Can you give us a general overview of your current work?

My graduate and post-doctoral students and I are working on a number of projects that I am very excited about. We are exploring different ways in which thinking of intelligence as a fixed trait (a ‘fixed’ mindset) versus a malleable quality that can be developed (a ‘growth mindset’) influences students’ motivation and achievement. In past work we have found that holding a fixed mindset makes students overly concerned with how smart they are, and leads them to avoid challenges, devalue effort and under-perform in the face of difficulty. In contrast, holding a growth mindset makes students more concerned with learning (rather than looking smart) and leads them to seek challenges, value effort, and shine in the face of difficulty. Here are examples of a few projects.

Mindset intervention

We (myself, Lisa Blackwell and Kali Trzesniewski) have completed a very successful intervention in which we taught at-risk junior high school students (aged 12–14) to think of their intelligence in a more growth-oriented way. By showing them that the brain forms new connections every time they learn, we gave them the message that intellectual skills can be expanded, and we explained how to apply this to their schoolwork. These students (compared to a control group that only received training in study skills) showed significant increases in their motivation, which had been poor, and their grades, which had been declining. The results of this intervention were published in the journal *Child Development* in February, 2007.

Buoyed by these results, we have now designed a series of colourful and engaging computer...
modules that deliver the intervention and, with a large sample of students, we are testing the impact on students’ motivation and achievement. This intervention (called ‘Brainology’) teaches students about the brain, how it works, how it changes with learning, and what students can do to make it work better and grow smarter over time. The first group of students who went through the programme unanimously reported that they had changed their ideas about how learning occurs and how they now go about it. Here are some samples of their responses:

My favorite thing from Brainology is the neurons part where when u learn something there are connections and they keep growing. I always picture them when I’m in school.

I did change my mind about how the brain works...I will try harder because I know that the more you try the more your brain works.

The Brainology programme kind of made me change the way i work and study and practice for school work now that i know how my brain works and what happens when i learn.

Thank you for making us study more and helping us build up our brain! I actually picture my neurons growing bigger as they make more connections.

I imagine the neurons making connections in my brain and I feel like I am learning something.

I will try harder because I know that the more you try the more your brain works.

**Women and mathematics**

We (myself, Catherine Good and Aneeta Rattan) carried out a large study at Columbia University concerning talented females and mathematics, and exploring the effects of believing that mathematical intelligence is a fixed trait versus an ability that can be developed. We wondered whether females who believe their mathematical ability is a fixed trait are more susceptible to ‘stereotype threat’ – that is, whether their mathematical motivation and performance would suffer in environments that evoke the stereotype of low mathematical ability on the part of females.

We have several fascinating findings. First, females in calculus who held a fixed view of mathematical ability showed a sharp decline in their confidence and sense of belonging in mathematics over the course of the semester, and this decline was especially pronounced for those who encountered stereotyping in their mathematics class. This decreased sense of belonging was accompanied by a drop in their grades and by a drop in their intention to pursue mathematics in the future. These were talented females; yet their belief in fixed mathematical ability made them vulnerable.

Women who had a growth mindset were not adversely affected by encountering stereotypes. They were able to maintain their confidence, sense of belonging, and grades. The stereotype tells women: ‘We think your group has less mathematical ability’. A growth mindset tells women that even if this has been true, their group can acquire those skills. It would be wonderful to eradicate the stereotype. Until then, a growth mindset seems to allow women to cope with it better.

Second, we have shown in a simulation experiment with college students that giving ‘teachers’ a fixed versus growth mindset about mathematical ability creates striking differences in how much they use stereotypes in dealing with their male and female students. Giving them a growth mindset essentially wiped out stereotyping on many measures, whereas giving them a
fixed mindset led them to show an alarming degree of differential treatment of males and females.

Third, in studies with middle school students (aged 11–14), we taught a mathematics lesson in a fixed-mindset way (referring to great mathematicians as born geniuses) or a growth-mindset way (referring to people who were passionate about mathematics and became great mathematicians). Females taught in the fixed way were later susceptible to stereotype threat, falling into poor performance when they worked on difficult problems. Those taught in the growth-mindset way were not. They were able to withstand challenges and maintain their motivation and performance. Thus these mindsets about mathematical ability seem to have important implications for how susceptible students and teachers are to stereotypes.

Attention and learning

We (myself, Jennifer Mangels, Catherine Good, Brady Butterfield and Justin Lamb) are also looking at psycho-physiological measures (brain waves) to measure students’ attention and to see how students with the different mindsets go about learning. We have found that students with the fixed mindset are so concerned about how smart they are that they direct all their attention on a learning task to whether their answers are right or wrong, and pay little attention to information that will help them learn. In contrast, those with the growth mindset pay attention to both: information about how they have done and about how they can improve. As a result, they do better on a re-test of the answers they got wrong. This means that many very bright students with a fixed mindset may go around their worlds with little desire to learn, robbing themselves of countless opportunities to expand their skills and knowledge. This work was published in the journal *Social Cognitive Affective Neuroscience*, October 2006.

