

ENCOURAGING A GROWTH MINDSET

By

James C. Ayers

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James C. Ayers

Has been approved for

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by

Sara Sunshine Campbell, Ph.D.

Member of the Faculty

ABSTRACT

The accumulated stress, or allostatic load, placed on children is often associated with negative impacts on their physical health, mental health, and academic achievement. In recent years, there has been an increase in factors that contribute to allostatic load. Traditional assistance programs often do not address the negative effects of having lived under a high allostatic load. The programs providing assistance are external to the person receiving assistance, intended to be temporary, and are subject to being withdrawn. A more permanent solution to help children cope with a high allostatic load is needed. Adopting a new perspective, such as that suggested by Carol Dweck's Growth Mindset, has been shown to reduce the negative impacts of allostatic load and to help children become more academically successful. Because thinking in a Growth Mindset is an internal process, the support it gives children cannot be taken away; this makes teaching students to develop a Growth Mindset a practical solution that is both affordable and available to everyone. For this action research project, I used a combination of teaching practices and methods to encourage in children a Growth Mindset perspective. The data collected indicated that the participants changed their thinking to a more Growth Mindset-oriented perspective and that both the least academically successful students and those that faced the greatest learning challenges shifted toward a Growth Mindset Perspective at a higher rate than did their peers. In other words, those who might see themselves as having the greatest need for assistance also made the greatest gains.

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CHAPTER 1: INTRODUCTION AND LITERATURE REVIEW

Problem Statement

The Office of the Superintendent of Public Instruction states that one of education's primary goals is to improve academic achievement for all students and reduce dropout rates (OSPIa). My complimentary goal as an educator is to provide students with the skills they need to be successful in life, but before I can work to solve a problem that is holding students back, I must know where and how it exists. Researchers have identified a strong correlation between allostatic loads (the cumulative effect on the body caused by chronic or repeated stress), reduced physical health, and compromised cognitive development (Juster, McEwen, & Lupien, 2009). Further, there is evidence that children are experiencing increased stress factors that contribute to allostatic load (Duncan & Murnane, 2011). Such stress factors have risen in my school district due (in part) to unstable labor markets and increased poverty, the impacts of which are evident in my endorsement areas: secondary English language arts and English as a second language. Eliminating stress, or developing effective coping strategies for dealing with stress, can improve children's behavior (Yeager, Trzesniewski, & Dweck, 2013) and academic performance (Park, 2004; Bandura & Schunk, 1981; Blackwell, Trzesniewski, & Dweck, 2007; Good, Aronson, & Inzlicht, 2003; Masten & Coatsworth, 1998). Among the most promising coping strategies I have found for classroom implementation is encouraging students to develop a Growth Mindset (Dweck, 2008).

In the background conditions section, I will examine research on the conditions present in today's schools that contribute to allostatic load, the connection between stress and academic achievement, the sources of stressors in people's lives, and how stress affects child development. Following the background section, I have included an examination of research that identifies traits present in people who succeed while enduring stress. Next, I review research that utilizes

instructional practices to encourage in students the traits that are beneficial in coping with stress and that promote academic achievement.

Background Conditions

It is well established that children from low socioeconomic status (SES) homes tend to score lower on standardized tests. According to Duncan and Murnane, fifty years ago children from low SES homes lagged, on average, a little over half a standard deviation (about 60 points) on SAT-type tests; the achievement gap is now more than a full deviation and graduation rates have not improved in 35 years (2011, pp. 5-6). The achievement gap between African American children and their European American peers has been well documented. However, the racial gap is not the largest achievement gap. A much larger achievement gap exists between the wealthiest people in American and the poorest. A comparison of the achievement gap between children from homes with incomes above the 90th percentile with those below the 10th percentile (90/10) reveals a gap two to three times as large as is the gap between African American children and European American children (Reardon, 2011, p. 98). Not only has the achievement gap widened for children in low SES homes, but the number of children living in low SES homes has increased. Statewide, the percentage of children qualifying for free and reduced price meals (a commonly used indicator of low SES) has risen from 31% in 1998 to 45% in 2014 (OSPIb). In the school district where I am teaching, free and reduced price meal qualification rose from 36% in 1998 to 59% today (OSPIb).

Several issues common to low SES environments have been identified as having negative impacts on children's development and academic achievement. Some of these are: family structure and behaviors, influence of neighborhoods, uncertainty in labor markets, and the

quality of schools (Duncan, & Murnane, 2011). All of these can be described as contributing increased stress to children's lives.

Research has shown that stress has deleterious effects on children's brain development, cognitive function, and human behavior. "Besides slowing down the development of the brain during the time of adversity, leading to reduced brain volumes in adulthood, stress in early life could modify the developmental trajectory of the brain." (Lupien, McEwen, Gunnar, & Heim, 2009, p. 441). Stress produces adrenaline which inhibits the creative functions of the frontal cortex. Stress also increases levels of cortisol in the blood which have been shown to damage or even kill cells in the hippocampus (Zull, 2002, p. 83). Children may be exposed to some stressors before birth. Neurological and cognitive disturbances have been linked to maternal stress, though these effects can be moderated by the quality of postnatal care (Lupien et al., 2009, pp. 435-436). The impact these stressors have on individuals varies, but in all cases, stressors present obstacles to learning with which the student must contend.

The brain development of children enduring the stress of low SES is not the only thing affected by their environment; their physical health is also damaged. A longitudinal study titled "The Effects of Poverty, Race, and Family Structure on US Children's Health: Data from the NIHS, 1978 through 1980 and 1989 through 1991" (Montgomery, Kiely, & Pappas, 1996) found that the health of children from families earning less than 150% of the poverty line were much more likely to be in poor or fair health than children from more affluent families. These findings were not explained by differences in race or family structure (Montgomery, Kiely, & Pappas, 1996). Less healthy children are more often absent from school, and may be less able to pay attention when they are in school.

Stress has a cumulative impact on development, and can contribute to physical changes including early sexual maturation (Lupien et al., 2009, p.437). The increase in hormones associated with reaching sexual maturity could be responsible for the brain's frontal cortex (the area responsible for short-term memory, problem solving, planning, assembling language, evaluations and judgments, and directing actions to the rest of the brain [Zull, 2002, p. 21]) having increased vulnerability to stress during adolescence (Lupien et al., 2009, p.437). Releasing these hormones into the system at an earlier age disrupts the natural progression of brain development and could mean that the brain is not yet sufficiently developed to withstand the effects of stress that it could withstand at a later sexual maturation time.

Reducing stress is possible, even though children often have no choice in the externally-originated stressors to which they are exposed: poverty, familial situation, violence, societal bias, prejudice, etc. Particularly by adolescence, children have better control over internal processes and can create shifts in perception to help them deal with the stressors they cannot escape (Romero, Master, Paunesku, Dweck, & Gross, 2014). Discovering the actions, strategies, traits and behaviors used by those who are better able to succeed in the face of stressors is a good first step toward developing these skills in others. Identifying and developing effective coping strategies that children can employ to maintain allostasis may be the most practical solution to ameliorate stress today.

Traits Present in People Who Succeed while Enduring Stress

Some people do succeed, even while enduring (what is considered by many to be) a high stress situation, e.g., war, poverty, crime, etc. (Masten & Coatsworth, 1998). Researchers have studied people who are able to succeed in spite of stressful situations and identified seven traits that are believed to be beneficial in dealing with stress: zest, grit, self-control, social intelligence,

gratitude, optimism, and curiosity (Duckworth, Peterson, Matthews, & Kelly, 2007; Duckworth, & Seligman, 2005). Other researchers have identified traits that include elements of each of the seven traits mentioned above and add to it the belief that intelligence is malleable (Blackwell, L., Trzesniewski, K., & Dweck, C. 2007; Good, Aronson, & Inzlicht, 2003) and that intrinsic motivation is beneficial (Lepper, Corpus, & Iyengar, 2005). Interventions were developed to test whether these efficacious traits and dispositions could be taught to others. Several of the interventions have been successful in such areas as reducing adolescent aggression in response to victimization and isolation (Yeager, Trzesniewski, & Dweck, 2013), eliminating the academic achievement gaps between various groups and improving standardized test scores (Good, Aronson, & Inzlicht, 2003; Aronson, Fried, & Good, 2001), improving goal setting strategies and goal attainment (Duckworth, Kirby, Gollwitzer, & Oettingen, in press), and producing overall improved academic performance (Magen, Dweck, & Gross, 2008).

An umbrella label that encompasses many of these successful individual interventions was described by Carol Dweck in her book *Mindset: The New Psychology of Success* as a Growth Mindset (2008). The major ideas and behaviors present in people with a Growth Mindset are a belief in the malleability of intelligence and that people can improve through hard work, developed intrinsic motivation, a belief that learning and accomplishment are their own reward, acceptance of setbacks and criticism as learning opportunities, and acceptance of responsibility for outcomes (Dweck, 2006).

Character traits and dispositions. Of the traits and dispositions listed in the previous section, three warrant discussing in greater detail due to their strong positive correlation to academic achievement: reliance on an intrinsic motivation system, passion and perseverance for long-term goals (grit), and belief in the malleability of intelligence. An additional disposition,

positive psychology, had a positive effect on self-reported happiness, but was not directly correlated to academic achievement. I mention it here because of its strong positive impact on happiness and because happiness has an indirect, but related connection to improved academic performance. (Seligman, Steen, Park, & Peterson, 2005). Essentially, this means that acting in ways (that are) suggested by positive psychology tends to make people happier and happier people are better able to work toward their goals than are depressed people.

Intrinsic vs. extrinsic motivation. Researchers have generally examined intrinsic and extrinsic motivation as if each was on the opposite end of a balance scale, expecting that if intrinsic motivation went up, extrinsic motivation would go down (Lepper, Corpus, & Iyengar, 2005, p. 184). However, research by Lepper, Corpus, & Iyengar (2005) with 797 third through eighth grade students examined intrinsic and extrinsic motivation as separate facets that are not mutually dependent (e.g., increased intrinsic motivation might not cause an equal lowering of extrinsic motivation). This research found a strong negative correlation between intrinsic motivation and a preference for easy work ($r = -.47, p < .01$) a significant positive correlation between intrinsic motivation and grade point average (GPA) ($r = .34, p < .001$) and test scores ($r = .27, p < .01$), and a significant negative correlation between extrinsic motivation and GPA ($r = -.23, p < .01$) and test scores ($r = -.32, p < .001$). Intrinsic motivation “proved positively correlated with children’s grades and standardized test scores at all grade levels. Extrinsic motivation... proved negatively correlated with academic outcomes” (Lepper, Corpus, & Iyengar, 2005, p. 184). In other words, people can be motivated by intrinsic or extrinsic reward. They may be motivated by both at the same time, but people who are more oriented toward an intrinsic reward system tend to accomplish more and have higher satisfaction in their work than are people who are extrinsic-reward focused. Schools and the society at large offer many

extrinsic rewards (e.g., grades, accolades, wages, bonuses, etc.). Development of an intrinsic reward system in my students could improve both their academic success and personal satisfaction.

Intrinsic reward is associated with self-determination, and a sense of control over events in one's own life. In a study using data from the National Educational Longitudinal Study (NELS), Ross and Broh tracked students' scores on standardized math and reading tests in the years 1988, 1990, and 1992, along with self-reported questionnaire results, to examine two aspects of development (1) the effects of self-esteem on academic achievement and (2) the sense of control on academic performance. Their study found that possessing a greater sense of personal control over events correlated directly to future academic achievement (Ross, & Broh, 2000). Reliance on the NELS data, the number of participant ($n = 8,802$), and use of widely accepted statistical analysis software (AMOS) gives this study strong external validity, meaning that results of this study are likely to be generalizable to other settings. According to the research, I should also be able to encourage students to higher levels of achievement by promoting a sense of control over their own education, and that this higher sense of self-control would produce higher levels of academic achievement over time.

Grit. Grit is defined as having “perseverance and passion for long-term goals” (Duckworth, Peterson, Matthews, & Kelly, 2007). People who demonstrate high levels of grit tend to be self-disciplined and work to achieve their goals over long periods of time. Duckworth and her colleagues identified grit as a strong predictor of success when people are taxed to their limits. Duckworth, et al., found a positive correlation between a person's level of grit and that person's future success, and that having a high level of grit compensated for lower intelligence.

In other words, people who had more grit excelled beyond people with equal intelligence (IQ) scores and lower grit (Duckworth, Peterson, Matthews, & Kelly, 2007).

Duckworth, et al. (2007) found that higher levels of grit demonstrated by National Spelling Bee contestants predicted advancement to higher rounds in competition. With the final round as the dependent variable, grit and age were significant predictors. Same age finalists with a grit score one standard deviation higher than the mean were 41% more likely to advance to further rounds. Self-discipline did not predict performance (when age was controlled for). Grittier participants outperformed the less-gritty, in part, because they studied harder and longer (p. 1098). If methods are available to encourage development of higher levels of grit in others, it would be beneficial to students to employ them in the classroom.

