

Growth Mindset: Trend or Real Science?

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Abstract

The following literature review begins by answering the question, “growth mindset: trend or real science?” It answers this question with a brief history of how, in the 1970s, the idea of “attribution of failure behaviour” from researcher Carol Dweck (1975) evolved to the well-known concept of *growth mindset* today. The discovery that the brain is elastic and intelligence can be grown led researchers to wonder the ways in which mindset could be manipulated to improve outcomes in education. The research then follows a path of growth mindset interventions in primary schools and parent guided settings as well. Finally, the review addresses cost effectiveness of growth mindset interventions and potential challenges of the studies.

Keywords: *Growth Mindset, Fixed Mindset, Status, Intervention, New Zealand, Cost Effective, Elementary, Primary, Stereotype Threat.*



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Introduction

The concept of self-theory and its role in behaviour has been discussed in the psychological community for over forty years. Carol Dweck published a seminal work in 1975 that would become the catalyst for a great deal of future research. In a small study, she found that subjects with *learned helplessness*, who also had the attribution of *failure behaviour modification*, had greater success at overcoming failure, or at least maintaining results, when they were taught that their effort could make a difference in completing a task. Subjects without the attribution of failure behaviour modification continued their downward slope of reaction to failure. In essence, if children believed the failure to be about their ability or out of their control, they continued to fail (Dweck, 1975). From this research, many studies have been born. The work has evolved steadily from attribution of failure to entity/incremental theory to today’s well known growth mindset theory. This literature review provides a brief history of how growth mindset came to be and how researchers are studying its importance and use with regard to students and families.

Brain Plasticity

A research study performed on adult London cab drivers discovered that the brain can indeed grow in adult years. Researchers used magnetic resonance imaging (MRI) to test trainee taxi drivers attempting to acquire the knowledge before and after their three to four year coursework learning the city’s layout. The results found that grey matter in the posterior

hippocampus was increased in those successfully completing the course. There were no changes or growth in candidates who did not complete the course. The memory profile of successful candidates was also changed, but it was at the expense of other working portions of the brain. In short, the taxi drivers expanded and grew their brain through intense learning ([Woollett & Maguire, 2011](#)).

Theory of Intelligence

Beliefs are fixed or malleable. Multiple researchers have studied this concept and come to the same conclusion—at any age we can train and grow our brain. An *entity belief* suggests that one cannot change the amount of intelligence that is possessed. Conversely, *incremental belief* suggests change in intelligence is possible with effort. Earlier work by Dweck zeroed in on helplessness, but this work brought clearer vision and understanding to individual mindsets. Entity belief and incremental belief reflect the extent to which an individual perceives control over the attributes of a given situation. When entity, or fixed, attributes are at a high level, subjects find control possible but, at a low level, control is not possible and outcomes are thought to be negative or just chance. When incremental or growth attributes are at a high level or a low level, subjects find control is possible but at a low level it requires effort; and belief in internal control (Dweck & Leggett, 1988). Dweck and others continued the research and refined this concept to what we know today as growth and fixed mindsets. This research exploded onto the psychological and educational scene in 2007 with the popular



research-based book: *Mindset, the New Psychology of Success*, and Dweck's amazing TED Talk (Dweck, 2014), *The Power of Yet*. People range on a spectrum of mindsets from fixed/stable to growth/malleable. People with a *fixed mindset* tend to think of their intelligence as unchanging and unmodifiable, and therefore any work done is predetermined; they already know whether they will succeed or fail. People with a *growth mindset* assume that with effort and intention they can change their intelligence; the outcome of the work is unknown and therefore they are more willing to try. The result of a growth/malleable mindset is that people are likely to attempt more tasks and thus experience more success overall. Without mindset intervention, people tend to remain stable and unchanging in their current, natural mindset (Dweck, 2014).

Growth Mindset Intervention

"Stereotype Threat"

Decades of research led to Dweck defining the theory of fixed and growth mindsets. Since then, many studies have applied the theory to the education setting: primary, secondary, and tertiary alike. This research has shown that a growth mindset can act as a powerful antidote to stereotype dynamics that otherwise hinder academic performance. *Stereotype threat*, a circumstance that can be explained as a problematic situation where individuals are, or feel themselves to be, at risk of conforming to stereotypes about their social group. This is explained by [Aronson, Fried, & Good \(2002, p. 114\)](#) as,

in situations where a stereotype about a group's intellectual abilities is relevant - taking an intellectually challenging test, being called to speak in a class, and so on - Black students bear an extra cognitive and emotional burden not borne by people for whom the stereotype does not apply. This burden takes the form of a performance disruptive apprehension, anxiety about the possibility of confirming deeply negative racial inferiority- in the eyes of others, in one's own eyes, or both at the same time. Importantly. It is not necessary that a student believe the stereotype to feel this burden

A study by [Aronson et al. \(2002\)](#) found that racially diverse students that succeeded in the education system and made it to university were more likely to fall behind or fail compared to their White/European counterparts with similar grade point averages. This was attributed to the concept of stereotype threat. "Education is the surest route to social equality, the academic underachievement of Black Americans tends to be regarded as both an educational and a social problem" ([Aronson et al., 2002](#)).

