

Fostering a Growth Mindset in Children & Why This is a Great Teaching Approach

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In this paper I want to share with you the science of learning behind why it's so important to foster a **growth mindset** in your students—as well as in you the teacher—and explain why this is such a necessary and powerful teaching approach.

Let me first start with a tiny shout out to Dr. Carol Dweck from Stanford University. It was Dr. Dweck's work on mindsets, detailed in her book *Mindset: The New Psychology of Success* (2006) that started us all down on this road of examining how our beliefs about ability, performance and intelligence really do create self-fulfilling behaviours within us...and our students. That is, whether we believe them to be innate and “fixed” at birth—an inherited trait—or whether we believe them to be developed and grown incrementally through effort, experience, and persistence—truly do affect that way you engage with learning and how you handle failure, goal setting and persistence. It also will influence the way you teach! We'll get to all that in a moment.

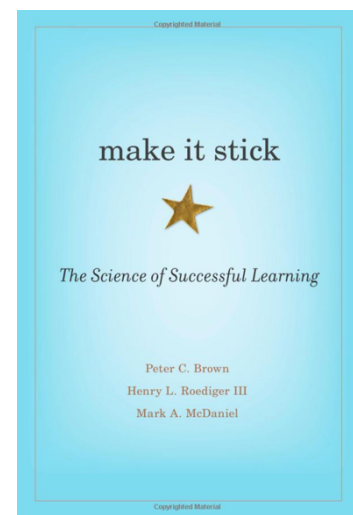
I want to introduce you to two excellent resources that I'd encourage you to invest in. They will help you truly understand the significant and important research that supports what cognitive scientists know about the human brain and how it can be altered by adopting a growth mindset, as opposed to a fixed mindset.

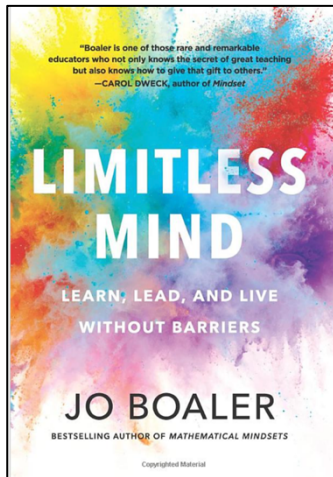
***Make it Stick: The Science of Successful Learning* (2014)**

By Peter C. Brown, Henry L. Roediger, Mark A. McDaniel

Research on Growth Mindset permeates this book, but specifically detailed on pages 179-183 and then again on page 233 when the effects of promoting growth mindsets in science classes is explored.

Chapter 7: *Increase Your Abilities* details what scientists have learned about the brain's potential to increase one's intelligence and add to one's abilities. It has long been believed by many that intelligence was fixed at birth, but scientists now know that simply isn't the case; we can increase our intelligence and add to our warehouse of abilities.





The second book is written by Jo Boaler, a colleague of Carol Dweck, and known internationally for her work on mathematics and mindsets.

[Limitless Mind: Learn, Lead, and Live Without Barriers \(2019\).](#)

Dr. Boaler does a remarkable job of unfolding the science that reveals how human beings' mental capacities are continually developing, and how a new understanding of mindset can liberate us from the mental constraints that prevent us from enjoying a full life.

Okay, let's get this topic underway and let me start with a question for you.

Do you think you could be a great artist?

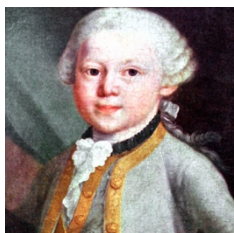
Seriously, do you think you could learn to paint in such a way that people would line up to buy your work? Or, are you the type of person who can barely draw a line straight and can only produce stick figures? Are you thinking; "umm, I wish I could draw, but I just don't have that talent".

Fair enough, but if you wanted to become an accomplished artist, could you?



