Summer 2021

Effects of Growth Mindset

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A Literature Review Presented

in Partial Fulfillment of the Requirements

For the Degree of Master of Education

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Abstract

Growth mindset and mindset theory is a topic that is explored around the world and in different levels of education and careers. However, there are contradictive studies and many misconceptions about what growth mindset and interventions can achieve. Research leads scholars to believe that academic achievement may not be a direct result of growth mindset interventions, but it is also proven that motivation and self-efficacy are in fact improved. Research also shows that motivation and self-efficacy are required for academic growth. This literature review contains information about mindset theory, important historical research for mindset theory, assumptions, and common misconceptions as well as growth mindset interventions' effects on academic growth, self-efficacy, and motivation.

This literature review and research of studies reveals that although academic growth is not a common result of growth mindset interventions, growth of self-efficacy and motivation is. It also outlines how these two attributes are imperative for academic growth and success in a global society.

Key Words: growth mindset, mindset theory, motivation, self-efficacy, academic growth

Effects of Growth Mindset

Growth mindset and mindset theory has been explored worldwide. According to Dweck and Yeager (2020), intellectual ability can be developed. This is referred to as growth mindset. Dweck's research has discovered two types of mindsets (Dweck & Yeager, 2020). While growth mindset means the ability to grow your intelligence and abilities, conversely a fixed mindset means a person feels that abilities are limited and predestined (Dweck & Yeager, 2020). Many, including Dweck and Yeager (2020), believe that students who have a growth mindset will have a greater resilience in academic struggles. Research suggests that students who have a growth mindset are more likely to score in the 20th percentile on achievement tests (Romero, 2015). Others, like Li & Bates (2020), believe that growth mindset has no association with grades. In their study, Li & Bates (2020) found that academic achievement was not influenced by growth mindset. He found that there was nearly no correlation between university grades and student mindset (Li & Bates, 2020). Another issue is that not all schools are educated in the proper presentation of growth mindset intervention or curriculums (Fraser, 2018).

One problem is that some people believe in growth mindset but do not know exactly how to apply it in their classroom (Yettick et al., 2016). In fact, according to Education Week Research Center, out of many teachers who were surveyed on their views on mindset, nearly the entire population reported that by using growth mindset strategies in the classroom, they would expect to see improved student learning and an improvement on the quality of their classroom instruction (Yettick et al., 2016). These results are nearly identical to that of the survey conducted by Boylan et al. (2018) where a large group of early childhood teachers were surveyed and most agreed that they thought a child's mindset can improve student learning. Other scholars think it has no sizable effect on student achievement (Li & Bates, 2020; Li & Bates, 2019). From

the perspective of a school district, those who believe in it may not know how to effectively deliver and embed growth mindset. In the Boylan et al. (2018) study although most of teachers agreed that a child's mindset could change their academic outcomes, only a small number of those teachers agreed that they felt strongly about their ability to foster growth mindset. An even lower number agreed that they had the knowledge base to help students develop a growth mindset (Boylan et al., 2018).

There are too few studies of the role parents play in growth mindset, however, one study shows a positive correlation between parents who use growth mindset with their children. There is evidence to suggest that parents can play a role in growth mindset. There was a study that investigated the effect of a growth mindset intervention for parents. Rowe & Leech (2019) wondered if it would improve their children's early gesture and vocabulary development. To elaborate this intricate design, parents of 10-month-old babies were given an intervention that was designed to test the effects of the use of "gesture play" on their children (Rowe & Leech, 2019). The interventions increased pointing gestures during interactions with their parents as well as language acquisition and vocabulary development as the children got older (Rowe & Leech, 2019). This research suggests that growth mindset can begin to be cultivated in the home (Rowe & Leech, 2019).

The group impacted by the topic of growth mindset is the students. To elaborate, educators are ultimately preparing them for the future and to do this they have to cultivate lifelong learners who are ready for success in a global society. Educators want to know how to best serve their students and if theory growth mindset is effective. The purpose of this literature review is to explore the effects of growth mindset in the classrooms of all ages. This literature review is for clarity on whether growth mindset is truly valuable academically. If not

academically, this will shed light on the positive effects growth mindset intervention has in other capacities. Educators should be able to use this literature to aid in making a decision as to whether to include growth mindset into their classroom. According to Dweck (2009) if students start out at the same levels academically, in theory a student who holds a growth mindset will eventually achieve more academically than a student who holds a fixed mindset. The fixed mindset will ultimately be outperformed (Dweck, 2009). The main topic that will be covered is effects of using growth mindset.

