Stereotype threat

Stereotype threat is a situational predicament in which people are or feel themselves to be at risk of conforming to stereotypes about their social group.[1][2] Since its introduction into the academic literature, stereotype threat has become one of the most widely studied topics in the field of social psychology.[3] Stereotype threat has been shown to reduce the performance of individuals who belong to negatively stereotyped groups.[4][5] If negative stereotypes are present regarding a specific group, group members are likely to become anxious about their performance, which may hinder their ability to perform at their maximum level. Importantly, the individual does not need to subscribe to the stereotype for it to be activated. It is hypothesized that the mechanism through which anxiety (induced by the activation of the stereotype) decreases performance is by depleting working memory (especially the phonological aspects of the working memory system).[6]

However, studies showing stereotype threat have been criticized for exaggerating its importance as an explanation of real-world performance gaps[7][8] and misrepresenting evidence as more conclusive than it is.[9][10] Several reviews have voiced concerns that the effect has been over-estimated and that the field suffers from publication bias.[11]

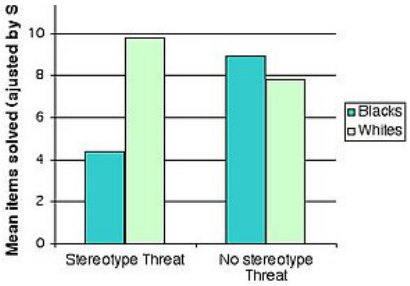
Stereotype threat is a potential contributing factor to long-standing racial and gender gaps in academic performance. It may occur whenever an individual's performance might confirm a negative stereotype because stereotype threat is thought to arise from a particular situation, rather than from an individual's personality traits or characteristics. Since most people have at least one social identity which is negatively stereotyped, most people are vulnerable to stereotype threat if they encounter a situation in which the stereotype is relevant. Situational factors that increase stereotype threat can include the difficulty of the task, the belief that the task measures their abilities, and the relevance of the stereotype to the task. Individuals show higher degrees of stereotype threat on tasks they wish to perform well on and when they identify strongly with the stereotyped group. These effects are also increased when they expect discrimination due to their identification with a negatively stereotyped group.[12] Repeated experiences of stereotype threat can lead to a vicious circle of diminished confidence, poor performance, and loss of interest in the relevant area of achievement.[13]

The opposite of stereotype threat is **stereotype boost**, which is when people perform better than they otherwise would have, because of exposure to positive stereotypes about their social group. A variant of stereotype boost is **stereotype lift**, which is people achieving better performance because of exposure to negative stereotypes about other social groups.[1]

Original study

In 1995, Claude Steele and Joshua Aronson performed the first

experiments demonstrating that stereotype threat can undermine intellectual performance.[2] They had African-American and European-American college students take a difficult verbal portion of the Graduate Record Examination test. As would be expected based on national averages, the African-American students did not perform as well on the test. Steele and Aronson split students into three groups: stereotype-threat (in which the test was described as being "diagnostic of intellectual ability"), non-stereotype threat (in which the test was described as "a laboratory problem-solving task that was nondiagnostic of ability"), and a third condition (in which the test was again described as nondiagnostic of ability, but participants were asked to view the difficult test as a challenge). All three groups received the same test.



"The Effects of Stereotype Threat on the Standardized Test Performance of College Students (adjusted for group differences on SAT)". From J. Aronson, C.M. Steele, M.F. Salinas, M.J. Lustina, *Readings About the Social Animal*, 8th edition, ed. E. Aronson

Adjusted for previous SAT scores, subjects in the non-diagnostic-challenge condition performed significantly better than those in the non-diagnostic-only condition and those in the diagnostic condition. In the first experiment, the race-by-condition interaction was marginally significant. However, the second study reported in the same paper found a significant interaction effect of race and condition. This suggested that placement in the diagnostic condition significantly impacted African Americans compared with European Americans.[2]