Malleable intelligence. Belief that intelligence is malleable means believing that people can increase their intelligence through applied effort. Malleability of intelligence stands in contrast to the belief that intelligence is fixed at birth. Like grit and self-discipline, belief that intelligence is malleable is predictive of future success (Blackwell, L., Trzesniewski, K., & Dweck, C., 2007).

In a study by Romero, Master, Paunesku, Dweck, & Cross (in print), students ($n = 101$ at the study's end) who were ending sixth grade, were followed through ending eighth grade. Two of the key findings describe the value in adopting a malleable intelligence belief system. Students who believed in malleable intelligence (1) earned higher grades in the first year of the study and in all subsequent time points within the study, and (2) were also more likely to take more challenging math courses over time (Romero, Master, Paunesku, Dweck, & Cross, 2014). Internal validity is high based on the change produced in the dependent variable by the independent variable, external validity is somewhat questionable due to small sample size and

over/underrepresentation of some ethnic groups. Overall reliability is high because the findings are consistent with findings of other studies and this study's reliance on practices that are repeatable.

Growth Mindset. All of the above traits and dispositions (intrinsic reward, grit in the form of self-discipline, and belief in malleable intelligence) share elements with Carol Dweck's Growth Mindset model (Dweck, 2006). Researchers have studied other traits and dispositions associated with a Growth Mindset. As example, a study by Angela Duckworth and Martin Seligman indicated that people with higher levels of self-discipline outperform those with equal IQ scores and lower self-discipline, and that high levels of self-discipline are predictive of higher levels of academic performance in adolescents (Duckworth, & Seligman, 2005).

Another Growth Mindset trait, intrinsic motivation, was found to have a positive correlation to grades (Lepper et al., 2005). The evidence suggests that thinking and acting in a growth mindset manner could offer a benefit to students and should be investigated to see if it can be taught. Rather than leap to acceptance of the Growth Mindset model as the most efficacious intervention to employ in the classroom, it could be beneficial to examine each of the associated traits (intrinsic reward, grit, self-discipline, and malleable intelligence) in isolation to increase understanding of (a) whether these traits can be taught, and (b) if they can be taught, which methods are most effective.

Determining which Traits and Characteristics are Teachable

In the previous section, I reviewed research that identified traits and dispositions present in people who are more often able to succeed than are people who do not possess those traits (or possess them to a lower degree), even though allostatic load is similar within both groups. In this section, I examine researchers' attempts to create interventions that teach to others these

beneficial traits and dispositions (malleable intelligence, grit, intrinsic reward [discussed in the Growth Mindset section], and the collection of traits called Growth Mindset). If successful, these interventions could help students develop better coping skills, improve academic achievement, increase intrinsic motivation, and be better able to set and achieve their goals. To be adopted in my classroom, each study must (a) show that the study's associated traits and dispositions can be taught, (b) offer clear methods for encouraging students in acquiring these traits and dispositions, and (c) describe how change was measured or observed to substantiate the benefit of adopting the change as part of my practice.

Malleable intelligence. Several researchers have offered interventions designed to persuade participants to the belief that intelligence is malleable. These researchers have used two names for the belief that intelligence grows with effort (malleable intelligence and incremental intelligence) and two names for innate intelligence (entity and fixed intelligence) (Blackwell, L., Trzesniewski, K., & Dweck, C., 2007; Dweck, C., 2008; Good, C., Aronson, J., & Inzlicht, M., 2003; Yeager, D. S., Trzesniewski, K. H., & Dweck, C. S., 2013). I will use the terms malleable intelligence and fixed intelligence for consistency.

Study One. A study by Good, Aronson, and Inzlicht (2003) included an intervention designed to test methods for “helping female, minority and low-income adolescents overcome the anxiety-inducing effects of stereotype threat, and consequently improve their standardized test scores” (p. 645). The study was done with a seventh grade class in a Texas middle school that served a largely low-income (70% free and reduced price lunch), high minority population (participants were 67% Hispanic Origin, 13% African American, and 20% European American). Forty-five percent of the participants were female, 55% were male ($n = 138$).

Participants were placed into four groups. Researchers taught one of two messages, or a combination of both to three of the groups. The fourth group (control group) was given an anti-

drug message. The messages were provided to the seventh grade participants by college-student mentors who worked with the participants throughout the school year. All mentors discussed with their groups study strategies and adjustment issues associated with coming to a new school environment. One group also received a message that described the malleability of intelligence. A second group was told that all students face difficulties during the transition to junior high school, but that most students overcome those difficulties and reach high levels of achievement, given time (retribution group). The third group received a message that was a combination of the malleable intelligence and the retribution messages, and the fourth group (which served as a control group) was given an anti-drug message.

The interventions consisted of two 90 minute face-to-face meetings, one in mid-November, and one at the end of January. All other communication was via a weekly email. The final phase of the intervention was having the participants create (with their mentor's help) a web page that promoted the intervention message that was provided to the participant.

The results of the study showed that the math achievement gap and reading achievement gap for the control group was consistent with the gap typically present in seventh-graders' scores. For the groups given the malleable intelligence message, the retribution message, and the combined message, both boy's and girl's test scores rose, and the achievement gap between boys and girls was eliminated. A similar result occurred in reading where the ability-stigmatized students successfully raised their reading scores. Researchers noted (and mentioned Carol Dweck's work in regard to) the benefits of the malleable intelligence message and the retribution message, both of which are similar at their base: the attributions people assign to difficulties is a result of their ideas about the nature of intelligence.

The relatively low investment of time compared to the improvement seen in reading and math scores makes this an intervention worth considering for the classroom. The improvement evident in the dependent variable gave this study a high internal validity and this work is consistent with the findings of other researchers creating a high external validity. The test group was weighted toward low SES and minority students, which indicates a high level of transferability to the school in which I work and to schools in which I am likely to work. The ability to incorporate the malleability message into other learning tasks makes the effort easier to justify to administrators, and the negligible cost makes it easily affordable.

Study Two. Joshua Aronson, Carrie Fried, and Catherine Good (2001) did a similar stereotype threat intervention with 79 Stanford University undergraduate students (42 African American, 37 European American). Students were randomly assigned to a control group that taught Gardner's multiple intelligence model (Gardner, 1983) to others, or to an intervention group that taught malleable intelligence to others. Belonging to the malleable intelligence group tended to result in higher grades and that gain was greatest for African American students, $t(72) = 2.24, p < .05$. This result appears to support the benefit of the malleable intelligence message.

The similarity between the two studies above supports the use of the first study as a viable intervention for the reasons already mentioned. The second study demonstrates that the intervention can work across age groups and provides further evidence that believing in malleable intelligence has the ability to reduce the academic achievement gap for African American students.

Study Three. Blackwell, Trzesniewski, and Dweck (2007) conducted two longitudinal studies and an intervention with New York City students beginning in the seventh grade and continuing over four consecutive years.

The two longitudinal studies included 373 students (198 females, 175 males). Test group sizes ranged from 67 to 114 students. The participants were 55% African American, 27% South Asian, 15% Hispanic, and three percent East Asian and European American. Sixth-grade math tests placed this group in the 75th percentile nationally. Fifty-three percent were eligible for free and reduced price lunch. Students, at the beginning of each fall term, were given a questionnaire to assess goals, theory of intelligence, helplessness, effort, and mastery-oriented responses to failure. The questionnaire used a six-point Likert-type scale. Also collected were math scores on a Citywide Achievement Test (CAT).

The results of the questionnaire showed that “an incremental theory of intelligence, learning goals, positive beliefs about effort, non-helpless attributions, and strategies in response to failure formed a network of interrelated variables” (Blackwell, Trzesniewski, & Dweck, 2007, p. 250). All of these attributes are believed to correlate to high achievement, and the academic results further upheld that point: upon entering junior high school, theory of intelligence was not a strong predictor of academic achievement, but as the students progressed through junior high school, the group believing in malleable intelligence had greater academic achievement and the trajectory widened the gap between the malleable and fixed intelligence mindsets.

An intervention was conducted to teach about malleable intelligence in the last phase of the study. Ninety-nine students (49 female, 50 male) in the seventh grade (52% African American, 45% Latin American, and three percent Asian American and European American) began the study. Five students were eliminated (three intervention, two control) because they could not participate regularly. This resulted in the study being conducted with 91 participants (48 intervention, 43 control). The same baseline questionnaire was used as in the first study. The intervention consisted of eight 25 minute periods, once per week during their regular advisory

class, in groups of 12 to 14 students. Both the control and the intervention groups were given instruction on the brain, study skills, and anti-stereotypic thinking. Additionally, the intervention group was instructed on the malleability of intelligence while the control group learned about memory and discussed academic subjects of interest to them.

Results showed that the malleable intelligence message was successfully communicated. Teacher reports showed that, of the students who showed improved classroom motivation, three fourths were from the malleable intelligence group. Academic achievement in mathematics lagged for all participants in a manner consistent with the grade drops typically seen in the junior high transition, but the decline ceased for the malleable intelligence group within a few months and began to rebound. Moreover, this study's methods are confirmable; it produced dependable results that are consistent with the findings of other studies, and though the sample size limits reliability, the total methodology makes the findings credible.

The three studies employing malleable intelligence interventions make clear that, with only a modest investment of time, and no additional financial investment, malleable intelligence can be taught, and that, with applied effort, students can realize greater academic achievement. The interventions clearly show qualitative and quantitative improvements across populations, genders, and age groups. Teaching students about malleable intelligence appears to be possible, practical, and can provide measurable gains in academic achievement.

Grit. Grit, as defined by Angela Duckworth, is “perseverance and passion for long-term goals. It entails working strenuously toward challenges, maintaining effort and interest over years, despite failure, adversity, and plateaus in progress” (Duckworth, et. al., 2007, pp. 1087-1088). There has been a great deal of interest in promoting grit in the classroom because of the correlation it has to many types of success, including higher grade point averages, completing

higher levels of education, and greater success in the Scripps National Spelling Bee. However, there are issues not yet resolved.

The definition provided leads to difficulties in two ways. First, perseverance is not always a good thing. Alfie Kohn, considered a leading figure in progressive education, pointed to several issues associated with grit and perseverance that are included in this quote taken from an expansion of the article published in the Washington Post:

Gritty people sometimes exhibit what psychologists call “nonproductive persistence”: they try, try again even though the result may be either unremitting failure or “a costly or inefficient success that could have been easily surpassed by alternative courses of action,” as Dean McFarlin at the State University of New York and his colleagues put it in the *Journal of Personality*.

The benefits of knowing when *not* to persist extend not only to the outcomes of a decision but to the effects on the individual who made it. Following a year-long study of adolescents, Canadian researchers Gregory Miller and Carsten Wrosch concluded that those “who can disengage from unattainable goals enjoy better well-being...and experience fewer symptoms of everyday illness.” (Kohn, 2014).

Second, there does not appear to be consistency across disciplines, e.g., people may be very passionate about spending time playing guitar, but neglect learning to communicate in writing.

There are two last issues with grit that I will mention. First, Ms. Duckworth has not yet definitively isolated grit as the force behind student success. Second, I have been unable to locate any method for specifically teaching grit that is supported by empirical evidence. This could be because grit is still a very recent idea. For all of the reasons stated above, I will not investigate further grit itself as a teachable trait in this action research project.

However, grit has several associated beneficial traits and behaviors: intrinsic motivation, goal oriented behavior, self-discipline, and self-efficacy—all of which are part of a Growth Mindset. Research has shown that children who have more developed abilities in each of these areas tend to achieve higher levels of success; each area will be discussed in the Growth Mindset section that follows.

Growth Mindset. As mentioned previously, Growth Mindset is a collection of traits and dispositions that include a belief in the malleability of intelligence, intrinsic motivation, goal oriented behavior, self-discipline, and others. I have already discussed the practical benefits and quantifiable positive outcomes associated with teaching students about malleable intelligence theory. In this section I will examine whether intrinsic motivation, goal-oriented behavior, and self-discipline can be taught, are practical to teach, and produce measurable results in students.

Intrinsic motivation. Albert Bandura and Dale H. Schunk (1981) studied the effect of self-motivation through proximal goal setting to determine whether it could serve as an effective mechanism for cultivating competencies, self-perceptions of efficacy, and intrinsic interest. This study discussed both intrinsic motivation and goal-oriented behavior.

Their study participants were 40, predominantly middle-class, children (aged from 7.3 to 10.1 years [$M = 8.4$]; twenty-one participants were males, 19 were females; ages were distributed equally across gender conditions), who displayed gross deficits in math skills and low interest in such activities. The participants were drawn from six elementary schools.

The participating students were divided into groups. One group was given proximal goals, a second was given distal goals, a third was offered an undetermined goal, and the last group (control) was not given any intervention. The results showed the greatest improvement in the proximal goal group.

