

HOW STUDENTS THINK ABOUT LEARNING: GROWTH MINDSET
IN INTERNATIONAL CONTEXTS

Kira Sze

Global Scholars Research

Brown

INTRODUCTION:

We all know that friend, or acquaintance, or maybe this applies to you, who believes that he or she “just isn’t a math person.” This statement has become a colloquial phrase that is casually thrown around in conversation— whether in the context of an adult prematurely excusing the few extra seconds it took him or her to calculate the tip on a bill, or a high school student’s response to the C+ he or she received on the last algebra test.

Professor Carol Dweck proposes a different mindset, specifically related to the C+ scenario. In her TED talk, she describes a grading method that was implemented in a high school in Chicago; if students didn’t pass a course, they got the grade “not yet.” The “not yet” grade references the natural curve of learning, a student’s academic room-for-improvement in the future, instead of connoting failure and hopelessness, which is the effect of receiving a C+.¹

Dweck describes students who embody the “not yet” mindset regarding learning and intellectual challenge as displaying a *growth mindset*, or a *mastery goal orientation* (these terms can be used interchangeably). Those are the kinds of students who embrace challenges and academic failures because they understand that “their abilities [can] be developed” and that their intelligence is malleable. Contrastingly, students who embody a *fixed mindset* perspective, or a *fixed-ability orientation*, shy away from challenges and see the “not yet” grade as a representation of their intelligence failing. “Instead of luxuriating in the power of yet, [fixed mindset students are] gripped in the tyranny of now.”²

Dweck also explains how fixed mindset students respond to academic challenge or failure:

“In one study, they told us they would probably cheat the next time instead of studying more if they failed a test. In another study, after a failure, they looked for someone who did worse than they did so they could feel really good about themselves. And in study after study, they have run from difficulty. Scientists measured the electrical activity from the brain as students confronted an error. On the left, you see the fixed mindset students. There's hardly any activity. They run from the error. ... But on the right, you have the students with the growth mindset, the idea that abilities can be developed. They engage deeply. Their brain is on fire with *yet*.”

3

They are able to process the error, correct it, and learn from it. This is the power of *yet*, the power of a growth mindset.

Dweck, as well as other professors in the field of Psychology, have investigated the implications of growth mindset and fixed mindset on academic development and performance; not only are growth mindset students more resilient in the face of academic challenges and failures, but these students have also been shown to perform higher and have an upward trajectory in grades.⁴ Furthermore, studies have shown that a growth mindset can be taught; in one study, teachers who generically praised a student for being good at something, (for example, “you are a good drawer”) tended to foster a fixed mindset in that student. These students were more likely to feel bad about their skills when confronted with challenges, or feel “stupid” when they did something wrong. Contrastingly, teachers who praised the process that students used to achieve success (for example, “you did a good job drawing”), fostered a growth mindset in those students, which was more conducive to an academically successful classroom.⁵

Research on growth and fixed mindset is fairly novel. Although similar educational philosophies, such as mastery learning, have been promoted by educational leaders including Maria Montessori and John Dewey, the terms growth and fixed mindset were coined within the past two decades. Furthermore, growth and fixed mindset research has been primarily focused on elementary school children in the United States.⁶ This paper aims to extend these findings by ex-

ploring the significance of a growth mindset in the context of secondary schools internationally. Specifically, this paper will examine successful high school systems globally to see if and how these systems' pedagogical practices foster a growth mindset, which might reveal how growth mindset is conducive to secondary-school academic success on a global scale.

Firstly, we must agree on what a "successful" education system looks like. In order to do this, we must also agree on what the fundamental goal of education is. After all, the goal of education has differed between cultures and time periods, from assimilation and acculturation to inspiring a patriotism in the upcoming generations. In this paper, the claims and analysis going forward will be based on the assumption that the goal of education is to produce students with skill and competency development, and intellectual resilience. In other words, the goal of education is to prepare students to become effective citizens in the modern world. Following this definition, growth mindset is conducive to educational success.

The three successful secondary educational systems that will be explored are those of Finland, Poland, and South Korea. These countries were chosen based on their notably high rankings on the internationally-administered PISA.⁷ Amanda Ripley, a writer and reporter who studied the PISA, explains the exam as such:

"This strange new test was called PISA, which stood for the Program for International Student Assessment. Instead of a typical test question, which might ask which combination of coins you needed to buy something, the PISA asked you to design your own coins, right there in the test booklet. PISA was developed by a kind of think tank for the developed world, called the Organization for Economic Co-operation and Development, and the scientist at the center of the experiment was Andreas Schleicher, [who, after working with many different types of standardized tests, was convinced that] the world needed an even smarter test, one that could measure the kind of advanced thinking and communication skills that people needed to thrive in the modern world. Other international tests had come before PISA, each with their own forgettable acronym, but they tended to assess what kids had memorized, or what their teachers had drilled into their heads in the classroom. Those tests usually quantified students' preparedness for more schooling,

not their preparedness for life. None measured teenagers' ability to think critically and solve new problems in math, reading, and science. The promise of PISA was that it would reveal which countries were teaching kids to think for themselves.”⁸

As Schleicher aptly described, the PISA doesn't test for “answers to equations or to multiple choice questions, [it tests one's] ability to think creatively.”⁹ PISA also had implications for life beyond high school: a student's score was a better predictor of that student's likelihood of continuing to college, or likelihood of dropping out of high school, than his or her report card. “PISA wasn't measuring memorization, it was measuring aspiration.” As Ripley described, “PISA results [sketch out a] treasure map of the world [that can] sort out which countries [are] teaching all of their children to think, and which are not.”¹⁰ This is the treasure map that I used to identify successful high-school educational systems.

Instead of merely choosing the three countries that were ranked the highest, I chose to study the three systems of Finland, Poland, and South Korea because they have very different stories and strategies regarding how they reached the top. Furthermore, I was able to reference the work of Amanda Ripley, who studied these three systems extensively and wrote about her findings in The Smartest Kids in the World.

Using Dweck's and other scholars' research and primary-source research from a survey I conducted and analyzed of secondary students in Finland and South Korea, I found that Finnish and Polish secondary school pedagogical practices cultivate a growth mindset, which is conducive to their academic success. South Korea's academic meritocracy is conducive to a growth mindset, and contributes to the country's success on the PISA. However, the cultural pressure on students to prove their intelligence on the college-entrance exam, and the rigid caste system that's based on these scores, inflicts a fixed-mindset on the students, which has negative

implications for students' mental health. These case-studies, when explored in parallel, suggest that a growth mindset is conducive to academic success, whereas a fixed-mindset, in a high-pressure environment, can be detrimental to students' wellbeing.

EDUCATIONAL PSYCHOLOGY: GROWTH VS FIXED MINDSET

Psychological research revealing the power of growth mindset, and the dangers of fixed mindset, is novel but fascinating. The concepts of growth and fixed mindset are closely tied to Carol Dweck, a professor of Psychology at Stanford University, who pioneered the nascent field of educational psychology known as *achievement goal theory*. This field is founded on the dichotomy between a fixed mindset (more formally known as a fixed-ability goal orientation,) and a growth mindset (more formally known as mastery goal orientation.) In the field of psychology, people who possess a fixed mindset are referred to as “entity theorists,” whereas people who possess a growth mindset are referred to as “incremental theorists.”¹¹

These two mindsets are relevant to many aspects of learning, including how one would approach or regard “challenges,” “obstacles,” “effort,” “criticism,” and the “success of others.” This relevance is concisely illustrated in an infographic that summarizes Dweck’s findings, which shows that a fixed-mindset leads to “a desire to look smart and therefore a tendency to ... avoid challenges ...[to] give up easily ...[to] see effort as fruitless ... [to] ignore useful negative feedback ... [and to] feel threatened by the success of others. As a result, [students who possess a fixed mindset] may plateau early and achieve less than their full potential.” Contrastingly, this infographic also shows that a growth-mindset leads to “a desire to learn and therefore a tendency to ... embrace challenges ... [to] persist in the face of setbacks ... [to] see effort as the path to

mastery ... [to] learn from criticism ... [and to] find lessons and inspiration in the success of others. “As a result, [students who possess a growth mindset] reach ever-higher levels of achievement” (See Appendix 1).

These tendencies are visible in the findings of Dweck and related scholars. One particularly informative study, which was conducted by psychology professors at Columbia University, Barnard College, Stanford University, and a doctor at Columbia Presbyterian Medical Center, explored how beliefs about intelligence (i.e. a growth or fixed mindset) influence learning success. Through a social cognitive neuroscience model, this study showed that entity theorists tend to emphasize performance goals (i.e. getting good grades), which can make them more “vulnerable to negative feedback” and less likely to engage in intellectual challenges. Contrastingly, incremental theorists were shown to tend to focus on “learning goals” (i.e. understanding a complex concept) and “rebound better from occasional failures.” In the study, students took a “test of general knowledge” and were evaluated after being confronted with various challenges, and then retested to examine to what extent the students were able to positively rebound from the challenges. The study showed that “entity theorists [didn’t respond well to] negative performance feedback,” which was related to their “concerns about proving [their] ability relative to others.” Furthermore, entity theorists demonstrated “less sustained memory-related activity” when given correct answers to mistakes, which “contributed to their reduced error correction on a subsequent surprise retest.” These findings demonstrate the negative effects of a fixed mindset, the mindset of an entity theorist, on academic performance. The prestige of the professors and the multitude of references (cited at the end of the paper) contribute to this source’s credibility. Furthermore,

the source states that no conflict of interest has been declared, implying that the source has no explicit bias.¹²

Two similar longitudinal studies, conducted by Stanford and Columbia University professors, explored how students' "implicit theories of intelligence" affected their math scores. The first study, which involved 373 8th graders, found that students who believed that their intelligence was malleable (incremental theorists) showed an "upward trajectory in grades over the two years of junior high school," while students who believed that intelligence was a fixed entity (fixed-entity theorists) showed a flat trend in grades. In the second study, an "intervention [that taught] incremental theory to 7th graders ... promoted positive change in classroom motivation" compared to the control group of students. This report reveals the efficacy of one form of intervention—it shows that a growth mindset, or incremental theory, can be fostered in students and can subsequently improve performance.¹³

Now, one might ask, how exactly can growth mindset be fostered in a classroom context? This question must be answered before we can search for the cultivation of growth mindset in the pedagogical practices of high school education systems.

