



The Effects of Stereotype Threat on Cognitive Functioning: A Literature Review and Suggestions for Practice

Zoya S. Firasta



Abstract

This paper explores the relationship between stereotype threat and cognitive ability. As defined by Schmader & Beilock (2012), “stereotype threat characterizes a concern that one might inadvertently confirm an unwanted belief about one’s group.” Stereotype threat is important to address because it is very prevalent in today’s society as it affects people of color and people from minoritized backgrounds. With reference to cognitive ability, stereotype threat can lead to underperformance on tasks in relation to objective ability and intelligence as measured by competency exams (e.g., intelligence quotient (IQ) tests; standardized tests). This threat to performance can impact what career paths are pursued and supported, how one is seen by the rest of society, and how one feels they are representing their identity. This paper will examine stereotype threat’s connection to cognitive ability through a review of the research literature and first person narratives in order to bring awareness to the neurocognitive effects of stereotype threat in the brain.

Keywords: Stereotype Threat; Cognitive ability; Executive functioning

1. Introduction

Over the past 15 years, research in social psychology has developed the theory that a factor contributing to the academic underachievement of non-Asian ethnic minoritized students, specifically in math and science, is the extensive negative intellectual stereotypes in typical academic settings. Within these environments, students face the risk of being evaluated based on these stereotypes rather than their true individual merit, leading to heightened levels of stress and perceived threat, from either peers or authority figures¹. When efforts are made to ease these stereotypes, the negatively stereotyped students exhibit latent ability, surpassing non-stereotyped peers in performance on tests and in classroom settings, even if both groups share similar previous academic accomplishments¹. By adding and using strategies derived from research that aims to establish stereotype-free academic environments, educational institutions have the potential to create settings that enable all students to achieve their maximum potential¹.

Cohen et al. (2012) defined stereotype threat as “the risk of (negative) predispositions about one’s race, gender, or overall identity as a part of society, discrediting certain people due to historical biases.” Stereotype threat occurs in situations when people are obstructed by the potential of being negatively viewed due to the group they are a part of^{13,14}. In everyday words and understanding, stereotype threat can be described as someone from a group being viewed as disadvantaged in a particular task or situation (e.g., women being viewed as worse at science, technology, engineering and mathematics (STEM)-based achievements or Asian people being considered poor at driving), and without conscious awareness, the person’s cognizance of this stereotype then negatively affecting their performance on the task at hand. One classic example of stereotype threat is a woman being handed a math test and told, “Women tend to do really well on reading tests” or “This is a really difficult math test.” These are examples of stereotypes about women that could affect their performance on a test. Another example of stereotype threat comes from Claude M. Steele (the scientist who originated the term “stereotype threat”) wrote about his personal experiences with stereotype threat and explained that he would whistle Vivaldi, among other renowned classics, in order to make people not see him, a Black man, as scary or intimidating¹¹.

As Schmader and Beilock (2012) note, one of the most insidious parts of stereotype threat is that it can happen without the person’s conscious awareness, and therefore powerfully affects their performance on many everyday tasks and challenges. Minoritized individuals may be particularly prone to experiencing stereotype threat due to not being able to guess what others think of them, so they are likely to accept or predict that they will be stereotyped. Because stereotype threat can become internalized and activated when individuals are being assessed, performance on measures of intelligence and cognitive ability for minoritized individuals can often result in scores that are lower than the individual’s true ability, a phenomenon referred to as “underperformance”¹³. Performance on these tests of ability can be manipulated by various factors such as who is present in the room (and their demographics), how a task is explained (or lack thereof), or the response from the other people in the room¹³. This is very likely to happen in school and work settings which are predominately White and not created for minoritized people to thrive⁵. Stereotype threat is something that is easily reinforced when either accepted internally or externally, for example, if a woman fails at a primarily male-driven career, she reinforces the stereotypes already set in place, such as women not

being good candidates for STEM-related jobs. An example of the “positive” side that is still fatalistic is the stereotype that all Asians are good at math; there is now that stress to uphold the “good” stereotype placed upon them, because if not, not only will they be critiqued for it, their whole race will be⁵. Increased effort is often shown in order to be “un-categorized” from your ethnic or diverse group that holds negative stereotypes¹³. Stereotype threat can cause stress and underperformance, and remove people’s sense of safety, belonging, and trust. It can also affect work as it can cause people to diverge from certain career paths due to how they assume they will be treated. Stereotype threat leads to depleted performance because threats act as a restraining force, stopping the person from asserting full potential⁵. To better understand the ways in which stereotype threat impacts performance on tests of cognitive ability and frequently results in minoritized individuals achieving scores below their true potential, this review paper focuses on neurocognitive mechanisms linking stereotype threat to performance.

2. Methods

A literature review was performed using google scholar. Search terms used included “stereotype threat”, “cognitive functioning”, “executive functioning”, “how executive functioning can be impaired”, “how stereotype threat can affect cognitive functioning”, “how stereotype threats affects people psychologically”, “how a hindrance of executive functioning affects the brain”, “Current examples of Stereotype Threat”, “Functions of the brain”, and “Regional aspects of the brain under duress”.

