How Perceptions of Intelligence Influence Education

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Abstract

Much research has been trying to understand education disparity from prejudice toward specific groups of people. However, it is necessary to figure out how this prejudice affects people and what makes people susceptible to them. This research paper analyzes how students' implicit theory of intelligence impacts education. It shows that students with an entity theory of intelligence are more susceptible to stereotype threat, likely to retreat when facing challenges and setbacks and hold more stereotypes and judgments toward others. It also highlights an increment theory's importance in reducing education inequality and concludes how schools can encourage this kind of mindset - praising students' efforts, lecturing about the human brain's structure intelligence's malleability to both students and teachers, and forming mixed-ability classrooms.

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An individual's level of education has been shown to impact many aspects of one's life: higher levels of educational attainment are linked with increased job satisfaction (GÜRBÜZ, 2007), higher lifetime income (Tamborini et al., 2015), and even improving children's eating behavior (Bere et al., 2008). Yet, not everyone is achieving the same levels of education. For example, although African Americans make up roughly 14% of the US population (US Census Bureau, 2022), they account for less than 10% of master's students and less than 5% of doctorate students (National Science Foundation, 2021). In a 2018 survey of adults ages 25 and older, 25.2% of Blacks were college graduates compared to 35.3% of Whites (Statista, 2021). Understanding the causes of education disparity in society is essential to designing remedies to increase equality.

Fryer (2006) found a growing Black-White gap in math and reading with each year in school, which ultimately leads to a score gap of more than 170 points on the SAT and five points on the ACT (Digest of Education Statistics Table 226.10., 2020; Digest of Education Statistics Table 226.50., 2021). Black students lagged behind their white counterparts even when they were in the same schools and from equally affluent families (Carter, 2019). Researchers in multiple past studies (e.g., Easterbrook & Hadden, 2020; McGee, 2020; Phelan et al., 2019) have attributed this disparity to racism; some (e.g., Perez, 2002; Rosales & Walker, 2021; Walton et al., 2013) even hold that standardized tests are flawed and favor White students over Black students. While systemic racism is undoubtedly a critical contributing factor to this education disparity and must be addressed, such a sweeping sociological reformation is beyond the scope of this paper. Instead, I will focus on why the field of psychology can help us understand how prejudice and stereotypes are impacting individuals' achievement levels. For even in the same classroom conditions, students' performances in different groups might also differ due to aspects of the human mind.

One such instance is the gender performance gap. Male students have outperformed female students in the SAT and ACT STEM sections (Digest of Education Statistics Table

226.10., 2020; Digest of Education Statistics Table 226.50., 2021). Large gaps also exist in the type of degree attained—less than 30% of students with a degree in physics, computer science, or engineering are female (National Science Foundation, 2021).

One way to interpret these gaps is through understanding how an individual's *implicit theory of intelligence* (how an individual views the nature of human intelligence) influences their behavior. Individuals hold one of two mindsets: an *entity theory* or an *increment theory*. The former believes that people's attributes are innate and constant, whereas the latter believes that abilities can improve over time. When viewing different matters, one can have different mindsets, partly shaped by related stereotypes and one's schooling environment (Laurell et al., 2021; see also Froehlich et al., 2016). Widespread negative stereotypes contribute to differences between different social groups. Todor (2014) showed a higher entity theory endorsement among girls regarding mathematics ability. Prot et al. (2014) also found that compared to females, males attribute a higher percentage of sports success to effort, suggesting that males may tend to endorse an increment theory when it comes to sports. In research by Froehlich et al. (2016) studying the effects of the negative ethnic stereotypes in Germany, Turkish migrants—who are negatively stereotyped—showed a higher endorsement of an entity theory toward verbal abilities. These mindset differences can affect students learning processes in several critical ways.

A big part of how mindset influences education is how it interacts with *stereotype threat*. Stereotype threat is initiated when one fears living up to the negative stereotypes about their group. It is an important form of *social identity threat*, which is experienced when students feel that the group they belong to is negatively evaluated. Easterbrook and Hadden (2020) showed that social identity threat has negatively impacted Black and Latino students, female students in male-dominated subjects, and is even responsible for 57-94% of the gender gap in the math section of SAT (Easterbrook & Hadden, 2020).