One surprising factor that can encourage a fixed or growth mindset in students is how the student is praised. A study performed at Stanford University by professors including Dweck explored how "subtle linguistic cues" related to praise can affect a student's mindset, and therefore his or her motivation and academic performance. The study involved four-year-old preschoolers who were told to make a drawing and then were subsequently praised on their drawings by a teacher. Half of the preschoolers were praised generically, meaning their "whole person[s]" were praised (for example, "You are a good drawer"). This feedback was meant to

foster a fixed mindset in the students. Contrastingly, the other half of the students were praised non-generically, meaning the “process[es] through which [their] success[es were] achieved” were praised (for example, “You did a good job drawing”). This feedback was meant to foster a growth mindset. This study found that, if the students made no mistakes and encountered no challenges, both forms of praise were equally rewarding. However, if the students did make mistakes and encounter challenges, students who received generic praise (and were therefore encouraged to adopt a fixed-mindset) exhibited more helpless behavior and less persistence in subsequent tasks. As the report succinctly summarizes, the negative repercussions of generic praise are that it “implies there is a stable ability that underlies performance; subsequent mistakes [made by students] reflect on [their] ability and can therefore be demoralizing.”¹⁴

This “praise” factor is inherently related to our perception and focus on talent. According to the Oxford Dictionary, “talent” is defined as “natural aptitude or skill.”¹⁵ This definition somewhat conflicts with a growth mindset; if someone thinks that academic success is based solely on talent, this leaves little room for improvement. Therefore, praising a child for being talented is a form of generic praise and promotes a fixed mindset, which can make wary of failing, “and therefore afraid to try at all.”¹⁶ Unfortunately, the detrimental effects of labeling someone as “talented” is prevalently counter-cultural in the United States. “In one Columbia University study, 85% of American parents surveyed said that they thought they needed to praise their children’s intelligence [and talent] in order to assure them they were smart.”¹⁷

However, talent-praise or generic praise can be replaced by process-oriented praise, “which speaks to the effort expended and even to the struggle involved. It celebrates toil and

commends tenacity and perseverance revealed in a given task. As such, this type of praise is given for something that did not come easily,” and therefore encourages intellectual challenges.¹⁸

Another pedagogical practice that can cultivate a growth mindset is simply reminding students that intelligence is malleable. The most dramatic proof of this idea comes from a recent study conducted by Dweck and Lisa Sorich Blackwell, which involved low-achieving seventh grade students. The students all attended lectures on the brain. Half of the students “attended a neutral session on memory [this half represented the control group in the experiment] while the other [half of the students] learned that intelligence, like a muscle, grows stronger through exercise.” The “training of students to adopt a growth mindset about intelligence [which the latter group experienced] had a catalytic effect on [the students’] motivation and math grades. Contrastingly, students in the control group showed no improvement, despite the other interventions that informed them about the brain, but not about growth mindset.¹⁹ This study reveals that merely teaching students about the concepts that underly a growth mindset can foster a growth mindset in students and can therefore improve their academic performance.

EDUCATIONAL HISTORY: FINLAND CASE STUDY

Ripley describes Finland’s education system as a “silky paradise, a place where all the teachers were admired and all the children beloved.”²⁰ Finnish education is now widely respected and studied by “hundreds of educators and policy makers annually [who are] trying to learn the secret of their success.”²¹ However, Finnish education was not always so widely-respected. On December 4th, 2001, when the results of the first PISA were announced, Finland scoring number

one was an international upset. As Ripley describes, reporters at the OECD press conference were shocked when the results were first released; even Finnish reporters couldn't believe what they'd heard.²² Finland has continued to be ranked in the very top tier in all PISA assessments in the last decade.²³ Finland's path to educational success was one of slow and steady reform, which took place gradually over the four decades preceding the 2000 PISA. In this chapter, Finland's secondary educational success will be examined; specifically, Finnish pedagogical practices will be analyzed in relation to Dweck's achievement goal theory. My findings on Finnish pedagogy, the history of Finland's education reform, and primary accounts of education from Finnish secondary students all suggest that Finnish secondary schools foster a growth mindset in its students and teachers, a mindset conducive to Finland's educational success.

Some argue that the success of the Finnish education system can be primarily attributed to Finland's specific history and culture, instead of the schools' pedagogical practices. These critics point out that Finland is culturally and racially homogeneous. However, Finland is becoming more diversified; nowadays, there are many schools in Helsinki, Finland's capital, where nearly half of the students are immigrants.²⁴ These skeptics also emphasize Finland's low rate of child poverty, which rests below 6% per capita, compared to the child poverty rate of the United States, which is 20%. However, this argument fails to appreciate that Finland's "average per pupil expenditure is well below that of the highest spending countries, including the United States."²⁵ Furthermore, other case studies disprove the theory that economic security can solely explain high test scores; Norway, for example, has a child poverty rate below 6%, similar to that of Finland. Norway also spent about as much on education in 2009 as the United States did, and yet the country still scored as "unimpressively [as the United States did] on an international test of scientific literacy in 2009."²⁶

Furthermore, Finland was not always an educational superpower. Finland emerged out of the Second World War with an education system that was “unequal and ... reflective of the needs of a predominantly rural, agricultural society.” The public system was also very short: in “1950 most young Finns left school after six years of basic education; only those living in towns or larger municipalities had access to a middle grade education.” There were then two types of middle grade education: civic school, which consisted of two or three extra years of education that led into vocational training, or grammar school, which offered five years of education and led into academic high school and then university. However, in 1950, only about one quarter of Finnish students had access to grammar school.²⁷ This reveals the contrast between Finland’s mediocre education system and its system today, which can be attributed to a set of reforms that will be described below.

Over the next decade following the war, grammar school enrollment skyrocketed, growing from 34,000 to 270,000.²⁸ This boom in enrollment came from three major factors: first, the post-war elections produced a parliament that prioritized the need to rebuild and modernize the education system. Secondly, Finland was experiencing significant urbanization, which meant that more children had access to schooling. Thirdly, “this growth reflected the aspirations of ordinary Finns for greater educational opportunity for their children.”²⁹

The Finnish government responded to this increase in enrollment with three successive reform commissions, which were built on and adapted as time progressed. These reforms were based on Sweden’s education system, but adapted to Finnish context and taken a step further.³⁰ The effects of these reforms are still visible in Finnish education today, and they reveal the driving philosophy behind Finnish secondary education. Furthermore, there are clear parallels be-

tween these tenets of Finnish education and mastery goal theory, or a growth mindset. However, it's important to note that these reforms preceded Dweck's research, and therefore they obviously didn't explicitly follow her work. Instead, these reforms were based on observations of other successful systems instead of explicit educational philosophy or research.

One distinctive aspect of Finnish education is the idea of the common or comprehensive school, known as *Peruskoulu* in Finnish. This secondary education structure, which was launched in 1946 but adopted by parliament in 1968, rests on the belief that all students should be held to the same high standard for education and therefore all should be educated at the same, high level. This pedagogical technique, having teachers address multiple skill levels in a single classroom, is known as differentiated instruction. This new system requires all students to attend comprehensive, compulsory education from grades 1-9. However, as Pasi Sahlberg, Director of the Center for International Mobility and Co-operation, explains, "the comprehensive school is not merely a form of school organization. It embodies a philosophy of education as well as a deep set of societal values about what all children need and deserve."³¹ This new philosophy clearly aligned with a growth mindset regarding students: if the system is founded on the belief that all students have the potential and ability to grow intellectually and to reach high standards, this belief will be fostered in the students. The Finnish government was attempting a form of education that comports with a growth mindset pedagogy, although Dweck's jargon obviously wasn't used at that time.

However, it was not easy to shift the entire system to adopt this growth mindset about students. As Jukka Sarjala, who spent 25 years in the Ministry of Education, explains:

"[adopting comprehensive schools was] a very big reform, very big and complicated for teachers accustomed to the old system. They were accustomed to teaching school with select-

ed children and were simply not ready for a school system in which very clever children and not so clever children were in the same classes.”³²

This reveals that many teachers had a fixed mindset regarding students based on their initial level of intelligence, and they didn’t believe that the seemingly less clever kids could excel at the same level as those who initially appeared to be clever. However, Sarjala explains, with time and practice, teachers became confident in their ability to teach students of all levels together. This shift in teachers’ confidence in differentiated instruction fundamentally resulted in a shift in teachers’ mindsets about their students’ abilities: teachers now believed that all students had the potential to thrive and grow in one environment, regardless of their initial ability. This is a pivotal belief related to growth mindset, showing that Finland’s new system fosters a growth mindset in teachers, allowing students of all abilities to flourish.³³

Another reform that accompanied the shift to comprehensive schools was the delay of tracking students. Not only were students all forced to attend comprehensive school until grade 9, which abolished the differentiation between the grammar track and civil track, but subject-specific tracking within comprehensive schools was also completely abolished by the mid-1980s. Instead of offering a basic, middle, and advanced class in various subjects, all students were taught the same material.³⁴

Delaying or abolishing tracking promotes a growth mindset, because tracking inherently inflicts a fixed mindset on students. As Amanda Ripley describes, “statistically speaking, tracking [tends] to diminish learning and boost inequality wherever it [is tried. Historically,] the younger the tracking happened, the worse the entire country did on the PISA ... once kids were labeled and segregated into the lower track, their learning slowed down.”³⁵ Tracking in its nature

can be seen as reminding students of the fixed-nature of their intelligence, instead of the malleability of their intelligence, the latter of which was proven to promote a growth mindset.³⁶ Therefore, tracking promotes a fixed-mindset. By delaying tracking, or implementing differentiated instruction, Finland sent the message to kids that the system of education believed in their ability to succeed at a high level, or their own growth mindset.

However, in order to make this utopian-like-system-in-which-everyone-succeeds possible, the system has to focus money and resources on students who need help. As Amanda Ripley describes based on personal accounts of Finnish students, “as soon as young [Finnish students] showed signs of slipping, teachers descended upon them like a pit crew before they fell further behind. About a third of kids got special help during their first nine years of school.”³⁷ One version of this ‘pit crew’ is known as a “pupils’ multi-professional care group.” These groups work behind the scenes instead of in the classroom; all schools must have at least one care group, which meets at least twice a month for two hours. They consist of “the principal, the special education teacher, the school nurse, the school psychologist, a social worker, and the teachers whose students are being discussed.” The goal of these groups is to decide how to best assist struggling students. As a principal of a school in Kerava explains, “this functional support system is a very important part of our education system. It helps explain why we have such small gaps in student achievement.”³⁸

Not only are struggling students helped, but the disparities between the high-performing and lesser-performing students are deemphasized. As a Finnish student whom I interviewed commented while reflecting on his time in secondary school, “of course we were encouraged to do well, but the praise we got never rose above the every now and then ‘Great answer’ or ‘Good

work.’ I suppose the teachers were trying not to discourage the students that were not doing so well.”³⁹ This encourages all students to continue to work their hardest, regardless of their current state of achievement, instilling the value that you can grow regardless of your current level of understanding or mastery.

