations of all students in your classroom.

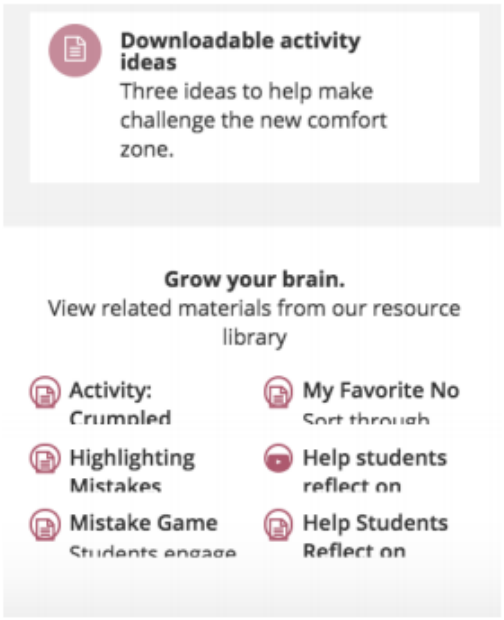

Growth Mindset
About Growth Mindset
Learn what a growth mindset is and why it's important.
View first lesson
Number of Lessons 3
Designed For Teachers
Time to Complete 12 min
What is a growth mindset?
Learn what a fixed and growth mindset are, how we measure mindsets, and the consequences of the two mindsets.
The evidence: how a growth mindset leads to higher achievement
See evidence that growth mindset is related to brain activity, higher grades, and higher standardized test scores.
Mindsets can change
When students develop a growth mindset, they do better in school. Learn about the rigorous research showing the power of changing students' mindsets.


Growth Mindset
Teaching a Growth Mindset
Learn how to talk to students about the brain, and download a growth mindset lesson plan.
View first lesson
Number of Lessons 4
Designed For Teachers
Time to Complete 16 min
Introducing students to the malleable brain
Researchers have learned a great deal about what works and what doesn't work, and we're still learning! Read about some of the lessons we've learned so far.
Explain the neuroscience
See evidence that the brain is malleable and share this evidence with students.
Growth mindset lesson plan
Download a sample growth mindset lesson plan to try out in your classroom.
Instilling a growth mindset takes time
Have a growth mindset about instilling a growth mindset!