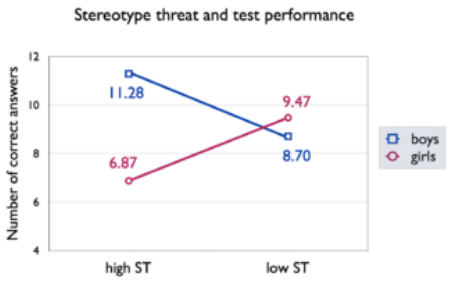
Steele and Aronson concluded that changing the instructions on the test could reduce African-American students' concern about confirming a negative stereotype about their group. Supporting this conclusion, they found that African-American students who regarded the test as a measure of intelligence had more thoughts related to negative stereotypes of their group. Steele and Aronson measured this through a word completion task. They found that African Americans who thought the test measured intelligence were more likely to complete word fragments using words associated with relevant negative stereotypes (e.g., completing "__mb" as "dumb" rather than as "numb").[2]

Further empirical studies

More than 300 published papers show the effects of stereotype threat on performance in a variety of domains.[14] The strength of the stereotype threat that occurs depends on how the task is framed. If a task is framed to be neutral, stereotype threat is not likely to occur; however, if tasks are framed in terms of active stereotypes, participants are likely to perform worse on the task. For example, a study on chess players revealed that female players performed more poorly than expected when they were told they would be

playing against a male opponent. In contrast, women who were told that their opponent was female performed as would be predicted by past ratings of performance.[15] Female participants who were made aware of the stereotype of females performing worse at chess than males performed worse in their chess games.

Researchers Vishal Gupta, Daniel Turban, and Nachiket Bhawe extended stereotype threat research to entrepreneurship, a traditionally male-stereotyped profession. Their study revealed that stereotype threat can depress women's entrepreneurial intentions while boosting men's intentions. However, when entrepreneurship is presented as a gender-neutral profession, men and women express a similar level of interest in becoming entrepreneurs.[16] Another experiment involved a golf game which was described as a test of "natural athletic ability" or of "sports intelligence". When it was described as a test of athletic ability, European-American students performed worse, but when the description mentioned intelligence, African-American students performed worse.[17]



The effect of stereotype threat (ST) on math test scores for girls and boys. Data from Osborne (2007).[18]

Other studies have demonstrated how stereotype threat can negatively affect the performance of European Americans in athletic situations[19] as well as the performance of men who are being tested on their social sensitivity.[20] Although the framing of a task can produce stereotype threat in most individuals, certain individuals appear to be more likely to experience stereotype threat than others. Individuals who highly identify with a particular group appear to be more vulnerable to experiencing stereotype threat than individuals who do not identify strongly with the stereotyped group.

The mere presence of other people can evoke stereotype threat. In one experiment, women who took a mathematics exam along with two other women got 70% of the answers right, whereas women who took the same exam in the presence of two men got an average score of 55%.[21]

The goal of a study conducted by Desert, Preaux, and Jund in 2009 was to see if children from lower socioeconomic groups are affected by stereotype threat. The study compared children that were 6–7 years old with children that were 8–9 years old from multiple elementary schools. These children were presented with the Raven's Matrices test, which is an intellectual ability test. Separate groups of children were given directions in an evaluative way and

other groups were given directions in a non-evaluative way. The "evaluative" group received instructions that are usually given with the Raven Matrices test, while the "non-evaluative" group was given directions which made it seem as if the children were simply playing a game. The results showed that third graders performed better on the test than the first graders did, which was expected. However, the lower socioeconomic status children did worse on the test when they received directions in an evaluative way than the higher socioeconomic status children did when they received directions in an evaluative way. These results suggested that the framing of the directions given to the children may have a greater effect on performance than socioeconomic status. This was shown by the differences in performance based on which type of instructions they received. This information can be useful in classroom settings to help improve the performance of students of lower socioeconomic status.[22]

