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**The Effects of Using Specific Language to Develop a Growth Mindset in Students with
Learning Disabilities**

by

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Abstract

The effect of a growth mindset intervention for students with learning disabilities in a classroom setting is explored in this single case intervention study. Through the process of direct mindset instruction along with explicit growth mindset language used by the teacher, students in a grade three classroom were observed during this three-week intervention. The application of using direct instruction along with explicit language relating to growth mindset is examined amongst the four students in the intervention. Findings suggest that growth mindset intervention seemed to depend on the student, having a positive effect for one student with a learning disability and a flat effect for the other student with a learning disability. Further research on the effect of the teachers' mindset on student mindset, the effect of an observer in the classroom, the potential use of a control group, and use of language over longer time frames is warranted.

Keywords:

fixed mindset, grit, growth mindset, language, learning disability

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Chapter One

Introduction

The acclaimed idea that success and failure is derived from a person's mindset, is a growing phenomenon that fails to take into consideration the fixed mentality that we endow students with when we label them with a learning disability. A leading researcher in the field, Carol Dweck (2006), recognized that there are essentially two different mindsets people can have: fixed and growth. A fixed mindset is the belief that basic talents, skills and abilities are fixed within the person. Meanwhile, a growth mindset is the belief that abilities can be developed, depending on the amount of effort and work put into developing them (Dweck, 2015). According to Carol Dweck's numerous studies, when students are taught to have a growth mindset, and imagine that their brains are malleable, they become much more challenge seeking, show greater motivation and increased achievement (2006). Johnston (2014) suggests that "special education students are not only placed within a fixed-performance frame, but also given frequent evidence that they are not being successful" (p. 14), leading to the idea that the education system fails to recognize the fixed ability sentence they are putting on students when labeling them with a learning disability.

As a special education teacher working with students with diverse needs has led me to wonder about what students' truly believe about their capabilities and if they believe knowledge is something fixed or if it is something everyone has the ability to acquire. Research surrounding growth mindset encompasses the idea that everyone has the capability to succeed but they may need to be taught how to think in such a way that allows them to believe in their potential. I am interested in students with learning disabilities specifically developing a growth mindset as these students are generally explicitly told they do not learn typically and struggle in some areas; so, will teaching these students allow them to develop a growth mindset and allow them to believe

they are fully capable academically? My research is designed to investigate the effects of using specific language along with direct instruction to develop a growth mindset in students who are designated with a learning disability (LD).

My intervention integrates the language and principles designed to develop a growth mindset as outlined in “Opening Minds” by Peter H. Johnston (2014) along with the instructional tool “You Can Grow Your Intelligence”, a 2014 article written by Brainology® (Appendix C). In the sections that follow, the general characteristics of the population of interest, students with a learning disability, will be described, along with the concepts of a growth mindset, fixed mindset, what it means to have grit, and language used to build a growth mindset. Finally, a statement of the problem, purpose of the intervention, and the main research questions of the intervention will be outlined.

Students with Learning Disabilities

Learning disability (LD) is a broad term used by educators to describe someone who has a disorder that may affect “the acquisition, organization, retention, understanding or use of verbal or nonverbal information” (British Columbia Ministry of Education, 2013). In a school setting learning disabilities are generally presented as a struggle in the acquisition of oral language, reading, written language and mathematics. Learning disabilities may also involve challenges with organizational skills, social perception, social interaction and perspective taking (BC Ministry of Education, 2013). Learning disabilities make up 3.2% of the school aged population (Brennan, 2006). Having a learning disability is generally due to genetic, and/or neurological factors or injury that alters brain function affecting learning (BC Ministry of Education, 2013). Learning disabilities present lifelong challenges, however while an individual may struggle in one area, they are often successful in others.

Students who receive a designation of a LD will also be required to have an Individual Education Plan (IEP). These plans highlight strengths, beneficial ways to aid the student, what types of support are necessary, and supplementary learning goals and assessment differentiation. Strategies to support a student with a LD often involve giving intense direct instruction, instruction in learning and compensatory strategies, as well as the appropriate adaptation of instruction (Ministry of Education, 2013). Due to the variation in ability for students who have a LD, IEPs and learning strategies will be very different based on the individual student.

For students, knowing that they have some form of a learning disability typically leads to a struggle in believing in themselves as well as less self-determination (Konrad, Fowler, Walker, Test, & Wood, 2007). Repeated failures also discourage learners from attempting to learn new strategies in academic areas where they have already performed poorly (Whyte, Saks, & Hook, 1997). This constant discouraging feedback and lack of self-motivation often demonstrates as associating academics with negative attributions (Tabassam & Grainger, 2002). What students believe about themselves and how they view themselves plays a significant role in the motivation of students with learning disabilities (Konrad et. al, 2007).

Growth Mindset

In the field of positive psychology, the idea of “mindsets” is becoming increasingly popular. Mindset is a term used to describe the implicit theories about how malleable the brain is and how it can change regarding characteristics (Dweck, 2006). When a person believes that their brain is capable of growing and developing, they are said to have a “growth mindset” (Dweck, 2006). For the purposes of this intervention, the operational definition of a growth mindset is “a belief that basic qualities can be developed through dedication and hard work” (Dweck, 2006). When a student develops a growth mindset they become more motivated and therefore will achieve

better marks on test scores, especially during courses that challenge them (Dweck, 2015). Studies by Dweck have shown again and again that students who are taught how their brains can grow tend to try harder, and are more motivated especially during challenging tasks (Dweck, 2000). Goldstein and Brooks (2007) identified five major characteristics surrounding students who have a growth mindset, including: Perceiving adults as people who genuinely care about and support them, believing that they personally play a major part in their learning process, recognizing that part of the learning process involves making mistakes, treating others with care and respect, and finally having a clear understanding of their learning strengths and weaknesses.

Theory of Neuroplasticity

The theory that with hard work and dedication traits can be changed, relates to the idea that brains can be developed and grown depending on how much work is put into deriving a desired characteristic. Neuroplasticity is “the ability of the brain to change, adapt, and rewire itself throughout our entire life” (Ricci, 2013, p. 8). Unfortunately, as the brain can make new connections it is also able to lose them, known as “pruning” (Ricci, 2013). Believing that the brain can form new connections and develop is an important aspect of developing a growth mindset. Research in neuroscience disconfirms the belief that intelligence is “fixed” from birth, and supports the idea that the brain can be developed given the proper stimulus (Ricci, 2013).

Fixed Mindset

Contrary to believing that one’s brain is malleable and capable of constant growth, is the belief that overall intelligence and abilities are traits that do not change regardless of the effort put into improving them (Steele, 2010). For the purposes of this intervention, the operational definition of a fixed mindset is “the belief that basic qualities, like intelligence or talent are simply fixed traits which are not developed with increased effort” (Dweck, 2006). In a fixed mindset students are

performance and result based, and do not believe effort can change what is an inborn trait (Dweck, 2000). Most of the time students with a fixed mindset believe that increased effort is a sign of weakness and give up far more easily on challenging tasks (Dweck, 2000). Research by Gutshall (2013) suggests that the mindset of the teacher can play a role in the mindset of students with learning disabilities. Gutshall (2013) showed that “when teachers have beliefs that students’ intelligence was fixed they would offer students less support and encouraged them to find their own solutions” (p. 1074). These beliefs are shown to not only affect student performance but also affect how they “get messages about the meanings of smartness” (Dweck & Bempechat, 1983, p. 251).

Grit

When students are taught how to develop a growth mindset the quality that is being embedded is known as “grit”. Grit is an intrinsic desire to keep going in a struggle. For the purposes of this intervention the operational definition of grit will be “the quality that enables individuals to work hard and stick to their long-term passions and goals” (Bashant, 2014, p. 14). When students are taught this characteristic, they are learning how to develop a growth mindset. Duckworth, Peterson, Matthews & Kelly (2007), suggest that grit may be the quality setting highly successful people apart from everyone else, and that by teaching students that making mistakes and struggling with an assignment is all part the learning process, we are teaching them how to develop grit. Bashant (2014) illustrates that children who have more of a growth mindset tend to be grittier. Pappano (2013) found that when he changed his lessons to include words such as “let’s get curious about this” and letting students struggle with problems on their own, they became much more motivated in solving the problem, as they were curious and wanted to learn. Overall, research concludes that grit is an intrinsic ability to stick to something and work for it, and by creating an

environment where students must learn from mistakes and struggle, we are teaching them a growth mindset and thus making them “grittier” (Bashant, 2013).

Language Used to Help Prosper a Growth Mindset in the Classroom

Johnston (2014) speaks about the importance of the words we say to students, and how much of an effect, what teachers say to students can have on the mindset of their capabilities. Johnston (2014) suggests some key features to creating a dialect in the classroom to foster a growth mindset:

1. Feedback. How we give feedback and praise in the classroom affects the type of mindset students develop. Giving students praise instead of asking questions about their thinking process, or highlighting the outcome rather than the process can undermine resilience and persistence (Mueller & Dweck, 1998). When effort is praised instead, this suggests that ability can be improved, encouraging persistence and “grit” (Mueller & Dweck, 1988). Dweck (2006) found that when teachers and parents praise intelligence, (for example “You’re so smart”) rather than the learning process, students’ motivation and overall performance is negatively affected. The confidence boost of the compliment does have a positive effect for that moment, but when a harder task arises and they are stuck, they lose the confidence boost and think lesser of themselves.
2. How we frame activities and questions can also influence how students approach a task. When activities are framed as a fun challenge rather than a competition, children will focus on the task and information given in a much different manner. Framing questions that invite dialogue and uncertainty, and creating a form of inquiry in the classroom, gives students a reason to continue thinking about questions, rather than simply answering yes/no.