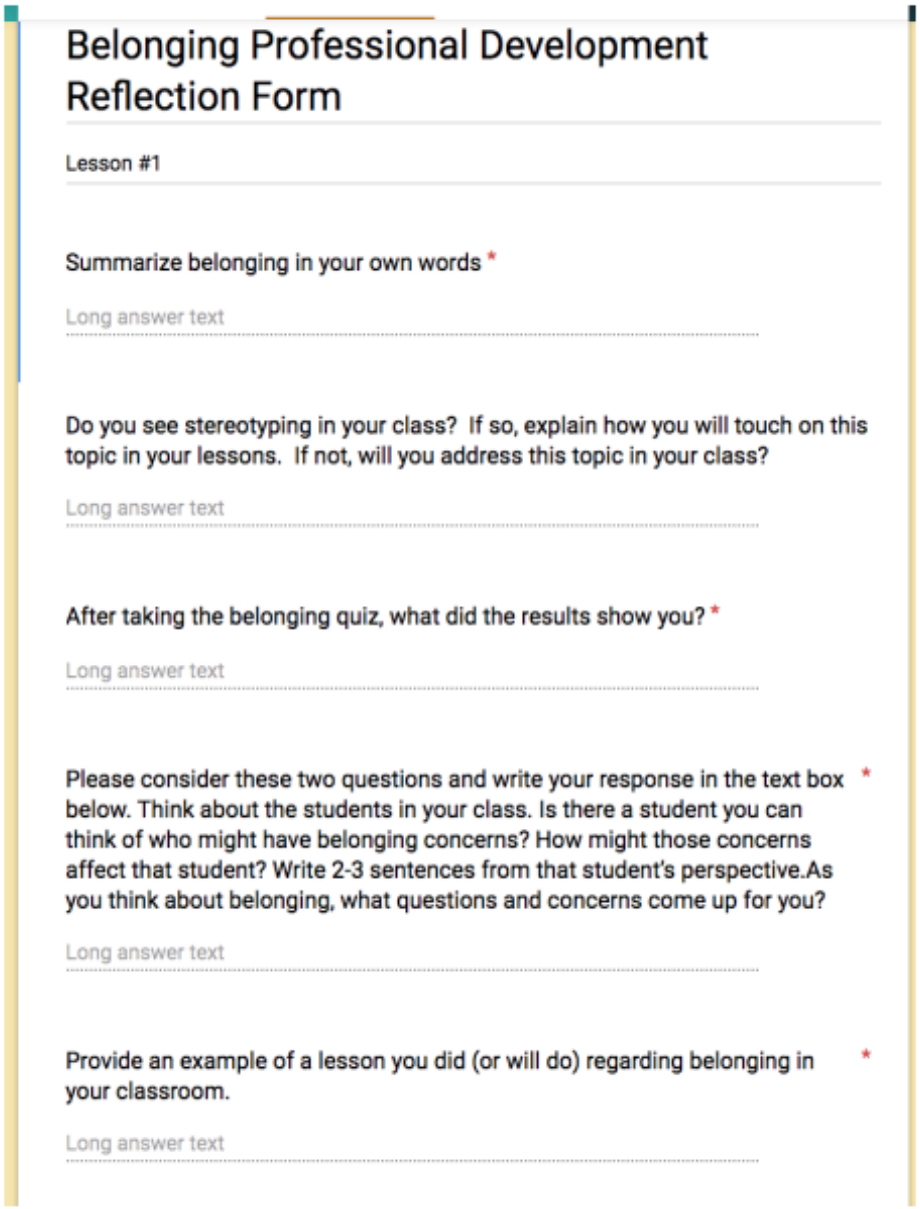

Growth Mindset
Praise the Process, Not the Person
Learn about the kind of praise that promotes a growth mindset, and see it in action.
View first lesson
Number of Lessons 3
Designed For Teachers
Time to Complete 12 min
Never say you're smart
See how process praise leads to challenge-seeking and increased performance.
Praising the process: See it in action
Watch a first grade teacher give her students process praise.
Do's and don'ts of praise
See examples of how to turn person praise into process praise.


Growth Mindset
Give Tasks That Promote Struggle And Growth
Learn from Jo Boaler about how opening up a math task can promote a focus on
View first lesson
Number of Lessons 5
Designed For Teachers
Time to Complete 20 min
Short, closed math tasks focus students on performing over learning
See how short, closed math tasks can promote a fixed view of intelligence.
Open tasks promote a growth mindset
Learn how open tasks promote a focus on growth, and see an example of how to turn a closed task into an open task.
Going deeper: How do open tasks encourage a focus on learning?
See an example of how opening up tasks promotes deeper learning.
Help students make sense of a problem: See it in action
Watch Cathy Humphries help her students make sense of a problem.


Growth Mindset
Celebrate Mistakes
Learn how to promote mistakes from Carol Dweck and Jo Boaler; watch teachers use this practice in action; and
View first lesson
Number of Lessons 5
Designed For Teachers
Time to Complete 20 min
A growth mindset means embracing challenge and mistakes
Learn why mistakes, challenges, and struggles can be key ingredients for success.
Make challenge the new comfort zone
Leading growth mindset researcher, Professor Carol Dweck talks about the downside of easy and the importance of challenge.
Three ways to celebrate mistakes in class
Professor Jo Boaler describes three ways to get students comfortable challenging themselves and making mistakes.
Give work that encourages mistakes: See it in action
Watch a second grade teacher give her students challenging work and guide them in persevering through it.


Downloadable activity ideas
Three ideas to help make challenge the new comfort zone.
Grow your brain.
View related materials from our resource library
Activity:
My Favorite No
Highlighting
Help students
Mistake Game
Help Students

**Teacher Proof of Professional Development Completion**



Belonging Professional Development Reflection Form

Lesson #1

Summarize belonging in your own words *

Long answer text

Do you see stereotyping in your class? If so, explain how you will touch on this topic in your lessons. If not, will you address this topic in your class?