There have been studies on the effects of stereotype threat based on age. A study was done on 99 senior citizens ranging in age from 60–75 years. These seniors were given multiple tests on certain factors and categories such as memory and physical abilities, and were also asked to evaluate how physically fit they believe themselves to be. Additionally, they were asked to read articles that contained both positive and negative outlooks about seniors, and they watched someone reading the same articles. The goal of this study was to see if priming the participants before the tests would affect performance. The results showed that the control group performed better than those that were primed with either negative or positive words prior to the tests. The control group seemed to feel more confident in their abilities than the other two groups.[23]

Cleopatra Abdou and Adam Fingerhut were the first to develop experimental methods to study stereotype threat in a health care context,[24] including the first study indicating that health care stereotype threat is linked with adverse health outcomes and disparities.[25][26]

Stereotype lift and stereotype boost

Stereotype threat concerns how stereotype cues can harm performance. However, in certain situations, stereotype activation can also lead to performance enhancement through stereotype lift or stereotype boost. Stereotype lift increases performance when people are exposed to negative stereotypes about another group.[27] This enhanced performance has been attributed to increases in self-efficacy and decreases in self-doubt as a result of negative outgroup stereotypes.[27] Stereotype boost suggests that positive stereotypes may enhance performance.[28] Stereotype boost occurs when a positive aspect of an individual's social identity is made salient in an identity-relevant domain. Although stereotype boost is similar to stereotype lift in enhancing performance, stereotype lift is the result of a negative outgroup stereotype, whereas stereotype boost occurs due to activation of a positive ingroup stereotype.[28]

Consistent with the positive racial stereotype concerning their superior quantitative skills, Asian American women performed better on a math test when their Asian identity was primed compared to a control condition where no social identity was primed. Conversely, these participants did worse on the math test when instead their gender identity—which is associated with stereotypes of inferior quantitative skills—was made salient, which is consistent with stereotype threat.[29][30] Two replications of this result have been attempted. In one case, the effect was only reproduced after excluding participants who were unaware of stereotypes about the mathematical abilities of Asians or women,[31] while the other replication failed to reproduce the original results even considering several moderating variables.[32]

Mechanisms

Although numerous studies demonstrate the effects of stereotype threat on performance, questions remain as to the specific cognitive factors that underlie these effects. Steele and Aronson originally speculated that attempts to suppress stereotype-related thoughts lead to anxiety and the narrowing of attention. This could contribute to the observed deficits in performance. In 2008, Toni Schmader, Michael Johns, and Chad Forbes published an integrated model of stereotype threat that focused on three interrelated factors:

1. stress arousal;
2. performance monitoring, which narrows attention; and,
3. efforts to suppress negative thoughts and emotions.[3]

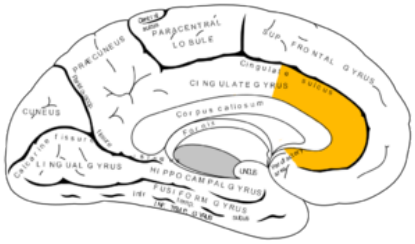
Schmader et al. suggest that these three factors summarize the pattern of evidence that has been accumulated by past experiments on stereotype threat. For example, stereotype threat has been shown to disrupt working memory and executive function,[33][34] increase arousal,[35] increase self-consciousness about one's performance,[36] and cause individuals to try to suppress negative thoughts as well as negative emotions such as anxiety.[37] People have a limited amount of cognitive resources available. When a large portion of these resources are spent focusing on anxiety and performance pressure, the individual is likely to perform worse on the task at hand.

A number of studies looking at physiological and neurological responses support Schmader and colleagues' integrated model of the processes that produce stereotype threat. Supporting an explanation in terms of stress arousal, one study found that African Americans under stereotype threat exhibit larger increases in arterial blood pressure.[38] One study found increased cardiovascular activation amongst women who watched a video in which men outnumbered women at a math and science conference.[39] Other studies have similarly found that individuals under stereotype threat display increased heart rates.[40] Stereotype threat may also activate a neuroendocrine stress response, as measured by increased levels of cortisol

while under threat.[41] The physiological reactions that are induced by stereotype threat can often be subconscious, and can distract and interrupt cognitive focus from the task.