By the end of the study, the proximal goal group substantially increased their perceived self-efficacy and exhibited further gains following posttest. The proximal group surpassed all other groups in subtractive skills and was markedly more persistent on difficult math problems: proximal (+90%), distal (+22%), no-goals (+39%), and control (-27%). In the area of intrinsic interest, students in the proximal group exceeded all three comparison groups (which did not differ from each other). Ninety percent of the students who improved their math skill through aid of the proximal group performed subtraction problems under free-choice conditions, compared to only 40% from the other groups. The proximal group was also more likely to display self-directed learning behaviors (Bandura, & Schunk, 1981).

Creating opportunities for self-directed learning coupled with proximal goals was effective in improving academic performance, self-efficacy, and intrinsic motivation. The small sample size and middle-class background limits the reliability of this study. However, the low investment of time and money, coupled with the improvements in academic performance, self-efficacy, and intrinsic motivation suggest that teaching proximal goal setting in conjunction with self-directed learning could be a viable intervention for the classroom.

Goal-oriented behavior. Duckworth, Kirby, Gollwitzer, and Oettingen (in press) studied the effect of mental contrasting with implementation intentions (MCII) to determine if it helped economically disadvantaged children convert positive thoughts and images about their future into actions.

Compared to children in the control condition, children taught how to apply MCII to their academic wishes and concerns significantly improved their report card grades ($\eta^2 = .07$), attendance ($\eta^2 = .05$), and conduct ($\eta^2 = .07$). These findings suggest that MCII holds considerable promise for helping disadvantaged middle school children improve their academic

performance (in press). The study also suggests that with a minimal investment of time (three hours), 11-year olds can learn a metacognitive strategy and apply it to goals that they identify as challenging, important, and possible. This study showed that thinking about positive future outcomes with mental contrasting (creating if-then plans) can be an effective method for attaining future goals. The low investment of time and money makes the intervention possible. The improvement in academic performance, attendance, and conduct make this an idea worth including in the classroom.

In “The Hidden-Zero Effect: Representing a Single Choice as an Extended Sequence Reduces Impulsive Choice”, researchers found that presenting choice as a sequence of outcomes, and including reference to the hidden-zero in each alternative, increased participants’ willingness to choose larger delayed rewards over smaller immediate rewards. (Magen, E., Dweck, C., & Gross, J., 2008).

Two study groups were used; both were drawn from the general population and had average ages that were over 30 years. The study groups also included many more women than men (group one: 98 females, 19 males; group two: 44 females, 13 males). The normal method of presenting choices in self-control tests is to leave the hidden-zero in the choice hidden. As example, the marshmallow test usually offers the choice as follows: You may have this marshmallow now, or you can have two marshmallows when I come back. This study altered the choice by stating: you may have this marshmallow now and no marshmallows when I return, or if you wait you can have two marshmallows when I return. Making the hidden-zero explicit caused people to opt for the greater reward at a later time much more often (group one: explicit-zero $M = 6.10$, $SD = 4.20$; hidden-zero $M = 9.24$, $SD = 3.20$, $t(110) = 4.43$, $p < .001$). (group two: explicit-zero $M = 4.42$, $SD = 2.90$; hidden-zero $M = 6.13$, $SD = 3.35$), $t(54) = 2.03$, $p < .05$). This

data demonstrates that including the downside in each choice reduces the selection of immediate reward and refocuses people's attention on the longer term gains.

This study expands on, and raises questions about the work by Duckworth and Seligman (2005) on the connection between success and self-discipline. As the study by Magen, Dweck and Gross indicated, self-discipline (choosing the later reward) was altered by rephrasing the choice (2008). This study does not demonstrate whether self-discipline is innate, but it does show that people possess more self-discipline than they use when their choices are not explicitly framed. It may be that children who exhibit greater self-discipline visualize the hidden-zero in their thinking. If so, it may be possible to develop children's awareness of the hidden-zero through practice in making it explicit and thereby improve children's self-discipline as they focus on a larger future goal.

Because children can be taught self-regulating strategies, as indicated in the MCII study, and to use proximal goal setting, as indicated in the Bandura and Schunk study (1981), it is also possible that children can be taught to visualize the hidden-zero when making choices. This study and the Duckworth, et al., study on MCII can be implemented in the classroom with little investment of additional time and no cost. The improvements in both self-disciplining behaviors and goal-setting would be valuable ideas to encourage in children.

Self-discipline. Self-discipline is often described as the control exerted to do something, and self-control is often described as the control exerted to prevent oneself from doing something. For this reason, the two constructs are closely linked. As mentioned earlier, people possess more self-discipline than they employ, and the use of self-discipline can be altered by how choices are phrased. Developing intrinsic motivation also seems to result in increasing the

amount of self-discipline exercised. As evidenced in the following study, self-discipline is also affected by many other factors including the changes wrought by adolescence.

The University of Washington is participating (with several other universities) in the multiyear Fast Track Project, which is designed to help students by providing academic tutoring and lessons in developing social skills and regulating their behaviors. The project showed some success in the elementary grades; however, as indicated in the following quote, the positive improvements did not continue through adolescence.

There were positive intervention effects on only 2 of 17 outcomes examined. Although the intervention had positive impact on children's hyperactive and self-reported delinquent behaviors in seventh grade, there were no intervention effects on other externalizing behavior problems or on social skills, and there was a negative intervention effect on children's involvement with deviant peers during this age period (Conduct Problems Prevention Research Group, 2009).

This study highlights the difficulty I might have in encouraging in adolescents the self-control that would increase academic achievement. Adolescence is a time in which we develop identities separate from that of our caregivers. This development of an individual identity is coupled with the need to belong to a group. Peers take on an increased importance and the desire to fit in with peers is apt to overwhelm students' self-control and cause them to engage in behaviors that are not conducive to greater academic success. The loss of positive improvements found in the University of Washington study could also be the result of other factors, e.g., increases in allostatic load, level of academic preparedness for the increasing rigor faced in school during adolescence, and whether participants had a Fixed or Growth Mindset. These influences, or changes in level of influence, were not included in the study.

Understanding Assessment's Role

In this section, I provide an explanation of the connection between developing a Growth Mindset and the types of assessments that promote Growth Mindset thinking, an examination of terms and sources of assessments, and the benefits assessments can provide toward and even beyond the academic task at hand.

Accepting assessment feedback. Feedback, and therefore assessment, has no value if one is not disposed to accept and learn from the suggestions the feedback contains. Carol Dweck found that those who believe in the malleability of intelligence (Growth Mindset) recognize criticisms as learning opportunities and unsuccessful attempts as a normal and valuable part of the learning process. In contrast, those with a Fixed Mindset tend to view natural ability as the source of success and a failure as a lack of ability. Brain scans of people from both groups (Fixed and Growth Mindsets) demonstrated that people with Fixed Mindsets were only interested and attentive when they were told whether answers they provided were right or wrong; their brain waves did not indicate interest when opportunities to learn from their errors were presented. Conversely, people with Growth Mindsets showed increased brain wave activity when they were presented with information that could help them in correcting errors and learning from their mistakes (Dweck, 2008).

“Students must understand that when we try to grow, we sometimes fail at first, and that failure is all right... but that it cannot continue. Improvement must follow. Success is continual improvement.” (Stiggins, R., 1999). This idea is fundamental to Dweck's Growth Mindset. People with a Growth Mindset tend to view failing at a task as something they have done that is separate from who they are as people, whereas those with Fixed Mindsets may see failure as a personal fault that defines them personally. This makes people with Fixed Mindsets less willing

to attempt new or difficult tasks and can limit growth (Dweck, 2008). “There is evidence from many studies that learners’ beliefs about their capacity to learn can affect their development” (Black, P., & Wiliam, D., 1998, p.12). This quote speaks to the learner’s belief in the malleability of intelligence as a necessary self-perception that underlies both expending effort on a new task and enduring temporary failure on the way to later success. Developing a Growth Mindset can help students accept the feedback that improves their learning and makes malleability of intelligence an aspect of mindset that is critical to student success.

Formative assessments. Assessments can be divided into two major categories: formative and summative. Formative assessment practices are “formal and informal processes teachers and students use to gather evidence for the purpose of improving learning” and summative assessments are “assessments that provide evidence of student achievement for the purpose of making a judgment about student competence or program effectiveness” (Chappuis, J., Stiggins, R., Chappuis, S., & Arter, J, 2012, pp. 4, 5). Formative assessment is the most often used form of assessment. It may be provided verbally or in writing at any time throughout the school term. Summative assessments are generally only done at the end of a major learning segment. I will limit my discussion in this study to formative assessment. Further, due to the close link between the two ideas, I will use assessment and feedback interchangeably.

The purpose of formative assessment feedback is “... to provide information specifically relating to the task or process of learning that fills the gap between what is understood and what is aimed to be understood” (Hattie, J, & Timperley, H., 2007), and is provided in the form of task-specific feedback. Three major providers of student formative assessments are the teacher, a student’s peers, and the student her/himself (self-assessment). Traditionally, teachers have been the most frequent providers of assessment feedback. Research in recent years has called for

increased involvement in assessment by peers and by the students themselves (Andrade, H., 2010; Boud, D., & Falchikov, N. 2006; Chappuis, S., & Stiggins, R., 2002; Gielsen, S., Tops, L., Dochy, F., Onghena, P., & Smeets, S., 2010; Stiggins, R., 1999; Stiggins, R., & Chappuis, S., 2005; Tsui, A., & Ng, M., 2000). In the following sections, I will discuss research that described the relative merits of feedback from each of the three feedback providers.

Teacher Feedback. Teacher feedback can make use of skills not yet developed in students, e.g., superior knowledge of the task, methods of providing feedback that promotes learning, deeper understanding of standards that must be met, and clearer understanding of course goals, but that the source of feedback (teacher or peers) is of less importance than is the validity of the feedback. For these reasons, peer feedback is not always an appropriate choice (Gielsen, S., et al., 2010). However, trust and personal interaction between peers is likely to be greater than between students and the teacher (Sadler, 1998).

Peer Feedback. A study on the comparative value of peer and teacher feedback by Gielen, Tops, Dochy, Onghena, and Smeets (2010) found that formative assessment feedback from peers can produce improved academic performance beyond those present in teacher-provided feedback, particularly when the subject being studied involves an *a priori* question form (p. 157). Research found that these performance improvements are the result of increased social pressure to perform well on assignments, feedback that students find to be more understandable and useful, quicker response than teacher feedback, an increase in the total amount of feedback a student receives, and the feedback often becomes more individualized than is teacher feedback (pp. 144, 145). Peer feedback can assist the teacher in providing differentiated instruction and researchers have found that second language learners also benefit from peer feedback (Tsui, A., & Ng, M., 2000).

Self-assessment. Adults are expected to self-assess their work and take corrective actions to improve their performance, but we are not born with these skills. Promoting development of these skills in children can prepare them to function effectively in the adult world. Self-assessment is the formative evaluation process through which students reflect on the quality of their work, compare it to the criteria or goals, and revise their work to eliminate differences between the two (Andrade, 2010). Self-assessment is sometimes referred to as self-reflection and its intent is to promote self-discovery and awareness (Harrington, 1995). Students who are actively involved in self-assessing their work have shown improvement in their performance (Andrade, 2010; Black, P., & Wiliam, D., 1998; Chappuis, S., & Stiggins, J., 2002), self-regulation, and self-efficacy (Panadero, E., Tapia, J., & Huertas, J., 2012).

Additional benefits of assessment. Studies have shown that care in determining who provides the feedback, how the feedback is framed, and when feedback is provided, can result in improved skills beyond those of the academic task at hand. Well-crafted feedback can encourage students to view themselves as life-long learners and agents in directing their own education (Boud, D., & Falchikov, N, 2006); improve goal-setting and planning abilities and increase motivation to learn (Chappuis, S., & Stiggins, R., 2002); increase self-efficacy (Pandero, et al., 2012); and bolster self-regulation (Andrade, H., 2010; Hattie, J., & Timperley, H., 2007). Each of these is an aspect of a growth mindset.

As indicated by the research discussed in this section, assessments provided by teachers, peers, and the self-assessment all offer specific benefits and all can contribute to improved academic performance and the development of a Growth Mindset. In the next section, I will discuss the crafting of effective feedback.

Assessments/feedback and Growth Mindset. Research by Geilen, et al. (2010)

indicated that the two feedback forms that produced the largest improvement between pre- and post-test in a writing class were question-peer feedback and peer feedback-reply. Question-peer feedback contains the author's requests directed at specific points the assessors will address. Peer feedback-reply is the author's justifications of how they will use the feedback they received (2010, p. 157). Including both forms is possible and practical in English language arts classes. Each form represents a goal in developing a growth mindset. The first places the students in a position to identify their specific needs, an activity which builds self-awareness and self-efficacy. The second indicates a plan of action aimed at meeting goals which represents a form of self-regulated behavior with aspects of intrinsic motivation.