Furthermore, Finland’s commitment to providing the same, quality education for all students even extends to students with special education needs. “While 8% of Finland’s children are deemed as having special education needs, only half of them are placed in special schools; the other half are mainstreamed.” Special teachers are Finland’s solution to this gap in ability. A special teacher is assigned to each school and identifies and works with students who need extra help or who are struggling to keep up with their classmates.⁴⁰ Finland’s belief in all students’ abilities to grow and improve academically is visible in their inclusion of students with learning difficulties in comprehensive schools.

Another vital cultural component that allows Finnish education to thrive is students’ attitudes towards failure. Because all students are held to the same high standard, most students will inevitably encounter academic failure or challenge. As a Finnish student explained in response to a survey I conducted, “grades [in Finnish secondary school] depends [*sic*] on Gaussian curve and every year about 5% [of students] fail [the secondary school exit] exam.”⁴¹ However, students are comfortable with failure; as an American exchange student who attended high school in Finland explained, failing was normal at school. “The logic made sense. If the work was hard, routine failure was the only way to learn.” This logic follows a mastery goal orientation. Furthermore, Ripley adds that “teenagers [in Finland] had the freedom to fail when they were still young enough to learn how to recover,” meaning that students were exposed to acade-

mic failure but were taught that failure didn't equate to a lower intelligence; instead, students were taught how to recover from failure, which is a skill that fixed-mindset students don't possess.⁴²

In conclusion, Finland's secondary educational success is the product of reforms that have culminated in a philosophy that "everyone has something to contribute and those who struggle in certain subjects should not be left behind."⁴³ This philosophy, which inherently aligns with a growth mindset, is visible in Finnish pedagogy, including the comprehensive schooling system, the abolition of tracking and implementation of differentiated instruction, the focus on extra support for students who are struggling, the incorporation of special needs students into the general schooling system, and the mindset students possess regarding academic failure and challenge.

EDUCATIONAL HISTORY: POLAND CASE STUDY

Poland's path to secondary educational success was one of recent and drastic reform, very different from Finland's path to success, and yet both countries managed to reach similar goals and educational ideals. In the 2000 PISA, Poland's average score was 479, well below the OECD average of 500. Furthermore, there was a great disparity within the scores of Polish students: over 21% of Polish students reached only Level 1 or below. However, by the 2003 PISA, Poland saw the greatest reduction in score variance in all European Union and OECD countries. This steep upward trend continued and was visible in the results of the 2006 PISA, which showed the average scores of all Polish students rising to 534 (See Appendix 3). Furthermore, in

2012, Poland was ranked in the top 10 countries in science and reading and 13th in mathematics.⁴⁴

Although some might argue that Finland's cultural and economic homogeneity put the country's education system in a position to succeed, the same cannot be said for Poland. Poland's economic situation is similar to that of the United States: one out of six Polish children are considered poor, while one out of five children in the United States are considered poor.⁴⁵ Furthermore, in the UN's comparison of children's wellbeing internationally, Poland was ranked dead last in the developed world.⁴⁶ Clearly, Poland's economic situation cannot be targeted as the reason for its educational success. Instead, the answer lies in two major educational reforms that were implemented in 1999 and 2002.

Poland's less than average score on the 2000 PISA reflected its old system of education that dates back to the Communist Era, during which only 10% of Polish students attended college. In the early 90s, when Poland was emerging out of the Communist era, more than 60% of adults living in rural areas in Poland had only a primary school education.⁴⁷

In 1999 and 2002, various educational reforms, partially based on the success of surrounding systems including that of Finland, were proposed. The implementation of these reforms drastically improved Poland's secondary education. These reforms were based on the philosophical goals of improving the general quality of education and ensuring equal educational opportunities for all.⁴⁸ These goals are clearly related to a mastery-goal orientation because they hold all students to the same, high standard; meaning that —through these goals— the Polish government is conveying their belief in all students' capacities to grow and flourish.

One implementation of these goals was a structural reform. Similar to Finland's comprehensive schools, Poland shifted its school structure to ensure that all students would attend compulsory education until the age of 15. This delayed tracking by one year, preventing students from being tracked into vocational schools at the age of 14, which was the standard before the reform.⁴⁹ This reform clearly affected Poland's PISA score: students who would have been tracked into vocational schools but instead stayed in the general secondary education system scored 115 points higher than their counterparts in 2000 who were tracked. As Amanda Ripley describes, "the expectations [for the students went] up, and these kids met them."⁵⁰

Poland also adopted a core curriculum for *gymnasium*, which refers to schooling for students between ages 13-15. This new academic core set high expectations for all students and required all teachers to implement differentiated instruction. This reform was met with opposition from teachers who were used to teaching the vocationally-tracked students less complex material.⁵¹ This negative response to high academic standards for all was mirrored in the similar response of teachers in Finland when tracking was delayed in Finnish secondary school, revealing a trend that teachers who view students with a fixed mindset find it difficult to hold all students to the same standard, and to adopt a growth mindset. However, in the case of teachers in Finland and Poland, the growth mindset did prevail in schools, elucidating the reality that mindset can be changed in both students and teachers.

Not only did these reforms raise the standards for all students, but the reforms also raised the standards for teachers. The 1999 reform required one quarter of teachers to go back to school.⁵² This reform was vital to the success of the delay-in-tracking reform because teachers needed to have the skill sets to be able to address the needs of a wider range of students and effectively implement differentiated instruction. This teacher training program has continued to

adapt and grow; nowadays, Polish teachers spend approximately 513 hours yearly actually teaching classes, which is significantly below the OECD average of 703 hours.⁵³ Instead of spending all of their time teaching, teachers spend a significant chunk of their job building on their skills and learning how they can improve. One example of this is Poland's pedagogical councils, which are "made up of at least three teachers as well as members of the school's management."⁵⁴ These councils allow teachers to collaborate and learn from each other. This emphasis on teacher training shows that the Polish government has a growth mindset regarding their teachers because it implies that teachers can always continue to grow and expand their knowledge and skills.

Another important aspect of the reform that complemented the delay in tracking was a new system of standardized testing. This reform made students take standardized tests at regular intervals in their schooling career: at the end of elementary school, middle school, and high school.⁵⁵ Although this focus on testing might initially seem like it would cultivate a fixed mindset, the purpose of this testing was to identify teachers and schools that were struggling, which allowed the Polish government to focus on these areas. This reform was essential to the efficacy of the delay in tracking because the high standard for all schools could only be realistically attained if the government focused its efforts and resources on struggling schools. This focus on helping those who are struggling is also visible in the Finnish system.

A cultural trend that resulted from these reforms is Polish students' abilities to respond to failure. An American exchange student who attended Polish high school noted this mindset; he observed that, in Poland, no one got a 5, which was the highest grade possible, and yet "no one seemed surprised or shattered." He contrasted this mindset to the prevalent mindset in American high schools, where "he hadn't experienced failure as normal or acceptable. [Instead,] failure in American schools was demoralizing and to be avoided at all costs. [He noted that] American kids

could not handle routine failure,” whereas Polish kids seemed to use the failure to figure out where they could improve.⁵⁶ This clear cultural distinction elucidates the difference between fixed-ability goal orientation, the prevalent orientation in American high schools, and mastery goal orientation, the prevalent orientation in Polish high schools.

Although Poland’s path to secondary educational success was one of recent reforms and drastic improvement, compared to the slow and steady improvement that led to Finland’s secondary educational success, both countries now have systems with values that reflect a mastery goal orientation and employ pedagogical practices that foster a growth mindset in teachers and students.

EDUCATIONAL HISTORY: SOUTH KOREA CASE STUDY

South Korea is notoriously for its high test scores. On the 2012 PISA results, South Korea was ranked #5, ranked below only Taiwan, Hong Kong, Singapore, and Shanghai.⁵⁷ Unlike Poland and Finland, Korea’s academic success is, in some parts, a manifestation of old traditions. Confucian values, which have been infused in Korean culture for centuries, emphasize the importance of valuing long, careful study. Furthermore, dating back to tenth-century Korea, men had to pass a standardized exam in order to get a position as a government tradition.⁵⁸

However, South Korean education was not always exceptional. In fact, the majority of South Korean citizens were illiterate until the 1950s. When the country had to rebuild itself after the Korean war, which unofficially ended in 1953, the Korean language didn’t even have words for modern science and mathematic concepts.⁵⁹ But, in the next fifty years that followed the war, Korea became a “talent power,” as described by Lee Ju-ho, South Korea’s Minister of Education. “The country had no natural resources, so it cultivated its people instead, turning education into

currency.”⁶⁰ This sent a very clear message to all citizens: if your child can perform well in school, and can score above a certain percentile on the college entrance exam, he or she will be sent to a good university, and will subsequently get a good job. A child who scored well on the college entrance exam became the Korean golden ticket that could lift the entire family out of poverty. Given the long-held cultural value on education, the widespread poverty, and this new emphasis from the government on education, schooling became a cultural obsession for Korean parents and children. This cultural obsession actually lifted the entire country out of poverty, as it was the driving force that developed South Korea into the economic powerhouse it is today; from 1962 to 2011, the nation’s GDP rose 40,000%, making it the world’s 13th largest economy.⁶¹

South Korea’s prevailing philosophy of an academic meritocracy—the belief that hard work can lead to academic success—is conducive to a growth mindset. However, in this section I will show that this growth mindset is immediately terminated once students take the infamous college-entrance exam. A student’s score on this exam is widely viewed as determining his or her intelligence. Once the exam is taken, the score is permanent. Intelligence is no longer something that a student can work to change; the score—the single numerical value—follows the student for the rest of his or her life and determines his or her placement in society. After the exam, students are no longer encouraged to adopt a growth-mindset; instead, South Korean society inflicts a fixed mindset on students. Throughout this section, I will show how this fixed-mindset aspect of the South Korean education system, the focus on proving one’s intelligence on the exam, is suggested to have negative consequences on students’ mental health.