Long answer text

After taking the belonging quiz, what did the results show you? *

Long answer text

Please consider these two questions and write your response in the text box below. Think about the students in your class. Is there a student you can think of who might have belonging concerns? How might those concerns affect that student? Write 2-3 sentences from that student's perspective.As you think about belonging, what questions and concerns come up for you? *

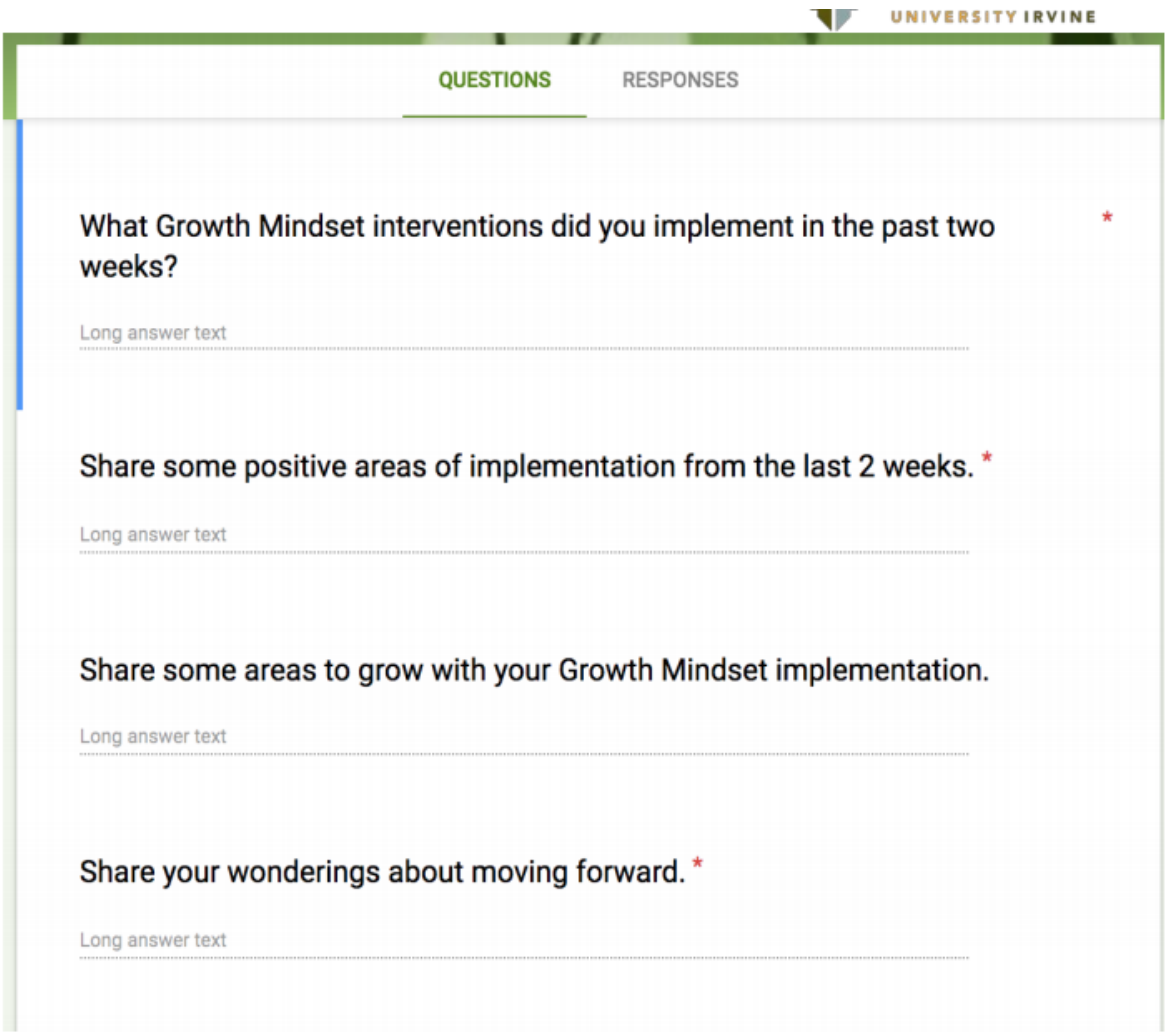
Long answer text

Provide an example of a lesson you did (or will do) regarding belonging in your classroom. *

Long answer text

# Appendix D

## Teacher Reflection Form



# Appendix E

## Student Post-Intervention Interview Questions

1. How would you describe a person with a growth mindset?

a. Can you provide me with an example of a time you chose a growth mindset?