The roots of mindsets

We (myself, Melissa Kamins and Allison Master) are examining the roots of mindsets in early childhood and looking at how they contribute to a hardy versus vulnerable sense of self-worth. We are finding that an early fixed mindset is associated with a strong sense of ‘contingent self-worth’, the feeling that bad behaviour or bad outcomes mean you are a globally bad, unworthy person. We are also looking at parental practices that foster the different mindsets in children.

Other projects include (a) how mild depression impairs versus motivates students with different mindsets; (b) how students’ mindsets affect the accuracy of their self-knowledge about their abilities; (c) how students with different mindsets repair their self-esteem; and (d) how educational environments communicate mindsets to students.

How do you teach students to value hard work, learning and challenges?

In the framework of fixed intelligence, hard work and challenges are bad things. When students believe in fixed intelligence, their primary goal is to look and feel smart. Since it is a framework in which ‘you have it or you don’t’, they want to look and feel as though they have it. Instead of challenging themselves and learning, they put the premium on tasks that are more certain to validate their intelligence. Students working in this framework also tell us that hard work makes them feel dumb – if you really have ability, you should not have to work. So, this framework is really detrimental to valuing challenges, learning and hard work.
In the framework of malleable intelligence, hard work and challenges are good things. Students who believe in malleable intelligence put a much higher value on learning and challenging themselves. They also highly value effort, realising that even geniuses need to work hard to reach their potential. Therefore, orienting students toward increasing their abilities through effort is an extremely important part of education. It is also important not to praise students for doing things quickly and easily, since this means they were not challenged, did not work hard, and learned little. Too often adults use this as an opportunity to tell kids how smart they are, but then ‘smart’ comes to mean doing everything quickly and easily, rather than taking on challenges. Instead, we should apologise to them for wasting their time with a task they could not profit from, and praise them when they stick to something, try different strategies, and generally apply themselves to something difficult.

We should also model enjoying challenges (‘This one is hard, so it should be fun!’) and being intrigued and informed by mistakes (‘Well, that didn’t work. How interesting! What does that tell us? What should we try next?’). Finally, we should be sure to show our pleasure when children make progress – to point out how they challenged themselves, worked hard, and improved. Pleasure in hard work, learning, and challenges can be communicated to students in all of these ways. In my book, *Mindset*, I give many more examples.

**Is motivation more important than intelligence?**

This is like asking if nurture is more important than nature. They are inseparable. Motivation is the motor for intelligence: it is what allows students to use their intellectual ability to full advantage and to increase their intellectual skills over time. There is a common but erroneous belief among many students (and teachers) that intelligence is all you need. Yet there are many examples of brilliant young people who end up accomplishing very little. There are also many examples of people who made huge contributions to arts, humanities and science who did not seem all that promising early on, but became passionate about an area and became brilliant at it.

Interestingly, more and more research (for example, by Anders Ericsson and his colleagues) is showing that what distinguishes people who achieve great things from their equally talented peers is how much effort they put in. Plain old dedication seems to be the foundation of important and creative contributions. Thomas Edison’s biographer tells us that by all standards Edison was an ordinary boy who then began a lifelong love affair with technology. Over time, he came to embody what we call a ‘genius’.

I have to confess that I do sometimes wonder whether what children come with is not talent or ability – but fascination with something. Prodigies, for example, are not just little founts of knowledge and skills, but are riveted by numbers, words, or music. Wouldn’t it be interesting if the fascination comes first and the ability comes second?

**Labelling children as gifted: What are the pros, cons and concerns?**

My concern about giving children the label ‘gifted’ is that when we do so, we are in danger of conveying a fixed mindset. We are, in essence, telling them that they have been given a ‘gift’, a fixed ability that sets them apart from others and makes them more special than others. I worry that some children will become so focused on showing they deserve the label that they will stop challenging themselves, avoiding any situation that might reveal any inadequacy and show that they do not have the gift.
I also worry that the word ‘gift’ itself implies that no effort is involved in the attainment of intellectual excellence. It is just something that is bestowed upon the lucky few, who because of it are destined to be successful. Indeed, if children believe that they simply have to sit there with their gift and success will come, this is a recipe for disappointment. I have received many letters from gifted children who are now disappointed adults. They waited and success did not arrive. They never learned how to work hard and persevere toward their goals because nobody told them they would have to.