3. Teaching students explicitly how the brain and mind works, and explaining that the brain can literally grow and develop new connections when they learn something new. Johnston (2014) suggests that this can be taught in the classroom by showing how the students have physically changed in their lives (using photos) and using the word “yet”. For example, “I’m not good at this *yet*”, and embedding this form of language in all aspects of the classroom learning environment.

For the purposes of this intervention, the language used to develop a growth mindset in the classroom will be categorized as the principles shown above. My research will frame all three of these key aspects. To aid the third aspect I have included the article “You Can Grow Your Intelligence” by Brainology ® (2014) (Appendix C).

Statement of Problem

To develop a growth mindset in students with learning disabilities, the effect of the “fixed performance frame” (Johnston, 2014, p. 14) needs to be taken into consideration, and determined if this influences the students’ mindset. Johnston (2014) describes the effect of placing a label on a student a “world of presumed disability traits”. Constantly being reminded of the designation students have when they go to separate classes or receive different work or treatment only emphasizes the disability they may have, possibly making their mindset more and more fixed into a state of limited ability. Educators and researchers should look for ways in which a designation may present barriers and create a fixed mindset for students with learning disabilities in the school system, and help to alleviate these barriers to ensure all learners have the capacity to believe they are capable of development.

Context of the Intervention

Teachers and researchers have seen the positive effects of developing a growth mindset in mainstream students, yet little to no research has been explored regarding how to develop a growth mindset in students with learning disabilities; students who are predisposed to a “fixed performance frame” (Johnston, 2014). The purpose of this intervention is to investigate whether the application of Johnston’s three key features, regarding the language used in the classroom, as well as the purposeful teaching of a growth mindset through the article “You Can Grow Your Intelligence” by Brainology ® (2014) (Appendix C) can help students with a learning disability develop a growth mindset.

Research Question

The question compelling this research intervention was “Can the mindset of students with learning disabilities be changed from a fixed mindset to a growth mindset?”

To frame the purpose of this question, students were taught using specific language used to prosper a growth mindset as shown in Peter H. Johnston’s book “Opening Minds” (2014). Students were taught about growth mindset through the article “You Can Grow Your Intelligence” by Brainology ® (2014) (Appendix C).

Chapter Two

Literature Review

Overview

Mindsets are an increasingly popular topic in the field of education. Several research studies have investigated the effectiveness of developing a growth mindset in improving the social and academic outcomes in students' learning and overall perceptions on their qualities and abilities. However, existing research on the application of developing a growth mindset in students with learning disabilities is very minimal. This chapter includes a review of selected literature and research outcomes related to developing a growth mindset in students with and without learning disabilities. This chapter is divided into two sections that review outcomes related to: (a) what the outcomes of developing a growth mindset is for students in the general population (b) why developing a growth mindset is particularly important for students with learning disabilities.

Outcomes of Developing a Growth Mindset in Students of the General Population

Psychological factors have been shown to matter even more than cognitive factors for students' academic performance (Dweck, Walton & Cohen, 2011). Dweck (2006) discovered in her studies, that when students develop a fixed mindset they believe that their traits and talents are inborn, and therefore cannot be developed or changed, as opposed to people with growth mindsets who believe that qualities and traits can be developed through dedication and hard work. In several studies, research has shown that students who develop a growth mindset have better self-esteem, self-efficacy, self-regulation, and grit, which leads them to academic achievement (Dweck, 2006). While there are several reasons why people differ in their mindsets, Dweck (2006) points out that the brain has a great capacity for lifelong learning, and while individual temperaments and aptitudes may start different, experience, training and effort can guide the brain to achievement.

However, while there is a surplus of research regarding the positive attributions of developing a growth mindset in students of the general population, there is limited research on whether developing a growth mindset in students with learning disabilities can lead to the same positive effects. Labeling someone with a learning disability, is essentially placing them within a fixed performance frame (Johnston, 2014). Questions that then arise are: when students are brought through the school system with a label, are they able to develop a growth mindset? Can these students receive the same positive effects from a growth mindset as the general population? While the literature covers many facets of developing a growth mindset, students who may be pre-disposed to a fixed mindset are often overlooked in the general research.

Mindset and Self-esteem

Hymer and Gershon (2014) identify the dangers of labeling a student as “clever” or “not clever”, relating to Dweck’s work on praise (Dweck, 2006). When stating that a student is “clever” or praising them for being “smart” it is misdirecting them away from the task at hand to focussing on their own success and failure – creating a fixed mindset (Gunderson, Goldin-Meadow, Levine, Gripshover, Romero & Dweck, 2013; Dweck 2006; Hymer & Gershon, 2014). When students do not succeed on a task they will then attribute the lack of success to failure (Dweck, 2006). When students are constantly reminded they are not as smart as others (through feedback), their fixed mindset results in an inability to use strategies to get through learning challenges as well as low self-esteem and a lack of resilience (Hymer & Gershon, 2014). Crocker, Brook, Niiya and Villacorta (2006) showed that generally people invest more effort in domains they link self-worth to, and in which their self-esteem is contingent. This is a particularly dangerous mindset, as Grant and Dweck (2003) have shown that when students attach self-worth to an ability, any outcome is a reflection on themselves, and therefore when they fail or struggle, their self-worth is harmed.

Crocker et. al, (2006) also stated that “when people have the goal of maintaining, enhancing, or protecting their self-esteem, it is particularly difficult to embrace failure or criticism as a learning opportunity” (p. 1766). In 2008, Murphy and Thomas found that when college-aged students had a fixed mindset, they were more likely to show a decrease in self-esteem when faced with challenges, as they attributed the failure an intellectual inability rather than lack of effort. For students with this fixed mindset, self-esteem is maintained by appearing smart. Often, self-esteem becomes diminished as academic challenges lead to a belief that they lack intelligence (Dweck & Yeager, 2012). Thus, the importance of developing a growth mindset in students who may already have feelings of self-doubt and lack self-esteem becomes even more important. While the research does not suggest developing a growth mindset will develop self-esteem in students, it does clearly show that a fixed mindset can have harmful effects on self-esteem.

Mindset and Self-efficacy

Self-efficacy is an individual’s perceived capability to perform given actions (Schunk & Zimmerman, 2011). When students view themselves as capable of a task, and tend to set higher learning goals for themselves, plan their work, and monitor their progress; they are said to have a high self-efficacy (Usher & Pajares, 2009). Usher and Pajares (2009) grouped students in mathematics, according to their achievement and ability to see how their groupings and successes or failures would determine their self-efficacy. He found, through interviewing, that students who had a high self-efficacy, were also put into the top groupings, and in conversations often spoke stories of their successes in mathematics. Students with low self-efficacy often compared themselves more negatively against their peers, seeing themselves as not as bright, or as lacking. When students obtained a high level of self-efficacy, their confidence stemmed from previous successes, and achieving higher marks than their peers. When students “believe in their ability to

learn and perform well in school, this self-efficacy can predict their level of academic performance above and beyond their measured level of ability and prior performance” (Dweck et. al, 2011, p. 5). Also of significance was the finding that when goals were broken into concrete short term steps, self-efficacy increases, as these steps promoted students learning and motivation (Dweck et. al, 2011). When students believe that they could achieve a specific task, this not only motivates academic attainment by influencing personal goal setting, but also increases self-regulation (Zimmerman, Bandura & Martinez-Pons, 1992). In 1992, Zimmerman, Bandura and Martinez-Pons found that the higher the self-efficacy students had, the higher the goals were that they set for themselves (p. 673). With these higher goals, came greater academic success. Similarly, Usher and Pajares (2009) found that when students had high self-efficacy for a task, they were more likely to adopt mastery goals. Overall, when a person develops a growth mindset, their resilience helps to develop learning goals, and when learning goals are met, self-efficacy is developed, leading to higher academic standards (Yeager & Dweck, 2012).