Now, when pressed, I'm sure you will admit that you certainly *could* learn to be a great artist if you devoted the thousands of hours of practice and instruction and resources to do so. I think most of us believe that if we truly dedicated time and effort and resources to something, we could become very good at it: learning a new language, learning to play an instrument, learning all about finances and economics, learning to garden or learning to be a great woodworker or mechanic or chef, and so on. It's all just a matter of time and practice and resources, right? This is the correct answer, but when pressed even further, I wonder if many of us would admit to not really believing this, especially when things do not go well for us.

Deep down inside do you believe that some people are born better than others at some things? Are some children naturally better at math or art or sports than others? Do some children have innate abilities that others do not?



I mean, isn't it obvious that Mozart was born a musician, having composed his first works by the age of five? There is no doubt that Wolfgang Amadeus Mozart (1756-1791) was a prodigious child with extraordinary intelligence and propensity to learn quickly. It is also true that he was born to a father who was an accomplished composer himself, as well as a teacher, and his father prided himself on rigorous home schooling of his

children, teaching them music and writing and languages as early as possible. Mozart was intelligent, no doubt, but he also was born into an extraordinary home that required enormous amounts of study and practice. It is unlikely that if Mozart was born into another home he would have developed into the talent we honour him for. Genes and biology are only part of the equation; environment and stimulation are as well.

We are all born with the same basic cognitive architecture but the way that our brain cells develop and grow after birth has a lot to do with how our intelligence and development are nurtured. The environment into which we are born has a tremendous impact on our initial trajectory of development, but nothing is guaranteed, and our brains are susceptible to change throughout our entire lifespan.

Okay, let me bring you back again to my initial question; could you become an artist?

Take a look at this young North Korean student I met in 2019. I was visiting schools in Pyongyang and was invited to visit the Children's Palace, a site where youth can engage in extra-curricular activities in several areas; art, calligraphy, languages, sports, musical instruments and so on. I was able to visit several classes such as this one....an art class.



The picture on the right is of a 10-year old girl. Obviously she has talent. Was she born this way? Is her brain different than yours and mine? Well, it is now, and we'll discuss this a bit more in a few moments, but let's first talk about what *you* believe about your students.

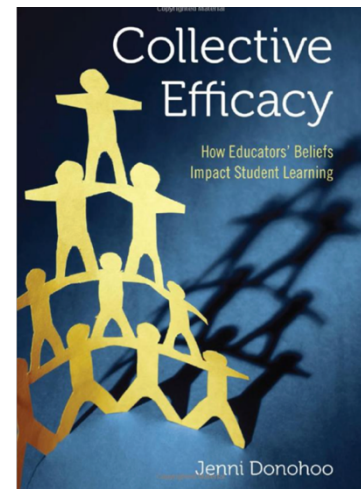
What we believe about children and their abilities, their potential to learn and develop, really matters to how we teach them. And a lot of research has borne this out. If you want to see this for yourself, simply go to Google or Google Scholar and enter terms such as *teacher beliefs* or *how teacher beliefs affect learning* and you will find hundreds of studies that have examined this phenomenon in all subject areas and grade levels, including university and work among adult populations. These studies have been carried out in many countries and the overwhelming result is that teachers' beliefs play a big role in how classroom teachers design their instruction.

I like how Jenni Donohoo frames it in the Preface to her 2017 book: *Collective Efficacy: How Educators Beliefs Impact Student Learning*.

Efficacy is defined as teacher's belief in their ability to produce a desired or intended result...in other words, it's the degree to which you believe you are going to be effective in teaching all of your students to reach intended outcomes, goals and benchmarks. Or to be a bit more provocative if I can, it really shows it's true colours when you come up against students who struggle to learn, or who have shown difficulty and may not be like other children. It's then that we see if we have differential efficacy...a belief that some children CAN and some children likely CANNOT.