Review of the Literature

Defining Mindset Theory

Growth mindset, also known as mindset theory, has become a facet all around the world. It is prevalent in schools and even business enterprises. Studies and action research have been completed in the United States, Scotland, Australia, India, China, Korea, Norway, Germany, the Netherlands, and Argentina, to name a few and from all ages including toddlerhood to university level (Burnette et al., 2018; Fraser, 2018; Boylan et al., 2018; Chao et al., 2017; Burnette et al., 2019; Li & Bates, 2019; Han et al., 2018; Rege et al., 2020; Zeeb et al., 2020; Verberg et al., 2018; Ganimian & Murmane, 2016). In mindset theory there are two main areas to be explored. The two mindsets are fixed mindset vs. growth mindset and they are evident in all ages.

One mindset that people tend to hold is a fixed mindset. According to Dweck (2016), a fixed mindset means an individual or group of people who possess it see their abilities as "fixed", hence the term fixed mindset. This means that they feel their talents and skills are set and predetermined (Dweck, 2016). They do not agree that skills and talents can be developed and grown into something more. These people might use phrases like "I am not a math person" or "art just isn't my thing". It is because they feel like if they do not have a raw talent for it, then they will not be able to achieve growth in that area (Dweck, 2016).

Another attribute of a fixed mindset is the idea that mistakes are seen as failure. This is likely due to the type of praise a person has received. This type of praise would include compliments that indicate intelligence leads to success. For example, intelligence praise might include phrases like "you are so smart" or "this subject must really be your thing". The problem with this is that in all new learning there will likely be challenges. When something doesn't come easily or "naturally" to that person anymore, they may feel like they are no longer capable

in the area they were previously praised for their level of intelligence. This is where a fixed mindset can become hindering to motivation and self-efficacy in learning. Those with a fixed mindset often worry about looking "smart" and do not want to make mistakes, when in fact mistakes is where most of our learning happens. Having a fixed mindset can obstruct the ever-growing demand to assimilate new knowledge. For example, the Iowa Common Core is designed to be built upon year after year and if one building block opportunity is to be missed, it can wreak havoc for the future of a student's learning in the affected domain. People with a fixed mindset often become stagnant in their learning. (Dweck, 2016; Popova, 2014).

Dweck's (2016) theory of growth mindset is that people who possess it see their intelligence and skills as malleable and dynamic. Malleable means that something is flexible or has to ability to be molded and changed. People with a growth mindset might use phrases more in line with "I am not a math person *yet*" or "I am going to change my skills in a certain subject area". These individuals know that if they work at something and put their best effort in, they will grow in the target area. They also are cognizant of the fact that if they do not show motivation and self-efficacy toward a new skill, they will not grow at all.

Growth mindset sees a challenge as a way to grow their intelligence (Dweck, 2016). They know that even if they do not get a new skill or concept right away, they will learn from their mistakes. Mistakes are oftentimes seen as the biggest learning opportunities (Dweck, 2016). Those with a growth mindset see the mistakes as the chance to see the actual answer, thus assimilating the new knowledge with previous notions (Dweck, 2016). Instead of seeing a mistake as a failure, they see it as a part of the learning process (Dweck, 2016). These individuals can persevere even when faced with a setback in their learning (Dweck, 2016). The ideology of mindset theory in education is that since students are learning new skills, having a

growth mindset will arm them with perseverance, motivation, and self-efficacy to continue to put forth their best effort in developing their own skills given the curriculum (Popova, 2014; Dweck, 2016).

Significant Research in the History of Mindset Theory

Dweck has been researching mindset theory for over two decades (Popova, 2014). The findings are true for both adults and children. The hallmark of Dweck's findings is that human intelligence can be cultivated through focus, practice, trial, and error. People with a fixed mindset often become stagnant in their learning (Dweck, 2016).

In earlier research performed by Dweck & Leggett (1988) when the understanding of mindset theory was just starting to emerge, the two mindsets were called helpless or maladaptive oriented and adaptive or mastery oriented. These are defined as nearly the same thing as growth and fixed mindset, where helpless is fixed mindset and mastery is growth mindset (Dweck & Leggett, 1988, p. 2). According to Dweck & Leggett (1988), children who show the helpless maladaptive behavior avoid challenges and lack motivation and self-efficacy. The children who are mastery oriented were challenge seeking.

To outline original findings the study done by Dweck & Leggett (1988) students were given problems to solve. The first problems were fairly simple to answer with the final problems being very perplexing. These were chosen based upon prior research that showed the questions were too challenging for this age group to answer correctly. Students fell into two groups. The individuals with a helpless behavior, which would later become known as a fixed mindset, were excited up until their performance was low. They then showed signs of withdrawing and avoidance from the task. Avoidance is a behavior defined in the study by Vogler & Bakken (2007) as one of the motivational variables. Work avoidance and motivation have a correlation in

that as work avoidance increases, motivation decreases (Vogler & Bakken, 2007). As soon as it became challenging, students seemed to halt their own academic growth. Students with the growth mindset reported to have learned more problem-solving strategies by persevering through the challenges of the harder problems. (Dweck & Leggett, 1988).