South Korea’s prevalent culture of an academic meritocracy in secondary education is conducive to a growth mindset. This mindset is the harder you work, or the more time you spend

doing work, the higher you will score on your exams. As a South Korean high school student explains, if you did bad on a test, “you didn’t work hard enough, you had to work harder next time.”⁶² Similarly, a Korean student responded to a survey I conducted by saying that grades in Korean secondary school “reflect how ... responsible you are,” which is basically synonymous to how studious you are.⁶³ However, this mindset is taken to the extreme; all students work tirelessly to prepare for the infamous college-entrance exam. This intense focus on academic performance and preparation is visible in a typical high-schoolers weekday schedule, which was described by an American exchange student who visited a South Korean high school.

Typical School-Day Schedule:

8:00-4:10 - School day

4:10-4:30 - All students participate in chores around the school.

4:30-6:00 - Students stay at school and attend test prep for the college entrance exam

6:00-7:00 - Students eat dinner in the school cafeteria

7:00-9:00 - students attend “raja,” which is a “two hour period of study loosely supervised by teachers. [During this time,] most kids[watch] online test-prep lectures, as teachers [roam] the halls”

9:00-11:00 - Students went to hagwons, which are private test-prep tutoring centers⁶⁴

As the American exchange student observed, “Korean kids essentially went to school *twice*—every weekday. ... Kids learned a lot, but they spent a ridiculous amount of time doing so. They had math classes at school—and math classes in hagwons. ... In Korea, *school never stopped*.”⁶⁵ Although this is an extreme version of growth mindset, it is an example of growth mindset nonetheless; students work tirelessly because they believe that they can improve and become smarter with more work. Therefore, they do believe that their intelligence is malleable.

However, a fixed-mindset comes into play in relation to the college-entrance exam. As Lee, the Korean Prime Minister of Education describes, South Korean culture is “an extreme

meritocracy for children [in primary and secondary school] that [hardens] into a caste system for adults.⁶⁶ This caste system is based solely on students' scores on the college entrance exam. As South Korean secondary school students explain, the college entry test is like the "SAT in America ... except that your score determine[s] the rest of your life. ... In Korea, your education can be reduced to a number ... if your number is good, you have a good future." Specifically, if you get into one of the three most prestigious universities, "everyone [will] respect you. You [will be] chosen by God," a Korean student described, only partially in jest.⁶⁷ But this isn't far from reality: virtually every form of opportunity in South Korean society, "from marriage prospects to job prospects," is determined by your score on the college entry exam.⁶⁸

However, this inevitably leads to a problem: only 2% of South Korean seniors can get into the top three universities, but the pressure to succeed and prove oneself academically is felt by all students.⁶⁹ This pressure to perform well, which is related to a fixed-ability goal orientation, is "depriving students of their ... sanity," Lee describes.⁷⁰

Ripley describes a tragic consequence of this pressure:

"One Sunday morning during that school year, a teenager named Ji stabbed his mother in the neck in their home in Seoul. He did it to stop her from going to a parent-teacher conference. He was terrified that she'd find out that he'd lied about his latest test scores. ... According to his test scores, Ji ranked in the top 1 percent for all high school students in the country, but, in absolute terms, he still placed four thousandth nationwide. His mother had insisted he must be number one at all costs, Ji said. When his scores had disappointed her in the past, he said, she'd beaten him and withheld food."⁷¹

Although this is a very extreme anecdote, it reflects the test-crazed culture, which is so focused on proving intelligence and ranking high that it is literally driving students and parents insane. In South Korea, suicide is the 4th most common cause of death, and suicide rates increase significantly during the months around the college-entry exam (See Appendix 5). Just

over half of South Korean teenagers aged 14 to 19 confess to having suicidal thoughts; the most common reason for suicides or suicidal thoughts is problems at home, closely followed by depression, grades and career concerns.⁷² Suicides have become so prevalent for school age kids that the Korean government has attempted to address it by creating a smart-phone app that searches for trigger-words on a student's social media outlets and alerts the parent if the app deems the child at-risk.⁷³ The government also posted uplifting posters on the railing of Mapo bridge, a common site for suicides, in an attempt to dissuade potential suicides (see Appendix 6). However, these are both merely quick-fixes that don't actually effect the problem, which can clearly be connected to the all-encompassing pressure put on the final exam, or South Korea's eventual fixed ability goal orientation post-exam.

These negative health effects, which are a result of South Korea's fixed-ability goal orientation in relation to its test-obsessed culture, are not visible in Poland or Finland, both of which don't put as much cultural pressure on test performance, but instead focus more on the learning of the material. Furthermore, there is more flexibility in Polish and Finnish society; citizens in the job market can return to vocational schools and learn a different profession if they so desire. Vocational training for adults in Poland consists of vocational qualification courses, occupational skills courses, and apprenticeships.⁷⁴ In Finland, 37,900 of the 120,700 students who enrolled in vocational training in 2014 enrolled in further vocational education, meaning they are working to gain another skill or qualification.⁷⁵

This contrast between Finland and South Korea's cultural focus on testing is also visible in the comparison of both countries' secondary school schedules; while South Korean students spent on average more than twelve hours a day in school, during which they are mostly

studying for tests, the Finnish secondary school schedule is much more sane.⁷⁶ According to the OECD, Finnish children spend the fewest number of hours in the classroom in the developed world.⁷⁷ And the time spent in the classroom isn't spent on test preparation. In fact, in the past month, Finland adopted a new curriculum that is more interdisciplinary, in which topics are taught instead of traditional subjects. This new system is meant to give students skills that they can apply in complex, real-world situations, which is very different from the goal of South Korean education, which is one of test preparation.⁷⁸ Furthermore, just one in ten kids in Finland take after-school lessons, far fewer than in Korea, where seven in ten students take extracurricular lessons.⁷⁹ Similar to Finland's system, Poland's secondary education system and curriculum don't put as much pressure on test-taking and performance as South Korea's system does.⁸⁰

There is also a stark contrast in the mental wellbeing of students in South Korea compared to students in Finland and Poland. Not only are the suicide rates drastically lower in both European countries compared to the rates in South Korea (See Appendix 7), but Finland and Poland are also ranked higher than South Korea in the 2012 World Happiness Report, which was commissioned by the UN.⁸¹ Although factors other than education inevitably affect these statistics, it is clear that Korea's fixed-ability orientation relating to the college-entry exam leads to detrimental health effects, which aren't seen in Poland and Finland, two countries that don't put as much pressure on examination and proving one's intelligence. As Lee warns, "there [is] more than one way to become [an educational] superpower... take care to choose the high road," not the road South Korean education is very far down.⁸² The fixed mindset regarding testing that's deeply engrained in South Korean education has visible, negative effects on students' mental health.

CONCLUSION

It is evident that the mastery-goal orientation that is fostered in students and teachers in the secondary-education systems of Poland and Finland is conducive to those systems' successes on PISA. Furthermore, South Korea's model of an educational meritocracy also reflects a mastery-goal orientation, which is one reason for the country's success on PISA. However, the rigid caste system in Korea that is determined by students' scores on the college-entrance exam inflicts a fixed ability orientation on its students. This test-driven, fixed-mindset aspect of Korean education is negatively affecting students' mental health. When viewed in tandem, these case-studies suggest that a growth mindset is conducive to academic success. Furthermore, the South Korean model suggests that a fixed-mindset, specifically in a high-stake situation, can negatively effect a student's mental health.

However, these findings provoke more questions than they answer. For example, this paper defines academic success as a country's score on PISA. As far as international standardized tests are concerned, PISA is widely believed to be the most effective in measuring one's ability to think critically and apply one's knowledge to situations, which are skills that hopefully translate into life beyond the classroom. However, it would be interesting to explore other measurements of academic success. Furthermore, this paper focuses on secondary education, but what about students' lives in higher education, or beyond school? More specifically, how does South Korea's rigid caste system, and the fixed-mindset regarding intelligence that inevitably results, affect students beyond secondary school? Does this fixed mindset affect Korean citizens' motivation and performance, like Dweck's research would suggest? How can this analysis of life beyond the classroom be compared to that of a Finnish or Polish citizen? How much does achieve-

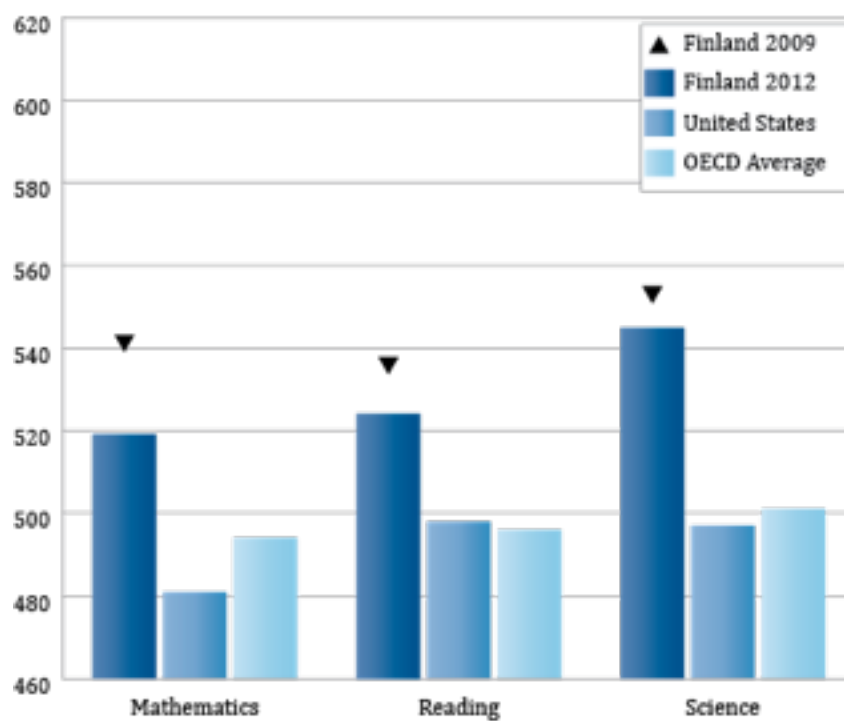
ment goal theory influence this? These are just a few of the endless number of questions that can continue to be explored. However, if nothing else, I hope this paper was able to elucidate the power of mindset and its effect on academic performance.

