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Stereotype Boost and Stereotype Threat Effects: The Moderating Role of Ethnic Identification

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Abstract
Belonging to a stereotyped social group can affect performance in stereotype-relevant situations, often shifting performance in the direction of the stereotype. This effect occurs similarly for members of positively and negatively stereotyped groups (i.e., stereotype boost and stereotype threat, respectively). This study examined ethnic group identification as a moderator of these effects in the math performance of Asian Americans and Latinos, who are positively and negatively stereotyped in this domain, respectively. Results showed that high ethnically identified Asian Americans performed better and high ethnically identified Latinos performed worse when an ethnicity– ethnic stereotype cue was present. The performance of low ethnically identified Asian Americans and Latinos was not affected by this cue.

Keywords: stereotype threat, stereotype boost, ethnic identification, self-categorization

Simply being a member of a stereotyped group can affect performance on stereotype-relevant tasks (i.e., tasks for which the stereotype might apply). Specifically, when a stereotyped group identity and the associated group stereotypes are made salient, performance tends to shift in the direction of the stereotype. This occurs similarly for members of positively and negatively stereotyped groups. For example, Shih, Pittinsky, and Ambady (1999) showed that Asian women performed better on a math exam when their ethnic identity was made salient (a stereotype boost effect; Shih, Ambady, Richeson, Fujita, & Gray, 2002) but performed worse on this exam when their gender identity was made salient (a stereotype threat effect; Aronson & Steele, 1995), consistent with the respective stereotypes about these groups.

The psychological mechanisms that account for these effects have been and continue to be debated (e.g., Steele, Spencer, & Aronson, 2002; Wheeler & Petty, 2001). In general, however, stereotype threat is believed to result from increased concerns about being evaluated in terms of a negative group stereotype (Steele, 1997; Steele et al., 2002), whereas stereotype boost is believed to result from an ideomotor process in which the mere thought of an action, even if only at a nonconscious level, increases the tendency to engage in that action (Dijksterhuis, Bargh, & Zanna, 2001; Wheeler & Petty, 2001). Regardless of the underlying mechanisms, research has clearly demonstrated that the stereotype boost and stereotype threat effects occur when an environmental cue makes a group identity or the associated group stereotypes personally salient, ostensibly leading to the cognitive activation of that identity and the associated stereotypes (e.g., Shih et al., 2002; Steele & Aronson, 1995). Thus, factors that increase the tendency that a stereotyped identity will become personally salient and cognitively activated should increase susceptibility to these effects.

Self-categorization theory (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) suggests that individuals who subjectively identify with their group are more likely to cognitively activate their group identity in the presence of identity-relevant cues (Spears, Doosje, & Ellemers, 1999). This perspective suggests that the stereotype boost and stereotype threat effects should be more pronounced among individuals who strongly identify with their stereotyped group. In this study, I tested this prediction by examining the math performance of Asian Americans, who are stereotypically viewed as mathematically talented (Niemann, Jennings, Rozelle, & Baxter, 1994), and Latinos, who are stereotypically viewed as academically inept (Hunt & Espinoza, 2007), as a function of ethnic identification and a situational cue that implicates their ethnicity and the associated ethnic group stereotypes regarding their group's ability.

In contrast to self-categorization theory, it is possible that ethnic group identification will reduce or even reverse the stereotype boost effect. For example, highly ethnically identified Asian Americans may feel greater pressure to confirm the positive group stereotype as a means of maintaining a positive social identity (Tajfel & Turner, 1979). Ironically, this additional pressure may negatively affect their performance (Wheeler & Petty, 2001). Alternatively, because the ethnic group stereotype is positive, high and low ethnically identified Asian Americans may benefit equally from situational cues that implicate their stereotyped identity. No studies have examined the role of group identification in the stereotype boost effect; thus, this study provides an important examination of how group identification affects susceptibility to this effect.

There is preliminary evidence that group identification increases susceptibility to the stereotype threat effect. Specifically, Schmader (2002) showed that women high in gender

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identification were more vulnerable to the stereotype threat effect in mathematics. In contrast to these findings, and the prediction drawn from self-categorization theory, it is possible that ethnic identification functions differently than gender identification in the stereotype threat effect. Indeed, a large body of research has demonstrated that ethnic identification can buffer the negative effects associated with ethnic-based societal devaluation and rejection (e.g., Armenta & Hunt, 2009; Armenta, Knight, Carlo, & Jacobson, 2008; Romero & Roberts, 2003; Umaña-Taylor & Updegraff, 2007). Thus, ethnic identification may in fact protect Latinos from the stereotype threat effect. No studies have examined the role of ethnic identification in the stereotype threat effect; thus, this study stands to make an important addition to the literature.