In another key study, Dweck offered a group of four-year-old children a jigsaw puzzle. The choice was designed to luminate the two mindsets prevalent in the children: fixed or growth. The choices included a puzzle that they had previously completed and a more challenging puzzle. Depending on the choice, children either had a fixed mindset or a growth mindset. Children who decided to redo the same jigsaw puzzle clearly have a fixed mindset in that they knew they were nearly guaranteed success. Children who picked the harder puzzle clearly did not mind the challenge of it, therefore, had a growth mindset. They did not worry about the struggles but were motivated and challenge seeking in wanting to try something new (Popova, 2014). They even showed confusion as to why the other children in the fixed mindset group would want to work on something that taught them nothing new.

Another key piece of research is when Dweck completed research that included testing of types of praise. There were two types of praise. One type of praise was performance or intelligence praise. This consisted of responses like “you must be really smart at this”. The other type of praise was more along the lines of “you must have worked really hard on this”. This was the effort praise. In this study students were given ten problems and the control group was praised using intelligence/performance praise while the treatment group received praise for their effort (Popova, 2014).

When given the next option, students who received the intelligence praise unsurprisingly went the safer route in choosing an easier task when given the choice. The majority of students in

the effort praise group went forth with a more challenging task when given the option (Popova, 2014). This supports the idea that growth mindset techniques can improve motivation and self-efficacy.

Furthermore, in this study, students were then given a harder set of questions in which they did not perform so well in. The intelligence praised group seemed to shut down and lose motivation while the effort praised group enjoyed the challenge. The final piece of this study is when students were asked to write a letter about their experience. The most startling find is that students in the intelligence praised group mostly lied about their scores in order to not be perceived as someone who is not intelligent or someone who is a failure, thus proving again that these participants have a fixed mindset (Popova, 2014).

Effects of Specific Growth Mindset Interventions

Rhew et al. (2018) and Schmidt et al. (2017) set out to examine the effects of using a growth mindset program called Brainology. Brainology is a growth mindset intervention or program designed by the founder of mindset theory, Dweck, and co-creator Blackwell. According to Mindworks Inc., Brainology is a learning curriculum that was created in order to educate students about their mindsets. It teaches them that their abilities and intelligence are malleable and able to be shaped if effort is put forth. It gives students a sense of self efficacy. Donohoe et al. (2012) concludes that Brainology does increase a student's efficacy toward growth mindset. Rhew et al. (2018) concludes that students who completed the Brainology program had a slight increase in grades and fewer work avoidances.

In the study of Rhew et al. (2018) their research served to satisfy the question they had about the effect of Brainology on a special education student's self-efficacy and motivation. In this study the participants included special education students. Specifically, there were 6th

through 8th grade students (Rhew et al., 2018). In this quasi experiment their measurements concluded that there was an increase in motivation but not in self-efficacy by use of the growth mindset intervention, Brainology (Rhew et al., 2018).

In another quasi-experiment by Schmidt et al. (2017), they tested the use of the same growth-mindset program, Brainology. Schmidt et al. (2017) examined the effects of a 6-week intervention program by way of use of Brainology with 7th and 9th grade students. Their findings show that students who did not receive the growth mindset intervention showed decline in areas of self-efficacy including perceived control, skill, interest, and learning (Schmidt et al., 2017). Students in the 7th grade group who received Brainology, did not show the same results as the 9th grade students who received Brainology. The 9th grade students remained at a consistent level of learning and skills and had a heightened perceived level of control and interest (Schmidt et al., 2017). The findings suggest that there is a need for materials that are relevant to students in the age range of the 7th grade students who participated in this study.

In the study of Broughman & West (2018) they reported an increase in growth mindset and efficacy but not in grades. The core grade point average was not improved due to the intervention (Broughman & West, 2018). The intervention used in this study was Brainology at Mindsetworks.org. A final online intervention used by Burnette et al. (2018) was called Project Growing Minds. Project Growing Minds did not serve to change the student's GPA but it did however change the participants' self-efficacy and personal perception of growth mindset.

Researchers who were examined in this literature review and tried to replicate Dweck's research and methods failed to reap the same results (Li & Bates, 2020; Li & Bates, 2019; Ganimian & Murmane, 2020). A few researchers however, designed their own intervention. For example, in the study of Carvalho & Skipper (2020) researchers developed the growth mindset

program with school staff in order to provide an appropriately leveled intervention to students with disabilities. Many of the techniques employed within at due to the findings of Blackwell et al. (2007). This research makes it clear that growth mindset intervention must be paired with the functions of the human brain to be truly effective in one way or another (Blackwell et al., 2007). This is exactly what Brainology contains in their learning modules.