Boud and Falchikov (2006) state that the focus of feedback should be on learning rather than performance; it should provide direction toward a solution, but also require the learner to fill in the gaps between what is known and a solution that was newly learned (pp. 408-409). Further, research has indicated that people perform tasks faster and with fewer errors when feedback is focused on the positive (the correct solution) rather than on the negative (the mistake made) (Duijvenvoorde, A., Zanolie, K., Rombouts, S., Raijmakers, M., & Crone, E., 2008). This indicates that feedback in my classes should highlight the correct answer (rather than stressing the incorrectly answered questions. In cases where more complex thought is required, feedback should indicate the direction toward a finding a solution, but not contain a solution.

In this section, I discussed the framing of peer feedback, the self-identified and self-directed action to improve learning that students will do, and the method and focus of teacher-provided feedback. Crafting feedback scenarios that encourage students to think in ways that

promote intrinsic motivation, self-regulated behavior, and focus on growth and learning are likely to improve academic performance and encourage students in developing a growth mindset. Tools that I can employ include having students complete self-reflection and task-planning sheets, providing students with peer feedback forms that include the author's questions to the reviewer and a space for the authors plan of action in response to the feedback received, and providing teacher-feedback that is focused on the correction and not on the error.

Developing a Research Question

There is always more to learn. We can use the knowledge gained from the work of those who came before us as a springboard from which we can launch into new research projects. Reviewing that which is known helps us to identify the work that still needs doing. In the following two sections, I address the limitations of what is suggested by current research and use that to sharpen my focus for this action research project.

Limitations of Current Research

Much research has focused on child development as it relates to academic learning. The research I have assembled and presented here identifies impediments to children's learning, as well as several traits and dispositions that are present in people who are better able to overcome the stress-related challenges in their lives. These traits and dispositions are also closely linked to student academic success. The research that indicated a positive academic achievement for students who had a system of intrinsic reward, a belief that intelligence grew through hard work (malleable intelligence), and self-disciplined/self-controlled behaviors are of particular interest. I want to encourage such success in all students.

Unfortunately, relatively little research has produced quantifiable and/or qualifiable evidence detailing methods of effectively teaching students the traits and disposition that lead to

academic success. Part of the problem that researchers face in determining which methods are most effective is caused by the changing allostatic load inflicted on students, much of which is created by forces that are external to schools. Additionally, many of those who conduct the research are not teachers. Those doing the research are often focused on how their intervention correlates to the researchers' particular field of study. This may be different from the focus of a classroom teacher. As an action-researcher, I have the opportunity to add a teacher's perspective to the corpus by investigating promising interventions that are described in others' research. I hope that contributing to the conversation helps to identify methods that benefit all students.

Supporting Growth

The present shifts in socioeconomic conditions and familial/societal relationships, coupled with a call for increased academic achievement, have resulted in increased stress placed on students and present additional challenges to student success. As a classroom teacher, identifying methods that help students overcome such obstacles so learning can occur is of primary importance. Helping students grow through learning has much in common with growing a garden: one must prepare the ground before seeds can take root. Providing students with adequate skills to overcome all obstacles, changing what can be changed, and coping with stressors that cannot be changed can prepare them for learning and result in improved academic performance. The greater benefit of developing these skills in students is that these skills are portable. By making evident the connection between growth mindset skills employed in my classroom and how those skills apply in the rest of their lives, students develop the tools that can help them to be successful adults.

As indicated by the research presented, student academic achievement in an English language arts classroom may be positively affected by direct instruction on the malleability of

intelligence and carefully crafted feedback that encourages the dispositions associated with a growth mindset. These dispositions include awareness of the malleability of intelligence, improved goal setting with plans for action, increased intrinsic motivation, and increased self-regulation. Can I, through direct instruction, assessment methods, and selected activities, bring about an increase in students' intrinsic motivation, self-regulated behaviors, and academic engagement, that is consistent with and measurable as an increased Growth Mindset view of life?

CHAPTER 2: METHODS AND ASSESSMENT

Community and Participants

The high school in which I conducted this action research project is in a small Pacific-northwestern city of approximately 10,000 residents. Like many communities in this area, the economy is heavily dependent on forestry, agriculture and aquaculture. Higher wage manufacturing jobs are few and low-wage jobs commonly associated with the service industry and the aforementioned farming-related work provide many of the jobs held by locals. Voting records indicate that the political climate is centrist with voters seldom leaning far to the left or right in choosing elected officials. The city is somewhat remote and requires over an hour's travel by car to reach any major metropolitan area. Public transportation options to major metropolitan areas are limited. The demographic composition of this city, as indicated in the 2010 census, was about 79% people of European descent and 19% people of Latino or Hispanic descent; the lineage of those remaining varies widely.

My school is a suburban comprehensive three year high school (grades 10 through 12) with just over 1,000 students. Extra-curricular activities are typical of those found at other schools in this state (seasonal sports, a variety of clubs, etc.). At the time of this project, 63% of the students received free or reduced price meals. The student body was predominantly European American (65%). Other ethnicities present included Hispanic/Latino (24%), two or more ethnicities (6%), Native American (4%), and Asian American, African American, and Pacific Islander contributed less than one percent each. The dropout rate was approximately four percent. Special education services were provided to 124 students (12% of the student population). At the beginning of this project, there were 24 students enrolled as English language learners. The school did not list separately the students for whom English was a second language

after they transitioned from English as a second language classes. However, there were many students who had transitioned out of English as a second language classes and had limited academic English skills, but who were receiving no academic English support beyond that available in the standard classroom.

The issues common within high poverty areas (e.g., unstable familial relationships, increased drug use, food instability, and limited access to educational materials in the home) were likely to be part of my students' lives. The limited access to social welfare resources within the community (and limited public transportation options to obtain such services elsewhere) that could help limit the stress caused by the above mentioned issues also contribute to the probability of a high allostatic load among my students. As indicated in the studies discussed in the previous chapter, elevated allostatic load can negatively impact students' learning. Students adopting the skills associated with a Growth Mindset could help them to limit the impact of stress on their lives.

This action research project was conducted in three 10th-grade honors English classes. The gender distribution of the participants completing the study was 51 females and 26 males. First period had 18 females and seven males, second period had 14 females and 12 males, and sixth period had 19 females and seven males. In total, four students had IEP/504 plans that indicated a condition that could affect academic performance. Four students self-reported reading challenges related to dyslexia, but did not have an IEP/504 related accommodation listed. Two students self-reported having ADHD. English was the second language for one student who had transitioned into mainstream classes and was no longer offered language learning support within the school.

The financial and living situation of my students is protected information and not shared with teachers by the school. Further, it is not appropriate to ask students about such personal issues. Students did often share information about such issues in their writing and class discussions. Based on this limited information, similar information gained in other classes that I taught at this school, and the information contained in the research included in the previous chapter, I conclude that the allostatic load contributors were likely to be somewhat lower in these honors classes than in they are in the general population of the school. However, while the allostatic load may have been lower for the participating group than for the general population of the school, it remained a significant issue.

At the time of this action research project, students in this school could elect to challenge themselves by choosing to take an honors class, regardless of prior achievement. There were 13 students whose prior academic performance would not place them in an honors class, but who chose to challenge themselves by enrolling. Eight of these students remained through the entire term. Five students who elected to challenge themselves in this way transferred out within the first two weeks. Additionally, one student withdrew when her family moved. Other issues affecting data collection included absences due to illness or to attend sporting events. One final issue with the data collection worth noting is that two students from the second period class were intentionally deceptive in completing the final surveys (they responded to questions so that they received a zero score on every question; this was a response to earning a failing grade in the class) and their survey answers have been omitted.

Promoting Success and Skills for Coping with Stress

If the stress factors that create allostatic load cannot be eliminated, the next best hope for helping children succeed may be through providing them with coping strategies to assist them in

overcoming the negative effects of these stressors. Research has identified several coping mechanisms that correlate to improved academic performance; many of these coping mechanisms are present in what Carol Dweck has coined as a Growth Mindset. Belief in, and actions aligning with, the component parts of Growth Mindset (malleable intelligence, intrinsic motivation, and self-disciplined behavior) has been linked to improved academic performance in reading and mathematics, improved self-regulation, and improved social interactions. Encouraging a Growth Mindset in children can improve their ability to cope with the stresses present in their lives and assist them in achieving greater academic success.

The students chosen to participate in this action research project have been (relatively) more academically successful than their peers in this school. A positive change within a group of high achievers (who, arguably, might be said to benefit less from Growth Mindset training than lower achieving students), could indicate that Growth Mindset training is beneficial to a wide spectrum of students.

By conducting an action research project that included Growth Mindset training and assessments that promote Growth Mindset thinking, I hoped to determine whether I was successful in communicating the Growth Mindset message to students and whether participating in this project would promote change in the participants' actions and attitudes that could lead to greater academic achievement.

Action/Practice. In teaching ideas associated with a Growth Mindset, I used a combination of direct instruction, homework handouts, student letter writing to pen-pals, and various feedback/assessment methods. Direct instruction provided participants with the information needed to understand the basic concepts. The homework handouts reinforced the message from direct instruction. The participants put their new knowledge into action as they

explained the focus of their learning to middle school student pen-pals. The participants received feedback/assessment on their letters in the form of self-evaluation, peer review, and group discussion/review when examining examples of student work. Additional individual student feedback was provided by me if further revision was needed. Assessment of other student work included narrative response written by me, highlighted correct response on true/false-multiple choice quizzes, and correct response on vocabulary homework.

Action. I told the participants that they had been selected to participate in a mentoring project called the “Shared Success Project”. They would be receiving from me direct instruction in study skills, how our brains function, and things we can do to become happier and more successful in our lives. Further, the participants would write letters to share this information with pen-pals in a middle school. I told the participants that the purpose of their letter writing was to help their pen-pal understand how our brains develop and to share the study skills that could make succeeding in school easier.

The direct instruction portion of this study included three classes on study skills (one each on note taking, successful planning, and developing intrinsic motivation) and three classes on aspects of Growth Mindset (malleability of intelligence/brain development, the differences between Growth and Fixed Mindset thinking, and actions one can take to develop a Growth Mindset). The study skills and Growth Mindset classes were intended to be alternated, with one 50-minute study skill lesson followed by one 50-minute Growth Mindset lesson on a later day. The lessons were intended to be spaced one week apart, and after one lesson of each (study skills and Growth Mindset training), students would write a draft of a letter to their pen-pal. The letter would be peer reviewed, revised and then given to me for review and delivery. Because of

school-dictated requirements, the study skills and Growth Mindset training schedule could not be maintained. This will be discussed in the Limitations section of this chapter.

Practice. As indicated by the studies examined in the literature review portion of this paper, the phrasing and focus of feedback is critical in achieving optimal results. The phrasing of feedback given in my classroom always directed focus toward the students' effort and growth in thinking rather than praising innate qualities. Grades were never written on assignments because research has shown that people often do not engage in learning from their errors when grades are included (Black, & Wiliam, 1998). Discussion of errors focused on the correct solution rather than the error. An author's request for specific help from the person providing peer-review and the author's plan of action to improve their work were always included on the peer review forms. I collected and assessed the completed peer-review forms along with the final draft of the pen-pal letters. An example of a peer review form is included in Appendix A. Additionally, participants completed reflection forms that focused on self-assessments of their learning in conjunction with each of the direct instruction sessions in study skills and Growth Mindset. Two examples of the reflection forms are included in Appendix B.

Each source of assessment was aimed at identifying students' understanding of the information provided, building students' skills in assessing their own work (and the work of others), increasing learning through implementation of recommended improvements, and developing the self-regulated behaviors and intrinsic-motivation that is associated with Growth Mindset and improved learning. All three types of assessment (self-, peer, and teacher-assessment) were used throughout the entire ten weeks and were not limited to the direct instruction sessions related to this project. For example, incorrect responses on quizzes were not

marked; the correct response was written on the papers (or highlighted on true/false and multiple choice questions).

In reviewing/assessing essay questions, I wrote comments in the form of guiding questions that were intended to encourage continued thinking about the question; sometimes the question was intended to redirect the student's thinking, and sometimes I sought to extend the student's thinking. For example, when a student's response was incorrect, I would suggest a path to find the correct solution; when a student's response was incomplete, I would ask "what else" questions that guided students to look for the more answers. When reviewing quizzes in class, students were encouraged to explain the reasons that one answer was more correct than another. Students were also encouraged to make correct answer comments on peers' papers and on their own papers. In this way, the focus was always kept on growing one's knowledge.

For the letter writing portion of this project, each participant drafted three letters. These letters explained what the participants had learned in the study skills and Growth Mindset classes they had recently attended, the benefits one receives by knowing and acting on these things, and the steps people can take to employ these ideas in their own lives. These drafts were peer-reviewed, revised, reviewed by me, and the final drafts of the letters were delivered to the participants' pen-pals (middle school students from two schools). The first letter received two peer reviews and revisions; the subsequent letters received one peer review and revision each. If I identified an issue that needed more attention, I requested that the participant complete another revision before the letter was sent to the recipient.

