

Bill Watterson's take on mindsets.

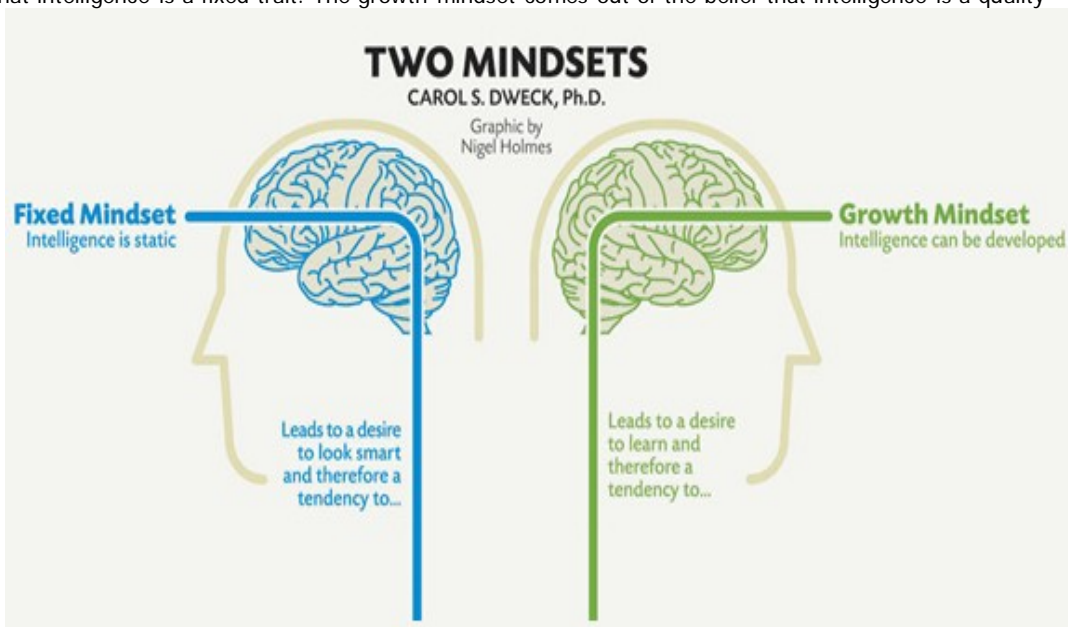
I want to tell you the coolest thing I know. It's not even astronomy related -- and you know how crazy I am about astronomy! So you can bet I think it's important. What I have learned about the topic of Mindsets lately has changed my personal worldview profoundly. I find it relevant not just to college classes, but to practically all areas in my life -- right down to my family relationships, and my motivation to exercise.

Research on motivational psychology has shown two different kinds of mindsets that people can have: "fixed", and "growth". People tend to be, in any domain or discipline, of one mindset or the other. This applies to everyone, not just students. Also teachers, parents, bosses, children, professional athletes, politicians, beekeepers -- everyone. This is applicable to many areas of life, too -- not just academic performance in a formal education setting. Also music, sports, art, business, social relationships (!), ethical behavior, and others.

The fixed mindset is rooted in the belief that intelligence is a fixed trait. The growth mindset comes out of the belief that intelligence is a quality that can be changed and developed.

(Dweck, 2008). Which mindset you're in depends on how you view your ability to grow intellectually.

People with a **fixed mindset** feel that they pretty much have to live with the hand that they're dealt. If you've ever heard someone say "I'm not a math person", or "I'm not artistic", or "I'm uncoordinated", these are hallmarks of a fixed mindset. If they think they're bad at something, they are resigned. But oftentimes, interestingly, someone can have a fixed mindset and actually be quite *good* at something. But even with a long history of successes and accomplishments, a person with a fixed mindset still has a feeling of resignation and helplessness about their ability. They are preoccupied with proving themselves. They spend their whole life trying to prove that they're as good as they think (or hope) they are. As Dweck says, if you have a fixed mindset you are "always trying to convince yourself and others that you have a royal flush when you're secretly worried it's a pair of tens." They don't want to look like they don't know stuff, or can't do stuff. They are hyperaware of how others view them, and very self-conscious. Much of their behavior acts a defense against this vulnerability.