Effects on Academic Growth

Many scholars believe that growth mindset interventions have a positive effect on student achievement and academic performance, however some research shows the contrary. According to research, participants gain self-efficacy and resilience after failure but do not increase in grades. Carvalho & Skipper (2020) found that students with special educational needs and/disabilities gained a stronger academic resilience through use of an intervention for growth mindset. Burnette et al. (2018) conducted a study that provided an online growth mindset intervention to young females with the average age of 15 years old. Burnette et al. (2018) set forth to find the effects that an online growth mindset intervention has on academic outcomes. This tests out original findings by Dweck on the growth mindset theory. Specifically, they had a treatment group of females subject to the intervention program, called Project Growing Minds, and a group that were randomly selected to be a part of the "attention-matched" control program called Project HEART (Burnette et al., 2018). The participants were all selected from rural areas of the United States (Burnette et al., 2018).

Burnette et al. completed a four-segment program in this research in 2018 and again used the same four segment intervention in 2019 on university students in the computer science program. The findings of the 2018 research concluded that the females in the study started at nearly the same level of growth mindset efficacy, previous years' final grades, learning

motivation, school belonging, and race. At the conclusion of the trial, the adolescent females' final grades did not shift in comparison to the participants' shifting mindset. Ultimately, grades were not affected but the students' mindsets and efficacy had changed.

In Burnette et al. (2019) research, they found that the participant's academic performance did not increase, but grades only slightly increased indirectly and not directly due to the intervention. Again, grades are not greatly affected. In analysis of these two artifacts, it is becoming clear that academic performance is not greatly affected by growth mindset interventions. Students do however increase in their motivation and personal efficacy of growth mindset. For example, in the 2018 research, Burnette et al. concluded that the growth mindset program increased interest in computer science but not academic achievement and performance. To synthesize, students may be willing to participate in challenging tasks when equipped with a growth mindset, but apparently there is a missing factor in application of growth mindset intervention and the work ethic needed to increase academic achievement.

These correlate with the findings of Li and Bates (2019). Their study tests mindset theory and its principles. Mindset theory suggests that students have the capacity to experience failure, yet not lose motivation (Li & Bates, 2019). Mindset theory also predicts that students will have a high academic achievement due to the continued motivation. In their trial, they ultimately completed all studies with a common aim and found no sizable change to academic growth (Li & Bates, 2019). In the first study, they replicated Dweck's original research and found that their study did not achieve the same results as Dweck's. Since Ganimian & Murmane (2020) also failed to replicate the results of Dweck's study, it is clear that it is more challenging to replicate and that results are dependent upon other factors since outcomes are not contradictive.

Effects on Self-Efficacy

As Damien et al. (2017) defines in their study, self-efficacy is the belief one holds to be true about their personal abilities to complete tasks and achieve goals. A study that supports the importance of self-efficacy is that of De Castella & Byrne (2015). In their study the results indicated that a student's belief in their personal ability to improve their intelligence, which is a form of self-efficacy, is a great predictor of motivation and achievement in their education (De Castella & Byrne, 2015). According to the outcomes of Xu et al. (2020) study, students who will have a growth mindset are more likely to engage in the process of learning and the steps towards mastery goal orientation. Students who do not attain a growth mindset typically have a lower self-efficacy and can feel an overwhelming amount of pressure and higher cognitive load when faced with a challenging task.

It is found within the study of Xu et al. (2020) that students who have growth mindset and after receiving intervention typically show less cognitive load when faced with a challenge (. A higher cognitive load means students may struggle to balance the intrinsic, extraneous, and germane cognitive load which is not conducive to effective learning. The intrinsic load is linked to the task of the learning material including but not limited to procedures or concepts. An extraneous cognitive load is the experience of the learner when interacting with learning and instructional materials. Finally, the germane load is experienced when learners are assimilating the new information into their schema, often into long-term memory. The results of this study showed that after growth mindset induction, it lowered perceived extraneous and intrinsic cognitive loads and beneficial effects on that of student learning (Xu et al., 2020). In yet another study, students who underwent a growth mindset intervention in a physics class had results

consistent to that of their hypothesis. Students who received training had a higher perception of their growth mindset, efficacy, and physics ability (Zeeb et al., 2020).

In the research of Burnette et al., (2018) students who underwent a growth mindset treatment had positive results and a stronger growth mindset and self-efficacy. In a survey most participants selected the growth mindset aligned answers which proved that students had a higher self-efficacy after interventions (Burnette et al., 2018). A hypothesis made by Burnette et al. (2018) proved true in their research showing that due to a growth mindset intervention, students developed greater intrinsic value than that of the control group. In another study that produced and employed a growth mindset intervention it was reported to have achieved a rapid decline in depression of students which increased self-efficacy while in another study students who completed a growth mindset program showed a statistical increase in engagement (Schleider & Weisz, 2018; Cavanagh et al., 2018).