Mindset, Self-regulation and Grit

As mentioned above, developing a growth mindset has also been shown to be a contributor in helping students develop self-regulation and grit. Zimmerman (1989) defines self-regulation as “the degree to which students are metacognitively, motivationally, and behaviourally active participants in their own learning process” (p. 329). When a student has “grit” they have a “perseverance and passion for long-term goals” (Dweck et. al, 2014, p. 13). These two terms have been described together here, as Dweck has stated that self-regulation involves the ability to avoid short term distractors, and grit is the ability to pursue long term goals, through challenging times (Dweck et. al, 2011). Zimmerman (2002) states that students who are self-regulating learners can set personal goals, identify and use specific learning strategies while monitoring their performance,

evaluate and reflect on their strategies, and adjust strategies to improve performance. In recent research, Feltham and Sharen (2015) investigated the effects of feedback and self-regulation. In their study, the intervention was designed to improve students' writing through feedback and revision. Several workshops were given to the students, focussing on topics such as critical thinking, the nature of the writing process, feedback and revision strategies. Feltham and Sharen (2015) found that students' beliefs and attitudes about whether they believed writing was an inborn talent, affected their self-regulation on revision and ability to engage in feedback. Interestingly, they also found a statistically significant increase in the results to the agree/disagree question: "How well you write depends mainly on your own effort" (p. 116). The results from this study helped students to understand and apply feedback and revisions, and develop self-regulation strategies in their writing when they believed they had the ability to control the outcome of their writing based on the amount of effort they put in. Supporting these findings, Blackwell, Trzesniewski, and Dweck, (2007) found students could be taught the science underlying their ability and shown how to apply these insights to their own lives, to promote resilience. An important finding states that students who have a growth mindset about intelligence, learning goals, a higher-order purpose, and a sense that they belong in school may show more grit in their academic work (Dweck et. al, 2011). Crocker et. al, (2006) found that when goals contribute to something larger than the self, students acquire better self-regulation. Job, Dweck, and Walton (2010) stated the importance of people understanding their own beliefs about willpower, as a resource that can affect their self-regulation. When students believed their implicit theories stating a lack of willpower, they were more likely to perform worse on a given task, whereas people who adopted a "nonlimited-resource theory" demonstrated no relationship between perceived exhaustion and performance, as their effort remained the same throughout. Cross (2014) measured

grit scores (calculated through a survey), in relation to GPA, and found a significant relationship between the two, suggesting that the more grit students had, the higher they achieved academically (Blackwell et. al, 2007). When students can sustain their effort on difficult tasks, showing self-regulation and grit, they will be able to achieve higher levels of achievement; therefore, grit is an important predictor of academic success in school (Dweck et. al, 2014).

Mindset and Academic Achievement

Numerous meta-analysis and comparative studies that have compared learning with a growth mindset versus learning with a fixed mindset have found that when students develop a growth mindset they will perform better academically when faced with challenges (Grant & Dweck, 2003). The mindset that students adopt (fixed or growth), has huge effects on student achievement (Dweck, 2006). When students are learning with a growth mindset, they are engaging in “learning goals” where the aim is to acquire new knowledge or skills, and results in active coping, sustained motivation, and higher achievement in the face of challenge (Grant & Dweck, 2003). Children who believe that abilities are fixed tend to display maladaptive achievement related behaviours such as attitudinal or motivational problems that interfere with work (Licht, 1983). Yeager and Dweck (2012) suggest that there are two different implicit theories of intelligence – entity and incremental. The “entity theory is based on measuring ability, while the incremental theory is about learning and growth, and everything (challenges, effort, setbacks) is seen as being helpful to learn and grow” (p. 304). When students develop an incremental view of intelligence, they become more resilient and earn higher grades when confronted with a challenging school transition (Blackwell et. al, 2007). In the general population, research has shown that encapsulating an incremental view of intelligence is a critical factor in academic achievement (Dweck et. al, 2011). In a longitudinal study by Blackwell et. al, (2007), research

showed that students who held the belief that intelligence was malleable (growth mindset) predicted an upward trajectory in grades over two years, in comparison to students who held the belief that intelligence is fixed (fixed mindset), who showed a flat trajectory in grades over two years. The students in the growth mindset group affirmed learning goals, believing that hard work was important and effective in achievement, and were more likely to invest more effort or change their strategy in the face of a setback. After two years, students who believed intelligence was malleable outperformed those who believed intelligence was fixed, academically in the subject of mathematics, which was controlled for prior achievement. Aronson, Fried, and Good (2002), found that students placed in an incremental treatment theory group developed a growth mindset after learning about the brain's malleability. Students were taught how the brain grows through neuroplasticity, and forms new connections when learning takes place, along with picturing their brain growing when they were faced with a challenging academic task. Students were then asked to write a letter to another classmate explaining what they learned about the brain's malleability, to make the message even more pronounced. Overall, the students in the incremental theory group reported greater academic engagement and obtained higher grade point averages by 0.23 points than their counterparts in control groups. Additionally, Aronson et. Al, (2002) showed that while presumably students who are younger have a greater ability to reshape their views, as their views of intelligence may be more malleable (Dweck, 1999), college students are also able to change their views on academics by developing an incremental theory of intelligence. Haimovitz, Wormington and Henderlong Corpus (2011), also concluded that students who experienced motivational declines over the course of the school year were those who endorsed the entity theory of intelligence, "approaching their school work as a means for validating their ability" (p. 4). Students who believed their academic ability was malleable, and worked hard were more self-

motivated and were more likely to do better academically (Haimovitz et. al, 2011). Overall, research has shown that “student mindset clearly plays a role in academic performance” (Gutshall, 2013, p. 1074).

Why Developing a Growth Mindset is Important for Students with Learning Disabilities

It can be concluded that the research generally supports the idea that growth mindset is related with higher self-esteem, self-efficacy, academic achievement, self-regulation and grit for students without disabilities. The importance of these findings should be researched further amongst students with learning disabilities, as research generally states these students tend to have more motivational problems, a lack of persistence during difficult tasks, and poor self-regulation (Licht, 1983).

Research regarding students with learning disabilities and self-esteem, has found that students with learning disabilities either have lower self-esteem than their peers, or see themselves as equal (Zyoudi, 2010). Licht (1983) found that children with learning disabilities generally score lower than their non-learning disabled peers on measure of self-esteem and perceptions of ability. Children with learning disabilities are also more likely to have a fixed mindset about their ability, attributing their difficulty in academics to insufficient ability (Licht, 1983). Supporting this research, Zyoudi (2010) found that students with learning disabilities have a negative self-concept of their abilities and academic skills, in comparison to their same-aged peers. Similarly, Harter, Waters, and Whitesell (1998) found that high school aged students with learning disabilities felt worse about their general ability intellectually, and self-esteem. This research highlights the importance in finding a method of promoting self-esteem in students with learning disabilities. Baird, Scott, Dearing and Hamill (2009) found that when students in grade six through twelve, all with learning disabilities, completed measures of academic self-efficacy, they were more likely to

possess lower self-efficacy than their peers, and believe intelligence is fixed and non-malleable. Interestingly, these students also believed that exerting more effort was equivalent to possessing less levels of ability. Licht (1983) also states in her review that “repeated failures of children with learning disabilities may not only lead to feelings of incompetence, but they also may cause these children to devalue their academic work” (p. 488). Licht (1983) concludes in her review, that there is a considerable amount of literature “suggesting that as a result of repeated failures, children with learning disabilities are likely to develop a set of maladaptive achievement-related beliefs that may themselves create problems that go beyond the children’s initial disabilities” (p. 488). These reviews and studies show that research should be conducted surrounding developing a growth mindset in students with learning disabilities, as this is clearly the group of students who may have a fixed mindset.

Summary

The goal of this review was to provide a summary of research outcomes related to developing a growth mindset in the general population of students, show how students with learning disabilities are an at-risk group for developing the key components of a fixed mindset, and establish the importance of developing a growth mindset in students with learning disabilities. Research shows that developing a growth mindset in students is related to higher levels of self-esteem, self-efficacy, self-regulation, and academic achievement (Dweck et. al, 2011). Research shows that students with learning disabilities often have lower self-esteem than their peers, are more likely to attribute challenges in learning with lack of ability rather than effort, and are more likely to give up on academic tasks (Licht, 1983), enhancing the need for more research to be conducted on developing a growth mindset in students with learning disabilities.

Significance of the Present Intervention

The proposed intervention therefore differs from earlier interventional studies as it considers a different learning group, students with learning disabilities, and aims to show the academic tenacity and self-determination qualities that developing a growth mindset can have in a group of students who are placed within a “fixed performance frame” (Johnston, 2014).

Chapter Three

Methodology

Research Method

To address the gap in theory and research connecting a growth mindset and students with learning disabilities, this intervention examined outcomes related to developing a growth mindset as a result of implementing specific language and instruction in the classroom. Outcomes for students with learning disabilities in a grade one/two combined classroom was examined. The intervention used a scale based measure and open ended questions to develop a growth mindset portfolio of each student, as well as perspectives of students regarding their feelings toward the effect they can have personally on their achievement, derived from quotes gathered through observation. This study used a mixed methods approach to determine whether using specific language in the classroom could develop a growth mindset in students with learning disabilities. Recognizing the need to incorporate standardized assessments, open ended questions and internal feelings on learning was intentional in this study, as research has shown incorporating qualitative and quantitative data allows for further insights and captures information that may be otherwise missed with only one design (Caruth, 2013).

The purpose of this intervention was to investigate whether the application of using specific language and explicitly teaching about brain growth and how the brain works would help students with a LD develop a growth mindset. A single case intervention study was chosen to specifically see if the intervention had a positive effect on the individual students with learning disabilities.