2. What are your thoughts on your brain growing?

a. Do you believe you can grow your brain neurons and become smarter?

- Tell me more about that.

3. What are your thoughts on sharing your mistakes with your classmates and/or your teacher?

a. Can you provide me with an example of a time you shared a mistake?

4. Do you feel motivated to do well in school?

a. Please tell me more about that.

**Teacher Post Intervention Interview Questions**

1. How would you describe a person with a growth mindset?

a. Can you provide me with an example of a time you or your students chose a growth mindset?

2. What are your thoughts on your brain growing?

a. Do you believe you can grow your brain neurons and become smarter?

- Tell me more about that.

3. What are your thoughts on sharing your mistakes with your colleagues?

a. Can you provide me with an example of a time you shared a mistake?

4. Do you think your students feel motivated to do well in school?

a. Please tell me more about that.

Appendix F

Student, Teacher, Parent Consent Forms

**Student Assent Form**

Date:

Dear fourth-grade student,

I am conducting a study to learn about student perception of intelligence and how it affects your thinking and your learning. I am asking for your help because I want to hear what you think about your classroom. It is important for educators to ask students about their thoughts on learning so you can help us become better educators. If you agree to be in this research study, you will complete a survey with twelve questions. The survey will be taken on your Chromebook and take about 15 minutes to complete. The survey will help us to determine if certain strategies in the classroom help you to grow in your perceptions and in academics. In addition, 5 students from each of the four classes will be asked interview questions on intelligence, how comfortable they are with mistakes, what they think about goals, and challenges in class. You can ask questions about the student survey and research study at any time. If you decide at any time you do not want to finish the survey, you can stop. The questions will be only about what you think and your opinions. There are no right or wrong answers because a survey is not a test. If you sign this paper, it means that you have read this and that you want to be in the research study. If you do not want to be in the research study, do not sign this paper. Being in the study is up to you and no one will be upset if you do not sign the paper or if you change your mind later.

Thank you,
Michelle Farrer, Mary Chapa Academy
Student, Concordia University Irvine
Your Signature: _____Date _____
Your Printed Name: _____

**Parental Informed Consent Form**

Dear Parent(s),

I am conducting a research study on Growth Mindset in our fourth-grade classrooms at Mary Chapa Academy and other schools within the district who wish to participate. The research study examines the impact of praising the process, celebrating mistakes, and learning about brain science as strategies to increase student perceptions of their intelligence and also the impact of such strategies that might increase student achievement. The study will last through the Fall and Winter of 2018. This research study is for my dissertation and is part of the requirements for my doctoral degree at Concordia University, Irvine, CA. I am writing to inform you of a student survey that will be administered during class time and to give you the opportunity to opt your child out of the survey and research study. Participation in this study involves having your child complete a 12-question survey on their Chromebook. The survey should take approximately 15 minutes to complete. In addition, 5 students from each of the four classes will be pulled from the class during their free time and asked interview questions on intelligence, how comfortable they are with mistakes, what they think about goals, and challenges in class.

The District Superintendent, has approved this research study for implementation in fourth grade in the Greenfield Union School District. One significance of the research study is learning how the Growth Mindset research can be practically applied by classroom teachers. By participating, the students will be helping teachers learn how to improve student perceptions of their intelligence and increase academic achievement. Dr. Catherine Webb, University Dissertation Chairperson, Site Academic Coach/Counselor and I will be the only people with access to the achievement and survey data collected. Students' identification number, rather than their names, will be used to sort and analyze data. Participating in the student survey is voluntary. You may contact me with any questions or concerns regarding

your child's participation. My phone number is 805-423-3671, and my email is mfarrer@greenfield.k12.ca.us. You may also speak with our school community liaison, Mr. Sergio Siguenza, who has been informed of this research study and has a copy of the survey questions.