People with a **growth mindset** feel that they just START with the hand they're dealt. But they believe that if they take advantage of opportunities, they can grow. They value the process more than the outcome. In Dweck's words, they believe that "everyone can change and grow through application and experience." "They believe that a person's true potential is unknown (and unknowable); that it's impossible to foresee what can be accomplished with years of passion, toil, and training." (Dweck, 2008)

Here are some example characteristics of the two different mindsets:

People in the fixed mindset avoid **challenges**. Because if you can't do math, why would you try to do hard math? It would expose you as somebody who can't do math. Or if you're an expert violinist and you can play a Mozart violin concerto flawlessly and so beautifully as to bring your music teacher and friends and relatives to tears, why would you tackle a brand new Beethoven violin concerto? It would make you sound like a bumbling novice. But people in the growth mindset welcome challenges. They see them as a way to expand their skills.

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People in the fixed mindset give up easily in the face of **obstacles**. (This is sometimes misdiagnosed as laziness by teachers.) An obstacle is a great excuse not to do something. But in the growth mindset, an obstacle is a challenge that, when surmounted, can help expand their skills.

People in the fixed mindset, when they've decided they are not good at something, may not be effortful. They think **effort** won't make a difference. And if you have to try, it exposes you as not good or smart anyway. You should be naturally talented. But people in the growth mindset, when they recognize that they're not good at something (yet), see effort as the path to mastery. If they can't do that problem yet, they resolve to try even harder.

Note: I think there is also an intermediate possibility here, which may make it hard to distinguish between the mindsets based on effort: A person may think they're being effortful, but expending effort on unproductive things that are not really helping their cause (e.g. going through the motions of athletic training, studying superficially, passively re-reading or highlighting, etc.). When these activities do not bring success, this fosters or reinforces the fixed belief that effort is useless. Much more important than the amount of time you put in is the level of difficulty of your effort. Real effort means pushing yourself to the point of discomfort, not just doing what's familiar and comfortable.

People in the fixed mindset ignore negative **criticism**. They are offended by it. It feels like a personal affront to their self-worth. People in the growth mindset attend to negative criticism. They even appreciate it. It helps them identify and home in on their weaknesses, so they can work on improving them.

The fixed mindset can make one feel threatened by the **success of others**. If somebody else is doing well, a person in the fixed mindset may feel like it makes them look bad: It shows they're not as good as the other person. The growth mindset sees the success of others as inspirational, uplifting, and motivating. If somebody else can do it, it shows it can be done! People in the growth mindset may be more likely to work with others to accomplish a goal collaboratively.

I'm not even going to pretend to be unbiased here about the two mindsets. I strongly believe that the growth mindset is better. For one thing, it has the virtue of being correct: The truth is, intelligence can grow. The brain, like a muscle, gets stronger and works better the more it is exercised. Every time you work hard, stretch yourself, and learn something new, your brain forms new neural synapses. Over time, you actually become smarter. The old idea that the brain is static is wrong. Qualities like "talent", "ability", "IQ", and "giftedness" are NOT permanent attributes, and they are not innate and out of our control. In fact I feel that these terms should not be used at all, because they are highly suggestive of fixed attributes. Anyone can improve their ability through hard work, especially if the work they do specifically targets their weaknesses.



"The distinguishing feature of geniuses is their passion and dedication to their craft, and particularly, the way in which they identify, confront, and take pains to remedy their weaknesses" (Good, Rattan, & Dweck, 2008).

In other words, it's not what you are born with that matters; it's your mindset that matters.

OK, if you've hung on with me this far, now I'm going to get personal. I felt like crying when I learned about mindsets at the age of 35 (last year!). I wished I'd learned about it 25 years ago. It was one of those rare, big, course-altering, "aha" moments in my life. I realized I had always had a fixed mindset.