Data Sources. I used four data sources to measure change in students' attitudes and actions: pre-/postsurveys, pre/postquestionnaires, participants' written reflections, and my own

written reflections. The inclusion of the aforementioned data sources improves the validity of my findings by providing triangulation.

Pre- and postsurveys. Participants in this action research project completed a pre- and a post-survey designed to indicate whether a person's responses were oriented toward a Fixed or Growth Mindset (see Appendix C). The survey was designed by Carol Dweck and has been accepted for use by other researchers for several years. Determining the self-reported mindset of participants prior to and after participating in this study provides indication of the areas in which attitudes have changed and reflects on the relative success of the practices used to bring about that change.

Pre- and postquestionnaires. The prequestionnaires were designed to serve two purposes: to inform me about the participant as a student and to provide corroborating evidence related to the participant's mindset. Half of the prequestionnaire was designed to provide me information about the student's current academic skill levels. The other half provided me with information related to the students' current mindset. The postquestionnaire was more narrowly focused on Growth Mindset and the learning that had occurred related to this project (see Appendix D for examples of the pre- and postquestionnaires).

Participant Reflections. Participants were periodically required to complete reflections on their learning. The prompt-based reflection sheets contained short answer prompts and some reflection sheets also contained Likert-type scale self-assessments that are worded in keeping with the principles of a Growth Mindset where the focus is on learning and growth rather than a score (see Appendix B). These reflections, coupled with the journal reflections that I kept, helped me to identify areas where I should work to improve the presentation of information, where I should offer additional assistance to participants, and which information needs to be revisited.

My Reflections. I kept a reflective journal to capture ideas, actions, and observations that might not otherwise be documented. These reflections offered additional perspective on the evidence provided by the participants. My reflections also highlighted differences in perception of events. Apart from enhancing understanding of my practice during this project, such a reflective process helped me to identify areas for improvement in my future lessons.

Data Analysis Procedures

I used a mixed methods approach in this action research project to include both quantitative and qualitative data for analysis (Mertens, 2009). The quantitative data comes from participants' scores on the pre- and postsurveys, percentage-values participants' assigned to the balance between ability and effort on the questionnaires, and the responses to the Likert-type scaled questions on the postquestionnaire. The qualitative data sources include the responses to short-answer questions on the pre- and postquestionnaire, and the reflections written by the participants and me. The use of this variety of sources allows me to triangulate the data and improves the dependability of the project findings. The detail given in explaining the materials and methods used enhances credibility and helps the reader to determine transferability. The chain of evidence and inclusion of materials in the appendices enhance this projects confirmability.

The quantitative data was tabulated in three ways: as a total group, divided by gender, and divided by period. The qualitative data was coded and is included here as corroborating evidence for the qualitative data.

Pre- and postsurveys. The same survey was used before this action research project began and after it ended. Using the same pre- and postsurvey offers a direct comparison of students' self-reported change in thinking. The survey was designed by Carol Dweck and used a

four-point Likert-type scale (strongly agree, agree, disagree, and strongly disagree) to examine the participants' self-reported mindset (Fixed or Growth). I determined the amount of change that has taken place by assigning a numerical value to the scaled-responses and computing the average for each of the following group divisions: whole group, by gender, by period, and by gender within a period for both the pre- and postsurvey.

Pre- and postquestionnaires. Although the pre- and postquestionnaires were different, they shared two questions in common: assigning a percentage to the ability/effort balance in success, and fear in asking a “dumb” question. The participant's assigning of a percentage to the amount of success that comes from effort, and the level of fear in asking (what they think may be) a “dumb” question, are correlated to the participant's mindset. The greater the percentage assigned to effort, the more growth-oriented is the response. The higher the fear level (rated on a four-point Likert-type scale), the more fixed-oriented is one's mindset. Comparing the tabulated responses to both questions on the pre- and postquestionnaire contribute to the evidence supporting a shift in mindset. These data points were examined as a whole group, by gender, and by period.

Questions on the prequestionnaire that relate the participant's thinking about goals, plans to reach their goals, and their definition of success provide qualitative information about the participant's current thinking. Comparing the responses to these questions can indicate a change in understanding with regards to setting and achieving goals and how the participant views success. I examined each question and coded the responses. Goals-related responses were categorized as focused or unfocused, e.g., a goal that lists “figuring out what to do with my life” was counted as unfocused, whereas “graduate high school with a 3.7 GPA” was counted as a focused goal. Definitions of success were coded as being Growth Mindset related or Fixed

Mindset related, e.g., “success is enjoying happiness from achieving goals” was coded as a being Growth Mindset related, “winning” was coded as being related to a Fixed Mindset.

The postquestionnaire included questions to be answered on a Likert-type scale about the Growth Mindset and study skills lessons that were offered in direct instruction for this project. These responses were tabulated and compared by whole group, gender, and period. Additionally, participants responded in their own words regarding a) the lessons(s) or skill(s) gained that found to be the most helpful, and b) what they found most challenging about the class. The “most helpful” responses were coded as either Growth Mindset related or other related (e.g., academically, personally, or otherwise oriented). The most helpful responses categorized to indicate which lessons resonated most strongly with the participants.

The most “challenging responses” were also coded as Growth Mindset related or other related. The responses were categorized to help me understand areas that were difficult for students. I will use this information to modify future lessons.

Reflections. I coded the reflections written by the participants to identify ideas that the participants found interesting, the subjects that they found difficult, and the types of things the participants liked about themselves (this relates to Seligman’s Positive Psychology that was discussed in the Literature Review section). The things that the participants found interesting or difficult varied based on the lesson being presented, but offered contemporaneous evidence of participant thinking. The responses were coded as either relating to Growth Mindset or as other-related, e.g., a response that said “I found myelin and the other brain stuff interesting” was coded as Growth Mindset oriented; “I don’t understand how we are supposed to write a letter” was coded as other-related.

The responses indicating what the participants liked about themselves were coded as deep or superficial. I coded a “deep” response as being related to a character quality (helpful, kind, etc.) and a superficial response as being related to an innate quality (hair, eyes, etc.). My intent was to find whether the participants would shift toward more “deep” responses as they learned more about Growth Mindset.

My own reflections provided a record of my direct observations and impressions. I correlated my observations with the participants’ reflections by date to gain a more complete understanding of the participants’ reaction to the direct instruction portions of this project. I also logged behavioral changes in the participants over the course of the project and the source of that change (as reported to me by the participants).

Successes

I was able to present all of the materials that I had prepared for use in this project. The participants engaged in drafting, peer-reviewing, revising, and submitting letters to their pen-pals, and received reply letters in most cases. Although the participants were initially confused by (and did not like) the absence of grades on their papers, they came to understand the reason behind it and made positive remarks about the comments I had written on their papers. I observed students regularly spending time reading the highlighted correct answers on quizzes. Reading comments and the correct answers on quizzes are engaging in Growth Mindset actions.

Limitations

Four major limitations to this action research project are that it is action research (wherein I am both teacher and researcher and therefore the reported results may be affected by my biases), the project had a short duration (ten weeks), the schedule for presentation of

materials could not be maintained within those ten weeks, and it had no academically summative pre-and postassessments.

Of these limitations, the largest may be that it is action research. My biases and limited experience as both a teacher and action researcher may influence this project's results. To mitigate my bias, improve credibility, confirmability, internal validity, and make my findings more reliable, I employed a widely used and accepted pre- and postsurvey that was developed by Carol Dweck, discussed my observations with my mentor teachers (and with other more experienced colleagues) to determine whether my assessment of events agreed with other observers accounts and with student behavior in other classes, engaged in peer reviews of the data collected, used multiple sources of data, and connected my data to the research conducted by others.

Another limitation comes from the short duration of the study. While the Growth Mindset lessons can be presented in only a few sessions, transforming a person's mindset and actions is a process that is developed over time. As the research presented in the Chapter 1 has shown, effects from Growth Mindset training tend to increase over a longer timespan (even with no further interventions). Therefore, reassessing the participants at a later date could reveal a stronger shift in mindset than was indicated in the data I collected.

Interruptions in the planned Growth Mindset material presentation schedule may have impacted the results. The planned presentation of information would have been completed in six weeks, with one lesson provided each week. In doing so, participants would have had weekly routines that kept the study skills and Growth Mindset lessons more present in their thinking. Participants would also have received four weeks of guided practice after all of the materials had been presented. This guided practice might have helped the participants in developing the

neuronal connections associated with lasting change in thinking and behavior and further increased their shift toward a Growth Mindset. Conflicts between project activities and school-required activities resulted in the first lesson being delayed until week two, a gap of nearly two weeks between lessons three and four, and lessons five and six being compressed into one session. Due to these changes, the participants had only one week of guided practice in employing the Growth Mindset lessons before the project ended.

The fourth limitation is that this study lacks pre-and postsummative academic assessments. Examining academic assessments from pre- and postinstruction could provide corroborating support for the participants' self-reported shift in mindset. A change in academic trajectory that correlates to mindset training would serve as another quantitative support for the effect caused by mindset training.

CHAPTER THREE: RESEARCH FINDINGS

This action research project examined the efficacy of my practice to encourage in my students a Growth Mindset perspective. Three sophomore honors English classes were given six direct instruction messages, three in study skills and three in developing Growth Mindset thinking. The direct instruction lessons alternated between study skills and Growth Mindset thinking. After one lesson of each, the participants drafted a letter to a middle school pen-pal; the draft was peer reviewed and revised. The revised letter was then submitted to me for final review and distribution.

In this chapter, I will discuss the findings from the data collected, the project's limitations, the implications for future practice, and suggestions for future research. Appendix F offers a table displaying the planned and actual schedule used in direct instruction and pen-pal letter peer reviews for this project. I offer this schedule here to make clearer the context for the findings.

Shift toward a Growth Mindset.

The question that guided my efforts in this action research project was: can I, through direct instruction, assessment methods, and selected activities, bring about an increase in students' intrinsic motivation, self-regulated behaviors, and academic engagement, that is consistent with and measurable as an increased Growth Mindset view of life?

To assess whether a change occurred in students' thinking, I examined several data sources. Those sources included pre-and postsurveys, pre- and postquestionnaires, the participants' reflections, and my own written reflections. Through my analysis, I noticed an overall pattern that indicated student thinking had shifted toward a Growth Mindset. The shift toward a Growth Mindset is supported by the quantitative data present in the pre- and postsurvey

and pre- and postquestionnaire; and the qualitative data present in the postquestionnaire, the participants' reflections, and my reflections.

Examining differences in the data by class period, by gender, and by comparing participants facing learning challenges and struggling learners to other participants allowed me to determine where the changes in mindset occurred and for whom the change was most pronounced. Analyzing the data in the aforementioned ways revealed that, on average, female participants had a more growth-oriented mindset throughout the project; male participants' mindsets shifted toward Growth at a higher rate than did female participants; and participants who faced greater challenges to their academic success shifted toward Growth Mindset thinking at a greater rate than did peers who did not face the same level of challenge to their learning.

I began the data analysis by comparing participant scores on the pre- and postsurvey. The pre- and postsurvey (see appendix C) was developed by noted researcher Carol Dweck and has been used and accepted by experts in the field. Therefore, the results of this survey offer what is perhaps the strongest and least biased evidence of change. Because of the strength of this data, I present it as primary support for my argument that I was successful in encouraging a Growth Mindset in the project's participants.

Total score categories on the pre-and postsurvey were divided as follows: a strong Growth Mindset = 45 to 60 points; a Growth Mindset with some Fixed ideas = 34 to 44 points; a Fixed Mindset with some Growth ideas = 21 to 33 points; and a strong Fixed Mindset = 0 to 20 points. The higher the score number, the more the response is oriented toward a Growth Mindset. The participants' responses were summed and averaged for each group to provide a single score that represents the group. A trend toward a Growth Mindset was evident in the average scores for all participants and in each of the three class periods.

Participants, when viewed both as a whole group and as individual classes, had a Growth Mindset with some Fixed ideas at the start of this project. The second period class had the most Fixed ideas at the outset of this project. The third period had the most Growth-oriented mindset. By the end of the project, all of the groups' scores indicated a change toward a Growth Mindset. As a whole group, a shift of 10% toward Growth Mindset was indicated. The largest shift was in second period (with a shift of 19%). The smallest change was in first period (with a shift of 2%). These results are presented in Table 1.

Table 1

Pre- and postsurvey data: average score and change by whole group and period

	All Participants	Period One	Period Two	Period Three
Pre	40.31	41.52	37.15	44.38
Post	44.50	42.32	44.38	48.14
Change	4.19	.8	7.23	3.76
Percent	10%	2%	19%	8.5%

As Table 1 indicates, the change to a Growth Mindset is present in each class, but there is a wide variance between periods. Period One only indicated a change of 2%, and Period Two changed by 19%. To gain a clearer understanding of the results indicated in Table 1, I calculated scores for each of the groups divided by gender (see Table 2). I found that female participants began with a stronger orientation toward Growth than was present in males. However, males changed the most between pre- and postsurvey. I will mention here that only one group indicated a shift toward a Fixed mindset: the males in Period One. Their indicated shift to a Fixed Mindset on this survey was responsible for creating the minor shift toward a Growth Mindset for Period One of 2%. I believe several factors contributed to this indication of a Fixed Mindset shift and I will address those issues in the Conclusions section, implications for my practice subsection.