Papers were included if they provided good explanations and relations to key terms such as executive functioning, cognitive ability, stereotype threat, and impacts of stereotype threat on the human psyche. Papers were excluded if there seemed to be overarching bias, a lack of inclusive information, or if it wasn’t in a quality, peer-reviewed journal.

3. Results

Based on the literature review, approximately thirty papers were reviewed, and fourteen were included based on the inclusion and exclusion criteria. The rest of the discarded articles and research were not incorporated as they showed flawed methodology (sample size, sample bias), imposed bias to either side, a lack of inclusivity when talking about Stereotype Threat as a whole, or untrustworthy references.

4. Discussion

4.1 Cognitive Functioning and its Assessment

As described in Dickens (2008), “cognitive ability is the mental capabilities that involve reasoning, problem solving, planning, abstract thinking, complex idea comprehension, and learning from experience.” Cognitive ability is often measured by intelligence quotient (IQ) tests or cognitive ability scores¹⁴. These tests are then often used to aid in important determinations with long-lasting implications, such as admissions to gifted and talented programs, college admissions, and suitability for certain jobs. Cognitive ability can be defined in a couple of different ways with one being the regional brain functions: the frontal lobe, temporal lobe, parietal lobe, and hippocampus. More simply put, these regional brain functions are the parts of the brain that control how you think, process auditory information and kinesthetic information, as well as the formation, encoding, and storage of memory. A definition of cognitive functioning more relevant to the present paper is cognitive functioning as measured by memory, attention, and executive functioning. Executive functioning is a particular aspect of cognitive ability that

merits further explanation as it is one of the primary cognitive functions negatively affected by stereotype threat. Executive functioning as a whole has been linked to the dorsolateral frontal cortex of the brain with a primary track to the dorsolateral head of the caudate nucleus. This part of the brain is directly connected with emotion networks, decision making, planning, working memory, reasoning, problem-solving and abstract thinking⁴. Executive functioning is the mental procedure that enables the brain to plan, remember instructions, focus attention and balance multiple tasks successfully. Executive functioning is considered a higher order cognitive ability as it entails reasoning and problem solving, meaning the collaboration of multiple intricate functions whether it be sensory, perceptual, or attentional. In summary, executive functioning is the brain's organizing power and it can become stressed when a person is concerned about their performance or how they are being assessed and perceived by others in a social situation.

4.2 Relationship between Stereotype Threat and Cognitive Functioning

Because cognitive ability, after taking into account genetic influence, is found to be extremely malleable throughout adolescence into adulthood, it is susceptible to influence from social situations which allows stereotype threat to influence cognitive ability. Stereotype threat directly creates physiological stress due to the critical examination by others¹⁴. When being constantly subjected to this stress of social evaluation, people often tend to have a negative emotional response and negative self-thoughts that must be repressed in order to concentrate. This repression takes a toll on the brain as the cognitive resources needed for attention and working memory are being drained, directly impacting executive functioning². Because executive functioning is strained between the dual tasks of organizing higher order cognitive functions and managing self-perceptions, a person's measured intelligence will appear lower than it really is². Thus, people of color are prone to their intelligence being underestimated on an analytical level due to stereotype threat.

Small initial differences in the environment, such as social cues, could reinforce stressors and create a preliminary rift. For example, being the only person of color in a testing environment activates negative stereotypes about ability, reinforcing stereotype threat. The social environment affects how humans (social creatures) perceive that they are being judged. By the same logic, an environment that is more diverse and welcoming to people from a variety of backgrounds can help people feel more comfortable, less socially judged, and increase performance, nourishing their ability¹⁴. From the context of examining stereotype threat, if a child of color is immediately rejected in environments that do not fit their stereotypes, they are more likely to grow up with more self-engrained stereotyping as opposed to if they were treated the same as other children.

Under the umbrella of stereotype threat, there are several ways the brain acknowledges and responds to it; one of those is stereotype priming. Stereotype priming is when one has the urge to either completely disassociate from the stereotypes put in place, or feels the need to rigidly align with them (this is usually dependent on the type of stereotype presented). This can easily hinder an individual from reaching their maximum potential due to extra stress, burden, and backlash. In this way, stereotype threat leads to underestimation of cognitive ability¹⁴. Because stereotype threat can lead to underperformance on cognitive tests, which then has implications for gifted and talented programs, college admissions, and job access, indirectly stereotype threat changes what is available to individuals in the world.

4.3 Real World Implications of Stereotype Threat

4.3.1 Effect of Stereotype Threat

In today's world, standardized tests are heavily used for academic and career advancement. However, results on these tests, as demonstrated throughout this paper, are susceptible to stereotype threat and therefore disadvantage minoritized individuals. While stereotype threat can hinder people's perceptions of what they themselves are capable of, the same stereotypes perpetuating stereotype threat can also negatively affect how people in positions of power, such as college admissions committees, evaluate their students' potential. If this is what someone is surrounded by in their environment, it can affect how they present themselves and their cognitive development and functioning.