Appendix 1



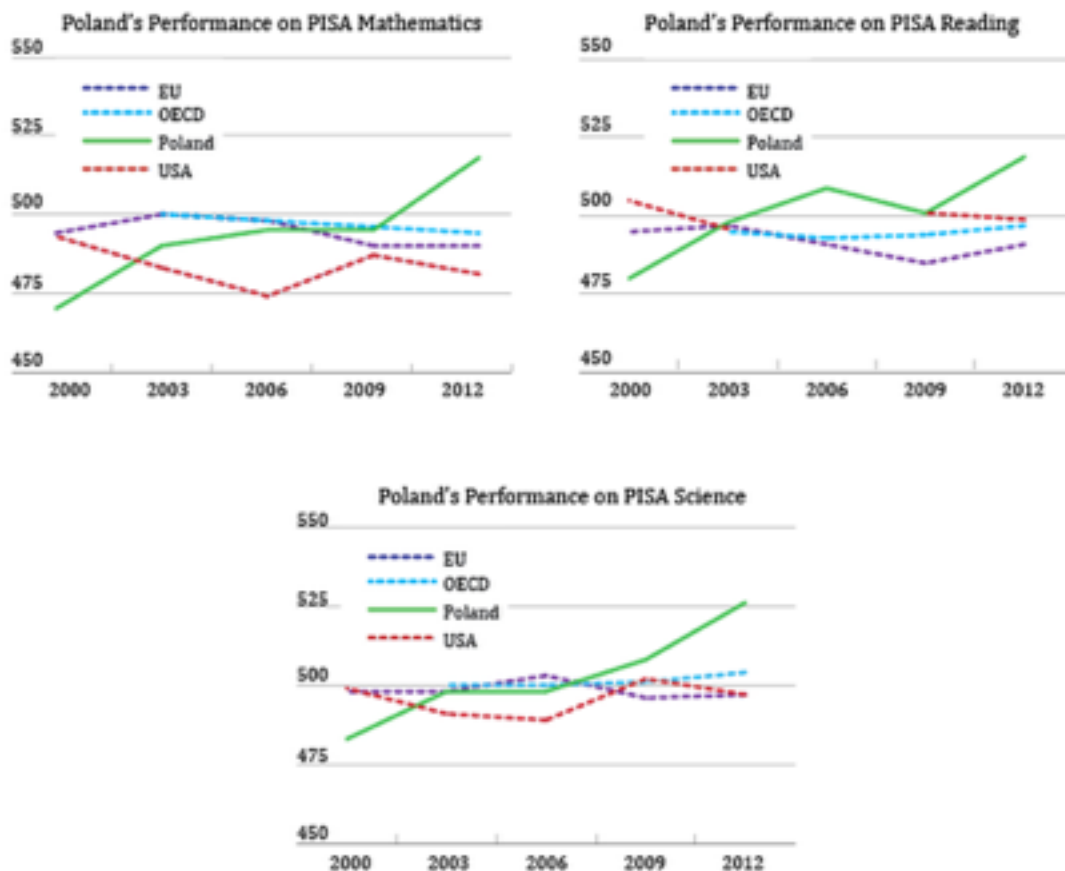
Nigel Holmes, "Two Mindsets," infographic, Brain Pickings, accessed February 4, 2015, <http://www.brainpickings.org>.

Appendix 2



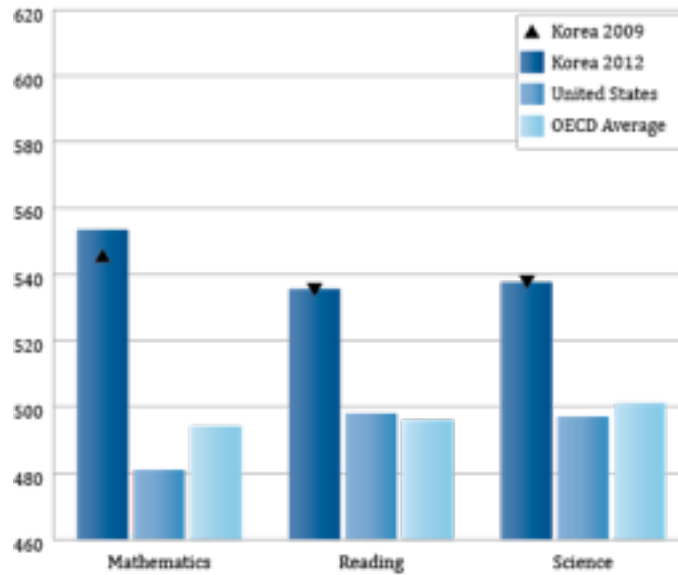
"Snapshot of Performance in Mathematics, Reading and Science," table, OECD, accessed January 22, 2015, <http://www.oecd.org/pisa/keyfindings/pisa-2012-results-volume-i.htm>.

Appendix 3



Vignettes on Education Reforms: England, Poland and Sweden, 2010, accessed April 1, 2015, <http://www.oecd.org>.

Appendix 4

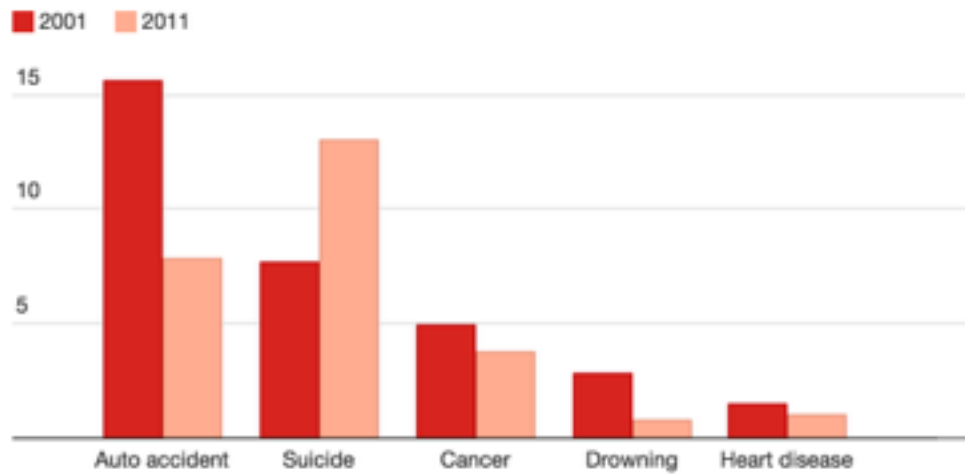


"South Korea: System and School Organization," Center on International Education Benchmarking, accessed April 1, 2015, <http://www.ncee.org>.

Appendix 5

Leading Causes of Death for Young South Koreans

For South Koreans aged 15-24 (Number of deaths per 100,000) | WSJ Korea Real Time



Yewon Kang, "Poll Shows Half of Korean Teenagers Have Suicidal Thoughts," The Wall Street Journal (New York, NY), 2015, accessed April 1, 2015, <http://blogs.wsj.com>.

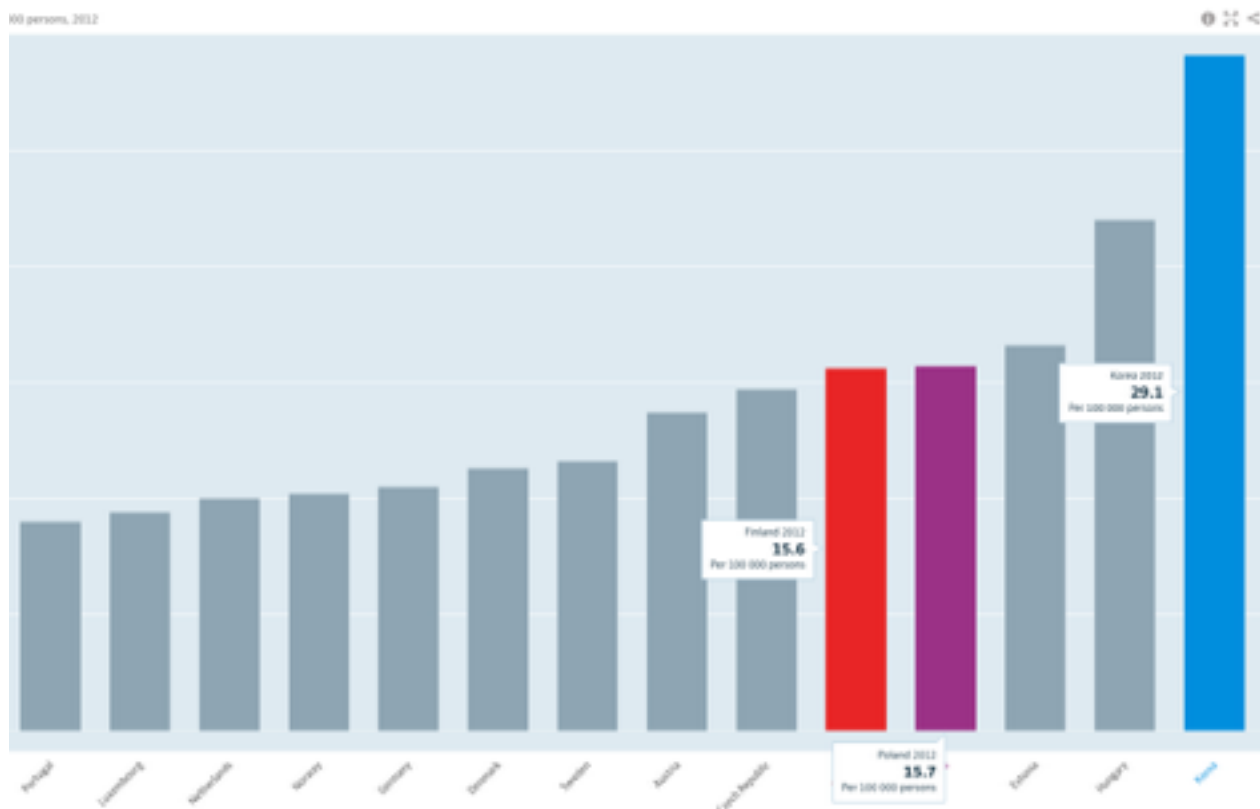
Appendix 6



Daniel Costa-Roberts, "South Korea Announces App to Combat Student Suicide," KQED, accessed April 1, 2015, <http://www.pbs.org/newshour/rundown/south-korea-announces-app-prevent-student-suicides/>.

Appendix 7

OECD Health Data: Health status, "Suicide Rates," chart, OECD, 2012, accessed March 22, 2015, <http://data.oecd.org/healthstat/suicide-rates.htm>.



NOTES

¹ Carol Dweck, "The Power of Believing That You Can Improve," speech presented at TEDxNorrkoping, Norrkoping, Sweden, December 2014, TED, last modified December 2014, accessed February 4, 2015, <http://www.ted.com>.

² Ibid.