With regard to performance monitoring and vigilance, studies of brain activity have supported the idea that stereotype threat increases both of these processes. Forbes and colleagues recorded electroencephalogram (EEG) signals that measure electrical activity along the scalp, and found that individuals experiencing stereotype threat were more vigilant for performance-related stimuli.[42]

Another study used functional magnetic resonance imaging (fMRI) to investigate brain activity associated with stereotype threat. The researchers found that women experiencing stereotype threat while taking a math test showed heightened activation in the ventral stream of the anterior cingulate cortex (ACC), a neural region thought to be associated with social and emotional processing.[43] Wraga and colleagues found that women under stereotype threat showed increased activation in the ventral ACC and that the amount of this activation predicted performance decrements on the task.[44] When individuals were made aware of performance-related stimuli, they were more likely to experience stereotype threat.



Researchers found that women experiencing stereotype threat while taking a math test showed heightened activation in the ventral stream of the anterior cingulate cortex (ACC).

A study conducted by Boucher, Rydell, Loo, and Rydell has shown that stereotype threat not only affects performance, but can also affect the ability to learn new information. In the study, undergraduate men and women had a session of learning followed by an assessment of what they learned. Some participants were given information intended to induce stereotype threat, and some of these participants were later given "gender fair" information, which it was predicted would reduce or remove stereotype threat. As a result, participants were split into four separate conditions: control group, stereotype threat only, stereotype threat removed before learning, and stereotype threat removed after learning. The results of the study showed that the women who were presented with the "gender fair" information performed better on the math related test than the women who were not presented with this information. This study also showed that it was more beneficial to women for the "gender fair" information to be presented prior to learning

rather than after learning. These results suggest that eliminating stereotype threat prior to taking mathematical tests can help women perform better, and that eliminating stereotype threat prior to mathematical learning can help women learn better.[45]

Long-term and other consequences

Further information: Minority stress § Health outcomes

Decreased performance is the most recognized consequence of stereotype threat. However, research has also shown that stereotype threat can cause individuals to blame themselves for perceived failures,[46] self-handicap,[2] discount the value and validity of performance tasks,[47] distance themselves from negatively stereotyped groups,[48] and disengage from situations that are perceived as threatening.[49]

In the long run, the chronic experience of stereotype threat may lead individuals to disidentify with the stereotyped group. For example, a woman may stop seeing herself as "a math person" after experiencing a series of situations in which she experienced stereotype threat. This disidentification is thought to be a psychological coping strategy to maintain self-esteem in the face of failure.[50] Repeated exposure to anxiety and nervousness can lead individuals to choose to distance themselves from the stereotyped group.

Although much of the research on stereotype threat has examined the effects of coping with negative stereotype on academic performance, recently there has been an emphasis on how coping with stereotype threat could "spillover" to dampen self-control and thereby affect a much broader category of behaviors, even in non-stereotyped domains.[51] Research by Michael Inzlicht and colleagues suggest that, when women cope with negative stereotype about their math ability, they perform worse on math tests, and that, after completing the math test, women may continue to show deficits even in unrelated domains. For example, women might overeat, be more aggressive, make more risky decisions,[51] and show less endurance during physical exercise.[34]

The perceived discrimination associated with stereotype threat can also have negative long-term consequences on individuals' mental health. Perceived discrimination has been extensively investigated in terms of its effects on mental health, with a particular emphasis on depression.[52] Cross-sectional studies involving diverse minority groups have found that individuals who experience more perceived discrimination are more likely to exhibit depressive symptoms.[52][53] Additionally, perceived discrimination has also been found to predict depressive symptoms in children and adolescents.[54] [55] Other negative mental health outcomes associated with perceived discrimination include a reduced general well-being, post-traumatic stress disorder, anxiety, and rebellious behavior.[52] A meta-analysis conducted by Pascoe and Smart Richman has shown that the strong link between perceived discrimination and negative mental health persists even after controlling for factors such as education, socioeconomic status, and employment.[56]

Mitigation

Additional research seeks ways to boost the test scores and academic achievement of students in negatively stereotyped groups. In one study, teaching college women about stereotype threat and its effects on performance was sufficient to eliminate the predicted gender gap on a

difficult math test.[57] Making people aware of the fact that they will not necessarily perform worse despite the existence of a stereotype can boost their performance.

