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# HIGHER SELF-ESTEEM IS LINKED TO GREATER STEREOTYPE THREAT AMONG ACADEMICALLY LOW-ACHIEVING STUDENTS

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As a stigmatized group, it seems likely that students whose level of academic achievement is low (LA students) would be vulnerable to stereotype threat. Therefore, we conducted a study on the role of stereotype threat and its possible interaction with self-esteem with 182 Chinese LA junior-high-school students. We developed a paradigm to induce stereotype threat about being LA and tested this in a pilot study, in which participants were asked to perform a mental rotation task while viewing stereotype threat information. In the main study, participants were randomly assigned to either the stereotype-threat condition or a control condition. Results showed that stereotype threat had a significant effect on LA students' performance in that (a) participants in the stereotype-threat condition performed worse than those in the control condition did, and (b) the effect of stereotype threat was greater for high self-esteem individuals than for low self-esteem individuals. There are more aspects of the topic to be explored in future studies.

*Keywords:* low academic achievement, stereotype threat, self-esteem, students.

The gap in achievement between low-achieving (LA) students and their peers has become a social issue because findings in research suggest that, compared to students who are higher achievers academically, LA students face disadvantages

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in their acquisition of knowledge and in their problem-solving skills (Kuo, Hwang, & Lee, 2012), and have more psychological and behavioral problems, including lower self-esteem, negative self-concepts, and poorer social adaptation (Md Yasin & Dzulkifli, 2009). To a large extent, these difficulties experienced by the LA students result from their poor cognitive abilities (e.g., poor working memory and executive function; Kearns & Fuchs, 2013), but the negative stereotypes that their teachers and peers hold about them are another likely contributor. Previous researchers have also shown that LA students are seen by those around them as less attractive and are often rejected by their peers (Bryan, 1974; Zhang, 2009). In addition, teachers often see LA students, compared to their classmates, as having poorer social skills and more behavior problems (Lavy, Paserman, & Schlosser, 2012). As a result of these generalizations, LA students form a group that is stigmatized (Zhang, 2009).

When a negative stereotype develops, what will happen to those LA students? One possibility is that they are likely to experience stereotype threat, which has a detrimental influence on their working memory (Steele, 1997). *Stereotype threat* occurs when a certain group of people is affected by an unconscious fear of confirming a negative stereotype concerning their performance in a particular domain (Steele, 1997). For instance, under a specific stereotype-threat condition (as compared to a no-threat condition), African-American students performed worse on intelligence tests (Sackett, Hardison, & Cullen, 2004), women performed worse on a mathematics tests (Stoet & Geary, 2012), and older adults performed worse on memory tests (Barber & Mather, 2013). Similar results have also been reported in China, including the effects of gender stereotypes (Guan & Chai, 2013), and having the status of being children of migrant workers (Mo & He, 2014). Although no research has been conducted in China to examine the possible effect of stereotype threat on LA students directly, in one previous study Zhang (2009) confirmed that middle-school students showed negative attitudes toward LA students, and that perceived stigma was associated with lower academic goals for LA students. To fill the research void, in the current study we examined the effect of stereotype threat on LA Chinese middle-school students.

As a kind of self-threat, stereotype threat may be related to self-worth or self-esteem. Researchers have explored the relationship between stereotype threat and self-worth (Stone, Lynch, Sjomeling, & Darley, 1999), and found an effect of stereotype threat on performance in an athletic task that was highly relevant to the participants' self-worth. Stone et al. (1999) looked at sport whereas in the present study we looked at academic achievement. Some researchers (i.e., Cohen & Garcia, 2005) also found that stereotype threat lowered self-esteem, but in another study the findings have not confirmed those results (i.e., Oswald & Harvey, 2000). Three studies have been conducted (Levy & Langer, 1994; Oswald & Harvey, 2000; Stone, 2002) in which the researchers also investigated

whether or not self-esteem mediated the effect of stereotype threat on task performance, and in none of these studies did the results indicate a significant mediation effect. However, to our knowledge, no study has been conducted to examine the moderating role of self-esteem in the relationship of stereotype threat and task performance. For the general population, high self-esteem is believed to be a protective factor against threats, risks, or stressors (Buckingham, Weber, & Sypher, 2012), whereas low self-esteem makes individuals vulnerable to negative effects of unfavorable feedback (Orth & Robins, 2013).

We believed that self-esteem could possibly moderate the effect of stereotype threat among LA students. On the one hand, as has been found in the studies cited above, high self-esteem can be a protective factor. On the other hand, for LA students, high self-esteem may exacerbate their vulnerability, because they feel a greater need than do their peers to enhance their self-worth (Brown, Collins, & Schmidt, 1988; Hughes & Beer, 2013), which would lead to even more anxiety and poorer performance.

In the current study we examined the effects of stereotype threat and its interaction with self-esteem on task performance among a group of Chinese middle-school LA students. We hypothesized that stereotype threat would disrupt the performance of LA students in a task involving mental rotation. In our second hypothesis we proposed that self-esteem would moderate the effect of stereotype threat on the task performance.