³ Ibid.

⁴ Lisa S. Blackwell, Kali H. Trzesniewski, and Carol S. Dweck, "Implicit Theories of Intelligence Predict Achievement across an Adolescent Transition: A Longitudinal Study and an Intervention," *Child Development* 78, no. 1 (January/February 2007), accessed March 1, 2015, <https://web.stanford.edu>

⁵ Andrei Cimpian et al., Subtle Linguistic Cues Affect Children's Motivation, report no. 4 (*Association for Psychological Science*, 2007), accessed February 28, 2015, <https://web.stanford.edu>.

⁶ Carol Dweck, "Department of Psychology: Carol Dweck," Stanford University, accessed April 1, 2015, <https://web.stanford.edu/dept/psychology/cgi-bin/drupal/cdweck>.

⁷ "Snapshot of Performance in Mathematics, Reading and Science," table, OECD, accessed January 22, 2015, <http://www.oecd.org/pisa/keyfindings/pisa-2012-results-volume-i.htm>.

⁸ Amanda Ripley, *The Smartest Kids in the World*, hardcover ed. (New York, NY: Simon & Schuster, 2013), 15.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Marina Krakovsky, "The Effort Effect," *Stanford Magazine*, March/April 2011, accessed April 1, 2015, https://alumni.stanford.edu/get/page/magazine/article/?article_id=32124.

¹² Jennifer A. Mangels et al., "Why Do Beliefs about Intelligence Influence Learning Success? A Social Cognitive Neuroscience Model," *Social Cognitive and Affective Neuroscience*, 2006.

-
- ¹³ Lisa S. Blackwell, Kali H. Trzesniewski, and Carol S. Dweck, "Implicit Theories of Intelligence Predict Achievement across an Adolescent Transition: A Longitudinal Study and an Intervention," *Child Development* 78, no. 1 (January/February 2007), accessed March 1, 2015, <https://web.stanford.edu>.
- ¹⁴ Andrei Cimpian et al., Subtle Linguistic Cues Affect Children's Motivation, report no. 4 (*Association for Psychological Science*, 2007), accessed February 28, 2015, <https://web.stanford.edu>.
- ¹⁵ "Talent," in Oxford Dictionary, US English ed. (2015), last modified 2015, accessed April 1, 2015, <http://www.oxforddictionaries.com>.
- ¹⁶ Tiffany Lewis, "In the Whirled: The Case against Talent," Deseret News, last modified March 11, 2015, accessed April 1, 2015, <http://www.deseretnews.com>.
- ¹⁷ Ripley, *The Smartest Kids in the World*, 20.
- ¹⁸ Ginger Klein, "Praise Can Foster Brain Development," *The Gazette* (Colorado Springs, CO), 2015, accessed April 1, 2015, <http://gazette.com>.
- ¹⁹ Krakovsky, "The Effort Effect," 2.
- ²⁰ Ripley, *The Smartest Kids in the World*, 27.
- ²¹ Finland: Slow and Steady Reform for Consistently High Results (OECD, 2010), 3, accessed April 1, 2015, <http://www.oecd.org/pisa/pisaproducts>.
- ²² Ripley, *The Smartest Kids in the World*, 16.
- ²³ Finland: Slow and Steady, 3.
- ²⁴ Ibid.
- ²⁵ Ripley, *The Smartest Kids in the World*, 32.
- ²⁶ Ripley, *The Smartest Kids in the World*, 139.
- ²⁷ Finland: Slow and Steady, 4.
- ²⁸ Ibid.
- ²⁹ Ibid.

³⁰ Jouni Välijärvi, "The History and Present of the Finnish Education System," ed. Finnish Institute for Educational Research, last modified May 31, 2005, PDF.

³¹ Ibid.

³² Ibid.

³³ Ibid.

³⁴ Ibid.

³⁵ Ripley, *The Smartest Kids in the World*, 37.

³⁶ Krakovsky, "The Effort Effect," 3.

³⁷ Ripley, *The Smartest Kids in the World*, 139.

³⁸ Finland: *Slow and Steady*, 4.

³⁹ Anonymous, e-mail interview by the author, Helsinki, Finland, April 6, 2016.

⁴⁰ "Ibid.

⁴¹ Anonymous, e-mail interview by the author.

⁴² Ripley, *The Smartest Kids in the World*, 72.

⁴³ Tom Burrige, "Why Do Finland's Schools Get the Best Results?," BBC, last modified April 7, 2010, accessed April 1, 2015, <http://news.bbc.co.uk>.

⁴⁴ Finland: *Slow and Steady*, 4.

⁴⁵ Ripley, *The Smartest Kids in the World*, 127.

⁴⁶ Ibid.

⁴⁷ Vignettes on Education Reforms: England, Poland and Sweden, 2010, accessed April 1, 2015, <http://www.oecd.org>.

⁴⁸ Ibid.

⁴⁹ Ibid.

⁵⁰ Ripley, *The Smartest Kids in the World*, 139.

-
- 51 Vignettes on Education Reforms, 5.
- 52 Ripley, *The Smartest Kids in the World*, 134.
- 53 CIEB, "Global Perspectives: How Poland Moved into the Top Ranks of International Performance," NCEE, last modified July 2014, accessed April 1, 2015, <http://www.ncee.org>.
- 54 Ibid.
- 55 Ibid.
- 56 Ripley, *The Smartest Kids in the World*, 72.
- 57 Ami Sedghi, "Pisa 2012 Results: Which Country Does Best at Reading, Maths and Science?," *The Guardian*, 2015, US edition, accessed April 1, 2015, <http://www.theguardian.com>.
- 58 Ripley, *The Smartest Kids in the World*, 80.
- 59 Ibid
- 60 Ripley, *The Smartest Kids in the World*, 85.
- 61 Ripley, *The Smartest Kids in the World*, 59.
- 62 Ripley, *The Smartest Kids in the World*, 57.
- 63 Anonymous, e-mail interview by the author, Seoul, South Korea, April 7, 2016.
- 64 This has been altered slightly for reader accessibility. Ripley, *The Smartest Kids in the World*, 58.
- 65 Ripley, *The Smartest Kids in the World*, 57.
- 66 Ripley, *The Smartest Kids in the World*, 58.
- 67 Ibid.
- 68 "South Korea Overview," NCEE, accessed April 1, 2015, <http://www.ncee.org>.
- 69 Ripley, *The Smartest Kids in the World*, 59.
- 70 Ibid.
- 71 Ripley, *The Smartest Kids in the World*, 61.

⁷² Daniel Costa-Roberts, "South Korea Announces App to Combat Student Suicide," KQED, accessed April 1, 2015, <http://www.pbs.org>.

⁷³ Ibid.

⁷⁴ EQAVET, "VET in Poland (IVET and CVET)," European Quality Assurance in Vocational Education and Training, accessed April 10, 2016, <http://www.eqavet.eu/gns/what-we-do/implementing-the-framework/poland.aspx>.

⁷⁵ Official Statistics of Finland, "Vocational Education," Statistics Finland, accessed April 10, 2016, http://www.stat.fi/til/aop/index_en.html.

⁷⁶ Ripley, *The Smartest Kids in the World*, 39.

⁷⁷ Burridge, "Why Do Finland's Schools," BBC.

⁷⁸ Meera Dolasia, "Finland Schools To Test Teaching By Topics Instead of Individual Subjects," DOGO News, last modified March 29, 2015, accessed April 1, 2015, <http://www.dogonews.com>.

⁷⁹ Ripley, *The Smartest Kids in the World*, 65.

⁸⁰ "Finland Overview," Center on International Education Benchmarking.

⁸¹ OECD, "Life Satisfaction," OECD Better Life Index, accessed April 1, 2015, <http://www.oecdbetterlifeindex.org>.

⁸² Ripley, *The Smartest Kids in the World*, 72.

Bibliography

Anonymous. E-mail interview by the author. Helsinki, Finland. April 6, 2016.

———. E-mail interview by the author. Seoul, South Korea. April 7, 2016.

Bill & Melinda Gates Foundation. *Ensuring Fair and Reliable Measures of Effective Teaching*. January 2013. Accessed February 5, 2015. <http://www.gatesfoundation.org/media-center/press-releases/2013/01/measures-of-effective-teaching-project-releases-final-research-report>.

This secondary source is a report on a fascinating project that was headed by the Bill and Melinda Gates Foundation called the MET (Measures of Effective Teaching) project. This report “culminat[es] the findings from [the project’s] three-year study” —which included more than 3,000 teachers from around the country— and describes “fair and reliable” methods that can be used to measure the efficacy of a teacher’s teaching. Partners of this project include representatives from a multitude of respected “institutions and organizations” such as the University of Chicago, Dartmouth College, Harvard University, the National Board for Professional Teaching Standards, Stanford University, and more, all of which add to the source’s credibility. In the study, teacher efficacy was based on various standardized tests that were administered to the teacher’s students, and many measures of teacher efficacy were studied to best understand which measurement (or combination of measurements) was the most accurate. The three measurements that were most accurate were a teacher’s students’ “achievement gains on state tests,” anonymous student surveys, and formal observations of the teacher. The research found that “heavily weighting a single measure [of teacher efficacy incentivized] teachers to focus too narrowly on a single aspect of effective teaching and [lead to the neglect of] other important aspects.” Instead, all three measurements should be combined to evaluate a teacher’s efficacy. This source is relevant to my project because measuring teacher efficacy, specific to the fostering of growth mindset, is a vital skill that will need to be implemented in institutions, especially since research has suggested that teachers are one of the largest factors in a student’s mindset and achievement level.

Blackwell, Lisa S., Kali H. Trzesniewski, and Carol S. Dweck. "Implicit Theories of Intelligence Predict Achievement across an Adolescent Transition: A Longitudinal Study and an Intervention." *Child Development* 78, no. 1 (January/February 2007). Accessed March 1, 2015. <https://web.stanford.edu>.

This secondary source, a report on two studies conducted by Stanford and Columbia University professors, explored how students’ “implicit theories of intelligence” affected their math scores. The first study, which involved 373 8th graders, found that students who believed that their intelligence was malleable (incremental theory) showed an “up-

ward trajectory in grades over the two years of junior high school,” while students who believed that intelligence was a fixed entity showed a flat trend in grades. In study 2, an “intervention teaching an incremental theory to 7th graders ... promoted positive change in classroom motivation” compared to the control group of students. This report is relevant to my thesis because it reveals the efficacy of one form of intervention; in other words, it shows that a growth mindset, or incremental theory, can be fostered in students and can subsequently improve performance.