This chapter will describe the methodology of the intervention focussing on the following sections: (a) setting (b) participant selection procedure (c) participants (d) data collection procedure (e) assessments and measures (f) the intervention and (g) data analysis procedures.

Context

The setting for this intervention was a public elementary school (Grades K-7). This school was specifically chosen as it is largely involved in Carol Dweck's work in developing a growth mindset in students. One classroom teacher participated in this intervention. The classroom was a first and second grade combined class. The classroom contained two full time Education Assistants as well as a side by side teacher that took the grade ones in the classroom out to work with them specifically in the morning for two hours.

Participant Selection Procedure

The sample of students for this intervention consisted of four second grade students, two of whom have a designated LD and two who are typical learners. Consent forms were handed out to the entire grade one/two combined classroom and the four who returned consent forms were then selected for the intervention. Having a designated LD meant two of the four students have an Individualized Education Plan (IEP) outlining specific goals related to their learning needs. Data was collected on all four of the second-grade students (7-8 year olds) who were selected for the study and the same intervention was applied to all. First/second grade students were purposefully selected for this intervention as it is important to identify helplessness accurately in younger children (Cain & Dweck, 1995), and specifically children with learning disabilities as Licht (1983) has found these children generally have lower scores on measures of self-esteem and perceptions of ability.

Participants

Student 1: Student 1 is a male student who is performing at grade level or above in all academic areas. This student was 7 years old at the time of the intervention.

Student 2: Student 2 is a male student who was performing at grade level in all areas except reading and writing. This student is an English Language Learner, meaning that English is not the first language and for this student, this was his second year of English instruction. Student 2 received extra pullout support in a small group focussing on the acquisition of the English language through reading, writing and practicing speaking. At the time of the intervention student 2 was 8 years old.

Student 3: Student 3 is a female student who has a designated LD. At the time of the intervention she was 7 years old. Student 3 was designated with a LD in September of her grade 2 year. Student 3 received 30 minutes per day of pullout instruction in a small group with three other students who struggle with mathematics. During this focussed intervention student 3 worked specifically on math and math strategies. Student 3 has an Individualized Education Plan (IEP) with goals focussing on organization, written output, reading comprehension, and basic math facts. Student 3 has a positive attitude and outlook, is very athletic and involved in a lot of extra-curricular activities, and was very helpful to other students and the teacher in the classroom. Participant 3 was significantly below grade level in math and approaching grade level in language arts.

Student 4: Student 4 is a male student who has a designated LD. At the time of the intervention he was 7 years old. Student 4 was designated with a LD in December of his grade 2 year. Student 4 was significantly below grade level in all academic areas and found it difficult to work without one-on-one support from a teacher or Education Assistant. Student 4 could become easily discouraged with academic tasks and shuts down quickly if support is unavailable or he struggles to understand the task. Student 4 has an IEP outlining goals in communication,

behaviour, reading comprehension, developing emergent writing skills, and basic addition and subtraction skills.

Data Collection

Both quantitative and qualitative measures of the intervention (Table. 1) were designed to measure the baseline of a growth/fixed mindset (pre-assessments) and the total effects on students' mindset as a result of the intervention (post-assessments). The total duration of the intervention was three weeks. The Intrinsic Motivation Scale (Appendix A) and Interview (Appendix B) was administered once prior to the intervention (day 1) and again post intervention (day 15). Observational data was collected during the five times the researcher visited to observe the students on designated growth mindset instructional days.

Table 1. Research Instruments: Quantitative and Qualitative Measures of Student Mindset

Dependent Variable	Quantitative Measure	Qualitative Measures
Growth Mindset	A. Intrinsic Motivation Scales	B. Interviews C. Researcher Observations

Measures

Growth Mindset Portfolio

There are three measures involved in this intervention. A quantitative measure which is the Intrinsic Motivation Scale, and qualitative measures which are the interview and researcher observations. The Intrinsic Motivation Scale and interview were administered once at the beginning of the intervention and again at the end. The goal was to evaluate students' mindset with regards to their experiences with learning and their theory of intelligence before and after the intervention.

Intrinsic Motivation Scale

The Intrinsic Motivation Scale, developed by Lepper, Corpus, and Iyengar (2005), examines the extent to which students are motivated in challenge seeking behaviour, their internal drive for curiosity, and independent mastery. Research surrounding growth mindset generally focusses around areas of “grit” (Bashant, 2013), curiosity, and the ability to self-regulate and persevere through challenging times. These have been shown to be key indicators of someone possessing a growth mindset, and therefore this scale was specifically chosen to indicate a fixed or growth mindset in this intervention. The scale allowed students to be read questions, explained if necessary, and rate their answers “Strongly Disagree” “Disagree” “Unsure” “Agree” and “Strongly Agree”. There were 18 questions (Appendix A), with six questions focussing on challenge seeking behaviour (e.g., “I like to learn as much as I can in school”), seven questions focussing on a drive for curiosity (e.g., “I read things because I am interested in the subject”), and five questions regarding independent mastery (e.g., “I like to try to figure out how to do school assignments on my own”). These questions provided information on how intrinsically motivated students are to learn. This scale was administered pre and post-intervention.

Student Interviews

Semi-structured in depth interviews were conducted to explore students’ experiences with learning. The interviews included 10 questions related to these personal experiences (Appendix B). All students participating in the intervention participated in interviews pre and post-intervention to collect data on their experiences with learning, engagement in the program, and feelings toward developing a growth mindset. Pre-interviews were conducted during the first week, consuming about ten minutes during in class teaching time. At the end of the third week, post-interviews were also conducted, consuming ten minutes during in class teaching time. Generating qualitative data helped to provide actual experiences of students during the

intervention, and helped create an awareness through the intervention of internal experiences, and feelings toward learning.

Observations

In addition to measuring growth mindset using the Intrinsic Motivation Scale and interviews, this intervention measured student mindset by observing the language students used in the classroom. This data was observed qualitatively recording any quotes the students who consented to the intervention said which related to the development of a growth or fixed mindset. Observational data was collected five times throughout the duration of the intervention which was three weeks.

Growth Mindset Intervention

The intervention consisted of three instructional sessions in total. One session per week, for a total of three weeks. The researcher met at the elementary school on week 1 to have the students complete the Intrinsic Motivation Scale (Appendix A) and the interview (Appendix B) one on one, to produce a baseline. This was completed in the classroom. The session took approximately ten minutes per interview and the self-assessment (Intrinsic Motivation Scale) took the students approximately twenty minutes. The first day of week 1 covered this initial data collection. Weeks 1, 2 and 3 all involved the intervention taking place, with the end of week 3 being the post self-assessment (Intrinsic Motivation Scale) and interview (same as above). A detailed illustration of the instructional time line is outlined below. It provides a lesson planning model and organizational tool for the three weeks of intervention.

Instructional Time Line

Instructional time line structure was derived from Blackwell, Trzesniewski, and Dweck (2007). Observations took place five times throughout the intervention on the first and second days of week 1, Monday of week 2, and Monday and Friday of week 3.

During week 1 students completed the preliminary Intrinsic Motivation Scale (Appendix A) which measured three essential elements of a growth mindset. Semi-structured interviews were also conducted with the students to understand their current feelings about their learning. This developed qualitative and quantitative data on students' mindsets pre-intervention. The classroom teacher began to use the methods outlined in Peter Johnston's novel "Opening Minds" (2014) to develop a growth mindset. This included: (1) giving feedback appropriately; giving students praise instead of asking questions about their thinking process has been thought to undermine effort. When effort is praised instead, this suggests the ability to develop the skill instead of the inborn trait or ability to complete the task properly. The process of learning is emphasized over the product and (2) framing activities as a fun challenge rather than a competition. Emphasizing these two key aspects of language for the students involved in the intervention would be a key aspect in developing a growth mindset or not. This was continued for the duration of the intervention. On Tuesday of the first week the classroom teacher also taught the first lesson which was page 1 of "You Can Grow Your Intelligence" by Brainology® (2014) (Appendix C). This article was suggested in Blackwell et. al, (2007). The article articulates in a fun/kid-like way how the neurons in your brain develop and grow stronger when you are learning new things. The teacher drew a neuron on the board to show the students that when we are learning tiny branches are forming between the neurons to produce more information.

During week 2 the classroom teacher continued to use the language outlined in Peter Johnston's book "Opening Minds" (2014). On Monday of week 2 the next lesson (page 2) from

“You Can Grow Your Intelligence” by Brainology ® (2014) (Appendix C) took place. The second section of the article highlights how animals living in isolation without stimulation were not using their brains and their nerves/neurons looked very different from the animals who were with other animals being constantly stimulated, showing that learning does produce a difference in the number of neurons our brains have and even in the overall weight of a brain. The second part of this lesson took the information from animals and applied it to all the learning a baby does when they are first born (with language acquisition) showing the different amounts of neurons from birth to at age 6. A discussion of the article followed, allowing students to ask any questions they had and talk about the article with their peers. This activity was highly structured and guided. The teacher then spoke as a group about ways to “grow” the brain through learning and effort.