My whole life, especially as a kid, I was always told I was "smart". I was placed in the "gifted and talented" program in school. My two older siblings were "the popular one", "the funny one", and I was "the smart one". I saw it as a way to distinguish myself. But I have now learned by reading Dr. Dweck's work that this kind of praise, sorting, and labeling of kids, even coming from the most loving and well-meaning parents and teachers, is actually de-motivational and damaging, and breeds the fixed mindset. (Note: Don't praise your kids this way!! See the references at the bottom of the page for more information about applying these ideas to parenting, and more constructive ways to praise.) Once branded "smart", I craved that approval. I came to need it as a continued affirmation of my self worth. I brought home all As on my report card, and if I ever got a B+, I was ashamed. I felt a need to be the best at the things I did, especially academics. It wasn't enough to be good. I constantly measured myself by external metrics: test scores, GPAs, athletic wins, and musical performances. When college and graduate school got difficult, I wrestled with "imposter syndrome" and worried endlessly that I didn't deserve to be there; that I'd be discovered to be a fraud. I almost quit school. And even when school was long over, in my personal life, I continued to exhibit fixed mindset traits. I got frustrated, cranky, and even belligerent when I tried to learn something new if it wasn't immediately easy. Just ask my poor husband about the time he tried to teach me to

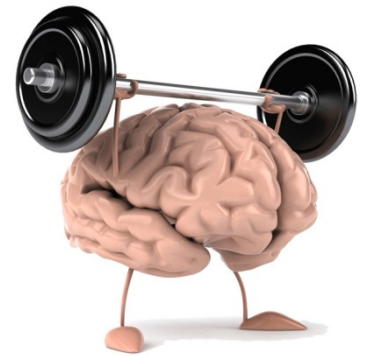


play bridge. Yikes. I passed up learning opportunities because they would be difficult and uncomfortable. When I didn't succeed in something, or if I made a mistake, I always tried to assign blame -- either to another person(s), or to circumstances beyond my control. In my career too, I was fixed: I craved the approval of my peers and superiors. I was constantly self-conscious and wondering if I was really good or not. If somebody didn't comment on what a great job I'd done, I felt like I failed. For a high achiever like me, who had a lot of successes along the way, I felt like a failure most of the time. That's not a happy place to be. ☹

Why should you care about mindsets in this class? And why am I spending a long page of reading, plus a discussion board assignment on it? To be sure, I hope that this helps you be happier people in your personal lives, but that is not my only motivation here. I am your teacher after all, and I'm here to help you learn astronomy. So here's the clincher: Students with a growth mindset learn more. Period. Researchers tracked students who began with equal skills, and found that students with the growth mindset learned much more, steadily pulling away from their fixed mindset peers. And that is relevant in this class. In all your classes. So my intent is to give you this tool to improve your learning -- in this class and beyond.

Luckily, we can change our mindset. Hallelujah! Otherwise this whole foray into motivational psychology would have been just totally depressing for a lot of us. I've been reading all about mindsets these last few months and my New Year's resolution from now until forever is to change to a growth mindset in several different areas of my life. And I'm going to challenge you, Astronomy students, to adopt a growth mindset toward this class (if you don't have one already), and to think about other areas of your life where you have room to become more growth-y. Here are some steps to moving more toward a growth mindset, in any area:

1. Learn, learn, learn. You can do this throughout your life, but there is no better time to do this than when you are formally a student! When you're in college, it's your job to learn. Here are some real quotes about learning from students who embody the two mindsets:
 - Fixed: "The main thing I want to do in college is to show others how good I am."
 - Growth: "It's much more important for me to learn than to get top grades."
2. Realize hard work is key. If you're not working hard, you're not making real progress. Like with physical exercise: "no pain no gain". How much do you improve your running ability by jogging slowly? How much do you improve your strength by lifting easy weights? Try to work at the edge of your ability, and beyond. Yes, it should be uncomfortable. You should make mistakes. And it takes a lot of time. A key realization for me was that struggle is a sign of progress. In fact, struggle was necessary for progress. I had always assumed that struggle meant I was failing.
 - Fixed: "When I have to work really hard in a subject, I don't feel very smart."
 - Growth: "The harder I have to work at something, the more effort I put into something, the better I'll be at it."
3. Face setbacks constructively. And there will be setbacks! If there aren't, you're not pushing yourself hard enough.
 - Fixed: Students tended to fail to recover from an initial poor grade. They reacted by withdrawing:
 - "I'd spend less time on this subject from now on."
 - "I would try not to take this subject ever again."
 - "I would try to cheat on the next test."
 - Growth: Students tended to be able to recover successfully from a poor grade. They reacted by digging in:
 - "I would work harder in class from now on."
 - "I would spend more time studying for the test."



Things to keep in mind if you are trying to move from a fixed to growth mindset:

- Focus on effort, struggle, and persistence despite setbacks. Remember that struggle is necessary for growth, not a sign of failure.
- Choose difficult tasks. Move past easy ones.
- Reflect on different strategies that work and don't work. Let go of ones that don't work and be willing to try new ones.
- Focus on learning and improving, not comparing yourself to others.
- Don't assign blame to external factors when things don't go how you want.
- Seek out challenges. Create challenges for yourself if need be.
- Work hard, with an emphasis on the difficulty of the work, not just the total time put in.

Summary of some Fixed vs. Growth mindset traits:

	Fixed Mindset	Growth Mindset
Achievement...	means proving you're smart.	means that you're learning and stretching.
Being smart...	means that you're making no mistakes.	means that you're confronting a challenge and making progress.
A setback or mistake...	leads to loss of confidence.	indicates an area of growth.
Failure...	leads to humiliation.	means that you're not yet fulfilling potential.
Effort...	shouldn't be required if you're smart and takes away excuses for failure.	is the path to mastery that makes you smarter. You get out what you put in.
Success...	is defined as being the best and is based on talent.	is defined as working hard to become your best and is based on motivation.
A bad grade...	means it's time to give up.	means it's time to work harder.
Feedback...	is threatening, as it provides good or bad news about precious traits.	is welcomed, as it provides useful direction toward areas to work on.
The need to ask for help...	indicates a weakness or deficiency that should not be admitted.	is a useful strategy for growth.
Stereotype threat...	is high due to fears of confirming negative stereotype.	is low; a stereotype is simply someone else's inaccurate view of their abilities.
Talented peers...	become grounds for feeling threatened and jealous.	are a source of inspiration.

References:

Dweck, Carol S., "Mindset. The new Psychology of Success. How we can learn to fulfill our potential.", Ballantine Books, 2008.

Resources and links from Dr. Dweck, and a mindset "quiz" to test your mindset: <http://mindsetonline.com/>

Some text taken from: http://www4.esu.edu/academics/enrichment_learning/documents/pdf/developing_growth_mindset.pdf

Some text and images taken from: <http://rampaks.com/read/mindset-dweck>

B&W table from: <http://hdfs861.weebly.com/character-development-growth-mindset.html> Applications to parenting: "How not to talk to your kids": <http://nymag.com/news/features/27840/> and also: <https://raisinghappykidsblog.wordpress.com/growth-mindset/>

See also

"The power of believing that you can improve" by Carol Dweck (TED talk):

https://www.ted.com/talks/carol_dweck_the_power_of_believing_that_you_can_improve?language=en

"What You Believe Affects What You Achieve" by Bill Gates: <https://www.gatesnotes.com/Books/Mindset-The-New-Psychology-of-Success>

"Fixed vs. Growth: The Two Basic Mindsets That Shape Our Lives" by Maria Popova:

<https://www.brainpickings.org/2014/01/29/carol-dweck-mindset/>