Burridge, Tom. "Why Do Finland's Schools Get the Best Results?" BBC. Last modified April 7, 2010. Accessed April 1, 2015. <http://news.bbc.co.uk>.

Center on International Benchmarking. "Global Perspectives: How Poland Moved into the Top Ranks of International Performance." NCEE. Last modified July 2014. Accessed April 1, 2015. <http://www.ncee.org>.

Cimpian, Andrei, Holly-Marie C. Arce, Ellen M. Markman, and Carol S. Dweck. *Subtle Linguistic Cues Affect Children's Motivation*. Report no. 4. Association for Psychological Science, 2007. Accessed February 28, 2015. <https://web.stanford.edu>.

This secondary source, a report on a study performed at Stanford University by professors including Dweck, explores how “subtle linguistic cues” can affect a young student’s motivation and academic performance. The study involved four-year-old preschoolers who were told to draw and then subsequently praised on their drawings by a teacher. Half of the preschoolers were praised generically, meaning their “whole person[s]” were praised (for example, “You are a good drawer”); this feedback was meant to foster a fixed mindset in the students. Contrastingly, the other half of the students were praised non-generically, meaning the “process[es] through which [their] success[es] were achieved” were praised (for example, “You did a good job drawing”); this feedback was meant to foster a growth mindset. This study found that, if the students made no mistakes and encountered no challenges, both forms of praise were equally rewarding. However, if the students did make mistakes and encountered challenges, students who received generic praise (and were therefore encouraged to adopt a fixed-mindset) exhibited more helpless behavior and less persistence in subsequent tasks. As the report succinctly summarizes, the negative repercussions of generic praise are that it “implies there is a stable ability that underlies performance; subsequent mistakes reflect on this ability and can therefore be demoralizing.” This source is very relevant to my project because it reveals the affect of a growth mindset vs a fixed mindset on a student’s performance and motivation. Furthermore, the study shows subtle methods (in this case, slightly different forms of praise) through which a teacher can foster a growth and fixed mindset. The fact that this study was conducted by various Stanford Professors (including Dweck, who is very notable in this field) contributes to its credibility. A shortcoming of this study is the small sample size; only 24 children participated. However, the report includes references to other stud-

ies that support this study's findings, which counteracts the uncertainty from the small sample size.

Costa-Roberts, Daniel. "South Korea Announces App to Combat Student Suicide." KQED. Accessed April 1, 2015. <http://www.pbs.org>.

Dolasia, Meera. "Finland Schools To Test Teaching By Topics Instead of Individual Subjects." DOGO News. Last modified March 29, 2015. Accessed April 1, 2015. <http://www.dogonews.com>.

Dweck, Carol. "Department of Psychology: Carol Dweck." Stanford University. Accessed April 1, 2015. <https://web.stanford.edu/dept/psychology/cgi-bin/drupal/cdweck>.

———. "The Power of Believing That You Can Improve." Speech presented at TEDxNorrköping, Norrköping, Sweden, December 2014. TED. Last modified December 2014. Accessed February 4, 2015. <http://www.ted.com>.

In this TED talk, which is a primary source, Carol Dweck shares her knowledge about “the power of believing that you can improve,” also known as a “growth mindset.” Dweck, the pioneer of this school of thought, describes growth mindset as the belief that intelligence is malleable and can adapt and grow, which is contrasted with a fixed mindset, the belief that intelligence is a fixed entity that can’t change. Dweck refers to personal anecdotes, studies she and other professionals have conducted in the past, as well as easily-implementable solutions that foster growth mindset in students, including a growth mindset online math game that “reward[s] ... effort, strategy and progress.” One suggestion she shares that works to foster growth mindset in schools is for teachers to write “not yet” next to failing grades; this strategy encourages students to focus on improvement—adopting a growth mindset—instead of dwell on failure—embracing a fixed mindset. Dweck is a highly-respected Stanford Professor with a Ph.D. in Social and Developmental psychology from Yale University; she has published many studies exploring developmental and social psychology, specifically in regards to mindset. I will use this introductory source to further explore Dweck’s work with mindset; I will specifically focus on implementable practices in which growth mindset can be fostered, and then look at the success of educational systems that implement these practices.

Eccles, Jacquelynne S., and Robert W. Roeser. "Schools as Developmental Contexts during Adolescence." In *Developmental Psychology*, 321-33. 2nd ed. Vol. 6 of *Handbook of Psychology*. Accessed January 22, 2015. Proquest.

This chapter, a secondary source, explores various aspects of school and how they are related to adolescents’ social, emotional, and intellectual development. This chapter covers a broad range of pedagogical influences such as teachers’ qualifications, teacher-student relationships, teachers’ mindsets and expectations of students, curriculum and course

relevance, school culture, and more. One claim I found interesting was how relevant and meaningful school curricula can cultivate intrinsic motivation in students and subsequently enhance performance. Another interesting point was the impact of a teacher's expectation of his or her students on student performance; "teacher optimism," which refers to a teacher's confidence in his or her ability to teach students, confidence in the student, and trust of the student, can benefit student learning. However, teacher optimism, also known as teacher efficacy, is less prevalent in American high schools than in elementary and lower schools. Although this chapter mostly relates these psychological theories to American schooling systems, I will relate these theories to other successful educational systems. Another fascinating theory that is discussed in this chapter is the Achievement Goal Theory, which encompasses two contrasting approaches to instruction: mastery-goal orientation and relative-ability goal orientation. The former focuses on students' mastery of subject material and emphasizes skill development and improvement, whereas the latter stresses student competition and the outperformance of peers. Studies have shown that classrooms that embody relative-ability goal orientation, classrooms in which students compete for grades, result in lower levels of student motivation. Furthermore, the relative ability goal orientation is often associated with a fixed mindset regarding intelligence, whereas a mastery-goal orientation tends to emphasize the malleability of intelligence. There is strong evidence to suggest that classrooms that embody the latter mindset, classrooms in which students are reminded of their ability to grow intellectually, tend to foster intrinsic motivation in students, and subsequently higher overall academic performance. These are just a few of the many pedagogical theories discussed in this chapter. I plan on taking these psychological theories and seeing if they are employed in the pedagogical practices of successful education systems.

EQAVET. "VET in Poland (IVET and CVET)." European Quality Assurance in Vocational Education and Training. Accessed April 10, 2016.
<http://www.eqavet.eu/gns/what-we-do/implementing-the-framework/poland.aspx>.

"Finland Overview." Center on International Education Benchmarking. Accessed January 22, 2015. <http://www.ncee.org/programs-affiliates/center-on-international-education-benchmarking/top-performing-countries/finland-overview/>.

This tertiary source provides a comprehensive overview of Finland's educational system. It includes a brief history of Finnish education, and highlights Finland's surprisingly high 2012 PISA scores. This success is partially attributed to the highly respected position teachers and educators hold in Finnish society. The source also describes the government's 4-year cycle of education reforms, which ensure that Finnish educational policy remains up-to-date and relevant. The current priorities include reducing class sizes and improving the quality of special-needs teaching. This source is very useful to me because it provides a baseline level of information that I can use to delve deeper into the complexities of the Finnish education system.

Finland: Slow and Steady Reform for Consistently High Results. OECD, 2010. Accessed April 1, 2015. <http://www.oecd.org/pisa/pisaproducts>.

Gladwell, Malcolm. "The Talent Myth." *The New Yorker*, July 22, 2002. Accessed February 5, 2015. <http://www.newyorker.com/>.

This secondary source, an article that was published in the New Yorker, discusses the negative repercussions of emphasizing “talent” and praising “smart people” in work and in school environments. Gladwell refers to various studies by Carol Dweck; one study conducted in the academically rigorous University of Hong Kong revealed that students who “believed in malleable intelligence” jumped at the opportunity to take extra English language classes to improve their English scores, whereas fixed mindset students chose not to take the courses. Dweck explains that fixed mindset students “care[d] so much about looking smart that they act[ed] dumb [by] giving up [the] chance to learn something that is essential [to their] success.” Another experiment discussed in this article showed that 40% of the students who were praised for their intelligence” instead of effort, therefore students who were encouraged to adopt a fixed mindset, lied about their grades. These studies and the ideas from this article are relevant to my paper because they reveal, through scientific observations and findings, the benefits of a growth mindset and the disadvantages of a fixed mindset. This source also refers to specific pedagogical practices—such as praising effort or intelligence—that can foster a fixed or growth mindset. Gladwell, a highly-acclaimed Canadian journalist and author, has published a multitude of books, five of which have been included on the New York Times Best Sellers list. Gladwell’s respectability and the New Yorker’s credibility contribute to this article’s reliability.

Hoffman, Bobby, and Alexandru Spatariu. "The Influence of Self-Efficacy and Metacognitive Prompting on Math Problem-Solving Efficiency." *Contemporary Educational Psychology* 33, no. 4 (October 2008): 875-93. Accessed February 4, 2015. <http://www.sciencedirect.com>.

This article, a secondary source, discusses a study that used a “regression design” to explore the effect of self-efficacy beliefs on “solving mental multiplication problems while controlling for mathematical background knowledge and problem complexity.” The study showed that “self-efficacy,” or the belief that one is capable of completing a task, “increased problem-solving performance and efficiency.” This study is relevant to my project because self-efficacy, the belief in one’s ability, is closely related to a growth-mindset, the belief that one’s ability can grow and change. The two authors, Bobby Hoffman and Alexandru Spatariu, are both Psychology professors at the University of Central Florida and Georgetown College, respectively. They have also published other findings in *Contemporary Educational Psychology*; their previous works, academic positions, and the respectability of the journal in which this article is published all contribute to the article’s credibility.

Holmes, Nigel. "Two Mindsets." Infographic. Brain Pickings. Accessed February 4, 2015. <http://www.brainpickings.org>.

This secondary source, an infographic, clearly and concisely summarizes Dweck's findings regarding the distinctions between a growth and fixed mindset. The source illustrates how people embodying the two contrasting mindsets would approach and regard "challenges," "obstacles," "effort," "criticism," and the "success of others." The infographic was illustrated by Nigel Holmes, a well-acclaimed British graphic designer and illustrator who's work in informational design has been published in various books and journals. More importantly, the infographic displays a compilation of information from Dweck's research on mindset; Dweck, who earned her Ph.D. in Social and Developmental psychology at Yale, is currently a professor in Stanford's Department of Psychology. Her work has been highly acclaimed, therefore boosting the credibility of this source.