Method

Study Overview

This study was conducted in two sessions. During the first session, Asian American and Latino undergraduate students completed a measure of ethnic identification and math identification. Math identification has been shown to moderate the stereotype boost and stereotype threat effects and was thus also assessed. During the second session, which took place 1–2 weeks later, participants completed a difficult math exam. Before taking this exam, participants were randomly assigned to one of two ethnicity–ethnic stereotype cue conditions: an experimental condition in which an ethnicity–ethnic stereotype cue was present and a control condition in which this cue was not present.

Participants

One hundred six Asian American (n = 66) and Latino (n = 40) undergraduate students from a public Southern California university participated in this study for course credit. This sample consisted of 46 men and 60 women, with an average age of 20.5 years (SD = 2.65).

Session 1: Recruitment and Measure Completion

Participants were recruited from introductory psychology courses for a study ostensibly examining the use of paper-based and computer-based testing methods. Participants read and signed an informed consent form, provided demographic information, and completed several measures, including measures of ethnic identification and math identification. Additional measures (e.g., self-esteem) served as fillers. No mention was made at this point that participants would be completing a math test during the second session.

Ethnic identification was measured with the Affirmation and Belonging subscale of the Multi-Group Ethnic Identity Measure (Phinney, 1992), which assesses the degree to which an individual feels positively attached to his or her ethnic group. Participants responded to seven items, such as "I have a strong sense of belonging to my ethnic group," on a 5-point scale, anchored by 1 (*strongly disagree*) and 5 (*strongly agree*). These items formed a reliable scale (α = .89).

Math identification was assessed with the Math Identification subscale of the Domain Identification Measure (J. L. Smith & White, 2001). This nine-item measure assesses the degree to which math is important to one's self-concept and consists of three types of questions. Participants responded to four questions, such as "How important is it to you to be good at mathematics?" on a 5-point scale anchored by 1 (*not at all*) and 5 (*very much*). Participants also responded to four items, such as "Mathematics is one of my best subjects," on a 5-point scale anchored by 1 (*strongly disagree*) and 5 (*strongly agree*). For the final item, participants responded to the question "Compared to other students, how good are you at math?" on a 5-point scale anchored by 1 (*very poor*) and 5 (*excellent*). These items formed a reliable scale (α = .92).

After completing the measures, participants were invited to return to a second session. Those who agreed to return provided a nondescriptive identification number and signed up for the second session. Course credit was given separately for the completion of each session.

Session 2: Experimental Procedure

The second session took place in a medium-sized computer lab (approximately 25 private computer stations), outside of class time. The racial composition of the testing sessions was not controlled or recorded. However, participants had little direct contact with each other after arriving at the study. Specifically, a maximum of 12 participants were allowed to complete the study at one session so that they could be seated at least one computer station apart from other participants. I provided verbal instructions to the group as a whole. Participants were informed that they would complete a math test and were given bogus information that their group had been assigned to take the paper version of the test. In fact, all tests in this study were completed in paper format. Participants were not aware that they would be taking a math exam, specifically, until after they were seated and given verbal instructions. The study was conducted in a computer lab to maintain an environment that was consistent with the purported study.

Participants were then given a packet with the math exam enclosed. Participants were randomly assigned to receive one of two packets containing the experimental manipulation. For both packets, information for the test was included (e.g., number of items, time allowed). In the experimental condition, participants read the following sentence: "[Understanding possible difference in testing methods] is crucial as it has been claimed that these types of tests measure individuals' true intellectual ability, which historically have shown differences based on ethnic heritage."

In the control condition, this sentence was replaced with the following: "[Understanding possible difference in testing methods] is important because most standardized testing is moving toward computer methods and away from the traditional paper and pencil methods."

After reading these instructions, participants were reminded that they would have 12 min to complete the test and that it was important that they try to do their best. At this point, I started a stopwatch and advised participants that they could begin. The math test consisted of 14 questions on basic algebra and geometry, similar to questions found on the Graduate Record Exam. Each question had five response options, and participants were instructed to circle the correct answer. A total math score was computed by assigning 1 point to each correctly answered question and summing across questions.