During week 3 students began their final session in the development of a growth mindset intervention; enforcing internal language in the students’ minds, and emphasizing the effect this can have in growing their brains. This was done by giving examples on the types of language to be changed such as “I can’t do this” to “I can’t do this *yet*” (derived from Peter Johnston’s book “Opening Minds”). The final part of the article “You Can Grow Your Intelligence” by Brainology ® (2014) (Appendix C) was discussed on the Monday of the third week. This part focussed on the truth of “smart” and “dumb” and how we can develop our “brain muscles” just like you would develop any other muscle; through practice. On Friday of the third week, students completed the same measures they completed on the first day of week 1, the Intrinsic Motivation Scale as well as the post-interview.

Analysis and Interpretation

The effectiveness of the intervention was measured by assessing the differences in responses between both the Intrinsic Motivation Scale and the interviews conducted prior to the

intervention compared with post-intervention. All questions on both measures were the same at both times. For students who had a more positive outlook on their learning on their post measures compared to their pre-measures it will be assumed that the intervention helped the student to develop a growth mindset in their learning. Interviews were transcribed by the researcher and the Intrinsic Motivation Scale was completed by students, however read out loud by the teacher allowing the students to ask any clarifying questions throughout the process.

Chapter Four

Results

In this section, both quantitative and qualitative research data is described and results are reported for the research question: Can the mindset of students with learning disabilities be changed from a fixed to a growth mindset?

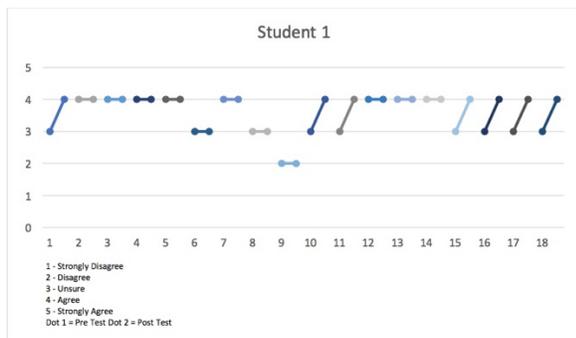
Quantitative Data

The quantitative research consisted of the Intrinsic Motivation Scale which was developed by Lepper, Corpus and Iyengar (2005), to measure the challenge seeking behaviour, curiosity, and independent drive a student has in their learning; all key indicators in a student possessing a growth mindset. Questions 1-6 focussed on challenge seeking behaviour, questions 7-13 focussed on curiosity in learning, and 14-18 focussed on challenge seeking behaviour. Table 2 shows the attitudes and beliefs students began with prior to the intervention and how their responses changed post intervention. The first dot represents their pre-intervention answer, and the linking dot represents their post-intervention answer. All students either kept their answers the same (shown with a horizontal line) or changed their answers to agree more with the statements (reflecting the development of a growth mindset in those areas), as shown with a slanted vertical line connecting the two dots.

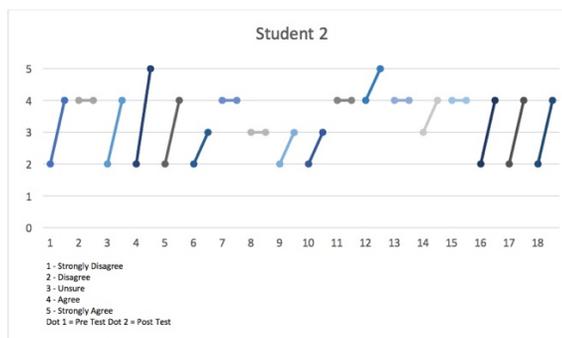
Intrinsic Motivation Scale

Table 2. Pre/Post Intrinsic Motivation Scale Results

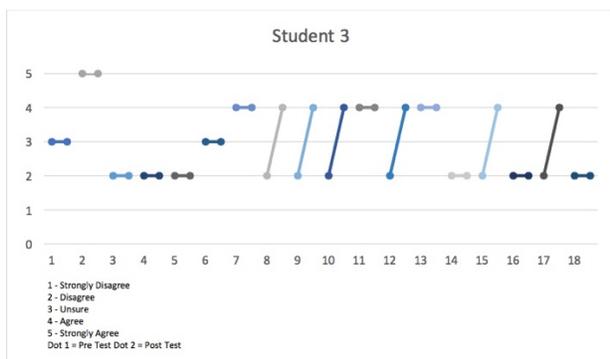
Student 1



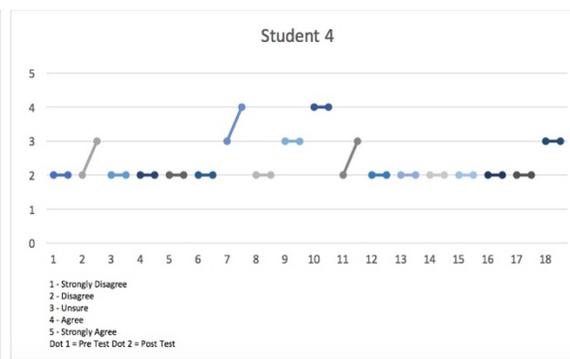
Student 2



Student 3



Student 4



It can be concluded that students without a LD (students 1 and 2) showed more questions on the scale where they developed their answers to a more growth mindset way of thinking. For example, student 1 changed his thinking on 7 of the 18 questions and student 2 was able to change his thinking on 12 of the 18 questions. Students with a LD also showed questions on the scale where they developed their answers to a more growth mindset way of thinking. For example, student 4 changed his thinking on 3 of the 18 questions and student 3, was able to change her thinking on 6 of the 18 questions. Students 2 and 3 showed a larger shift of thinking changing their answers more drastically (ex. From disagreeing to agreeing or strongly agree), meanwhile students 1 and 4, while still showing a change in thinking tended to show less drastic of a change in their

answers. Through the duration of the intervention no students changed their answers to present a more fixed mindset.

Interviews

Interviews provided the researcher with an opportunity to go deeper into the thinking and understanding of the students involved in the intervention. Students could give examples and explain some of their reasoning for struggling or succeeding in different subject areas. The main theme that arose in differences from the pre-interview to the post-interview was the idea of grit.

During the first interview with students 1 and 2 both explained that they struggled the most in Language Arts – specifically writing in their journals and reading groups, and both explained that their easiest subject was either math or science. This did not change after the intervention. What did change was their outlook on what to do when they were faced with a difficult problem. During the pre-interview students 1 and 2 explained that when they did not understand something they ask for help – generally from the teacher. Both also explained that when they do not understand something right away they often feel frustrated and seek help immediately. Over the course of the intervention both students were observed to put more effort into trying their work before putting their hand up, therefore increasing their grit. When asked in the post-interview what they do when they do not understand something both students said they now will try first and then if they are really stuck they ask for help. For student 3, there was also a difference in her grit before and after the intervention. She explained that while asking for help was her immediate response before, she will now try harder to understand herself first, before asking. She believed that she would eventually understand and if she kept trying she would eventually learn. This theme was not noticed in student 4. Pre and post-intervention, student 4 suggested that when he is stuck asking for help is generally the first strategy they use. Overall, the main theme of the interviews suggested

that all students changed their thinking on some of the questions to reflect more of a growth mindset outlook, and their overall attitude with regards to developing grit and perseverance changed for students 1, 2, and 3. Transcribed interviews are shown in Appendix D.

Observations

All observations took place in the classroom environment, primarily during growth mindset instruction from the teacher. Prior to the intervention on day 1 the researcher observed students working on classroom material they had been assigned by the classroom teacher. The researcher observed student 1 and 2 to be working individually on the reading comprehension work that was assigned. Student 3 and student 4 were receiving small group instruction from the classroom Education Assistant (EA). Students 3 and 4 were working on adapted reading material better suited to their learning. While observing students 3 and 4 I heard statements such as *“Is this the right answer?”* and *“I don’t get this; can you help me?”*. Students 3 and 4 were working with one other student in their small group, and the EA was working with them all on the same reading sheet. I noticed students 3 and 4 get physically discouraged often, shown by slumping in their chairs or fidgeting and looking around the room often to avoid reading or working on the sheet. Both students also tried to talk to the EA about other topics besides the work in front of them. On day 2 the first lesson on how you can grow your intelligence was taught to the students. During the first lesson, all students were engaged and seemingly interested in the material about developing a growth mindset. Student 1 put up his hand and asked the teacher *“can brains actually grow bigger when we learn new things?”* and Student 3 asked *“Do the neurons in the brain get stronger?”*. All students were then asked to talk to the person beside them about what they learnt. The teacher asked Student 4 what he thought of what was taught and he explained that *“my brain can’t grow”*. The teacher explained to him that *“everyone’s brain is capable of growing, we just have to keep*

exercising it by teaching it new things". On day 3 the students were taught the next section of the article. This time, students learned about how animals living in isolation do not have as many neurons firing as those who live and learn with other animals. They also learnt about how babies are born knowing no language but can develop it very fast. Student 3 asked "*how come babies are able to learn so much so fast?*". After the lesson, Student 1 said to another student that "*if we are learning new things in the classroom we are actually making our brains bigger*". Throughout this lesson, I overheard the teacher using language such as: "*you are working hard in math right now, because you don't get it yet, but you are building your neurons so eventually there will be enough and you will understand it more*". The students then moved on to their math work.