Donohoo says this:

Efficacy beliefs are very powerful because they guide educators actions and behavior. Efficacy beliefs help determine what educators focus on, how they respond to challenges, and how they expend their efforts....If educators realities are filtered through the belief that they can do very little to influence student achievement, then it is very likely these beliefs will be manifested in their practice. (p. xv)

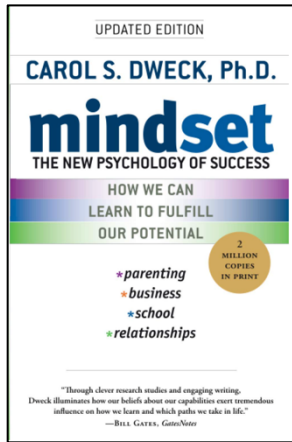


A Relatively New Concept

Now, for me, and I suspect this is true for many of you, we grew up in a schooling era before growth mindset was talked about or known in education circles, and many of us never learned about growth mindsets in our Teacher Education programs. For some of you, this topic may still be somewhat new. Much of what we've come to learn about the impact of mindsets has been learned within the last few years at teachers' conventions, workshops or professional development sessions. Many of us grew up being taught and believing that intelligence, ability, skill and dispositions are innate...we are born with them, they are fixed traits.

There certainly is a genetic component to development, and we know that some people are born with differences in their brains, BUT all of us share the same components of **human cognitive architecture**, and we all can learn and grow and develop...probably beyond what we sometimes think we can.

Our mindset has a lot to do with what we attribute our success or failings, or our current skill level. Was it hard work, study, feedback and learning from our mistakes that helped us develop, or was it luck, natural ability, good genes, or fate that caused us to learn, or not learn a skill or talent? When we have a "fixed mindset" we believe that we only have a certain amount of intelligence and character and personality.



As Dweck says in *Mindset*, "...then you'd better prove that you have a healthy dose of them. It simply wouldn't do to look or feel deficient in these most basic characteristics." In other words, if you cannot develop your intelligence any further, and it is fixed at birth, then you will need to be content with what you already have.

But that usually never happens, right? Instead, if we believe that we have to live with the brain that we've been born with, depending on how well we fare in life, then we tend to attribute the outcome to our genes, our upbringing, fate, luck, and so on. Undoubtedly there is some truth to the contextual factors that have influenced and shaped us, but harbouring a **fixed mindset** virtually prevents any growth or change when necessary because we don't really believe it

can happen. Instead of getting down to the business of making changes in our thinking or ability, we would be more apt to make excuses.

I like what Dweck says in response to adopting a **growth mindset**:

There's another mindset in which these traits are not simply a hand you're dealt and have to live with, always trying to convince yourself and others that you have a royal flush when your secretly worried it's a pair of tens. In this mindset, the hand you're dealt is just the starting point of development. This growth mindset is based on the belief that your basic qualities are things you can cultivate through your efforts.

Let me return to the question I asked you before. Could you be a great artist?

What if I asked you to draw a portrait of yourself. Might it look like this?



This is an actual self-portrait by a student in Betty Edwards' class. Edwards was an American High School Art teacher and author, becoming famous for a book she published in 1979 called *Drawing on the Right Side of the Brain*. The book was updated in 1999.

These self-portraits I'm about to show you were drawn five days apart. Students were given an art course by Betty Edwards, who believes that ability to draw is actually an ability to see (contours, spaces, relationships, shapes, light and shadows). Edwards acknowledges that many people think that drawing is mostly an innate ability or that a rare few can possess this skill, but she has shown through her teaching that drawing consists of **teachable component parts**, or as Edwards puts it, "Drawing as a learnable, teachable skill"(p.3).

Carol Dweck adds to this discussion; “Just because some people can do something with little or no training, it doesn’t mean that others can’t do it (and sometimes do it even better) with training”(p.70).

Okay, once again, the following self-portraits were drawn just 5 days apart.



Impressive aren't they....drawn 5 days apart after being taught how to draw...and how to see. In case you're interested, you can learn more about Betty Edwards and learning to draw on her website at <https://www.drawright.com/>

Okay, let's move on.