Table 1. Means (and Standard Deviations) by Ethnicity, Gender, and Condition

	Ethnicity–ethnic stereotype cue			
	Asian Americans		Latinos	
Gender	No cue	Cue	No cue	Cue
Male	5.79 (0.51)	7.13 (0.55)	6.80 (0.96)	5.25 (0.76)
Female	4.89 (0.51)	5.93 (0.56)	5.29 (0.58)	4.69 (0.60)

Finally, participants were questioned about suspicions regarding the study. The most common response was that the study was investigating the use of computers in math exams. No participants indicated suspicion about the true purpose of the study. After questioning, participants were debriefed, thanked, and excused.

Results

On average, participants attempted 11.44 of the 14 test items (SD = 2.43) and correctly answered 5.65 of the items (SD = 2.23). Interestingly, contrary to ethnic stereotypes (Hunt & Espinoza, 2007; Niemann et al., 1994), Asian Americans did not perform significantly better (M = 5.88, SD = 2.37) than Latinos (M = 5.28, SD = 1.93), $F(1, 104) = 1.89$, $p = .18$. In addition, this sample was moderately identified with mathematics (M = 3.26, SD = 0.93) and slightly more identified with their ethnic group (M = 3.73, SD = 0.74). Also, contrary to ethnic stereotypes, Asian Americans and Latinos did not differ in their identification with math (Ms = 3.31 and 3.19, SDs = 0.93 and .93, respectively), $F(1, 104) = 0.45$, $p = .51$. However, Latinos did identify slightly more with their ethnic group (M = 3.99, SD = 0.70) than did their Asian American counterparts (M = 3.58, SD = 0.73); $F(1, 104) = 8.05$, $p = .005$. As would be expected, math identification was positively associated with math performance, $r(104) = .24$, $p = .01$; however, it did not interact with any other variables in predicting math performance. Thus, I included math identification in the primary analyses as a control variable to isolate the effect of the experimental manipulation that is not a result of previous math identity (see Thoman, White, Yamawaki, & Koishi, 2008, for a similar use of domain identification).

Some research has shown that women are susceptible to the stereotype threat effect in math performance (e.g., Schmader, 2002; Spencer, Steele, & Quinn, 1999). Thus, I considered gender as an additional factor in this study. Results showed that men performed significantly better (M = 6.24) than women (M = 5.20) on the math exam, $F(1, 104) = 5.94$, $p = .02$. However, gender did not interact with any of the other variables in the study. Thus, gender was retained in all models as a control variable. For descriptive purposes, the means and standard deviations for math score by ethnicity, ethnic identity cue condition, and gender are reported in Table 2. [1]

To test the hypotheses, I conducted a hierarchical regression analysis (Aiken & West, 1991). For this analysis, ethnic identification and math identification were centered at their means; gender, ethnicity, and ethnicity–ethnic stereotype cue conditions were contrast coded (gender: men = −1, women = 1; ethnicity: Asian American = −1, Latino = 1; ethnicity–ethnic stereotype cue: no cue = −1, cue = 1); and interaction terms were created by multiplying together the appropriate variables.

The first analysis tested the effects of ethnicity, ethnic identification, and ethnicity–ethnic stereotype cue on math performance, controlling for gender and math identification, using a three-step hierarchical regression model. In the first step, math performance was regressed on gender, math identification, ethnicity, ethnic identification, and ethnicity–ethnic stereotype cue (main effects model). The two-way interactions between ethnicity, ethnic identification, and ethnicity–ethnic stereotype cue were entered on the second step (stereotype boost–threat model). The two-way interaction between ethnicity and ethnicity–ethnic stereotype cue provides a test of the stereotype boost and stereotype threat effects. The three-way interaction between ethnicity, ethnic identification, and ethnicity–ethnic stereotype cue was entered on the final step (moderation model). This interaction provides a test of the hypothesized moderation of the stereotype boost and stereotype threat effects by ethnic identification. The results for these models are shown in Table 2.

Step 1: Main Effects Model

This model was significant ($R^2 = .12$), $F(5, 100) = 2.63$, $p = .03$. As shown in Table 3, gender and math identification were the only significant predictors and followed the same pattern as reported earlier.