However, other research has found the opposite effect. In one study, women were given a text "summarizing an experiment in which stereotypes, and not biological differences, were shown to be the cause of women's

underperformance in math", and then they performed a math exercise. It was found that "women who properly understood the meaning of the information provided, and thus became knowledgeable about stereotype threat, performed significantly worse at a calculus task".[58]

Another approach involves persuading participants that intelligence is malleable and can be increased through effort. If people believe that they can improve their performance based on effort, they are more likely to believe that they can overcome negative stereotypes and perform well.[59][60]

A third type of intervention involves having participants engage in self-affirmation, which is a process in which participants write about a value that is important to them. In 2006, researchers Geoffrey L. Cohen, Julio Garcia, Nancy Apfel, and Allison Master found that a self-affirmation exercise (in the form of a brief in-class writing assignment) significantly improved the grades of African-American middle-school students, and reduced the racial achievement gap by 40%. Cohen et al. have suggested that the racial achievement gap could be at least partially ameliorated by brief and targeted social-psychological interventions.[61] One such intervention was attempted with UK medical students, who were given a written assignment and a clinical assessment. For the written assignment group, white students performed worse than minority students. For the clinical assessment, both groups improved their performance maintaining the racial difference.[62] Allowing participants to think about a positive value or attribute about themselves prior to completing the task seemed to make them less susceptible to stereotype threat.

A fourth intervention for stereotype threat involves increasing participants' feelings of social belonging within the academic world. Greg Walton and Geoffrey Cohen were able to boost the grades of African-American college students, as well as eliminate the racial achievement gap over the first year of college, by telling participants that concerns about social belonging tend to lessen over time.[63] Allowing individuals to feel as though they are welcomed into a desirable group makes them more likely to ignore stereotypes. If minority college students are welcomed into the world of academia, they are less likely to be influenced by the negative stereotypes of poor minority performance on academic tasks.

Criticism

The stereotype threat explanation of achievement gaps has attracted criticism. According to Paul R. Sackett, Chaitra M. Hardison, and Michael J.

Cullen, both the media and scholarly literature have wrongly concluded that eliminating stereotype threat could completely eliminate differences in test performance between European Americans and African Americans.[7] Sackett et al. have pointed out that, in Steele and Aronson's (1995) experiments where stereotype threat was removed, an achievement gap of approximately one standard deviation remained between the groups, which is very close in size to that routinely reported between African American and European Americans' average scores on large-scale standardized tests such as the SAT. In subsequent correspondence between Sackett et al. and Steele and Aronson, Sackett et al. wrote that "They [Steele and Aronson] agree that it is a misinterpretation of the Steele and Aronson (1995) results to conclude that eliminating stereotype threat eliminates the African American-White test-score gap."[8]

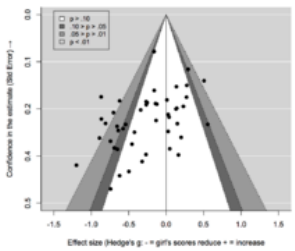
Arthur R. Jensen criticised stereotype threat theory on the basis that it invokes an additional mechanism to explain effects which could be, according to him, explained by other, well-known, and well-established theories, such as test anxiety and especially the Yerkes–Dodson law.[64] In Jensen's view, the effects which are attributed to stereotype threat may simply reflect "the interaction of ability level with test anxiety as a function of test complexity".[65] However Diamond *et al* state "that one problem with the Yerkes-Dodson law is that it invokes an ill-defined distinction between 'simple' versus 'complex' tasks.", they go on to say, "Yerkes and Dodson may have the dubious distinction to be the most highly cited, but largely unread, paper in the history of science."[66]