I have no problem with gifted programmes that provide enrichment and that allow high achieving students to be challenged. Such programmes should convey loudly and clearly that students’ current ability is just the starting point and that challenge, effort, and learning are the only way to fulfil their potential. These programmes should give numerous examples of highly accomplished people and the devotion that it took for them to make their contributions. In short, gifted students need the same motivational lessons that all children need, but maybe more so, since many of them may have been coasting along and receiving accolades.

**Tell us about children’s approaches to schoolwork . . . are there male-female differences, racial-ethnic differences or socio-economic differences?**

We have shown that the same motivational principles hold across males and females, and across racial, ethnic, and socio-economic groups. Some groups may be more vulnerable because of stereotypes, and actually, research is showing that these more vulnerable groups are the ones that are being helped the most by growth-mindset interventions. Stereotypes, it seems, have less force when you believe the skills in question can be acquired.

**What do you mean by ‘contingent worth’? Why is it important?**

By ‘contingent worth’, I mean the idea that you are worthy when you are succeeding and unworthy when you are not. Everyone is disappointed when they don’t do well, but only some children lose their self-respect and their sense of being a deserving individual. This is important because when it happens, they become unable to function adaptively. We have studied this mostly in young children, and found that a fixed mindset can contribute to contingent self-worth. These children conclude they are bad people when they fail or are criticised, and become too paralysed to fix the problem.

**How do the types of praise children receive affect them? Can praising intelligence be a negative thing?**

People in our society want their children to feel good about themselves and they think the way to accomplish this is to praise their children’s intelligence. Is this correct? Does it work?

In a series of studies, we gave students praise for their intelligence or praise for their effort after they succeeded on a challenging task. Compared to those who were praised for effort, those praised for intelligence fell into a fixed mindset; wanting to avoid a challenging learning task in favour of one that could make them look smart over and over again. Then, following some difficult problems, those praised for intelligence concluded that they were not smart after
all – since success meant they were smart, failure meant they were not. What is more, they now lost their enjoyment of the task, and their performance fell off dramatically.

Those who were praised for effort remained learning-oriented and, even in the face of difficulty, maintained their enjoyment and high level of performance. Effort praise, by the way, is just one type of ‘process’ praise – praising the process children are engaged in. It could have been praise for their strategies, their careful thinking, or the like. It is praise that keeps them focused on their engagement with the task, and allows them to maintain (or even intensify) that focus when the task gets harder. Intelligence praise, by contrast, puts the focus on the child and the evaluation of his or her abilities. Interestingly, children loved the intelligence praise. They got self-satisfied smiles on their faces that we never saw in the effort-praised children. But their self-satisfaction was short-lived. One bout of difficult problems was enough to blow it away. We have demonstrated these effects in children as young as four and a half years of age. Even telling a child he or she is a good ‘draw-er’ made them lose their confidence and zest when they later made mistakes.

Gifted and talented children are easy targets for ‘intelligence praise’. Parents and educators are delighted with what these children can do, and eager to heap praise on them for their unusual performance. This temptation should be resisted. Early promise so often remains unfulfilled, and I wonder how much of this is because of our well-meant, but misguided praise.

What exactly are self-theories? How do they affect development?

Self-theories (or mindsets) are the beliefs that children form about their personal qualities; for example, about their intelligence. As I have been discussing, believing that intelligence is a fixed trait that cannot be changed, has different effects from believing that it is a malleable quality that can be developed. We are finding that children with the growth mindset fare better across challenging developmental transitions, than do those with the fixed mindset. Believing that their qualities can be cultivated allows children to falter and recover, and to explore new subjects and interests in a curious, learning mode.

Believing that their traits are carved in stone makes mistakes and challenges – so common during times of transition – threatening to these students. They fear they will find out they are dumb rather than smart, and that everyone else will find this out about them too. These challenges may cause children to slacken their effort (just when more effort is needed) so as not to seem to care and so as not to try and still fail. It is hard for students to confront a challenging developmental transition successfully when they are running the other way to save their egos. In short, a mindset in which challenge, effort, growth and learning are sought is one that serves children well across development.

Why are confidence and success not enough?

Society tends to think they are. I’ve seen in my work that they’re not. Many of the most confident students, who have had lots of success, still avoid challenges and falter in the face of difficulty. For example, many students with the fixed view of intelligence have high levels of confidence as they confront a task, but if things go wrong, they lose interest in it and they lose the desire and ability to work toward mastery. What we should be working toward is not puffing up students’ intellectual self-confidence but building a learning-oriented confidence that withstands setbacks and keeps students on track, expending effort when they need it most.
We have shown that this is best promoted by focusing students on the goal of learning (expanding their abilities) and teaching them the efficacy of effort and strategy use in the face of obstacles.