Step 2: Stereotype Boost–Threat Model

The inclusion of the two-way interactions resulted in a significant increase in explained variance ($\Delta R^2 = .07$), $\Delta F(3, 97) = 2.65$, $p = .05$. The only significant interaction was between ethnicity and ethnicity–ethnic stereotype cue. I conducted follow-up tests using planned contrast analyses. To test the expected stereotype boost effect, a weight of 3 was assigned to Asian Americans in the ethnicity–ethnic stereotype cue condition and a weight of −1 was assigned to Asian Americans in the control condition and to Latinos in both conditions. I tested a second regression analysis in which the interaction term for the Ethnicity × Ethnicity–Ethnic Stereotype Cue effect was replaced with the contrast code. The contrast code was significant ($\beta = .51$, $p = .005$) and indicated that Asian Americans in the ethnicity–ethnic stereotype cue condition performed significantly better than their counterparts, thus replicating the stereotype boost effect (e.g., Shih et al., 1999). To test the expected stereotype threat effect, I assigned a weight

[1] There was an average of about 13 participants per cell for this test; thus, it is possible that no gender effects emerged because of insufficient power. I conducted a bootstrap analysis (Efron & Tibshirani, 1993) to partially address this issue. Math score was regressed on ethnicity, gender, ethnic identity cue conditions, and the two- and three-way interactions between these variables using 1,000 bootstrap samples. Consistent with the analysis of variance, the bootstrap analysis did not show any significant gender effects (Gender × Condition: $\beta = .08$, 95% confidence interval [CI] [−.34, .55]; Gender × Ethnicity: $\beta = .01$, 95% CI [−.45, .45]; Gender × Condition × Ethnicity: $\beta = .16$, 95% CI [−.23, .62]). A more focused test of the interaction between gender and ethnic identity cue conditions for each ethnic group also revealed no significant gender interactions.

of 3 to Latinos in the ethnicity–ethnic stereotype cue condition and a weight of −1 to Latinos in the control condition and to Asian Americans in both conditions. A final regression analysis showed that this contrast code was significant (β = −.45, p = .005), indicating that Latinos in the ethnicity–ethnic stereotype cue condition performed significantly worse than their counterparts, thus replicating the stereotype threat effect (e.g., Steele & Aronson, 1995).

Step 3: Moderation Model

The inclusion of the three-way interaction resulted in a significant increase in explained variance (ΔR^2 = .05), $\Delta F(1, 96)$ = 5.61, p = .02. To examine the hypothesis that ethnic identification would moderate the stereotype boost and stereotype threat effects, I conducted tests of the simple slopes of ethnicity–ethnic stereotype cue at 1 standard deviation above and below the mean of ethnic identification for each ethnic group (Aiken & West, 1991). This analysis showed that for Asian Americans, the simple effect of ethnicity–ethnic stereotype cue on math performance was significant for those who were high in ethnic identification (β = .57, p = .01) but not for those who were low in ethnic identification (β = .07, p = .67). For Latinos, the simple effect of ethnicity–ethnic stereotype cue on math performance was significant for those who were high in ethnic identification (β = −.45, p = .02) but not for those who were low in ethnic identification (β = .65, p = .63). Thus, the prediction that ethnic identification would increase vulnerability to the stereotype boost and stereotype threat effects was supported. [2]

Table 2. Hierarchical Regression Analyses Predicting Math Performance

Model	Math performance			
	b	SE	*β*	*p*
Model 1 (main effects)				
Gender	–.43	.21	–.19	.05
Math identification	.51	.23	.21	.03
Ethnicity	–.19	.23	–.08	.40
Ethnic identification	–.07	.29	–.02	.92
Ethnicity–ethnic stereotype cue	.17	.21	.08	.43
Model 2 (stereotype boost–threat model)				
Ethnicity × Ethnic Identification	.06	.30	.02	.85
Ethnicity × Ethnicity–Ethnic Stereotype Cue	–.63	.22	–.28	.01
Ethnic Identification × Ethnicity/Ethnic Stereotype Cue	.20	.33	.07	.54
Model 3 (moderation model)				
Three-way Interaction	–.82	.34	–.27	.02

Gender was coded –1 (men) and 1 (women). Ethnicity was coded –1 (Asian American) and 1 (Latino). Ethnicity– ethnic stereotype cue was coded –1 (control condition) and 1 (ethnicity– ethnic stereotype cue condition).