Stereotype threat pertains to the risk of validating negative stereotypes related to an individual's racial, ethnic, gender, or cultural background. This risk can lead to heightened cognitive load, undermining academic concentration and performance. Negative stereotypes erode this belief, diminishing the prospects of academic success. When students feel uncertain about their place in the classroom, they become attuned to environmental cues indicating their acceptance and may worry about reinforcing group-based stereotypes. This heightened vigilance and added stress deplete cognitive resources necessary for learning, influencing their performance and dampening their enthusiasm for forming valuable connections¹⁰.

4.3.2 Potential Strategies

Because negative stereotypes continue to affect the futures and opportunities available to students, it is important to continue policies that are currently under threat, such as affirmative action policies, that aim to increase access to higher education for historically underserved groups. While there is a danger that policies such as affirmative action can in fact reinforce the negative stereotypes they aim to dismantle, evidence also suggests that there are ways to mitigate this by providing students with psychological and social support⁶. For example, it has been shown that affirmative action policies can reinforce stereotypes that students of color are less intelligent and capable, rendering them less valuable to institutions⁶. However, there is also evidence that these unintended consequences of affirmative action policies can be addressed by interventions that challenge implicit biases and provide social and psychological support for minority students^{6,10}.

To address the challenge of stereotype threat in educational settings, it is imperative for individuals to cultivate awareness of their own implicit biases—unconscious attitudes or stereotypes towards diverse groups¹⁰. This can reduce the negative social evaluation pressures students feel in testing situations. One way to address the stereotypes and implicit race-based associations that people hold is through the Harvard Implicit Association Test (IAT). The IAT is a social psychology test that gauges a person's instinctive first associations to certain groups of people (see <https://implicit.harvard.edu/implicit/> for more information). The IAT gauges attitudes and beliefs that individuals may not readily acknowledge consciously. It assesses personal associations linked to concepts such as race or gender¹⁰.



Students who possess a strong sense of belonging within a learning community, along with recognition and support from educators and peers, exhibit enhanced classroom engagement¹⁰. This sense of belonging fosters active participation in discussions, facilitates relationship building, encourages receptivity to feedback, and bolsters resilience in the face of challenges¹⁰.



References

1. C.R. Logel, G.M. Walton, S.J. Spencer, J. Peach and Z.P. Mark. Unleashing latent ability: Implications of stereotype threat for college admissions. *Educational Psychologist*, **47(1)**, pp.42-50 (2012).
2. G.M. Walton, M.C. Murphy and A.M. Ryan. Stereotype threat in organizations: Implications for equity and performance. *Annu. Rev. Organ. Psychol. Organ. Behav.*, **2(1)**, pp.523-550 (2015).
3. H. VanLandingham, R.L. Ellison, A. Laique, A. Cladek, H. Khan, C. Gonzalez, and M.R. Dunn. A scoping review of stereotype threat for BIPOC: Cognitive effects and intervention strategies for the field of neuropsychology. *The Clinical Neuropsychologist*, **36(2)**, pp.503-522 (2022).
4. J.A. Alvarez and E. Emory. Executive function and the frontal lobes: a meta-analytic review. *Neuropsychology review*, **16**, pp.17-42 (2006).
5. M. Inzlicht and T. Schmader eds. *Stereotype threat: Theory, process, and application*. Oxford University Press (2012).
6. M.J. Fischer and D.S. Massey. The effects of affirmative action in higher education. *Social Science Research*, **36(2)**, pp.531-549 (2007).
7. P.D. Harvey, Domains of cognition and their assessment. *Dialogues in clinical neuroscience* (2022).
8. P.L. Mason, Race, cognitive ability, and wage inequality. *Challenge*, **41(3)**, pp.63-84 (1998).
9. R.J. Rydell, K.J. Van Loo and K.L. Boucher. Stereotype threat and executive functions: which functions mediate different threat-related outcomes?. *Personality and Social Psychology Bulletin*, **40(3)**, pp.377-390 (2014).
10. *Stereotype threat Center for Teaching & Learning*. Available at: <https://www.colorado.edu/center/teaching-learning/inclusivity/stereotype-threat> (2023).
11. 'Whistling Vivaldi' and beating stereotypes NPR. Available at: <https://www.npr.org/2010/04/12/125859207/whistling-vivaldi-and-beating-stereotypes> (2010).
12. T. Schmader, M. Johns and C. Forbes. An integrated process model of stereotype threat effects on performance. *Psychological review*, **115(2)**, p.336 (2008)
13. T. Schmader and S. Beilock. An integration of processes that underlie stereotype threat. *Stereotype threat: Theory, process, and application*, pp.34-50 (2012).
14. W.T. Dickens, Cognitive ability. The new Palgrave dictionary of economics. *Steve Durlauf ed* (2008).