The results in the study of Nallapothula et al. (2020) in which they tested a growth mindset intervention to see if it would have a scalable effect on the participants internal locus of control, they found that in fact it did increase LoC. Locus of control, or LoC, is the extent at which individuals feel that they can control the events in the lives and the influence on which it has in their lives (Nallapothula et al., 2020). Broughman & West (2018) found similar results in their study of the impact of growth mindset intervention on academic performance and attendance of high school students. Their results showed an increase in self efficacy, but not in GPA or attendance (Broughman & West, 2018). In fact, the GPA of the treatment group had a decline. However, this may have been due to the fact that attendance also declined. To clarify, students' attendance in both control and treatment groups declined from trimester one to trimester two. The control group had a much higher rate of decline in attendance (Broughman &

West, 2018). In conclusion, the group that had a smaller rate of decline in attendance may be due to the receipt of growth mindset intervention. Lack of attendance is sometimes considered an avoidance behavior.

Effects on Motivation

According to a study in which early childhood teachers rated factors by level of importance to a child's learning, motivation was believed to be "very important" to "extremely important" by nearly the entire surveyed populationCITE. Motivation can be considered a possible predictor of how a student will perform (Rhew et al, 2018). There are different types of motivation. When students are intrinsically motivated, they are more intrigued by the process and parts to the task, while students who are motivated extrinsically tend to be more results focused (Rhew et al., 2018). Rhew et al. (2018) also found that students who held intrinsic motivators feel responsible for their own academic outcomes.

Students in Rhew et al. (2018) study were found to have a higher intrinsic motivation after completing the Brainology intervention. Since intrinsic motivation nearly matches the definition of growth mindset, it is clear that Schmidt et al. (2017) reiterates the idea that motivation and growth mindset go hand in hand. Their study showed that Brainology improved motivation which many teachers believe is important for students learning and self-efficacy (Schmidt et al., 2017; Boylan et al., 2019). For a student to improve in any area, there must be motivation.

Growth mindset positively influences motivation and challenge seeking effects as does self-efficacy (Han et al., 2018; Nallapothula et al., 2020; Rege et al., 2020). As Rege et al. reports in their research from 2020 they found that students who were tasked with creating math worksheets and could choose the complexity of the problems in the worksheet tend to fall into

two groups. The students who chose the more challenging questions were the students with a growth mindset (Rege et al., 2020). The positive correlation of growth mindset and motivation stands firm within this research. Moreover, students who picked the harder questions to start were the same students who were motivated to choose a harder follow-up after the intervention. Coincidentally, students who had a fixed mindset were not motivated towards choosing more challenging problems (Rege et al., 2020).

Some students in the study done by Rege et al. (2020) maneuvered policies and administrative changes in order to change their upcoming math course to a more challenging math course after their growth mindset intervention. This is significant because students had to have a challenge seeking effect and motivation for them to change the course they were enrolled in before the growth mindset intervention took place (Rege et al., 2020). To prepare students for the future and college readiness, students need this motivation and work ethic. It is especially true since Mills and Mills (2018) report that only about one-third of college students are prepared for college level math courses, therefore it is important to instill motivation and growth mindset earlier in their lives. This conclusion is supported in the study of Degol et al. (2018). Degol et al. (2018) found that students who had a higher motivation and value in math were predicted to aim toward a career in STEM. It's evident that growth mindset intervention increases a student's motivation and ultimately their personal knowledge gain due to being in a higher-level academic math course and more likely college ready (Rege et al., 2020). One major factor of growth mindset is that students persist even when faced with a challenge.

Growth mindset has the potential to unlock a deeper engagement in curriculum and will lead to greater motivation and intrinsic value, therefore intervention may be necessary in schools (Xu et al., 2020; Rhew et al., 2018). In some cases, intervention did not increase motivation, but

it stopped it from a rapid decline as shown in the study done by Zeeb et al. (2020). This indicates that even in the rare case of a null effect of growth mindset intervention on motivation students can still benefit in maintaining their current mindset. It is clear that schools should incorporate growth mindset into their curriculum. In many pieces of research there are positive effects on the participants' motivation.

Motivation and Academic Achievement

There are two main types of motivation. There is intrinsic motivation and extrinsic motivation. According to Luria et al. (2021) intrinsic motivation is when the reasoning an individual has for completion of a task is due to internal values. Another term for intrinsic motivation is self-determination, which is said to be the strongest and most effective form of motivation (Luria et al., 2021). The reasoning may include personal growth or other factors that simply contribute to an individual's unseen needs. This is the epitome of growth mindset. These individuals tend to complete tasks for the pure growth and pride in the process, which is extremely similar to the definition of growth mindset (Dweck, 2016).