In 2009,[67] Wei examined real-world testing over a broad population (rather than lab assessments with questionable external validity), and found the opposite of stereotype threat: randomly assigned gendered questions actually raised female students' scores by 0.05 standard deviations. The lack of stereotype threat replicates an earlier large experiment with Advanced Placement exams which found no stereotype threat.[68]

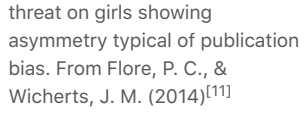
Gijsbert Stoet and David C. Geary reviewed the evidence for the stereotype threat explanation of the achievement gap in mathematics between men and women. They concluded that the relevant stereotype threat research has many methodological problems, such as not having a control group, and that the stereotype threat literature on this topic misrepresents itself as "well established". They concluded that the evidence is in fact very weak.[9]

Failures to replicate and publication bias

Whether the effect occurs at all has also been questioned, with researchers failing to replicate the finding. Flore and Wicherts concluded the reported effect is small, but also that the field is inflated by publication bias. They argue that, correcting for this, the most likely true effect size is near zero (see meta-analytic plot, highlighting both the restriction of large effect to low



both the restriction of large effect to low-powered studies, and the plot asymmetry which occurs when publication bias is active).[11]



Meta-analysis of stereotype threat on girls showing asymmetry typical of publication bias. From Flore, P. C., & Wicherts, J. M. (2014)[11]

Earlier meta-analyses reached similar conclusions. For instance, Ganley et al. (2013)[10] examined stereotype threat on mathematics test performance. They report a series of 3 studies, with a total sample of 931 students. These included both childhood and adolescent subjects and three activation methods, ranging from implicit to explicit. While they found some evidence of gender differences in math, these occurred regardless of stereotype threat. Importantly, they found "no evidence that the mathematics performance of school-age girls was impacted by stereotype threat". In addition, they report that evidence for stereotype threat in children appears to be subject to publication bias. The literature may reflect selective publication of false-positive effects in underpowered studies, where large, well-controlled studies find smaller or non-significant effects:[10]

> nonsignificant findings were almost always reported in an article along with some significant stereotype threat effects found either at another age (Ambady et al., 2001; Muzzatti & Agnoli, 2007), only with certain students (Keller, 2007), on certain items (Keller, 2007; Neuville & Croizet, 2007), or in certain contexts (Huguet & Regner, 2007, Study 2; Picho & Stephens, 2012; Tomasetto et al., 2011). Importantly, none of the three unpublished dissertations showed a stereotype threat effect. This observation suggests the possibility that publication bias is occurring. Publication bias refers to the fact that studies with null results are often not written up for publication or accepted for publication (Begg, 1994). This bias is a serious concern, especially if these results are being used to make recommendations for interventions.

In a study designed to see whether incentives could overcome stereotype threat in mathematics tests, Fryer Levitt and List (2008)[69] could not replicate the stereotype threat, finding instead a modest facilitation effect of threat for males and females.

Several attempts to replicate Cohen et al.'s 2006 and subsequent experiments using larger sample sizes have failed to reproduce Cohen's impressive results associated with the use of self-affirmation exercises by African-American students. One experiment by Paul Hanselman using Cohen's methodology showed only a negligible 0.065 increase in GPA, while an even larger experiment demonstrated no increases in achievement at all.[70]

See also

- Intergroup anxiety
- Pygmalion effect
- Self-fulfilling prophecy
- Thin-slicing

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Further reading

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External links

- *Claude Steele on stereotype threat*. Stanford University, November 17, 2011.
- Reducing Stereotype Threat
- Can stereotype threat explain the sex gap in mathematics achievement and performance? – Video by Gijsbert Stoet, University of Leeds, hosted by YouTube.com