The key to these improved drawings—and might I say, in all learning, lies in three realities:

- 1. Believing you can learn a new skill**, and just importantly because I'm talking to you as a teacher, that you can **teach** new skills like this...provided, of course, that you know your subject area very well and work hard to reach all students. According to research studies done on teacher beliefs and teacher efficacy, teachers who do not believe that their students have the ability to learn (skill, intelligence, patience, background knowledge, etc) tend to use less effective methods of teaching, tend to challenge students less, and tend to spend less time working with these students.
- 2. That learning something new, especially difficult things, requires breaking it down into teachable component parts.** A wonderful book by Stanford Professor Dr. B. J. Fogg called *Tiny Habits: The Small Changes that Change Everything* (2020) argues that we are most likely to affect real change when we start with the smallest possible increments and link them to existing knowledge or behaviours. When students know that we deliberately seek to build incrementally upon what we know and can do (or almost do), it gives them hope and assurance that they are capable of growth.
- 3. It will require incremental growth over time after effort and struggle and forgetting...and corrective feedback are applied.** These are normal AND desirable, what we call *desirable difficulty* or *effortful learning*...because the brain responds to learning this way by strengthening neural pathways in the brain. We should not always seek to make things easier for students. I know that sounds counterintuitive, but the brain strengthens its own neural pathways through resistance. Allowing students to struggle within the safe confines of your support is helpful to them and should be encouraged.

Having a growth mindset is not just all of a sudden simply believing that you can do it or that you are now suddenly capable because you are looking at things differently. It's not just a matter of voicing or acknowledging that you believe in a growth mindset. I am not promoting a 'say it and seize it' type of nonsense.

No, having or possessing a growth mindset comes initially through believing in the cognitive science that supports the truth about growth mindset, but becomes reality when you experience growth and change and improvement over time through effort. It's an experience-dependent belief.

What about the effects of failure on a child's self-perception?

Isn't there a risk that after a number of failures a student would give up and be emotionally or mentally injured? Children are far more resilient than we sometimes give them credit, especially if they learn within a safe learning environment. There's always a risk that students will become frustrated or feel they are incapable of learning. However, if a student is taught from a very early age that our brains are malleable and always in the process of development, there's a better likelihood that failure will not derail them.

If a student believes that ability and intelligence is fixed at birth and then struggles with new material, they are more apt not to apply themselves and will give up...even if they've experienced schooling to be easy up to this point. Their reasoning may sound like this, "I've never had to work hard to learn before and working hard is only necessary for those who are not smart". For these students, maintaining the appearance of being smart is important and their goal orientation is toward looking good and maintaining this belief through successful performance. We call these **performance-oriented goals**. The problem with these types of goals is when they meet difficult challenges and are initially unable to figure something out. People with performance-oriented goals are more likely to give up or avoid the work altogether when they encounter struggle, believing that since they are smart this shouldn't be happening, so it's just too hard for them.

People who believe that learning is not fixed, and that intelligence and skill is malleable, and that it develops incrementally over time and with effort, are more likely to confront difficulties—although they don't always appreciate it—with the belief that they will eventually learn how to do it.

Let me introduce you to an interesting study on motivation by a friend and former colleague of mine, Dr. Tim Seifert of Memorial University. He published a study in 2009 called *Intrinsic Motivation and Flow in Skateboarding: An Ethnographic Study*.



Observing skateboarders trying to master specific stunts is a lesson in **mastery/task orientation**. These youth had a goal in mind to learn and master certain skateboarding tasks and they were willing to take the time, effort and failure (and pain) associated with this goal. One of Seifert's observations, which is very important for classroom teachers to catch, is that skateboarders—and similarly all learners—do not necessarily have to enjoy all that they are doing to embrace a task that they believe to be important or worthwhile. I think this is important so I am going to include a lengthy passage from Seifert's Results section of his study:

What is it about an activity that can keep a teenage boy engrossed for hours, persisting in the face of failure? It was not uncommon to witness, during 15 or 30 min of observation, a skateboarder attempting to master a trick with dogged persistence. They would attempt to execute a trick, fail, and retry; after repeated attempts they might take a break only to return to attempt to master the same trick. For example:

This skateboarder ... looks to be around 14 or 15. He is attempting a stunt on the rail ... he began to pick up speed as he approached the rail, hit the rail and grinded down halfway when he lost his balance. He landed on his side, but quickly got up and ran after his skateboard ... picked up his skateboard and ran back to where he started. He stood up for a moment and looked at the rail ... began to pick up speed as he approached the rail. He reached the rail, grinded half way down the rail ... and lost his balance. He fell down again, quickly got back up and said, "Ugh! Man, why can't I get this now?" He picked up his skateboard and laid it on the ground ... - where he initially started. One of his friends yelled out, "J! Come on over, man!" J. turned to them and

yelled, “I am in the middle of something here, D! Can’t you see that?” [He made at least three more attempts; Observations of J.].

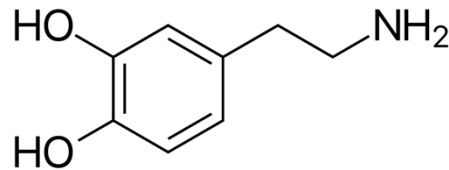
If being intrinsically motivated means to engage in an activity for enjoyment, J.’s actions raise questions about what it means to be intrinsically motivated. There appeared to be no external pressures (although admittedly we did not ask him about his motives—.... If J. experienced frustration, could he be said to be enjoying the activity and, therefore, intrinsically motivated? Is it the case that intrinsic motivation is defined by the source of goals and goal pursuit rather than by enjoyment (Seifert 2004)?

J.’s behaviors are consistent with a mastery/task orientation. He was focused upon mastery of a particular skill rather than a concern for perceived ability (e.g., Seifert 2004). Indeed, it appears that skateboarders might be one group that exhibits high levels of task orientation, as evidenced in a study by Boyd and Kim (2007) in which a sample of skateboarders had a mean item score of 4.41 ($\pm .57$) on a 5 point Likert scale assessing task orientation. At one point we were interested in interviewing skateboarders exhibiting behaviors consistent with an ego/performance orientation, but they were rare.

A number of themes consistent with previous research emerged from the interviews and allow for speculation about the relationship between intrinsic motivation and flow. In a setting that supports autonomy, skateboarders are free to set goals and pursue challenges. In doing so, they persist and adapt, increasing concentration. Increased concentration leads to a narrowing of the field of attention, resulting in flow and providing an emotional foundation for sustaining intrinsic motivation. The end result is an intense flow episode, a psychological state that many actively sought.

Working within the Paradox of Failure

In Seifert’s study of skateboarders—as is observed in any classroom where students overcome challenges and learn something new—we see a realized sense of satisfaction and efficacy, even if the task or learning process is not immediately considered favourable. This likely occurs because our brains release an organic chemical called **dopamine** when we experience success at a task, or in the case of these skateboarders, when success (or success approximation) is anticipated. There is a paradox here. The skateboarders in Seifert’s study KNEW that they would fail hundreds of times trying to learn new tricks, but they were not deterred. Perhaps it’s because even small progress toward mastery is rewarding when you have a growth mindset...or in the case of the skateboarders, a mindset that accepted small incremental progress along with the a number of unsuccessful trials. These teens simply believed that their mistakes would eventually be overcome through continual effort.