Table 2

Pre- and postsurvey data: average score by gender and period

	Whole Group		Period One		Period Two		Period Three	
	Female	Male	Female	Male	Female	Male	Female	Male
Pre	41.38	38.08	43.55	39.17	38.64	35.42	42.94	41.71
Post	45.32	42.67	46.52	35	45.54	43.0	45.65	47.17
Change	3.94	4.59	2.97	(4.17)	6.90	7.58	2.71	5.46
Percent	9.5%	12%	6.8%	(12%)	18%	21%	6.3%	13%

The data displayed in Table 2 indicates greater consistency between all groups except Period One males (already noted) and a shift toward a Growth Mindset. Females began this project with scores in the Growth Mindset with some Fixed ideas category and ended with scores in the strong Growth Mindset category. Males began in the Fixed Mindset with some Growth ideas and ended in the Growth Mindset with some Fixed Ideas category. Both females and males moved toward more Growth Mindset orientations, but males indicated the most change during the project. Part of the reason that males indicated more change than females may be that males had more room to change in the Growth Mindset direction. Females began closer to the upper limit of the scale. As one approaches the limits of the scale, changes can appear smaller and produce an asymptotic curve.

As I continued to analyze the data, it became apparent that the participants who faced greater challenges to their learning (those students with IEP/504 plans; English language learners; and those who had self-reported learning issues [e.g., dyslexia, ADHD]) offered responses oriented toward a Growth Mindset at a greater rate than did the majority of participants. As displayed in Table 3, the average change in this group's responses was 8.79 points (22%) and male responses changed 10.67 points (30%). By comparison, the average response change for all participants was 4.19 points (10 percent).

Table 3

Pre- and postsurvey data: average scores for participants with more learning challenges

	Challenged Group	Female	Male	All Participants
Pre	40.3	42.43	35.33	40.31
Post	49.09	50.86	46	44.50
Change	8.79	8.43	10.67	4.19
Percent	22%	20%	30%	10%

The greater rate of change experienced by participants facing learning challenges is important to note because these participants represent the learners with (arguably) the greatest need for help in finding their pathways to success and developing those pathways is a major reason for adopting a Growth Mindset. The shift to a Growth Mindset reported by this group suggests that the ideas presented in this project could be accessible to other struggling students and could benefit their future success; the results from the challenged learner group strengthens the case for including Growth Mindset training in my future classes.

The purpose of this action research project was to investigate whether I could successfully promote Growth Mindset thinking through my teaching practice. The pre- and postsurvey results offered initial indications that I had been successful in that effort. Analyzing the data by class period, gender, and learning challenges revealed the groups for whom the message was most readily accepted, and the groups for whom the message adoption was more limited. While the pre- and postsurvey used is a widely accepted measure, no single data source is sufficient for reaching a supportable conclusion. Next, I examined the pre- and postquestionnaire for confirming and conflicting data and to gain a greater insight into the participants' thinking.

The pre- and postquestionnaire included two quantifiable prompts whose responses I compared to the presurvey responses. These quantifiable responses offer corroborating evidence of existing mindsets prior to this project and change over the project's duration. One of these prompts, "I am afraid that if I ask the teacher a 'dumb' question he/she might think I'm not very smart" solicits a response on a four-point Likert-type scale (very much like me, mostly like me, not much like me, and not like me at all). Scores were assigned on a zero-to-three scale, with zero being the least fearful and three being the most fearful. The other quantifiable prompt asks participants to place a percentage value on the amount of success that is due to natural ability and the amount due to effort (ability ___+ effort ___= 100%). A higher percentage of success attributed to effort correlates to a belief in malleable intelligence which is a foundational concept in Growth Mindset thinking.

Table 4 contains the averaged response to the prompt, "I am afraid that if I ask a 'dumb' question..." and is identified as "Afraid." The lower the number, the less fearful a person was. The ability to ask questions without fear is a Growth Mindset action and a lowering of the fearful response number correlates to an increase in Growth Mindset thinking and to the effectiveness of the methods within my practice. A significant change occurred in each class period. This provides support for the presurvey indication that a shift toward a Growth Mindset did occur.

Table 4

Afraid to ask "dumb" questions

Afraid	All Participants	Period One	Period Two	Period Three
Pre	1.35	1.18	1.58	1.23
Post	.90	.62	1.21	.83
Change	(.45)	(.56)	(.37)	(.40)
Percent	(34%)	(47%)	(31%)	(32%)

Note: On the chart labeled "Afraid", a lower number indicated that the participant feels less afraid to ask questions. The numbers in parentheses indicate a reduction in fear of appearing "dumb" by asking questions.

The strong reduction of fear across all class periods provides support for the participant's shift toward a Growth Mindset perspective. The result for Period One also conflicts with the pre- and postsurvey male response indicated in Table 2. The reasons for the conflicting indications are discussed in the Conclusions section, Implications for my practice subsection.

The average response to the ability/effort balance (listed as "Effort" in Table 5) reflects the percentage of success that participants attributed to effort. The responses to the "Effort" question offers additional confirming evidence for the participant's shift toward Growth Mindset thinking that were indicated in the pre- and postsurveys. Period Two indicated no change in the percentage of success that was due to effort. This stands in sharp contrast to the change indicated by the other two periods. This indicated lack of change may be, in part, due to the high percentage assigned to effort in the prequestionnaire. Period Two indicated in their initial response a significantly higher percentage of success was due to effort than was indicated by the other two periods. As with the Growth Mindset thinking change exhibited by females (see Table 2), the reduced room for change may be partly responsible for the absence of indicated change on this question.

Table 5

Effort as a percentage of success

Effort	All Participants	Period One	Period Two	Period Three
Pre	64.23	59.09	73.26	60.58
Post	69.73	68	73.54	67.26
Change	5.5	8.91	.28	6.68
Percent	8.5%	15%	0	11%

The act of designating effort as the primary contributor to success reflects a belief that intelligence is malleable and offers support for the other indications of change in participants thinking toward a Growth Mindset.

Table 6 displays responses to both the Afraid and Effort questions by gender and period. Reduction in fear was substantial across all divisions. Period Three males showed a negative change in their Effort responses that seems inconsistent with all other indicators. A significant part of the shift indicated by Period Three males may be attributed to the loss of one male postquestionnaire response due to that participant's absence. On the prequestionnaire, he had assigned a high percentage of success to effort. By including his prequestionnaire response in the postquestionnaire averages, the total change in the Period Three group drops from a negative 4.57% to a negative 2%.

Table 6

Afraid to ask ... and effort as percentage of success responses by gender and period

	Whole Group		Period One		Period Two		Period Three	
Afraid	Female	Male	Female	Male	Female	Male	Female	Male
Pre	1.48	1.04	1.25	1.0	2.08	1.0	1.26	1.14
Post	1.06	.55	.75	.2	1.69	.64	.88	.67
Change	(.42)	(.49)	(.5)	(.8)	(.39)	(.36)	(.38)	(.47)
Percent	(40%)	(53%)	(40%)	(80%)	(23%)	(36%)	(43%)	(41%)

	Whole Group		Period One		Period Two		Period Three	
Effort	Female	Male	Female	Male	Female	Male	Female	Male
Pre	61.83	69.22	54.44	60.83	72.15	74.7	57.63	68.57
Post	68.96	71.32	67.33	70	71.54	75.9	68.41	64
Change	7.13	2.1	12.89	9.17	(.61)	1.2	10.78	(4.57)
Percent	12%	3%	24%	15%	(1%)	1.5%	19%	(7%)

Note: On the chart labeled “Afraid”, a lower number indicated that the participant feels less afraid to ask questions. The numbers in parentheses in the “Afraid” section indicate a reduction in fear of appearing “dumb” by asking questions. The numbers in parentheses in the “Effort” section indicate a negative change in “Effort” responses.

The sharp reduction in participants' fear of asking “dumb” questions and the increase in the percentage of success assigned to effort correlate to an increased Growth Mindset and strengthens the argument that I was successful in encouraging a Growth Mindset in this project's participants. It is worth noting that females as a whole group showed a significant shift toward

effort-based success. This aligns with research conducted to increase belief in malleable intelligence that resulted in the elimination of the gender achievement gap in mathematics (Blackwell, et al., 2007). Over time, this change in the female group's belief about success could lead to higher academic achievement.

The prompt on both pre- and postquestionnaires that asks the participants to define success in their own terms provides qualifiable data. I coded the responses used to define success to identify patterns and changes in thinking. The participants' level of Growth Mindset thinking related to the meaning of success mirrored the data in Tables 1 and 2.

The definitions of success that participants offered were generally formed around three ideas: achieving goals or learning, being happy, and receiving an extrinsic reward (e.g., "a good paying job," "an 'A' in class," etc.). On the prequestionnaire, roughly sixty percent of the responses centered on achieving goals, twenty-five percent focused on being happy, and fifteen percent sought an extrinsic reward. On the postquestionnaire, slightly more than seventy percent named achieving goals or learning, nearly twenty percent were seeking happiness, and the remaining ten percent were concerned with extrinsic rewards. As Tables 1 and 2 indicate, the participants' Growth Mindset thinking increased roughly ten percent across all divisions. Analysis of the participants' own words seems to corroborate the survey results and further corroborate the shift in participants thinking toward a Growth Mindset.

The postquestionnaire asked the participants to rate the helpfulness of each of the six lessons, whether they thought the letters helped their pen-pal, and whether the participant thought she/he was helped by writing the letters. I used a zero-to-three Likert-type scale (very helpful, mostly helpful, a little helpful, and not helpful at all) in this portion of the questionnaire. During data analysis, very helpful was rated as three points and not helpful at all was rated at

zero points. In asking the aforementioned questions, I hoped to determine the relative value the participants placed on the information and activities.

The lessons that the participants found most beneficial are presented here in descending order of reported benefit: 1) setting goals and creating plans to achieve them; 2) intrinsic and extrinsic motivation; 3) learning to do the actions that develop a Growth Mindset; 4) the difference between Growth and Fixed Mindsets; 5) tenacity and how the brain develops; and 6) note taking strategies. Rating the lessons provides insight into the value participants place on the skills they acquired from each. The importance they assigned also reflects the order of importance I see in the skills and knowledge one needs to be successful in developing and acting from a Growth Mindset perspective. The participants determining the value the lessons had for them indicates how useful the lessons were. While study skills may be important to them without a change in mindset, the lessons in Mindset are only of value if one is interested in applying them in one's life. The lessons tightly aligned with mindset were rated as second, third, and fourth on a list of six, and indicates that participants were adopting the Growth Mindset way of thinking.

I scored the question that asked whether writing to another person helped that person as a one (yes) or zero (no). A perfect score, in which everyone thought they helped their pen-pal, would therefore earn an average score of one. The same rating system was used to calculate the benefits the participants thought that they received from writing the letters. In both cases, the participants responded affirmatively (a 0.9 score for helping the pen-pal, and a 0.8 score for the participants being helped themselves). This indicates that the participants felt strongly that engaging in the letter writing activity benefitted both the participants and the pen-pals. I interpret this to mean that participants found value in explaining what they had learned about Growth

Mindset and study skills to others. The letter writing practice seems to be particularly effective in engaging and promoting the skills taught.

My primary use for information from the participants' reflection sheets was to assess the level of understanding of the material. This, in turn, helped me create future lessons. The reflection prompt that relates to Growth Mindset asked participants to list one thing they liked about themselves; Positive Psychology has shown that listing one thing a person likes about her/himself each day increases overall happiness and reduces depressive symptoms (Seligman, 2005).

In asking participants to list one thing that they liked about themselves, I discovered an anomaly. I wanted to elicit character-based responses, similar to those found in Seligman's research (Seligman, et al., 2005). Participants initially, and nearly unanimously, listed innate and superficial physical characteristics (e.g., my hair, my eyelashes, that I am a boy, etc.). To shift the responses, I began requesting they list something new each time, but this only appeared as a shift from one innate/superficial response to another. In week five of the project, I changed the prompt so that it was now asking participants to answer the question "what makes you a good person?" This change produced the desired effect and responses began to be focused on the participants' character qualities. The responses also shifted from two word replies (e.g., my hair) to complete sentences (e.g., "I volunteer at the Senior Center", "I am kind to everyone", "I help my mom with housework and babysit my little brothers.").

I cannot claim that changing the prompt produced a happier participant, but I did observe the faces of the participants as they completed these reflection sheets. It appeared to me that the participants smiled much more often after they listed something associated with their character. Also, the responses nearly all shared a common theme of helpfulness and kindness to others.