Extrinsic motivation stems more from the outward goals. Individuals who attain extrinsic motivation tend to be more focused on the outcome. Extrinsic motivators can include rewards provided by teachers, job promotions and prestige (Luria et al., 2021). Some extrinsic motivators can even include a final grade. For example, a student who hopes to achieve a very high score on standardized tests would have what is called extrinsic motivation. There is a parallel between having a fixed mindset and being extrinsically motivated sense having a fixed mindset means an individual is more focused on the outcome then the process (Dweck, 2016). Generally speaking, a student who has a higher motivation whether extrinsically or intrinsically will have better motivation towards achieving academic growth (Luria et al., 2021; Rhew et al., 2018). Growth

mindset interventions have been proven repeatedly to grow a student's motivation. Even when academic growth isn't achieved in studies, many of said studies also include a one-off intervention for growth mindset. This leads a researcher to believe that an embedded program where students and teachers alike we're invested in growth mindset values would increase motivation and overtime increase academic growth (Fraser, 2018; Luria et al., 2021; Rhew et al., 2018).

Both intrinsic and extrinsic learning can be linked to having interrogative goals (Luria et al., 2021). Interrogative goals are scientifically and biologically linked to the activation hippocampus in the brain, which releases dopamine. Some forms of extrinsic motivation are found to be linked to intrinsic values which leads back to the idea that core intrinsic values are mainly related to interrogative goals. Interrogative goals are correlated with the establishment of relational memories, which is a foundation of true academic learning (Luria et al., 2021).

In a study done by Daniels & Bulut (2019) they sought out to find a link motivation and academic performance. They found that there is a link between what a student perceives as useful and motivation. For example, when goals are clearly communicated a student, they begin to assimilate the information as useful and therefore are more motivated to work towards growth and mastery in the goal. According to this study it is also important for instructors to provide feedback in order to increase the motivation of students, participants, and individuals (Daniels & Bulut (2019).

It must be noted that self-efficacy and motivation are linked in many of the studies due to similarities in traits. To reiterate, self-efficacy is an individual’s belief of self-capabilities and personal achievement and motivation is the intrinsic or extrinsic value which is held personally valuable to an individual. According to Mega et al. (2014) self-efficacy is one of five

motivational beliefs. In synthesis of the many studies, these two attributes are often correlated with one another positively. Self-efficacy is defined in the study of Damien et al. (2017) as an individual's capabilities to perform and achieve a task. Undoubtedly self-efficacy has an important role in motivation and academic achievement. In many of the outlined studies, there is an increase of self-efficacy due to growth mindset interventions.

Misconceptions

Dweck (2016) reported some common misconceptions among researchers. One of them is that people confuse having an open-mind and positive outlook with having a growth mindset. According to Dweck (2016) there is no such thing as a pure growth mindset. Every individual has a mixture of fixed and growth mindsets in which the growth mindset can be tempered over time throughout life experiences (Dweck, 2016).

Another common misconception of growth mindset is that people think it is only about praising effort (Dweck, 2016). This is not true, rather, the product should be praised as well. According to Dweck (2016) it is imperative to praise production as well. It may be even more important to praise the process since this is where the learning takes place (Dweck, 2016). Although praise is necessary, words of praise must be chosen intentionally and concisely. If the grade is what is to be praised, individuals may lose value in the learning process.

One final misconception that others hold of growth mindset that Dweck (2016) notes is individuals assume that if they espouse a growth mindset positive results will fall into place. It takes more than this to attain a growth mindset. Whether it be a leader of a company or a teacher of a classroom, risk-taking and rewards must accompany trial and error. Growth mindset values must be reinforced and embedded.

Assumptions, Beliefs, and Implications

Dweck (2016) reports with the popularity in the field of mindset theory comes distortion of the ideology and misrepresentation of the materials. A trend among the research has shown that there are discrepancies in the presentation of growth mindset. One-off mindset interventions show to have results in one or more areas, however, lacks the longevity that is inferred to be needed by Dweck (2009) for the growth mindset students to begin to outperform their previous fixed mindset trajectory (Donohoe, et al. (2012). One-off mindset interventions are completed in a reactive manner. Another common theme among the research is the use of the work by Blackwell et al. (2007). Blackwell et al. (2007) presents the case that students must learn about the abilities and function of the brain to gain a true foundation for the building blocks of growth mindset education.

Fraser (2018) outlines in one study that school districts may need to embed growth mindset to achieve longevity in self efficacy toward growth mindset. This differs from the interventions that are present in Li & Bates (2018) in that it is proactive versus reactive. Proactive means that it is done beforehand where reactive means it is done to neutralize negative effects. The embedded program from Fraser's study is not done as needed or in a remedial fashion.