With a clear understanding of the damaging effects of stereotype threat on a person's mindset, researchers saw a possible link to growth mindset, and wondered if it represented a solution. This critical work by [Aronson et al. \(2002\)](#) on stereotype threat involved a mix of Black and White college student subjects writing letters to at-risk middle school students. The college students were split into two groups with one group being encouraged and manipulated to write letters with a malleable/growth orientation, and the second simply a control group writing uplifting letters. In addition to the growth mindset orientation, subjects were also shown a video with vivid

animation and neuron growth. The results were encouraging and found that a small degree of intervention—just three sessions—created a change in mindset, higher grades and greater enjoyment in the academic process at university for the Black students in the study. This study helps illuminate that mindset can affect achievement of students at all levels of education, from primary through university, by recognising that even those who are succeeding in education can be held back by deeply ingrained ideas.

Understanding this effect is meaningful because, in countries with diverse student populations—like New Zealand—combatting stereotype threat effectively could meaningfully change student performance. Many countries invest a considerable amount of money in public education. New Zealand spent NZD 13.2 billion on education in the 2016 fiscal year (Treasury, 2016). Around the world, nations are becoming more and more diverse with immigrants entering countries by land, sea, and air every day. Understanding that no country is exempt from the threat of stereotypes of their citizens within a racially diverse community means ensuring that public money is not wasted. New Zealand, with people from several different countries, is no different.

School Interventions in the Primary Years

Numerous research studies involving mindset interventions have been conducted in primary classrooms across the globe. For the purposes of this literature review, four studies of differing methods have been chosen for examination. The research covers a wide range of subjects: low, middle, and high socioeconomic status, varied languages, different countries (Denmark, United States and New Zealand) and multiculturally diverse students ranging from ages seven through twelve. Researchers used a variety of strategies: parental intervention by watching a video about mindset (available in ten different languages) and then reading to their children ([Andersen & Nielsen, 2016](#)); teacher incorporated micro-interventions within lessons ([Bonne & Johnston, 2016](#)); mentoring with embedded education messages and restricted websites with embedded messages ([Good, Aronson, & Inzlicht, 2003](#)); use of Brainology®, a growth mindset intervention programme, ([Schmidt, Shumow, & Kackar-Cam, 2017](#)); and, changing the messaging within a popular educational video game (BrainPOP®, 1999-2017) to be growth mindset related ([O'Rourke, Haimovitz, Ballweber, Dweck, & Popović, 2014](#)).

Three studies that utilised in-school interventions are: [Good, et al., \(2003\)](#), [Bonne and Johnston \(2016\)](#) and [Schmidt et al., \(2016\)](#). [Good et al. \(2003\)](#) from the United States of America sought to help reduce stereotype threat by changing student mindsets with the help of mentors from local colleges. [Bonne and Johnston \(2016\)](#), from New Zealand, attempted to change mindset through everyday micro-messaging in class by teachers. The third, [Schmidt, et al., \(2016\)](#) used Brainology® (2017), a growth mindset programme developed for grades 6-9, and was taught once a week for six weeks to the test group. The interventions in all three studies occurred during school hours on school grounds and with different populations, but they all tested a similar central hypothesis—that growth mindset interventions will raise student achievement.

The results of the three studies were consistent. Student achievement and perception of control was elevated by

intervening with lessons and messaging about incremental or growth mindset. The information gleaned from these studies found that even small amounts of intervention were enough to produce results. Moreover, these results seem to hold across diverse groups of subjects (including high and low socioeconomic status, male and female subjects, and high priority learners) and across diverse curriculum areas (mathematics, reading and science).

Beyond the findings that growth mindset-oriented interventions matter, further studies suggest that timing of those interventions also matters. [Schmidt et al., \(2017\)](#) found that the Brainology[®] intervention had greater influence over 9th grade subjects than 7th grade subjects. The researchers suggest there are a few possible developmental explanations for this: 7th grade students may be more optimistic, more realistic/accurate reflections of self-assessment occur as students age, and there is an “increased desire for independence and autonomy that often occurs as children move through adolescence” ([Schmidt et al., 2017, p. 597](#)).

Findings from these growth mindset research studies are especially important considering current trends affecting primary education. The underperformance of minorities and those of low socioeconomic status is present in nearly every nation. In the United States of America: “Each year, statistics from state-wide and national tests reaffirm the disturbing pattern of underachievement. For example, compared to white and Asian students, black students (*sic*) receive lower grades and have higher dropout rates at practically every level of schooling” ([Good et al., 2003, p. 646](#)). In these cases, the ability of a growth mindset can counteract a stereotype threat and it represents a path for boosting performance of minority student populations.