Sincerely,

Michelle Farrer, Mary Chapa Academy

Student, Concordia University Irvine

Please return to your child's class.

☐ I DO give permission for my child's academic and survey data to be included in this research study.

☐ I do NOT give my permission for my child's academic and survey data to be included in this research study.

Student Name:_____

Signature of Parent/Guardian: _____

Printed Name of Parent/Guardian:_____Date: _____

**Información para los Padres y Forma de Consentimiento**

Fecha:

Queridos padres,

Estoy llevando a cabo un estudio de investigación sobre la mentalidad de crecimiento en nuestros salones de cuarto grado en la Academia Mary Chapa. El estudio de investigación examina el impacto de elogiar el proceso, celebrando los errores y aprendiendo sobre la ciencia del cerebro, como estrategias para aumentar las percepciones de los estudiantes sobre su inteligencia y también el impacto de tales estrategias que pueden aumentar el rendimiento estudiantil. El estudio durará hasta el otoño e invierno de 2018. Este estudio de investigación es para mí disertación y es parte de los requisitos para mi doctorado en la Universidad de Concordia, en Irvine, California.

Les escribo para informarles de una encuesta estudiantil que se administrará durante horas de clase y para darles la oportunidad de excluir a su hijo de la encuesta y del estudio de investigación. La participación en este estudio implica que su hijo complete una encuesta de 12 preguntas en su Chromebook. La encuesta debe tomar aproximadamente 15 minutos para completarse. Además, a 5 estudiantes de cada una de las cuatro clases se les harán preguntas sobre inteligencia, qué tan cómodos están con los errores, qué piensan sobre las metas y los desafíos en la clase. La Superintendente, Zandra Galván ha aprobado este estudio de investigación para la implementación en el cuarto grado en el Distrito Escolar de Greenfield. Un significado importante del estudio de investigación es aprender cómo la investigación sobre la mentalidad de crecimiento puede ser aplicada de manera práctica por los profesores del aula. Al participar, los estudiantes ayudarán a los maestros a aprender cómo mejorar las percepciones de los estudiantes sobre su inteligencia y aumentar el rendimiento académico. La Dra.

Catherine Webb, Presidenta de Disertación Universitaria, la Entrenadora Académica del Sitio y yo seremos las únicas personas con acceso a los logros y a los datos recopilados de las encuestas. El número de identificación de los estudiantes, en lugar de sus nombres, se utilizará para ordenar y analizar los datos. La participación en la encuesta estudiantil es voluntaria. Ustedes pueden contactarme para cualquier pregunta o inquietud con respecto a la participación de su hijo/a. Mi número de teléfono es 805-423-3671, y mi correo electrónico es mfarrer@greenfield.k12.ca.us. También pueden hablar con nuestro enlace de la comunidad escolar, el Sr. Sergio Sigüenza, quien ha sido informado de este estudio de investigación y tiene una copia de las preguntas de la encuesta.

Sinceramente,

Michelle Farrer, Mary Chapa Academy

Estudiante, Concordia University Irvine

Favor de regresarlo a la clase de su hijo/a.

☐ SI doy permiso para que se incluyan los datos académicos y de encuestas de mi hijo en este estudio de investigación.

☐ NO doy permiso para que se incluyan los datos académicos y de encuestas de mi hijo en este estudio de investigación.

Nombre del Estudiante:_____

Firma del Padre/Tutor: _____

**Teacher Consent Form**

**Practical Applications of Growth Mindsets in Fourth Grade Classrooms**

The study which you are being asked to participate is designed to investigate practical applications of growth mindset research in fourth-grade classrooms. This study is being conducted by Michelle Farrer under the supervision of Dr. Catherine Webb, Professor and Dissertation Chairperson, with Concordia University, Education Doctoral program. This study has been approved by the Institutional Review Board, Concordia University Irvine, in Irvine, CA.