Gunderson et al. (2013) suggests that school districts and climates may be the contributing factor of an overall fixed mindset in the student body. This is coherent with Education Week Research Center's national study of K-12 teachers and their personal views and competency on growth mindset theory (Yettick et al., 2016). In this survey, only a small number of teachers felt competent in delivery of growth mindset (Yettick et al., 2016). Lack of competency can be hindering to instruction. Even the growth mindset of parents can influence

their children. Children of parents who were given a growth mindset intervention and a way to employ it with their children in a study that was designed to help improve toddler's early gesture and vocabulary development did in fact improve. This was all due to their parents' ability to administer playtime using a growth mindset moderator (Rowe & Leech, 2018).

In classrooms across the United States teachers feel drawn to the idea of growth mindset and its core values but simply do not feel armed with the knowledge on how to successfully deliver it (Boylan et al., 2018; Yettick et al., 2016). This may be due to lack of administrative support or simply misconceptions of the topic. This may also be due to lack of cohesion of district expectations and policies. Regardless of the cause there must be cohesion in missions to incorporate any program.

Educators feel strongly about growth mindset, but do not know how to maximize its leverage on student achievement (Boylan et al., 2018; Yettick et al., 2016). Perhaps they are using their fixed mindset, which looks at the end result and scores only, in looking at standardized testing scores and GPAs (Dweck, 2016). It seems clear through the evaluation of this research that having a growth mindset is very important to motivation and self-efficacy of students (Rhew et al., 2018; Han et al., 2018; Nallapothula, 2007; Luria et al., 2021). In studies like the one done by Rege et al. students were able to achieve a higher level of education for themselves regardless of the GPA in that students sought to challenge themselves with advanced math courses (Rege at al., 2020). Without this intervention, those students would not have done that since they were already signed up in an easier math course before the intervention (Rege at al., 2020). These participants had to go and change their future while facing policy makers and administrators (Rege at al., 2020). This is a prime example of self-efficacy.

According to Daniels & Bulut (2020) due to advances in score reporting, descriptive rubrics and scoring reports have become a widely used option for grades reporting. If teachers are to embrace a growth mindset, this may be a viable option. Descriptive rubrics help students understand their goals, thus increasing their motivation and self-efficacy (Daniels & Bulut, 2020). Aside from growth mindset training, Daniels & Bulut (2020) suggest that although quite laborious it may be necessary for instructors to create descriptive score reports in order for students to develop an intrinsic value toward mastery of the skill at hand.

To synthesize, it will be imperative for teachers to embrace a growth mindset while implementing growth mindset interventions. Growth mindset interventions should be embedded and specific, however, teachers may communicate a different message contradictive to growth mindset when reporting grades and during standardized testing. This can be hindering to the ultimate effects of growth mindset interventions. Administration must begin to change the way they approach learning targets and standardized testing because ultimately it can instill a fixed mindset into teachers which is then conveyed to students thus completely undoing the effects that a growth mindset intervention could have had on the students.

Implications for Lifelong Learners

In a global society, which is changing rapidly, students must be ready to face the ever-changing demands of the world. Individuals who are equipped with a growth mindset are going to be the most successful in this area due to their flexibility in new knowledge acquisition. A fixed mindset often strives for perfection in terms of finding the concrete answer and mastering it (Dweck & Yeager, 2020). This is different than growth mindset because someone with growth mindset will often see the path to knowledge acquisition as the ultimate learning experience Dweck & Yeager, 2020). When living in a shifting world, knowledge is subject to change and

this would be obstructing to one with a fixed mindset, where an individual with a growth mindset would see this as a natural part of succession in the acquisition for knowledge (Dweck, 2016). This is going to be true in any profession. Knowledge is always changing.

According to Erukulapatl (2019), individuals who want to compete in a global marketplace and economy will need to be equipped with the skills and attributes that make them a lifelong learner. Future job holders and members of society, both professional and non-professional, will need to be able to maintain competency. There are various means listed by Erukulapatl (2019) in which an individual could do this, however for an adult to pursue these opportunities they would need to have motivation and self-efficacy. The opportunities and various means include educational training, self-study, certifications, coaching, teaching, research, professional networking, professional engagement, and professional practice (Erukulapatl, 2019).

Since work avoidance and motivation have a correlation in that as work avoidance increases, motivation decreases (Vogler & Bakken, 2007), it is obvious that individuals need a growth mindset. Growth mindset has been proven to increase motivation and self-efficacy, which are both imperative to decrease work avoidance (Rhew et al., 2018; Han et al., 2018; Nallapothula, 2007; Luria et al., 2021). Work avoidance, or evasion of necessary tasks, is generally not accepted in any career. Motivation and self-efficacy should be implanted early on in an individual's school career in order to have longevity in their successes. Instructors should always have the aim of preparing students for the 21st century (Erukulapatl, 2019).