**How do we convince all students that although grades are important, learning is more important?**

We recently completed a study of students in a chemistry course leading to medical school, the entry course to the curriculum required for medical school application. All students thought that grades were critically important, but those who said that learning was most important were the ones who used the best study strategies, bounced back from initially disappointing grades, and did best in the course. I think the finding that focusing on learning can help you get better grades in challenging courses makes a convincing argument!

**What should parents do for students who are not motivated to succeed in academic pursuits?**

Often students who are not motivated are hung up on their abilities. They fear they will expose themselves and that their parents will be ashamed to have a child who is not smart. If they do not try hard, they can preserve a sense of themselves as smart (but unmotivated): ‘If I really cared, I could do well’. Often parents and teachers respond to this with intelligence praise. They think that if they tell these students they are smart, it will give them confidence and re-motivate them. But that just compounds the problem. It keeps the students in their fixed-intelligence framework, still worrying whether they are smart or not and still unwilling to take the risk of trying hard. Instead, parents and teachers would do better to follow the suggestions I outlined above: teach and praise effort, strategies, learning and improvement.

**How can intelligence tests and their results be more properly used? Or, how can we use intelligence tests and their results more intelligently?**

Intelligence tests were invented by Alfred Binet, who had a radical growth-mindset. He believed that the most basic capacity to learn could be transformed through education. He invented the IQ test simply as a diagnostic tool, to identify children who were not profiting from their current school instruction, so he could devise educational techniques that would suit their learning styles better. This was a great idea. Tests used as diagnostic tools, to identify a student’s strengths and weaknesses in order to best teach that student, are still a good idea. However, if an IQ test is used for this purpose, perhaps it should be given another name!

The real danger of these tests is that many educators come to believe (erroneously) that they are a good index of how intelligent children are and what their intellectual potential is. The public needs to be educated: the fact is that nothing can measure intellectual potential. It is something that unfolds as children work hard and learn. Moreover, scientific research is showing that many of the most basic parts of intelligence can be changed with training.

The bottom line is: By all means, use tests to diagnose what a children need to learn, but not simply to label them or to place them into fixed categories.
In our high stakes testing society, with such an emphasis on grades and student achievement on standardised tests, what kind of message are we sending our students and children?

It is not a good message and we have to be careful not to make it even worse. In the high stakes testing atmosphere we must be careful not to let students think that these tests measure their underlying capacity or intelligence. In one study, we showed fixed- and growth-minded school children a test of ability, and later asked them what they thought it measured – their ability in that area? Their intelligence? Their intelligence when they grew up? Students with a growth mindset said ‘yes’ to the first (after all that is what we told them), but ‘no’ to the next two. No current test could tell them how smart they would be when they were grown up. However, students with a fixed mindset said ‘yes’ to all three – they thought a single test could tell them how smart they would be for the rest of their lives. Students must learn that tests can measure what they know now, but tests cannot tell them about their potential for learning in the future.

Many students ‘fall apart’ when they get to junior high or middle school (age 11–14). Have they been ‘spoon fed’ for too long, and are then unable to function autonomously? Or have other things happened?

In our studies, we have watched students fall apart at this time. Many of them have not confronted this kind of challenge before, and those with the fixed mindset are petrified that they will be found to be unintelligent. An emphasis on a growth-mindset orientation and on challenge, learning, and effort before then would have helped students cope when the going got rough. In fact, our intervention has shown that teaching students a growth mindset allowed them to fare better both in terms of their motivation and their grades at this very time.

Who has most influenced you and why?

The people who have influenced me most over the years are my graduate students, who are the most extraordinary group of people. They have not only been my collaborators on this rewarding, adventurous journey of research, but they are the ones who have taught me how to be a mentor. Two other people influenced me greatly – two little boys in one of my first studies. As they confronted highly difficult problems, they welcomed the challenge with glee. I was astounded that they could happily greet what I considered to be a highly threatening situation. They became my role models and as, through my research, I’ve discovered their secrets, I have tried to emulate them.

Of what professional and personal accomplishment are you most proud?

I am extremely proud of my past and current students and the wonderful contributions they are making. I am very proud that our work is benefiting teachers and students. More personally, I am proud that I have become more like the two little boys in my early study.

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Future Perspectives

Suggested priorities for gifted education over the next decade

It is critical for gifted education to take a modern view of giftedness and talent, one that fits with solid research findings. Past perspectives simply categorised people as gifted or not gifted, erroneously portrayed giftedness as a stable thing, and sought more to measure and reward giftedness and talent than to develop it. We now recognise that talent is often very specific, that it can wax and wane over time, and that it can be stifled by the wrong kind of praise or well-meant encouragement. Many of our gifted young people today need constant praise, become afraid of challenges, and fall apart when things do not come easily to them. As a result, they lose their ability to grow. The most important task facing us today is how to develop and sustain talent by fostering a love of learning, a zest for challenge, and resilience in the face of setbacks.

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