On day 4 the last lesson from the article was taught with the students. This lesson focussed on what it means to be "smart" and "dumb" and how we can grow our brains like they are muscles. Student 3 was excited by this lesson, she asked the teacher "*even though I am having a hard time in reading do you think if I keep trying my brain will still get bigger?*". Student 4 did not seem as engaged, often distracted and trying to talk to his friends or fidgeting with a pencil during the lesson. When the students were asked to talk in pairs about the lesson student 4 did not say anything regarding what was taught. On the final day of observations, the researcher noticed that students 1 and 3 were using the language that had been taught, for example student 1 said "*I'll need to take it home to practice to get better at it [math facts]*", and student 3 said "*I work on reading at home to make my brain stronger*". Student 2 and 4 were not observed using language related to the intervention.

On the Intrinsic Motivation Scale all students either remained the same on survey questions or developed their answers to reflect a growth mindset outlook. During the interviews, it seemed

that students 1, 2 and 3 were using the language that showed they had the grit to persevere through harder work. Student 4 did not seem to change many answers to reflect the development of grit.

Chapter Five

Discussion

The aim of this single-case intervention study was to examine the effectiveness of direct growth mindset instruction and language principles outlined in Peter Johnston's book "Opening Minds" (2014) in developing a growth mindset in grade two students with a LD. The aim was to use language Johnston (2014) suggests in his book to help students develop a growth mindset. Johnston's book "Opening Minds" (2014) explains that direct instruction about how the brain works is also part of developing a growth mindset, which is why "You Can Grow Your Intelligence" by Brainology® (2014) (Appendix C) was used in addition to explicitly teach about how the brain can grow. Three of the four students in the intervention showed progression in their thoughts after the intervention as measured on the Intrinsic Motivation Scale, Interviews and naturalistic observation quotes from the classroom environment. On the Intrinsic Motivation Scale students either answered the same on the pre-measure as they did on the post measure, or were more likely to change their answers from disagree to agree with the statements given in all three areas (Challenge, curiosity, and independent mastery). While the progression of thoughts (changes on the post-measure compared to the pre-measure) was more limiting for students 3 and 4, all progress can be cautiously attributed to the intervention instruction and teacher language used related to growth mindset.

Students 1 and 2: Typical students tended to show the same results regarding growth mindset Gunderson et. al, (2011) found regarding praising effort and the effect that language can have on the development of a fixed and growth mindset. The results Gunderson et. al, (2011) concluded were that children who were praised on their effort were more likely to persist on difficult tasks, over students who were given praise for their traits (e.g., "You must be so smart"). In this

intervention, the two typically developing students developed an agreeance to all of the questions in the “Independent Mastery” section of the Intrinsic Motivation Scale indicating that they agreed to questions such as “When I don’t understand something right away I like to try to figure it out myself” (question 15) and “If I get stuck on a problem I keep trying to figure out the problem on my own” (question 17), showing that these students had developed “grit” and perseverance through the growth mindset intervention.

Student 3: Student 3 tended to show results indicating the development of a growth mindset in one subsection of the Intrinsic Motivation Scale, as well as the comments she made during classroom observations. On the Intrinsic Motivation Scale, student 3 showed her biggest change in thinking on questions in the “curiosity” section. Examples of questions in this section include “I ask questions in class because I want to learn new things” and “I work hard because I really like to learn new things”. Student 3 was also observed to ask questions relating to her LD and if her brain was still able to grow. This curiosity and willingness to try and learn indicates that student 3 could have developed a growth mindset from the intervention. Questions during the interview were limited with their relation to this curiosity, as it would have been helpful to know if her curiosity was specifically in subjects she succeeded in or struggled in, to know if this related to her academic success. This raises the question for future research, if academic curiosity and perseverance are related and if this relates to academic success in those areas.

Student 4: Developing a growth mindset for one student with a LD was not constantly positive during the intervention. Student 4 struggled participating in the growth mindset as this student tended to become distracted easily and tended to need 1:1 support to continue with work, as he often became defeated easily and struggled to persevere with challenging work. This student changed his answers on the Intrinsic Motivation Scale from disagree to unsure on two of the 18

questions (Questions 2 and 11), and unsure to agree on one of the 18 questions (Question 7). The other 15 questions remained unchanged. Observations indicated a fixed mindset when the student explained that “my brain can’t grow”. The post-interview also showed a lack of change in the responses, indicating more of a fixed mindset throughout the process of the intervention. A more in depth and longer intervention may have helped student 4 develop a growth mindset.

Limitations

The purpose of this intervention was to examine the effects of a growth mindset intervention on students with learning disabilities. The purpose of the intervention was not to compare learning disabled students with non-learning disabled students, and thus this was a single case intervention study, so all students could be examined on their individual results. As a single case intervention study, this study did have limitations including the potential of a researcher bias and teacher effect, the length of the intervention, the lack of control group, and the language used.

Researcher Bias/Teacher Effect and Education Assistants

Gutshall (2013) suggests that when teachers themselves believed that intelligence is fixed they offer less support and often encouraged their students to find their own solutions, meanwhile when they believed that intelligence was malleable they were more supportive. In this study, the effect of the teacher’s mindset was not taken into consideration. Osterholm, Nash, and Kritsonis (2007) noted in their analysis that when college teachers were asked to judge the academic promise of a student with a LD and their ability to work successfully with the student, the label significantly and negatively influenced their expectations. The classroom teacher in the observed classroom could potentially have a bias towards the LD students in her classroom and the amount of time and effort she puts forward to each of them may be significantly impacted by this. The researcher being present in the room could also have caused adverse effects on the way students behaved and acted

in the classroom due to students being distracted or perhaps putting forth more effort with the researcher present. Perhaps in future research, to help eliminate the effect of the researcher being present in the classroom, the classroom teacher could have recorded her lessons and the students responses on a video to observe later. Furthermore, for students who work very closely with one on one support from an Education Assistant, how does their mindset play a role in effecting the growth mindset of the students' they work with? This is something that could also be taken into consideration in future research.

Length of Intervention

Unfortunately, the length of the intervention was a mere three weeks in duration, while most studies surrounding growth mindset in the classroom tend to be longer. Students were only exposed to three lessons of explicit instruction about growth mindset, which for many students may not have been enough time to fully grasp the concept.

Lack of Control Group

Allowing this study to be a single case intervention study meant that the non-learning disabled students did not serve as the control for this intervention. By comparing each individual to themselves pre and post-intervention assumptions could be made about the mindset of the individual and their learning styles rather than that of an entire LD or typically learning population.

Language

Although the classroom teacher was given language to specifically use with the students in the classroom, there was no way to control how often or how explicit this language truly was. While the classroom teacher was given suggestions on how to praise effort instead of the final product, and to correct students in saying they can't do it "yet", it would be challenging to measure just how often this language was used and how often it mistakenly was not used. Another

component to consider with regards to language, is that if the student had a learning disability specifically in language acquisition how would this effect their ability to understand growth mindset concepts and how could you teach these ideas differently to reach all learners?

Implications

While the focus of this intervention was to research whether the mindset of students with a LD could be changed from a fixed mindset to a growth mindset, more research should have been conducted prior to the intervention to see if students with a LD did in fact possess a fixed mindset prior to the intervention. It seemed from the pre-measures that student 4 did have a fixed mindset, and this mindset did not seem to change throughout the intervention. Meanwhile, student 3 tended to start off with a growth mindset from the pre-measures, which seemed to develop into a more curious drive for learning.

Conclusion

In summary, the results of this intervention suggest that an intervention focussing on language and explicit instruction about brain development may be effective for students with a LD to develop a growth mindset. As the intervention was non-controlled and concerned only two students with learning disabilities, more research is still needed. Further studies should take into consideration the effect the teachers' mindset on their students, the effect the researcher has being present in the classroom on student behaviour, the length of the intervention and the amount of time children need to grasp and use new information, a control group, and the examination of the language teachers use. The effect of the development of a growth mindset in students with learning disabilities is an important topic to be researched further as the LD label has been shown to lower teachers' expectations of the student and leaves the student feeling less than their peers (Osterholm

et. al, 2007), so perhaps the development of a growth mindset in these learners will increase their grit and self-esteem leaving them with a more positive experience with learning.

References

- Aronson, J., Fried, C., & Good, C. (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of Experimental Social Psychology, 38*(2), 113-125.
- Baird, G., Scott, W., Dearing, E., & Hamill, S. (2009). Cognitive self-regulation in youth with and without learning disabilities: academic self-efficacy, theories of intelligence, learning vs. performance goal preferences, and effort attributions. *Journal of Social and Clinical Psychology 28*(7), 881-908.
- Bashant, J. (2014). Developing grit in our students: why grit is such a desirable trait, and practical strategies for teachers and schools. *Journal for Leadership and Instruction, 13*(2), 14-17.
- Blackwell, L., Trzesniewski, K., & Dweck, C. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and intervention. *Child Development, 78*(1), 246-263.
- Brainology ® (2014). Introductory Unit: *You Can Grow Your Intelligence*. Retrieved from www.mindsetworks.com
- Brennan, S. (2006). Participation and Activity Limitation Survey 2006: *Facts on Learning Limitations*. Retrieved from <http://www.statcan.gc.ca/pub/89-628-x/89-628-x2009014-eng.htm>
- British Columbia Ministry of Education. (2013). Special Education Services: A Manual of Policies, Procedures and Guidelines: *Learning Disabilities, 67*. Retrieved from http://www.bced.gov.bc.ca/specialed/special_ed_policy_manual.pdf#page=5
- Cain, K., & Dweck, C. (1995). The relation between motivational patterns and achievement cognitions through the elementary school years. *Merrill-Palmer Quarterly, 41*(1), 25-52.