The research study examines the impact of Growth Mindset professional development that centers on classroom lessons on brain development, students' perception of intelligence, praising the process, and celebrating mistakes. Your participation is voluntary and refusal to participate will involve no penalty. You may discontinue participation at any time. Should you elect to participate in the teacher reflection and proof of professional development, your responses will be kept confidential. The survey responses will be collected via a Google Form and aggregated with other responses from other participants. Identifying information, such as your name, school name or class will not be revealed, and all responses will be kept in private rather than shared computer files. Participation in this research will conclude by February of 2019. There are no foreseeable risks to your participation in this research. Instead, you may benefit from learning more about growth mindset research and strategies for your classroom instruction. Prior to and towards the end of the intervention,students will be surveyed and some will be asked to interview on the implementation of the Growth Mindset strategies. Students will be asked questions about mistakes, growth mindset, brain science and perceptions of intelligence. Student responses will be documented. If you have any questions regarding the research, please contact Michelle Farrer, Assistant principal of Mary Chapa Academy at 805-423-3671/mfarrer@greenfield.k12.ca.us. Research results will be

published and shared with all participants after the study is complete. Copies of the dissertation can be obtained from the Mary Chapa Academy Office and the CUI library. I have read the information above and agree to participate in your study.

☐ I agree to participate in this research study.

☐ I do NOT wish to participate in this research study.

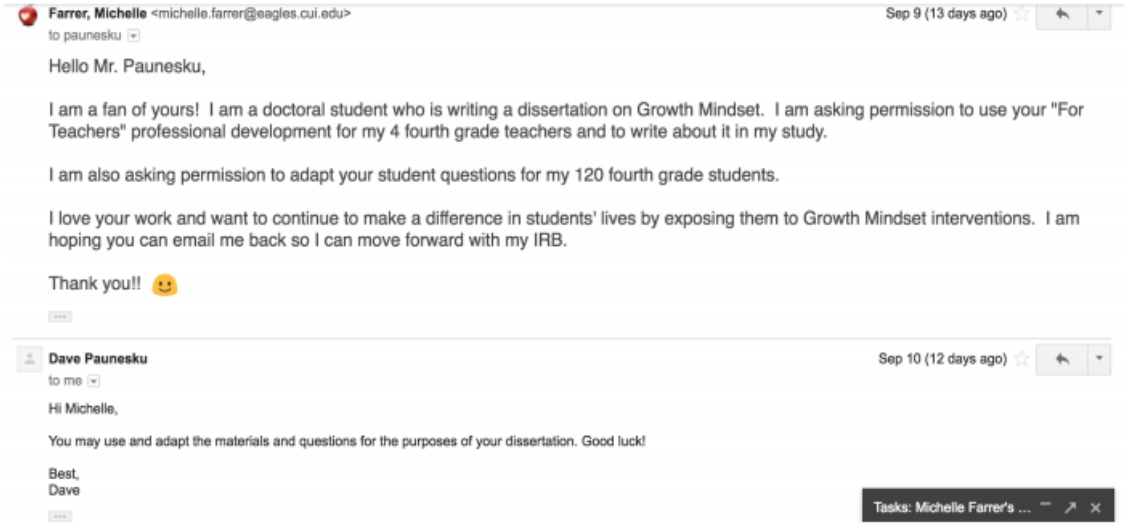
Signature: _____

Printed Name: _____Date: _____

The extra copy of this consent form is for your record.

# Appendix G

## Permission To Use The PERTS Website and Adapt Student Questions



**Farrer, Michelle** <michelle.farrer@eagles.cui.edu> Sep 9 (13 days ago)
to paunesku

Hello Mr. Paunesku,

I am a fan of yours! I am a doctoral student who is writing a dissertation on Growth Mindset. I am asking permission to use your "For Teachers" professional development for my 4 fourth grade teachers and to write about it in my study.

I am also asking permission to adapt your student questions for my 120 fourth grade students.

I love your work and want to continue to make a difference in students' lives by exposing them to Growth Mindset interventions. I am hoping you can email me back so I can move forward with my IRB.

Thank you!!

**Dave Paunesku** Sep 10 (12 days ago)
to me

Hi Michelle,

You may use and adapt the materials and questions for the purposes of your dissertation. Good luck!

Best,
Dave

Tasks: Michelle Farrer's ...