These types of responses were also present in Seligman's research and were correlated to increased happiness. Increased happiness is only tangentially related to Growth Mindset, but it is an attitude that I want to promote in my classroom. It relates to reduced depressive symptoms, and happier people are better able to focus on learning (Seligman, et al., 2005).

I included a comments space on the reflections sheets. The purpose was to provide participants a forum to say anything they wished; I hoped that the comments section would help capture any information that the participants thought important to share with me and that had not been shared in another way. This was only marginally successful.

The comments space was most often left blank. There seemed to be three occasions in which the participants completed this section: when they found something they did not like, when they felt that there was something they needed and were not getting, and when they had experienced something they liked especially well or found helpful. Initially, there were complaints like "Why do we have to study brains in English? That should be science class." and "There is too much homework in this class." Often the comments made early in the project related to the needs that participants felt were not being met, e.g., participants were trying to write down everything, rather than taking brief notes; they requested that I slow down. Later in the project, the comments became more heavily tilted toward the positive (e.g., "That was really fun!!", "I loved our class discussion.", "Thank you for working with us."). The overall rate of response in the comments section was still low (20% on average), but the content trajectory clearly indicated less resistance and greater engagement in learning.

The response rate to the comments section was too low to assign meaning to the whole group. However, the responses that participants gave do offer some support for the argument that participants' thinking was changing toward a Growth Mindset.

Of the data I collected, my reflection journal is most apt to contain a high level of bias. I was looking for particular actions, speech, and behaviors and may have missed or discounted opposing or disconfirming actions, speech, and behaviors. To reduce the bias in my findings and increase internal validity, I have tied my observations and thoughts to external confirming evidence, engaged in peer reviews of my findings, and had discussions with my mentor teachers. My observations are summarized in the following paragraphs.

Early in the project, participants were very energetic about contributing. At about week three, the crush of school work fell heavily on them. Many had taken all honors/advanced courses and were involved in extracurricular activities, too. They showed evident stress and were obviously exhausted. It was common to witness participants crying before the first period class as they struggled to cope with their workload. Ideas and lessons that could help them cope were warmly received, especially those lessons that appeared to have immediate value. The first two lessons on study skills (note-taking, and how to successfully set and achieve goals) were seen as important and valuable, though many students already had a functional note taking method. Participants asked questions, offered comments and observations, and were heavily involved in taking notes during the project's sessions. Notes were kept in a journal that I reviewed periodically; I was able to confirm my observations of stress and the value they placed on the lessons mentioned above when I checked the journals. Another confirmation of the value participants placed on the study skills lessons is found in the postquestionnaire responses (see the pre-and postquestionnaire section in this chapter). Participants listed two of the three study skills lessons as first and second when rating which lessons were most beneficial of the six lessons offered.

I was responsible for grading the drafts of the participants' "Smarter Balanced" practice essays during week seven of the ten week project. Although the subject matter of the essays had no direct connection to Growth Mindset (or any of the qualities associated with it), the participants often related their essays to their Growth Mindset learning. The essay required the participants to read articles about global warming, the melting polar icecap, and the plight of the polar bear. Forty-five percent of the participants worked material from the Growth Mindset training (tenacity, creating successful plans, and malleable intelligence) into their essays. This indicates the level of understanding participants had and (perhaps) the value the participants placed on these ideas. It also indicates that I was successful in transmitting these concepts to the participants.

The interruption for test preparation and testing, combined with a need to complete the reading of a novel, disrupted the plan for presenting the last two lessons in the Growth Mindset lessons sequence (see Appendix F). The effort involved in completing the Smarter Balanced practice testing and finishing the novel we were reading seemed to make students less receptive to working on this project. Other factors that may have influenced participants' attitudes include the slow response from their pen-pals, and the inconsistency of who was responding to the pen-pal letters (a different middle school student than the original pen-pal would often write the reply). The above issues severely reduced the feelings of purpose and connection held by the participants and may have had a negative impact on the adoption of Growth Mindset thinking.

The last two lessons of the sequence had to be combined and presented in one class session (Appendix F). Students expressed their confusion at having two disparate ideas (developing intrinsic motivation, and actions that encourage a Growth Mindset) presented at once and in a very limited timeframe. I provided handouts with all of the lessons; these handouts

seemed to fill some of the gaps in understanding and reduce confusion. Participants said that they understood the ideas much better after reading the homework handouts. The participants' ability to relay the information in their last letter to their pen-pal was confirmed in my review of the letters. Further confirmation of understanding is evident in the participants' postquestionnaire responses (completed nearly three weeks later) where these two ideas (intrinsic motivation and thinking in a Growth Mindset) were rated as second and third most beneficial of the six lessons.

The methods for assessing the letters (peer review before my review) resulted in participants submitting letters to me with high quality writing, that contained the pertinent information, and the proper tone. The narrative-type feedback from their peers was effective in providing the participant with corrective direction for letter revisions. I rarely needed to send a letter back for further revision. This outcome is in keeping with research by Tsui & Ng (2000). Further, students made positive written and verbal comments to me about the benefit of narrative feedback that I provided them on other work. Here are three examples: "That got me unstuck." "At first I didn't like what you wrote, but then I got over myself and changed it. Its [sic] a lot better now." "The things you write on my papers make my head hurt, but in a good way." My feedback comments maintained a constant focus on growth and finding better solutions (rather than pointing to errors) and served as a model of Growth Mindset thinking. Participants' peer comments served as practice in offering and receiving Growth Mindset suggestions.

The data collected from pre-and postsurveys, pre- and postquestionnaires, and participant and my own reflections show a trend toward Growth Mindset thinking. This indicates that I experienced some success in transmitting the Growth Mindset message to the participants. In the next section, I will discuss the findings from this project, reflect on the implications for my practice, and suggest further avenues for research.

Conclusions

Throughout this action research project, I investigated whether I could bring about an increase in students' intrinsic motivation, self-regulated behaviors, and academic engagement, consistent with an increased Growth Mindset view of life. The work of Carol Dweck and others indicates that students who hold such beliefs and act upon them tend toward greater academic success, are better able to overcome stereotype threat, and may be happier than those who do not (Aronson, et al., 2001; Dweck, 2008; Good, et al., 2003; Lepper, et al., 2005; Park, 2004; Romero, et al., 2014; and Yeager, et al., 2013). The average presurvey/postsurvey score indicated a change from a Growth Mindset with some Fixed Mindset ideas to a Strong Growth Mindset. This change in participants' thinking was corroborated by participant responses to the pre- and postquestionnaire, the participants' reflections, and my reflections. In the following sections, I will connect my findings to the research, reflect upon implications for my teaching practice, and offer suggestions for further research.

Connecting the Research to My Findings

I began this project by reading research on issues impacting student success. It became apparent that stress was present in students' lives from many sources: poverty, racism, violence, insecure food supplies, shelter instability, etc. Each of these stressors adds to the total stress load, or allostatic load, a child endures. Allostatic load detracts from a person's ability to think and learn (Duncan, & Murnane, 2011; Juster, et al., 2009). Since the sources of stress in students' lives are pervasive, individualized, and increasing in recent years, it seemed to me that a patchwork of interventions that are applied external to the child (e.g., reduce poverty, reduce racism, reduce violence, etc.) would be impractical because there is little or no national will to address these issues, limited or no resources available locally, and support would be lost if the child moved or otherwise lost connection with the support provider. If I am to reduce the effect

of allostatic load on students in the near term, I must offer the students a way of thinking about themselves, and their present circumstance, that helps them to develop the skills that make it possible for them to overcome (or cope with) the particular stressors they endure.

I began by identifying traits that were present in people who succeeded in the face of stress, and that could be learned in a classroom setting. The research indicated that these beneficial traits include belief in malleable intelligence (Aronson, et al., 2001; Blackwell, et al., 2007; Dweck, 2008; Good, et al., 2003; Lepper, et al., 2005; Park, 2004; Romero, et al., 2014; and Yeager, et al., 2013) , being intrinsically motivated, and developing higher levels of self-regulation (Bandura, & Schunk, 1981). While not directly linked to academic success, happiness does tangentially relate to improved learning, and happiness may be improved through acknowledging things one likes about oneself (Seligman, et al., 2005). Additionally, learning more successful ways to set and achieve goals is linked to increased success (Duckworth, et al., in press; Magen, et al., 2008). Lastly, assessment methods that keep the students' focus on growth, learning, and the correct answer (e.g., on true/false, multiple choice, and matching questions), contribute to and improve student learning (Andrade, 2010; Black, & Wiliam, 1998; Boud, & Falchikov, 2006; Chappuis, & Stiggins, 2002; Chappuis, et al., 2012; Duijvenvoorde, et al, 2008; Gielen, 2010; Nolen, 2011; Panadero, 2012; Sadler, 1998; Shute, 2008; Stiggins, 1999; Stiggins, 2005; and Stiggins, & Chappuis, 2005).

I employed the practices referenced in the preceding paragraph, offered lessons in effective study skills, and introduced the ideas and benefits associated with developing a Growth Mindset through direct instruction and guided practice. The data indicates that the majority of the participants incorporated aspects of Growth Mindset into their own thinking. Further, the participants themselves indicated that participating in this project was helpful to them.

Implications for My Teaching Practice

During this project I provided three direct instruction lessons in beneficial study skills and three lessons in developing traits associated with a Growth Mindset. At the end of the ten week project, participant responses to questionnaires and surveys showed an increase in Growth Mindset thinking. I was able to employ practices that promoted a Growth Mindset in my students. My research indicates strongly that there is value in continuing to refine and offer Growth Mindset training to my students.

In my future practice, there are areas that I will modify and deal with differently. Most significantly, I will not reveal the scores on the presurvey to my students. I did so in this project and regretted it almost immediately. I was operating from a Growth Mindset and underestimated the negative response people with a Fixed Mindset would have. It did not matter that I made exceptionally clear that the score was only an indication of current position and that the score will change over time.

Participants with a Fixed Mindset correlated it with something wholly negative. Because of their Fixed Mindset, they did not see effort as the key to change. Once they saw their position on the scale, they effectively shut out information that conflicted with their world view. Some of their reactions were so strong that they regularly identified themselves as being Fixed Mindset people (those with Growth Mindsets almost never referred to themselves as being Growth Mindset people). They seemed to automatically reject academic research that conflicted with their thinking as mere opinion. Those with Fixed Mindsets often said that they liked themselves just as they were and would not change. An example from a class that was not part of this study follows: I was asked by my mentor to teach these lessons in one of her classes because she thought her students would benefit from this information. I gave the presurvey as the first lesson.

As soon as one student saw his score, he angrily got up and left the class; he transferred out of the class immediately. Subsequent conversations with other students in this group who also had a Fixed Mindset confirmed that they felt that they were seen as bad and wrong when they saw their current score. Nothing else got through once they made that judgment. While this is anecdotal to this project, it illustrates the strength of the reaction a person with a Fixed Mindset is capable of having.

The pen-pal letter writing was initially an area of high student interest. When the replies were slow in coming and several participants' pen-pals were switched, interest waned. There was still fairly strong interest, but I think future students would benefit more if I could keep the project on a more regular schedule and ensure a single pen-pal for each participant. Maintaining the writing for real purposes aspect of this project (pen-pal letters) will be important because it produces buy-in quickly, encourages development of writing skills, and strengthens the Growth Mindset ways of thinking by repeating focus on these ideas

Another area for revision is in the area of groupwork. I had very little groupwork included in this project, other than peer reviews. In the future, I will engage students in many more small-group activities to enhance their motivation, improve their learning, and create a stronger sense of community in the classroom.

Maintaining a more regular schedule for investigating ideas associated with the Growth Mindset lessons may enhance students' understanding, assigned importance, and interest. I will make every effort to include direct reference to Growth Mindset each week, even when an entire lesson is not possible.

There was one inconsistent indicator related to the amount of success attributed to effort. Period Two showed the largest shift toward a Growth Mindset perspective in other areas, but no

change in the amount of success they attributed to effort. It may be that participants remembered the value they had entered nearly 10 weeks prior, or it could be that they invested little thought into their reply, e.g., they may have quickly jotted down 50/50 or other easy division without investing deeper consideration. In the future, I think that it may be valuable to present the question differently, e.g., asking the question “out of 100% what percent of success is from effort? _____%”. This may be different enough to cause a more thoughtful response.

It appears that the lessons offered and practices engaged in may be of greater benefit to students in standard and remedial classes than for honors level classes. The change in mindset for the participants with challenges group and period two (who had the lowest GPA) may suggest that those who struggle perceive a greater incentive to adopt new strategies (such as those presented in Growth Mindset lessons) than do their relatively more successful counterparts. This might also indicate that offering Growth Mindset training to those who are not in an honors-level class would have a more profound outcome.