- Caruth, G. (2013). Demystifying mixed methods research design: review of the literature. *Mevlana International Journal of Education*, 3(2), 112-122.
- Crocker, J., Brook, A., & Villacorta, M. (2006). The pursuit of self-esteem: contingencies of self-worth and self-regulation. *Journal of Personality*, 74(6), 1749-1771.
- Cross, T. (2014). The gritty: grit and non-traditional doctoral student success. *Journal of Educators Online*, 11(3), 1-30.
- Dweck, C. (2006). *Mindset: The New Psychology of Success*. New York, NY: Ballantine Books.
- Johnston, P. (2014). *Opening Minds: Using Language to Change Lives*. Portland, Maine: Stenhouse Publishers.
- Duckworth, A., Peterson, C., Matthews, M., & Kelly, D. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92(6), 1087-1101.
- Dweck, C. (2006). *Mindset: The New Psychology of Success*. New York, NY: Ballantine Books.
- Dweck, C. (1999). *Self-theories: Their role in motivation, personality, and development*. New York, NY: Psychology Press.
- Dweck, C., & Bempechat, J. (1983). "Children's Theories of Intelligence: Consequences for Learning." In S. Paris, G. Olsen, and H. Stevenson (eds.), *Learning and Motivation in the Classroom*. Mahwah, N.J.: Erlbaum.
- Dweck, C., Walton, G., & Cohen, G. (2011). *Academic tenacity: Mindsets and skills that promote long-term learning. White paper prepared for the Gates Foundation*. Seattle, WA: Bill and Melinda Gates Foundation.
- Dweck, C. (2015). Teacher's Mindsets: every student has something to teach me. *Educational Horizons*, 93(2), 10-15.

- Feltham, M., & Sharen, C. (2015). "What do you mean I wrote a C paper?" Writing, revision, and self-regulation. *Collected Essays on Learning and Teaching*, 8, 111-138.
- Goldstein, S., & Brooks, R. (2007). *Understanding and managing classroom behaviour: creating resilient, sustainable classrooms*. New York, NY: Wiley.
- Grant, H., & Dweck, C. (2003). Clarifying achievement goals and their impact. *Journal of Personality and Social Psychology*, 85(3), 541-553.
- Gunderson, E., Gripshover, S., Romero, C., Dweck, C., Goldin-Meadow, S., & Levine, S. (2013). Parent praise to 1 to 3-year-olds predicts children's motivational frameworks 5 years later. *Child Development*, 85(5), 1526-1541.
- Gutshall, C. A. (2013). Teachers' mindsets for students with and without disabilities. *Psychology in the Schools*, 50(10), 1073-1083.
- Haimovitz, K., Wormington, S., & Henderlong Corpus, J. (2011). Dangerous mindsets: how beliefs about intelligence predict motivational change. *Learning and Individual Differences*, 21(6), 747-752.
- Harter, S., Waters, P., & Whitesell, N. (1998). Relational self-worth: differences in perceived worth as a person across interpersonal contexts among adolescents. *Child Development*, 69(3), 756-766.
- Hymer, B., & Gershon, M. (2014). *Growth Mindset Pocketbook*. University Park, IL: Teacher's Pocketbook Publishers.
- Job, V., Dweck, C., & Walton, G. (2010). Ego depletion – Is it all in your head? Implicit theories about willpower affect self-regulation. *Psychological Science*, 21(11), 1686-1693.
- Johnston, P. (2014). *Opening Minds: Using Language to Change Lives*. Portland, Maine: Stenhouse Publishers.

- Konrad, M., Fowler, C. H., Walker, A. R., Test, D. W., & Wood, W. M. (2007). Effects of self determination interventions on the academic skills of students with learning disabilities. *Learning Disability Quarterly, 30*(2), 89-113.
- Lepper, M., Corpus, J., & Iyengar, S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: age differences and academic correlates. *Journal of Educational Psychology, 97*(2), 184-196.
- Licht, B. (1983). Cognitive-motivational factors that contribute to the achievement of learning-disabled children. *Journal of Learning Disabilities, 16*(8), 483-490.
- Mueller, C., & Dweck, C. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology, 75*, 33-52.
- Murphy, L., & Thomas, L. (2008). Dangers of a fixed mindset: implications of self-theories research for computer science education. *Innovation and Technology in Computer Science Education, 40*(3), 271-275.
- Osterholm, K., Nash, W., & Kritsonis, W. (2007). Effects of labelling students "learning disabled". Emergent themes in the research literature 1970 through 2000. *Focus on Colleges, Universities, and Schools, 1*, 1-11.
- Pappano, L. (2013). Grit and the New Character Education. *Harvard Education Letter, 29*(1), 1-3.
- Ricci, M.C. (2013) *Mindsets in the Classroom: Building a Culture of Success and Student Achievement in Schools*. Waco, Texas: Prufrock Press.
- Schunk, D., & Zimmerman, B. (2011). *Handbook of Self-Regulation of Learning and Performance*. New York: NY: Routledge.

- Steele, C. M. (2010). *Whistling Vivaldi: How stereotypes affect us and what we can do*. New York, NY: W. W. Norton Company, Inc.
- Tabassam, W. & Grainger, J. (2002). Self-concept, attributional style and self-efficacy beliefs of students with and without attention deficit hyperactivity disorder. *Learning Disability Quarterly*, 25(2), 141-151.
- Usher, E., & Pajares, F. (2009). Sources of self-efficacy in mathematics: a validation study. *Contemporary Educational Psychology*, 34(1), 89-101.
- Whyte, G., Saks, A. M., & Hook, S. (1997). When success breeds failure: the role of self-efficacy in escalating commitment to a losing course of action. *Journal of Organizational Behavior*, 18(5), 415-432.
- Yeager, D., & Dweck, C. (2012). Mindsets that promote resilience: when students believe that personal characteristics can be developed. *Educational Psychologist*, 47(4), 302-314.
- Zimmerman, B. (2002). Becoming a self-regulated learner: an overview. *Theory into Practice*, 41(2), 64-70.
- Zimmerman, B. (1989). Social cognitive view of self-regulated academic learning. *Journal of Educational Psychology*, 81(3), 329-339.
- Zimmerman, B., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: the role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal*, 29(3), 663-676.
- Zyoudi, M. (2010). Differences in self-concept among students with and without learning disabilities in Al Karak District in Jordan. *International Journal of Special Education*, 25(2), 72-77.

Appendices

Appendix A

Intrinsic Motivation Scale – Based on a five-answer scale

Questions

Strongly Disagree / Disagree / Unsure / Agree / Strongly Agree

Challenge

I like hard work because it's a challenge

I like to learn as much as I can in school

I like to go on to new work that's at a more difficult level

I like those school subjects that make me think pretty hard and figure things out

I like difficult problems because I enjoy trying to figure them out

I like difficult schoolwork because I find it more interesting

Curiosity

I ask questions in class because I want to learn new things

I do extra projects because I can learn about things that interest me

I read things because I am interested in the subject

I do my schoolwork to find out about a lot of things I've been wanting to know

I work really hard because I really like to learn new things

I work on problems to learn how to solve them

Independent mastery

I like to try to figure out how to do school assignments on my own

When I don't understand something right away I like to try to figure it out by myself

When I make a mistake, I like to figure out the right answer by myself

If I get stuck on a problem I keep trying to figure out the problem on my own

I like to do my schoolwork without help

Appendix BStudent Interviews

1. What is the subject you struggle the most with?
2. What is the subject you find the easiest?
3. How do you feel when you learn something new in class?
4. How do you feel when you don't understand how to do a math question?
5. How do you feel when you understand something the first time?
6. Do you ever feel like you are never going to understand?
7. Do you think if you read more you would understand more?
8. Would getting extra help from the teacher help you become better at (answer to question 1)?
9. When you don't understand something do you ask for help?
10. When you have a hard time with work or reading at home what do you do?

Appendix C

Reading for Activity Option 1 or 2

You Can Grow Your Intelligence
New Research Shows the Brain Can Be Developed Like a Muscle

Many people think of the brain as a mystery. They don't know much about intelligence and how it works. When they do think about what intelligence is, many people believe that a person is born either smart, average, or dumb—and stays that way for life.

But new research shows that the brain is more like a muscle—it changes and gets stronger when you use it. And scientists have been able to show just how the brain grows and gets stronger when you learn.