Stereotype threat is especially damaging to students with an entity theory of intelligence. Believing that one's abilities are innate and inflexible, entity theorists tend to think that negative

stereotypes indicate their failure in the future (Froehlich et al., 2016). Entity theory ideas particularly harmed girls and played a part in dissuading them from continuing their studies in mathematics and science. In fact, the gender difference in math performance is only found among entity theorists (Boaler, 2013). Moreover, stereotype threat can contribute to performance differences even when the stereotypes are implicit. In a study by Huguet and Régner (2007), researchers selected middle school students with highly selective math grades and divided them into two groups. While the researchers provided both groups with the same test of replicating figures from memory, one group was told it was a "geometry test" and the other group a "memory game." By naming the test "geometry test" and implying that it measures math skills, the test activated the stereotype threat of boys being better at math and caused girls to underperform boys. However, girls told that the test was a "memory game" outperformed boys. Similarly, racism stereotypes and other negative stereotypes can harm the corresponding groups.

Even for positively stereotyped students, entity theory is ultimately harmful to education. While such students, in the short-term, showed improved performance when the situation is described as indicative of the related ability (Froehlich et al., 2016; see also Dweck, 2007), they tend to retreat when facing obstacles (Dweck, 2008, 2012; Hong et al., 1999; Froehlich et al., 2016) as they are afraid to show incapability. The common belief of entity theory among students makes them see mistakes as evidence of unintelligence and want to produce pages of correct answers in their math assignments. In reality, students' brains form new synapses and grow when they make mistakes (Boaler, 2013).

Moreover, a classroom environment where more people hold an entity theory causes more stereotype threats, as entity theorists tend to form more stereotypes of others and even reject information that proves otherwise (Dweck, 2012). Carr et al. (2012) found that people with a more entity-oriented theory toward prejudice feel more uncomfortable when interacting with a member of another race and tend to avoid interactions and distance themselves during one ("prejudice" without prejudice). On the contrary, those holding an incremental theory desired

more time in cross-race interactions compared to interracial ones and are more interested in activities designed to reduce prejudice. Incremental theorists also lean toward policies that reduce the disadvantages of the negatively stereotyped (Levy et al., 1998). Besides, a growth mindset also correlates with self-efficacy, self-esteem, academic achievements (Diseth et al., 2014; see also Burnette et al., 2010), and even emotional functioning during adolescence (Romero et al., 2014).

Given how much an incremental theory of intelligence can benefit an individual's education, interventions to encourage this mindset are critical to addressing education disparity. There are many insights we can glean from past studies to accomplish this. First, praising students' efforts instead of their ability. Praising students' abilities indicates that ability is a gift and enforces an entity theory. Students praised for their ability are also more likely to lose confidence in struggles (Dweck, 2007). Next, though ability grouping means that students can receive more customized lessons and assignments, it conveys the idea that ability is fixed and only some students are smart. Furthermore, it was found that ability grouping is somewhat arbitrary and students are oftentimes given inappropriately work (Boaler, 2013; Laurell et al., 2021). In the research of Boaler (2005) about the impact ability grouping has on students with similar initial grades and social class, it was found that students in classrooms abandoning ability grouping acquired higher overall achievements in school and landed on higher social class jobs years in the future. Teaching students how one's brain forms more connections and grows when one learns also conveys the idea that skills can be gained over time. In contrast, descriptions of prominent figures in the field having their skills as inborn deliver an entity theory message (Dweck, 2007). Finally, it is also important to encourage a growth mindset among teachers so that they believe that every student has potential and give them opportunities (Boaler, 2013).

Education disparity is a complex problem caused by a variety of factors; entrenched prejudice is a key contributor. While eliminating these prejudices is a noble goal that we must work towards, it will be a long and slow battle. In the meantime, understanding how individuals'

implicit theory of intelligence impacts their educational outcomes and encouraging individuals to hold an incremental theory will be a significant step toward reducing education disparity.

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