People who view themselves as less “smart” are often reluctant to ask questions in class. Setting aside one’s ego in the quest for learning allows one to ask questions in class, regardless of whether that question might seem “dumb” to some listeners. The willingness to do so is an indicator of a shift toward a Growth Mindset. Responses on the pre- and postquestionnaire indicate a significant reduction in fear associated with asking questions in all participating periods. If Growth Mindset training allowed less vocal people to ask questions without fear, they may also improve their understanding and success. Reducing a student’s fear in asking questions might make continuing to teach Growth Mindset worth the effort all by itself.

Participants’ assigned a percentage value to the portion of their success attributable to effort (associated with a Growth Mindset), or to ability (associated with a Fixed Mindset). The

results indicated a shift toward Growth Mindset thinking by 8.5% on average. Often students who see themselves as unsuccessful disengage from their studies. Believing that one can become better through effort may offer those who have not experienced as much success as their peers a reason to try to encourage the increased effort that accompanies success and learning. The increase in attributing a portion of success to effort is another indicator of the value of Growth Mindset oriented practices and lessons in the classroom; it provides another reason for me to continue in both areas.

Suggestions for Further Research

This project was conducted with (comparatively) successful students. Those who were less academically successful and who face learning challenges adopted the message at a much higher rate than did the norm. Future research should be done in standard and remedial classes to investigate whether these groups adopt the Growth mindset ideas and place them into practice at a higher rate than was found in this research.

Another area for future investigation might be to conduct longitudinal research with students from the high-achieving, standard, and remedial groups who have all received the Growth Mindset message using methods and practices similar to those used in this project. In this way we may learn whether the training results in all groups improving their academic performance over time. Due to its short duration, this project did not include academic performance as an indicator of change. Since the drive for ever higher academic achievement in schools is at the forefront of many educational policy discussions, determining methods that improve academic achievement (and especially at a low cost) could offer policy makers a way forward.

In conclusion, I was successful in helping students develop a stronger Growth Mindset perspective. After participating in a combination of direct instruction, guided practice, pen-pal sharing, reflection, receiving feedback, and giving feedback, participating students reported a change in their thinking consistent with a Growth Mindset perspective. While the shift was significant for the whole group, the class period with the lowest academic achievement improved more than the class periods with greater academic success. Perhaps most significant is that, for the students who faced the greatest learning challenges (those students with IEPs, 504 plans, and self-reported learning challenges), the shift toward a Growth Mindset perspective was between two and three times as large as the average for all students. In other words, it appears that those students who might benefit most from shifting to a Growth Mindset perspective may also be most eager to make that shift. If the change indicated here continues to parallel other research, the shift to a Growth Mindset perspective will also result in greater academic achievement.

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APPENDICES
Appendix A
Peer Review Form for First Letter

Author _____

Reviewer _____

1. Writer's question to the reviewer: Please answer the following question:

Reply:

2. Is the tone of this letter friendly and inviting?

If not, what changes do you suggest?

3. Has the author included information about her-/his-self and created empathy? _____

If no, what changes might be beneficial?

4. Did the writer follow the conventions of Standard English (format, spelling, grammar, parallel structure, and punctuation)? If not, highlight the spots for revision directly on their letter.

5. Is the information in the letter factually correct and aligned with what we learned about study skills and brain development? If not, where/how can it be revised?

6. Did the author ask for a return letter and assure the reader that she/he will write again?

7. If you were a middle school student, would you understand this letter? If yes, what makes the letter clear and understandable? (New words are defined or described, vocabulary is at a sixth grade level, etc. Be specific)

If not, what change(s) would make it clearer?

Other suggestions for improvement (be specific):

Author's Plan to Implement Revisions

Appendix B

NAME _____ Reflection Sheet- 1st Shared Success Session

Name one thing that we did in class that was confusing, or that you are curious about.			
Write two things that you learned or contributions you made to the class today.			
How confident are you in your ability to... (mark in the box above your choice)			
<i>Write a letter and include definitions to help the audience understand new ideas and terms</i>			
I haven't learned to do this yet, but I will	I sort of get it; a little help would be good	I understand; I need practice	I can do this; an editor would help
<i>Use standard English structures, including parallel structure, grammar, punctuation, and spelling</i>			
I'll get there; right now, please help me	I can do some of this; help is good	I can do most of this; a little help is good.	I've got this; editors are helpful
<i>Explain to an audience of middle school students how the brain develops</i>			
I don't understand this yet.	I can do some of this; help is good	I can do most of this; a little help is good.	I completely understand
<i>Write clear, organized, detailed information that is appropriate for the audience</i>			
I'll get there; right now, please help me	I'm okay with some of this; help is good	I'm okay with most of this; a little help is good.	I've got this; an editor would help
Write a Brief Definition			
Axon			
Cortex			
Dendrite			
Myelin			
Neuron			
Neurotransmitter			
Synapse			
Abstract			
Hypothesis			
Integrative			
Write one thing that you really like about yourself.			

Name _____	Lesson 5 and 6
Name one thing that we did in class that was confusing, or that you are curious about.	
Write one thing that you learned or a contribution you made to the class today.	
Offer a suggestion that would help you (or the class) learn.	
Write two things that you are going to say to yourself to strengthen your growth mindset.	
Name two actions are you going to take to develop more intrinsic motivation.	
Name one thing that you do that makes you a good person.	
Please include any other comments you would like to share with me below.	

Appendix C

Name _____

Mindset Disposition Survey

This is ***not*** a test. It is ***not*** a competition with others. There is ***no*** right or wrong answer. Your answers help me to determine the content of future classes. Because you are playing such a vital role in making future classes interesting, being completely honest in your responses is very important.

To what extent do you agree or disagree with these statements:

1. Intelligence is something people are born with that can't be changed.

___ Strongly Agree Agree Disagree Strongly Disagree

2. No matter how intelligent you are, you can always be more intelligent.

___ Strongly Agree Agree Disagree Strongly Disagree

3. You can always substantially change how intelligent you are.

___ Strongly Agree Agree Disagree Strongly Disagree

4. You are a certain kind of person, and there is not much that can be done to really change that.

___ Strongly Agree Agree Disagree Strongly Disagree

5. You can always change basic things about the kind of person you are.

___ Strongly Agree Agree Disagree Strongly Disagree

6. Musical talent can be learned by anyone

___ Strongly Agree Agree Disagree Strongly Disagree

7. Only a few people will be truly good at sports –you have to be “born with it.”

___ Strongly Agree Agree Disagree Strongly Disagree

8. Math is much easier to learn if you are male or maybe come from a culture who values math.

___ Strongly Agree Agree Disagree Strongly Disagree

9. The harder you work at something, the better you will be at it.

___ Strongly Agree Agree Disagree Strongly Disagree

10. No matter what kind of person you are, you can always change substantially.

___ Strongly Agree Agree Disagree Strongly Disagree

Total F ____ Total G ____ Transfer these numbers to the bottom of the other side of this paper.

11. Trying new things is stressful for me and I avoid it.

___ Strongly Agree Agree Disagree Strongly Disagree

12. Some people are good and kind, and some are not—it's not often that people change.

___ Strongly Agree Agree Disagree Strongly Disagree

13. I appreciate when people, parents, coaches, teachers give me feedback about my performance.

___ Strongly Agree Agree Disagree Strongly Disagree

14. I often get angry when I get negative feedback about my performance.

___ Strongly Agree Agree Disagree Strongly Disagree

15. All human beings are capable of learning.

___ Strongly Agree Agree Disagree Strongly Disagree

16. You can learn new things, but you can't really change how intelligent you are.

___ Strongly Agree Agree Disagree Strongly Disagree

17. You can do things differently, but the important parts of who you are can't really be changed.

___ Strongly Agree Agree Disagree Strongly Disagree

18. Human beings are basically good, but sometimes make terrible decisions.

___ Strongly Agree Agree Disagree Strongly Disagree

19. An important reason why I do my school work is that I like to learn new things.

___ Strongly Agree Agree Disagree Strongly Disagree

20. Truly smart people do not need to try hard.

___ Strongly Agree Agree Disagree Strongly Disagree

Total from side one: Total F ____ Total G ____

Total from side two: Total F ____ Total G ____

F + F ____ G + G ____

F A _____ F P/C _____

G A _____ G P/C _____

This survey was developed by Carol Dweck. Modified by Bihn Thai UNMS

Appendix D Prequestionnaire

Name _____

This is not a test. Your replies will give me information that will help me to help you. Please take your time and thoughtfully answer each question. No one will see your answers except your teacher and me. Your answers will help me understand your needs as learners, and how I can become a better teacher. Thank you for your participation.

1. I can write clear arguments and detailed informational essays that include references to other sources.

___ Very much like me ___ Mostly like me ___ Not much like me ___ Not at all like me

2. I can make clear and detailed connections between stories that I have read.

___ Very much like me ___ Mostly like me ___ Not much like me ___ Not at all like me

3. Please rank from 1 to 4 the ways you like learning new things? (1 is your favorite way to learn)

___ Doing (hands-on) ___ Listening to someone talk ___ Reading about it ___ Seeing it done

4. I learn best when I am (choose one) ___ Working alone OR ___ Working with someone

5. Even though it may be a while, I believe that my hard work and effort will pay off one day.

___ Very much like me ___ Mostly like me ___ Not much like me ___ Not like me at all

6. What is one goal you want to achieve in the next five years?

7. What are you doing to reach that goal?

8. I'm afraid that if I ask my teacher a "dumb" question, she/he might think I'm not very smart.

___ Very much like me ___ Mostly like me ___ Not much like me ___ Not like me at all

9. I want to learn as much as possible from this class.

___ Very much like me ___ Mostly like me ___ Not much like me ___ Not like me at all

10. What does "success" mean to you?

11. What percent of success is due to natural ability and how much is due to effort?

(Ability% + Effort%=100% Success) Ability _____% + Effort _____% = 100% Success

12. What advice would you offer to a new student that would help them succeed at this school?

13. Think of the best teacher that you ever had. Please tell me what it was that made that person the best.

Please include any additional comments or suggestions here:

Thank you. Your responses will be very helpful.

Appendix E

Postquestionnaire

Name _____

This is not a test. Your replies will help me to become a better teacher. Please take your time and thoughtfully answer each question. No one will see your answers except me. Thank you for your participation.

Please tell me how helpful the following lessons were to you:

1. Learning about tenacity and how the brain develops connections.

____ Very helpful ____ Mostly helpful ____ A little helpful ____ Not at all helpful

2. Learning note taking strategies.

____ Very helpful ____ Mostly helpful ____ A little helpful ____ Not at all helpful

3. Learning the differences between people with growth and fixed mindsets.

____ Very Helpful ____ Mostly helpful ____ A little helpful ____ Not at all helpful

4. Learning how to develop a successful plan for reaching your goals.

____ Very Helpful ____ Mostly helpful ____ A little helpful ____ Not at all helpful

5. Learning about the thoughts and actions that help people to develop a growth mindset.

____ Very helpful ____ Mostly helpful ____ A little helpful ____ Not at all helpful

6. Learning about intrinsic and extrinsic motivation.

____ Very helpful ____ Mostly helpful ____ A little helpful ____ Not at all helpful

7. Do you think that the letter writing project helped your pen-pal?

____ Yes ____ No

8. Do you think that sharing the things you learned with your pen-pal helped you?

____ Yes ____ No

9. I'm afraid that if I ask my teacher a "dumb" question, she/he might think I'm not very smart.

____ Very much like me ____ Mostly like me ____ Not much like me ____ Not like me at all

10. What does “success” mean to you?

11. What percent of success is due to natural ability and how much is due to effort?

(Ability% + Effort%=100% Success) Ability _____% + Effort _____% = 100%

Success

12. Name the lesson(s) that you learned, or skill(s) that you developed, from participating in this class that you think are the most helpful.

13. What was the most challenging thing about taking this class?

Please share any additional comments or suggestions here:

Thank you. Your responses will be very helpful.

Appendix F

Planned and Actual Lessons Timeframe

The planned lesson progression provided participants with a weekly session that built and extended their knowledge. This learning would be followed by four weeks of reinforcing experience and practice applying the concepts with me as a facilitator that assisted the participants in developing and deepening their learning.

▲ = Study Skills Lesson ★ = Mindset Lesson ↔ = Peer Review of Letter

Week	Monday	Tuesday	Wednesday	Thursday	Friday
One			Questionnaire	Presurvey	▲
Two	★			↔	▲
Three					★
Four				↔	▲
Five					★
Six				↔	
Seven					
Eight					
Nine					
Ten				Questionnaire	Postsurvey

Due to required testing and other school events, the planned schedule had to be altered. The schedule below represents the actual lesson presentation schedule. Note that there were two peer reviews for the first letter, and two lessons were given on the same day in week eight. There was a period of three weeks between the second and third lesson sets where no lessons were possible. There were fewer than two weeks of supported practice following the last presentation.

Week	Monday	Tuesday	Wednesday	Thursday	Friday
One				Questionnaire & Presurvey	
Two	▲		★		
Three	↔		↔		
Four	▲				★
Five				↔	
Six					
Seven					
Eight	▲ ★				↔
Nine					
Ten					Questionnaire & Postsurvey