The dopamine molecule

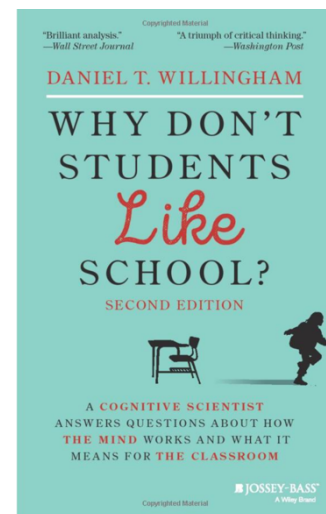
It is also true that our brains will reduce production of dopamine when it anticipates failure to a task facing us. Similarly, when we then actually fail at a task the brain experiences what some have called a “dopamine drop” that results in unpleasant feelings that the brain wishes to avoid. **This is where one’s mindset really stakes it’s worth.** Either we give in to the feelings associated with a dopamine drop and conclude that we will never be any good at our new learning challenge, or we accept that learning something new is sometimes associated with feelings of confusion, frustration, loss, and so on, and we press on...because we KNOW that eventually things will improve and we will learn...just like the skateboarders!

Why Teachers Should Utilize Growth Mindset as a Teaching Approach

Children—and teachers—who believe that learning is the result of incremental growth over time and through effort, error, feedback and practice, and who believe that intelligence and ability is malleable, tend to set more ambitious goals, fear failure less, stick with difficult tasks longer, believe that they are responsible for their own learning, and ultimately achieve more....and research suggests they enjoy school more. Although these students may not be aware of dopamine or its role in reward-motivation, will still persist even through difficult learning experiences because they know they are slowly getting better.

So, what should teachers do with this knowledge about growth mindsets and how can it be used as a teaching approach? I take a few of these recommendations from a great book by Dr. Daniel T. Willingham, called, *Why Students Don't Like School?* (2nd Ed., 2021, pp.207-209)

- 1. Learn all you can** about Growth Mindset, Attribution Theory, Goal Orientation and Brain plasticity and malleability. Learn it to believe it.
- 2. Start teaching and reminding students about growth mindset at every grade level beginning in September.** Make it one of your mantras. Cognitive scholars have suggested that children start to adopt a mindset as early as three years of age, but it's not too late to promote growth mindset in older students. Children can and do change their mindsets.
- 3. Praise process rather than ability.** Watch our language: don't say, "wow, you're so smart!" That communicates intelligence as an entity...something that the child is. Instead, encourage students about what they are doing....they've engaged in learning and being successful or making mistakes along the way is really helping them develop and learn new things.
- 4. Encourage students to seek out and receive feedback from you.** It's not enough for a teacher to praise a student's effort—whether the problem was solved correctly or not. Instead, teachers need to be in the habit of providing honest, informative feedback to improve and students should be encouraged to seek this. It is not enough to praise a student's effort and stop there. It actually sends the wrong message..."great effort Mark, you tried hard and that's great"....tells the student that their effort was good enough...a consolation prize...because they probably won't be able to do it..so, let's just say you're finished." No, follow through with helpful corrective feedback and let the last interaction you have with a child on this feedback be their demonstration of a correct trial.
- 5. Allow students to struggle a bit and become accustomed to finding new strategies and resources to correct their mistakes.** It's okay to let children struggle a bit, and there's nothing wrong with asking students to stick with it a little longer to figure it out. Have



they tried to think of the problem a different way? Have they wrestled long enough with the problem.

Willingham puts it this way, “What is growth mindset preparing students for? It’s meant to give them a positive attitude about challenging work.” p.209

This applies to my students and this applies to me...and to you. Adopting and applying a growth mindset to all areas of my life helps me to see everything in a different light. When I think in terms of a growth mindset I am encouraged to be patient and to keep striving forward through difficulty. I know that eventually I will improve and get better at the task before me, and this gives me hope and patience. Your students will be faced with hundreds of challenging learning tasks during their years of schooling and we don’t want them giving up. We want our students to learn to persist, seek help when necessary, work with others as a strategy, ask good question, seek out resources, rely on time effectively and maintain continual growth. This is a life skill that serves all of us in our relationships, our parenting, our work environment and our self-realization. I no longer view my mistakes and errors as falling down...I see them as falling forward. And this is what learning is all about.

Tell me your story!

I would love to hear from you about your own journey concerning growth mindset, either as you’ve experienced it yourself or you’ve watch your students experience it. Please write to me and tell me your story.

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