Discussion

The goal of this study was to examine ethnic identification as a moderator of the stereotype boost (Shih et al., 1999) and stereotype threat (Steele & Aronson, 1995) effects among Asian Americans and Latinos, respectively. Consistent with previous research, results showed that Asian Americans performed better and Latinos performed worse on a math exam when a cue implicating their ethnicity and associated ethnic group stereotypes was present, thus replicating the stereotype boost and stereotype threat effects, respectively. More important, as predicted, ethnic identification moderated the stereotype boost and stereotype threat effects. Specifically, high ethnically identified Asian Americans performed better and high ethnically identified Latinos performed worse when an ethnicity–ethnic stereotype cue was present. The math performance of Asian Americans and Latinos who did not strongly identify with their respective ethnic groups was not significantly affected by the presence of an ethnicity–ethnic stereotype cue.

The results are consistent with self-categorization theory (Turner et al., 1987), which posits that group identification increases the likelihood that a group identity will become personally salient and cognitively activated in the presence of situational cues that implicate that identity (Spears et al., 1999). There are, however, other potential explanations for these results. Specifically, it is possible that the experimental manipulation primed high and low ethnically identified individuals but that only highly identified individuals were affected by it. For example, it is possible that highly ethnically identified Asian Americans experienced greater pride and confidence in the experimental condition because of their personal attachment to the group (E. Smith, 1993). In addition, it is possible that Latinos in the experimental condition were more motivated to disconfirm the negative group stereotype to maintain a positive social identity (Tajfel & Turner, 1979). Clearly, additional research is necessary to understand exactly why group identification increases susceptibility to the stereotype boost and stereotype threat effects.

Conclusion

This study showed support for the central hypothesis that group identification increases susceptibility to the stereotype boost and stereotype threat effects among Asian Americans and Latinos, respectively. This provides initial evidence that group identification moderates the stereotype boost effect and provides converging evidence for Schmader's (2002) finding that gender identification moderates the stereotype threat effect among women, suggesting that group identification has similar effects across different stereotyped groups, regardless of the valance of the group stereotype (i.e., increases susceptibility to the stereotype boost and stereotype threat effects). These findings are consistent with the theoretical contentions of self-categorization theory and highlight an important similarity between stereotype boost and stereotype threat, which have been discussed as somewhat different phenomena (Wheeler & Petty, 2001). In addition, alternative explanations for the findings, which will need to be tested, can be derived from social identity theory (Tajfel & Turner, 1979). This

[2] I conducted a second hierarchical regression analysis to examine the effects of ethnicity, ethnicity–ethnic stereotype cue, and ethnic identification on number of items attempted, controlling for math identification and gender. None of the models in this analysis were significant, suggesting that the observed effects on overall math performance were not the result of differences in number of items attempted.

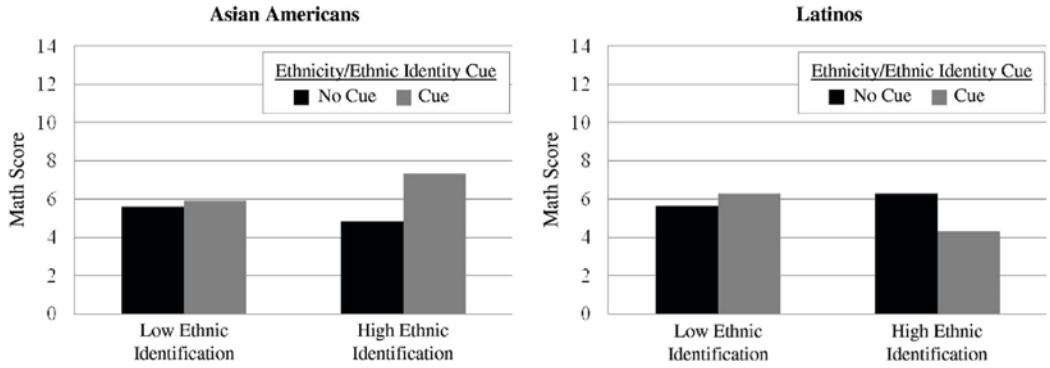

Figure 1. Moderation of stereotype boost (Asian Americans) and stereotype threat (Latinos) effects by ethnic identification.

suggests that self-categorization and social identity theories (Tajfel & Turner, 1979; Turner et al., 1987) can provide useful frameworks for further examinations of the stereotype boost and stereotype threat effects.

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