Everyone knows that when you lift weights, your muscles get bigger and you get stronger. A person who can't lift 20 pounds when they start exercising can get strong enough to lift 100 pounds after working out for a long time. That's because the muscles become larger and stronger with exercise. And when you stop exercising, the muscles shrink and you get weaker. That's why people say "Use it or lose it!"



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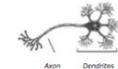
But most people don't know that when they practice and learn new things, parts of their brain change and get larger a lot like muscles do when they exercise.

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A section of the cerebral cortex

Inside the cortex of the brain are billions of tiny nerve cells, called neurons. The nerve cells have branches connecting them to other cells in a complicated network. Communication between these brain cells is what allows us to think and solve problems.



A typical nerve cell

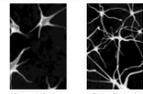
When you learn new things, these tiny connections in the brain actually multiply and get stronger. The more that you challenge your mind to learn, the more your brain cells grow. Then, things that you once found very hard or even impossible to do—like speaking a foreign language or doing algebra—seem to become easy. The result is a stronger, smarter brain.

How Do We Know the Brain Can Grow Stronger?

Scientists started thinking that the human brain could develop and change when they studied animals' brains. They found out that animals who lived in a challenging environment, with other animals and toys to play with, were different from animals who lived alone in bare cages.

While the animals who lived alone just ate and slept all the time, the ones who lived with different toys and other animals were always active. They spent a lot of time figuring out how to use the toys and how to get along with the other animals.

Effect of an Enriched Environment



Brains of animal living in bare cage (left) and Brain of animal living with other animals and toys (right)

These animals had more connections between the nerve cells in their brains. The connections were bigger and stronger, too. In fact, their whole brains were about 10% heavier than the brains of the animals who lived alone without toys.

The animals who were exercising their brains by playing with toys and each other were also "smarter"—they were better at solving problems and learning new things.

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Even old animals got smarter and developed more connections in their brains when they got the chance to play with new toys and other animals. When scientists put very old animals in the cage with younger animals and new toys to explore, their brains also grew by about 10%!

Children's Brain Growth

Another thing that got scientists thinking about the brain growing and changing was babies. Everyone knows that babies are born without being able to talk, or understand language. But somehow, almost all babies learn to speak their parents' language in the first few years of life. How do they do this?

The Key to Growing the Brain: Practice!

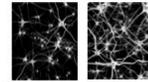
From the first day they are born, babies are hearing people around them talk—all day, every day, to the baby and to each other. They have to try to make sense of these strange sounds and figure out what they mean. In a way, babies are exercising their brains by listening hard.

Later, when they need to tell their parents what they want, they start practicing talking themselves. At first, they just make goo-goo sounds. Then, words start coming. And by the time they are three years old, most can say whole sentences almost perfectly.

Once children learn a language, they don't forget it. The child's brain has changed—it has actually gotten smarter.

This can happen because learning causes permanent changes in the brain. The babies' brain cells get larger and grow new connections between them. These new, stronger connections make the child's brain stronger and smarter, just like a weightlifter's big muscles make them strong.

Growth of neuron connections in a child from birth to 6 years old



At birth (left) At age 6 (right)

The Real Truth About "Smart" and "Dumb"

No one thinks babies are stupid because they can't talk. They just haven't learned how to yet. But some people will call a person dumb if they can't solve math problems, or spell a word right, or read fast—even though all these things are learned with practice.

At first, no one can read or solve equations. But with practice, they can learn to do it. And the more a person learns, the easier it gets to learn new things—because their brain "muscles" have gotten stronger!

The students everyone thinks as the "smartest" may not have been born any different from anyone else. But before they started school, they may have started to practice reading. They had already started to build up their "reading muscles." Then, in the classroom, everyone said, "That's the smartest student in the class."

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They don't realize that any of the other students could learn to do as well if they exercised and practiced reading as much. Remember, all of those other students learned to speak at least one whole language already—something that grownups find very hard to do. They just need to build up their "reading muscles" too.

What Can You Do to Get Smarter?

Just like a weightlifter or a basketball player, to be a brain athlete, you have to exercise and practice. By practicing, you make your brain stronger. You also learn skills that let you use your brain in a smarter way—just like a basketball player learns new moves.

But many people miss out on the chance to grow a stronger brain because they think they can't do it, or that it's too hard. It does take work, just like becoming stronger physically or becoming a better ball player does. Sometimes it even hurts! But when you feel yourself get better and stronger, all the work is worth it!

1

2

3

4

5

6

Appendix D**Student 1 Pre and Post-Interview**

1. What is the subject you struggle the most with? Why?
Pre – Reading groups [language arts] because its boring
Post – Mostly reading groups probably
2. What is the subject you find the easiest? Why?
Pre – Science because it’s fun to learn about
Post – Science because I like what we’re learning about
3. Describe how you feel when you learn something new in class?
Pre – I don’t know, good I guess
Post – I feel good and like I’m smart
4. Describe how you feel when you don’t understand how to do a math question?
Pre – Sometimes I get frustrated
Post – I guess a little angry and then I usually get it
5. How do you feel when you understand something the first time?
Pre – Like I’m smart
Post – I feel good when I learn something new – it makes me happy
6. Do you ever feel like you are never going to understand? When and why do you think this is?
Pre – No, I will get it eventually
Post – No, I will get it
7. What do you think would help you understand better?
Pre – If somebody helped me when I’m stuck
Post – Practicing more at home too
8. Would getting extra help from the teacher help you become better at (answer to question 1)?
Pre – Yes, she does help me
Post – Yes
9. What do you do when you don’t understand something?
Pre – Get help from a friend or the teacher
Post – I usually try to get it and if I can’t I ask the teacher
10. When you have a hard time with work or reading at home what do you do?
Pre – Ask my mom or dad for help
Post – Ask my mom or dad

Student 2 Pre and Post-Interview

1. What is the subject you struggle the most with? Why?
Pre – Journals [language arts] it's hard to think of writing
Post – Journals
2. What is the subject you find the easiest? Why?
Pre – Math, it's easy for me to learn
Post – Math because its easiest
3. Describe how you feel when you learn something new in class?
Pre – I feel smart
Post – I feel happy and smart
4. Describe how you feel when you don't understand how to do a math question?
Pre – I usually understand
Post – I usually understand
5. How do you feel when you understand something the first time?
Pre – Smart
Post – Good
6. Do you ever feel like you are never going to understand? When and why do you think this is?
Pre – No
Post – No
7. What do you think would help you understand better?
Pre – My teacher helping me
Post – Studying at home and getting help sometimes
8. Would getting extra help from the teacher help you become better at (answer to question 1)?
Pre – Yes
Post – Yes
9. What do you do when you don't understand something?
Pre – Ask for help [from who?] the teacher
Post – Try on my own and then get help
10. When you have a hard time with work or reading at home what do you do?
Pre – Ask my mom
Post – Try harder

Student 3 Pre and Post-Interview

1. What is the subject you struggle the most with? Why?
Pre – Math because it’s hard to understand
Post – Math because it’s hard for me

2. What is the subject you find the easiest? Why?
Pre – Science because I enjoy it
Post – Science

3. Describe how you feel when you learn something new in class?
Pre – Good
Post – Happy

4. Describe how you feel when you don’t understand how to do a math question?
Pre – Upset and frustrated
Post – Still feel frustrated sometimes but I will eventually get it

5. How do you feel when you understand something the first time?
Pre – Good
Post – Like I accomplished something

6. Do you ever feel like you are never going to understand? When and why do you think this is?
Pre – Not usually
Post – No, eventually I will get it

7. What do you think would help you understand better?
Pre – Practice
Post – To keep on practicing so eventually I will get it

8. Would getting extra help from the teacher help you become better at (answer to question 1)?
Pre – Yes
Post – Yes

9. What do you do when you don’t understand something?
Pre – Ask for help
Post – I usually try really hard and then ask for help from the teacher

10. When you have a hard time with work or reading at home what do you do?
Pre – Ask for help from my mom or dad
Post – Ask for help from my mom or dad

Student 4 Pre and Post-Interview

1. What is the subject you struggle the most with? Why?
Pre – Pretty much everything but math is hard
Post – Math is hard for me mostly
2. What is the subject you find the easiest? Why?
Pre – Science experiments cause they're interesting
Post – Science experiments
3. Describe how you feel when you learn something new in class?
Pre – I like it
Post – Like my brain is growing
4. Describe how you feel when you don't understand how to do a math question?
Pre – Like I will never understand
Post – Sometimes I actually get frustrated
5. How do you feel when you understand something the first time?
Pre – Happy
Post – Happy
6. Do you ever feel like you are never going to understand? When and why do you think this is?
Pre – Ya sometimes with math
Post – Ya, in math
7. What do you think would help you understand better?
Pre – More help
Post – Getting help and trying more
8. Would getting extra help from the teacher help you become better at (answer to question 1)?
Pre – Yes
Post – Yes
9. What do you do when you don't understand something?
Pre – Ask for help
Post – Usually ask for help
10. When you have a hard time with work or reading at home what do you do?
Pre – My mom helps me
Post – I usually don't have any