Kang, Yewon. "Poll Shows Half of Korean Teenagers Have Suicidal Thoughts." *The Wall Street Journal* (New York, NY), 2015. Accessed April 1, 2015. <http://blogs.wsj.com>.

Klein, Ginger. "Praise Can Foster Brain Development." *The Gazette* (Colorado Springs, CO), 2015. Accessed April 1, 2015. <http://gazette.com>.

Koo, Se-Woong. "An Assault upon Our Children." *The New York Times*, August 1, 2014. <http://www.nytimes.com>.

In this article, a primary source, Se-Woong Koo describes his negative experience growing up in the South Korean education system and teaching in a Hagwon. Koo discusses the repercussions of a cut-throat academic environment; although the system's "students rank among the best on international education tests", the system produces "ranks of overachieving students who pay a stiff price in health and happiness." Koo goes on to describe the health-costs of the education system; he recounts how his brother fell ill as a result of chronic stress from school. And this isn't unusual, since an "average South Korean student works up to 13 hours a day" and sleeps only about 5.5 hours a night. Furthermore, Koo describes the mental health ramifications of this environment; "Among young South Koreans who confessed to feeling suicidal in 2010, an alarming 53 percent identified inadequate academic performance as the main reason for such thoughts." Koo attributes this stressful environment to the pressure put on students by parents. He explains how his students at the Hagwon were "serious about studying but their eyes appeared dead." Apparently, they blamed the stress on their parents who would constantly pressure them to succeed and "perform" academically. This source contradicts my thesis, because it sheds light on aspects of South Korean Education that don't appear to be conducive to a growth mindset. Specifically the parents' focus on "academic performance" should encourage a fixed mindset, because the focus pressures students to work for the end product instead of focusing on the process of learning. Koo also makes implications

about intense competition in the school, which is also not conducive to growth mindset. Koo is a “former fellow and lecturer in Korean studies at Yale” as well as the “editor in chief of Korea Expose”; his firsthand experience and titles give his article credibility.

Krakovsky, Marina. "The Effort Effect." *Stanford Magazine*, March/April 2011. Accessed April 1, 2015. https://alumni.stanford.edu/get/page/magazine/article/?article_id=32124.

Lewis, Tiffany. "In the Whirled: The Case against Talent." *Deseret News*. Last modified March 11, 2015. Accessed April 1, 2015. <http://www.deseretnews.com>.

Mangels, Jennifer A., Brady Butterfield, Justin Lamb, Catherine Good, and Carol S. Dweck. "Why Do Beliefs about Intelligence Influence Learning Success? A Social Cognitive Neuroscience Model." *Social Cognitive and Affective Neuroscience* 1 (2006).

This secondary source, a report on a study conducted by various Psychology Professors, explores how and why “beliefs about intelligence influence learning success.” In the report, students who possess a fixed mindset are referred to as “entity theorists,” which is referring to their belief that intelligence is a fixed entity. Through a social cognitive neuroscience model, this study showed that entity theorists tend to emphasize performance goals, which can make them “vulnerable to negative feedback” and less likely to engage in intellectual challenges. Contrastingly, students who have a growth mindset are called “incremental theorists,” referring to their belief that intelligence is malleable. Incremental theorists were shown to tend to focus on “learning goals” and “rebound better from occasional failures.” In the study, students took a “test of general knowledge” and were evaluated after being confronted with various challenges and then retested to examine to what extent the students bounced back after the challenges. The study showed that “entity theorists [didn’t respond well to] negative performance feedback,” which was related to their “concerns about proving ability relative to others.” Furthermore, they demonstrated “less sustained memory-related activity” when given correct answers to mistakes, which “contributed to their reduced error correction on a subsequent surprise retest.” These findings are relevant to my paper because they demonstrate the negative affects of a fixed mindset, the mindset of an entity theorist, on academic performance. The prestige of the professors and the multitude of references (cited at the end of the paper) contribute to this source’s credibility. Furthermore, the source states that no conflict of interest has been declared, implying that the source has no explicit bias.

National Center on Education and the Economy. "South Korea Overview." NCEE. Accessed April 1, 2015. <http://www.ncee.org>.

———. "South Korea: System and School Organization." Center on International Education Benchmarking. Accessed April 1, 2015. <http://www.ncee.org>.

The Organisation for Economic Co-operation and Development. "Life Satisfaction." OECD Better Life Index. Accessed April 1, 2015. <http://www.oecdbetterlifeindex.org>.

The Organisation for Economic Co-operation and Development Health Data: Health status. "Suicide Rates." Chart. OECD. 2012. Accessed March 22, 2015. <http://data.oecd.org/health-stat/suicide-rates.htm>.

This chart, a primary source, illustrates suicide rates in 16 different countries, globally (Per 100,000 persons in 2012). This data was collected by the OECD, a reliable government organization. The graph shows that 29.1 out of 100,000 persons committed suicide in South Korea in 2012, which is significantly higher than 15.6 and 15.7 persons out of 100,000 who committed suicide in Finland and Poland, respectively. This graph illustrates the disparity between (on indicator of) mental health in South Korea and in Poland and Finland, which supports my thesis.

Official Statistics of Finland. "Vocational Education." Statistics Finland. Accessed April 10, 2016. http://www.stat.fi/til/aop/index_en.html.

"Poland Overview." Center on International Education Benchmarking. Accessed January 22, 2015. <http://www.ncee.org/programs-affiliates/center-on-international-education-benchmarking/top-performing-countries/poland-overview/>.

This tertiary source provides a comprehensive overview of Poland's educational system, including a brief history, a chart illustrating Poland's schooling track, and a list of demographic and economic indicators. This source discusses the disparity between Poland's 2000 and 2012 PISA scores and attributes this drastic improvement to the country's education system's two major structural reforms in 1999 and 2009. This article is useful because it provides sufficient general knowledge about Poland's education system as well as reasons for its success. I will be able to use the basic information gathered in this source to explore Poland's pedagogical practices on a deeper level.

Ripley, Amanda. "The \$4 Million Teacher." *The Wall Street Journal*, August 3, 2013, U.S. edition. Accessed January 25, 2015. <http://www.wsj.com/articles/SB10001424127887324635904578639780253571520>.

This article, a secondary source, discusses one of South Korea's most infamous pedagogical practices: hagwons, or private, after-school tutoring academies. These academies are arguably the most influential factor in South Korea's consistently high rankings on the PISA exams. The hagwons are a fascinating model because they are the epitome of an educational meritocracy: they are completely disconnected from the public school system, and teachers are paid primarily based on student evaluations. The system is effective, but ruthless. If a teacher receives negative evaluations from his or her students, he or she will be placed on probation. If the trend continues, the teacher will be fired. Ms. Lee,

who owns a chain of five hagwons in Seoul, fires 10% of her teachers annually, which is a typical rate for teacher dismissal in hagwons. In comparison, about 2% of US public school teachers are dismissed annually because of poor performance, and teacher performance is rarely evaluated by the students. Although the hagwon system might seem merciless for the teachers, it can benefit both the teacher and student; not only does this system result in extremely well-prepared students — 47% of 8th graders in South Korea are considered ‘advanced’ in the US, compared to our 7% — but the effective teachers also benefit; Kim Ki-hoon, a successful hagwon tutor, earns about \$4 million a year by giving lectures and selling them online for \$4 an hour.

This source is useful because it describes a unique South Korean pedagogical practice—interestingly enough, a practice that aligns with recent analysis of successful educational systems. This source’s credibility is evident because of the reputation of Wall Street Journal, in which the article was published. Furthermore, the source is recent, published in 2013, which gives it relevance. Additionally, the author, Amanda Ripley, is a well-known investigative journalist for other respected journals such as Time and The Atlantic. She also authored a New York Times best-selling book about global education, a section of which this article was based on.

———. *The Smartest Kids in the World*. Hardcover ed. New York, NY: Simon & Schuster, 2013.

This secondary source is extremely useful for my paper. Ripley paints a vivid picture of the secondary education systems in Poland, Finland, and South Korea through extensive and comprehensive personal accounts from three exchange students who visited these countries, interviews with government officials, and extensive background research. Through these complex narratives, Ripley describes the advantages and drawbacks of these education systems. Ripley is a credible source; her work has been published in Time Magazine as well as the Atlantic, which contributes to the credibility of this New York Time's best-selling book.

Roberts, Daniel Costa. "South Korea Announces App to Combat Student Suicide." KQED. Last modified March 15, 2015. Accessed March 22, 2015. <http://www.pbs.org/newshour/run-down/south-korea-announces-app-prevent-student-suicides/>.

This article, a secondary source, discusses a new app that the South Korean government recently released, which is meant to decrease the number of student suicides by searching through social media networks (Facebook, messaging, twitter, etc.) for possible trigger-phrases and then alerting parents if potentially dangerous phrases are found. This article is relevant to my paper because it shows just how drastic the issues of student stress are in South Korea. Daniel Costa Roberts is a well-known writer for PBS NewsHour; both the author's credibility as well as the credibility of the organization contribute to the credibility of this source.

Sedghi, Ami. "Pisa 2012 Results: Which Country Does Best at Reading, Maths and Science?" *The Guardian*, 2015, US edition. Accessed April 1, 2015. <http://www.theguardian.com>.

"Snapshot of Performance in Mathematics, Reading and Science." Table. OECD. Accessed January 22, 2015. <http://www.oecd.org/pisa/keyfindings/pisa-2012-results-volume-i.htm>.

This primary source provides a clear table of 63 countries' mean scores in the mathematics, reading, and science sections of the 2012 PISA. The table is sorted by country from highest to lowest mean overall score. This is very helpful because I can easily access the top scoring countries' overall average scores or a specific country's score broken down into the math, reading, and science sections. Thus, I can identify the high-scoring countries.

Sudworth, John. "Culture of Studying in South Korea." *BBC News*. Accessed March 22, 2015. http://news.bbc.co.uk/2/hi/programmes/world_news_america/8605789.stm.

This secondary source follows the typical daily routine of a 10-year-old boy who's growing up in the South Korean education system. This source highlights the challenges South Korean students must face, including unreasonable school hours and intense pressure to perform well. As the young boy explains, "the harder you work and the earlier you begin the better university you get into. And a better university means a better job." This mindset supports my thesis that South Korea's focus on academic performance reveals its focus on growth mindset. The reliability of BBC news contributes to this source's credibility.

Vignettes on Education Reforms: England, Poland and Sweden. 2010. Accessed April 1, 2015. <http://www.oecd.org>.