Areas of Future Research, Limitations, and Synthesis

It is clear that more research should be done in the area of academic growth and mindset theory. That is, there is lack of research in this area. The future research should include the

effects of growth mindset intervention on academic outcomes. There is an abundance of research studies on the topic of self-efficacy and motivation, and the relationship they have with mindset theory in individuals.

Another area of future studies should include the effects of instructors and their mindset. Specifically, the effects that their specific mindset can have on the outcome of student achievement. It is clear that in the research as fore-outlined that there is a strong correlation with student mindset and teacher mindset. There is more of a relationship between growth mindset interventions with motivation and self-efficacy then there is between growth mindset intervention with academic grades and outcomes (Han et al., 2020; Luria et al. 2021; Li & Bates, 2020; Li & Bates, 2019). This is perhaps due to the contradictive emphasis put onto standardized testing and grades, which is counter-intuitive to having a growth mindset. This oftentimes stems from the expectations of administration.

The effects of growth mindset interventions clearly have a positive effect on an individual's level of motivation and self-efficacy (Rhew et al., 2018; Han et al., 2018; Nallapothula, 2007; Luria et al., 2021). Through synthesis of many studies, the increase of student motivation towards both academic goals and growth mindset is a common strand within. A growing motivation can lead to higher academic achievement, but it will likely take more than a single application of a growth mindset intervention (Fraser, 2018). Both intrinsic and extrinsic motivation are positively correlated to academic growth (Luria et al, 2021).

Furthermore, as the research shows, for the future of growth mindset in the classroom and to move forward into a deeper understanding of the topic researchers must dive deeper into embedded growth mindset interventions and curriculum versus one-off growth mindset interventions (Fraser, 2018). As outlined in the literature review, there are far more studies in the

area of one-off growth mindset interventions than in embedded growth mindset curriculum. Exploration of a curriculum is much needed as there are only a few developed according to this literature review: Brainology and Project Growing Minds (Burnette et al., 2018; Donohoe et al., 2012; Rhew et al., 2018; Schmidt et al., 2017). Growth Mindset should be implemented proactively instead of reactively. In exploration of different studies, the other growth mindset interventions were all researchers made which shows there are not a vast number of interventions to choose from. It is very likely that educators as well as students would benefit from having more options for growth mindset intervention curriculum.

Conclusion

There have been many researchers in pursuit of the understanding of the original work in mindset theory. Many professionals wish to instill a growth mindset within their students but may not know how. Growth mindset interventions are limited unless researcher made, which would make it more challenging for instructors to embrace it in their classrooms. Some of the growth mindset interventions available are Brainology and Project Growing Mind which are available for instructors to use in their classrooms.

The effects on academic growth found in the above studies are found to have be null. This may be unappealing to instructors, as it seems many teacher's area of focus may be on the final GPA or academic outcome. The fore-mentioned is the epitome of a fixed mindset which is the opposite of what a growth mindset intervention would hope to achieve. It is possible that instructors are misplacing their emphasis onto academic outcomes when research shows that self-efficacy and motivation are just as pertinent to the success of individuals, especially in academics. This literature review brings light to an indisputable fact. Growth mindset interventions increase motivation and self-efficacy. Research shows that these two attributes are key ingredients to success and intrinsic value.

Growth mindset interventions should be included in the educational setting for the sake of lifelong learners. Although GPAs may not be raised with a one-off, or reactive and remedial intervention, it is possible that over time with an embedded program schools will see an increase in GPA that has longevity. This will require proper training for instructors and administrators. Teachers would have to have the proper education in the presentation of the content. This would be not only in training to gain a growth mindset themselves, but also in how to cultivate a growth mindset culture in the classroom. There are many common misconceptions that show teachers

need to have the proper training. It is clear that a district wide embedded program would be more beneficial and add longevity and possibly a lifelong growth mindset that adds motivation and self-efficacy to individuals' lives.

In reality an individual only spend a small amount of time in school and much of their life as a working adult. Due to this fact, schools are required to create lifelong learners. Growth mindset interventions will help instill motivation and self-efficacy. These are imperative to success in any career.

In this literature review it became clear that there were needs for future research. One area of future research, as forementioned, is research in embedded and long-term growth mindset programs versus one-off interventions. There are not enough studies to show the extent of the effects that an embedded program can have. Another area of future research is the effect that a teacher's mindset can have on a student's mindset and outcomes. This would help support the need for an embedded program. One final area of future research uncovered by this literature review is the effects of growth mindset implemented in the homelife. There are many factors that have an effect of student achievement, and this relationship could make an enormous difference in the growth mindset of children. Of all the effects of growth mindset interventions, positive motivation and self-efficacy are the most valuable. In conclusion, it will take more than one teacher and one intervention to truly and deeply instill a growth mindset and all its value.

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