Likewise, application of mindset interventions could be promising when it comes to addressing various problems associated with timing. For example, New Zealand invested a substantial amount of time and money into Numeracy Development at the turn of this century, only to find an initial jump and then a stall in student achievement. Mindset intervention might be used to reverse the stall, or could be used pre-emptively to prevent stalls in similar programmes in the future. Further, 15 year olds from New Zealand showed a decrease in self-efficacy and achievement in the last 15 years ([Bonne & Johnston, 2016](#)). “Children tend to become increasingly self-critical in their assessment of their abilities across early adolescence in a variety of domains... Additionally, as children move through their adolescence their motivation for academic activities tends to decline” ([Schmidt et al., 2017 p.585](#)). Mindset interventions applied at this critical developmental stage could yield significant results.

Parent Intervention

Mindset interventions show promise in non-academic settings, as well. A study in Denmark conducted by [Andersen and Nielsen \(2016\)](#) attempted to show how parental mindset affects their own child’s reading ability. The results, as predicted, found that parents with a fixed mindset were less able to help their children and parents with a growth mindset were more able to assist them. Over the treatment period, the intervention had a greater effect on fixed mindset parents. Like other studies, this study found that small interventions—encouraging parents to

read to their child and using growth mindset messaging—had a positive impact.

Cost Effective Solutions

Combining parent and school mindset interventions is a cost-effective solution for confronting the achievement gap between children of low and high socioeconomic backgrounds. Meta-analysis revealed that effective feedback interventions are a valuable tool for fostering success in students ([Dietrichson, Bøg, Filges, & Jørgensen, 2017](#)). This was noted specifically when addressing the concept of parent mindset in relation to their child. Understanding and intervening in the parent mindset led to a progression in reading levels. “From the perspective of public expenditures, engaging parents in reading with their child directly is much cheaper than increasing the time that the child spends with teachers in school” ([Andersen & Nielsen, 2016, p. 12113](#)). While not explicitly stated in the other research, it is clear that growth mindset methods require few physical items to be purchased and are a budget friendly intervention requiring only verbal and mental skills to be changed or altered to fit into a school curriculum. [O’Rourke et al. \(2014\)](#) studied growth mindset messaging within the popular academic game, BrainPOP[®]. In this research, growth mindset messaging “teaches the growth mindset directly through the game’s narrative, feedback, and incentive structures” ([O’Rourke et al., 2014, p. 3341](#)). Schools can use the current technology and curriculum, altered with growth mindset messaging, to see academic gains. The research suggests growth mindset interventions are low cost but can produce a big change for large student populations. Therefore, growth mindset interventions can be considered a viable option for any classroom, regardless of budget, that aims to improve student attitudes towards academic study.

Potential challenges

The interventions all attempted to tackle the issue of student achievement from different angles and found similar results. Growth mindset interventions are, in general, a simple and effective way to raise student achievement. Although each study did present its own unique set of challenges, these are mostly outweighed by the benefits of a mindset intervention. For example, [Bonne and Johnston \(2016\)](#) used micro-interventions within the classroom in their research. They found that while this approach was harder to control for in a study, they believed teachers would be more likely to sustain it over a long period of time. In contrast, the [Good, et al., \(2003\)](#) study used a more intensive intervention by bringing in mentors from a local college, over the course of a year, and required dedicated class time. These kinds of intensive interventions are less likely to be sustained, due to time and resource requirements. The two larger studies, [Andersen and Nielsen \(2016\)](#) and [O’Rourke, et al., \(2014\)](#) were challenged by a bulk of diverse data in that they had difficulty attributing the results conclusively to the intervention. However, the data strongly suggested positive results and therefore more research was further warranted. Their study findings were still positive and suggested the growth mindset approach is a necessary tool for teachers and parents.

A further open question is how long mindset interventions endure. Despite researchers referring to the effect as lasting, one is left to wonder how students would maintain a growth mindset

in the face of life altering events, such as a death of a close family member. This question is not addressed specifically in these studies, but is a possibility for further research.

A gap in the research that was not addressed is teacher mindset. Given what has been studied and discovered to date about the importance of student and parent mindset, it seems important to study the effect of teacher mindset as well. Research could revolve around the idea of teacher perceptions of his or her students' abilities. Research could also be applied to the teacher's mindset of his/her own subject expertise and associated teaching capabilities. For instance, if a teacher were not skilled in mathematics or science as a student, does s/he believe s/he can teach that subject effectively as an adult? How would this mindset affect the classroom learning? These questions are possible inquiries for future study.

Conclusion

It took decades for the concept of growth mindset to emerge. With a handle on the idea of fixed and growth mindsets, researchers turned their focus to questions like “What are the pros and cons of mindset?” and “How can our students benefit from what we know?” The studies were all learner-centred and hypothesised that intervening with a growth mindset programme or messaging would raise achievement and engagement. Researchers found that the mindset of students of all ages, ethnicities, and socioeconomic status can be positively affected by small or large interventions. This is significant because the outcome of education is something all citizens have a vested interest in. This research is promising for the future of education because it is cost effective and can be implemented at one of the most basic levels of education—in the classroom, teacher to student. Moreover, in the interest of individualised learning, messages can be tailored to fit any student group's learning needs, through whole class messaging, individual intervention, or even through gaming and technology. The opportunities for growth mindset intervention are endless.

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