## Method

### Participants

For our study we selected a public three-year junior high school that was well below average (ranked 11 out of 15 junior high schools in its school district). Participants consisted of 170 students (97 boys, 73 girls) with an average age of 12.94 years ($SD$ = 0.81). Teachers at the school were asked to provide the list of students without intellectual disabilities or other diagnosed psychiatric disorders who were the lowest 15% in academic performance. We sent a letter to every parent or guardian of participants in which the study aim and procedure were explained. To obtain parental or guardians' agreement, we asked them to sign at the end of the letter and then seal the letter in an envelope. Then we collected the letters, which had been brought back to the teachers, and reviewed the signatures. The students in the participant group were then randomly assigned to either the stereotype-threat or the control group.

### Measures

**Negative stereotypes collection.** To generate statements that constituted negative stereotypes, we asked an independent sample of junior-high-school

students (two classes randomly selected from a different school, $N = 54$, with 30 boys and 23 girls and one student for whom information on gender was missing, $M_{age} = 11.53$ years) to respond to two open-ended questions about their general impressions of students with poor academic grades. Students were asked to write down as many features as possible about LA students.

We categorized students' responses about negative features into seven types of description: (a) inappropriate behaviors in class, (b) unfinished homework, (c) poor academic performance, (d) lack of learning initiative, (e) problem behaviors (i.e., hitting other students) and bad language (i.e., using insulting words), (f) poor relationships with others, and (g) negative personal features such as being lazy or stupid. From among these examples of stereotypes, we picked 13 statements to use to elicit stereotype threat. Because our focus was on the academic aspect of LA students' achievement, we chose statements mainly about poor learning performance, difficulty with finishing tasks, and poor personal and interpersonal characteristics, not about problem behaviors and use of bad language. Specifically, we used the following 13 statements: "Students with poor grades can't concentrate"; "Low-achieving students are super slow in tasks"; "Students with poor grades are not able to finish the tasks"; "Low-achieving students' answers are always wrong in examinations"; "Students with poor grades make more mistakes"; "Students with low achievement don't work hard"; "Students with poor grades can't remember what they learned"; "Low-achieving students are unwelcomed" (not invited to play or communicate with other students); "Students with poor grades are not smart"; "Low-achieving students are awkward"; "Students with low achievement are careless"; "Students with poor grades are silly/foolish"; and "Low-achieving students are not confident." These sentences were used along with a mental rotation task to elicit stereotype threat for the experimental condition (see below). For the control (or neutral) condition, we used 13 neutral sentences about objective facts irrelevant to the task or to learning, such as "Orange is a kind of fruit." The length of the sentences was matched between the two conditions.

**Mental rotation task.** We used a two-dimensional mental rotation task dependent on working memory rather than specific ability to assess the students' performance. We selected six orientations (30°, 90°, 150°, 210°, 270°, and 330°) of the stimulus, a Chinese character "习" and its mirror image "  ". Stimuli presentation was on a computer screen individually for each participant, and the task was programmed using the E-Prime 2.0 software (Psychology Software Tools, Pittsburgh, PA). The task had two phases. In Phase 1 (baseline), participants performed the mental rotation task with no statement presented. In each trial, at the top of the screen, there was "习" on the left side and "" on the right side. Participants were instructed to press the Q key if the character at the center of the screen was rotated from "习" and press the P key if it was

rotated from "". Participants were asked to respond as quickly and accurately as possible. The character stayed on the screen until participants pressed a key. The intertrial interval varied randomly within the range of 250ms to 500ms. There were 12 practice trials before the experiment. The baseline phase included 36 trials. After the baseline phase came the test phase. The mental rotation task stayed the same, except for the presentation of one of the 13 negative-stereotype statements for 1,000ms right before each trial of the mental rotation task (the statements were randomly selected and some statements appeared several times). Participants were informed that for the second part of the experiment, there would be a statement added on the screen before each trial and they were required only to read it and no response to the statement was required. Each participant completed 36 trials without practice for the test phase.

**Self-esteem.** Self-esteem was assessed with the 10-item Rosenberg Self-esteem Scale (RSES; Rosenberg, 1965). The RSES is a commonly used and well-validated measure of people's global perception of their self-worth and their general sense of self-acceptance (Robins, Hendin, & Trzesniewski, 2001). Participants indicate the extent to which they agree with each item using a 4-point Likert scale ranging from 1(*strongly agree*) to 4 (*strongly disagree*). Cronbach's alpha was .75 in the present study.

### Procedure

The study was approved by the Institutional Review Board of Renmin University of China, Beijing, China. The participants were clearly informed that data collected for this study would be used only for scientific purposes, and that they could withdraw from the study whenever they wished at their discretion. Numbers rather than names were used to distinguish among participants.

Participants first completed the mental rotation task. They then completed the RSES, as well as a form on their demographic information. Finally, participants were thanked, debriefed, and informed about the purpose of the study. After that, participants were invited to watch a 5-minute-long humorous video, for the purpose of improving their mood, and answered some items aimed at self-affirmation. It took from approximately 15 to 20 minutes for both groups.

### Data Analysis

First, to assess effect of stereotype threat on participants' performance in the mental rotation task we calculated descriptive statistics and performed analyses of variance (ANOVA). Second, to try to understand any associations of self-esteem and stereotype threat, we examined the relationships of level of stereotype threat and change in mental rotation performance. Then the interaction of condition and self-esteem was added to investigate the effect of this interaction term. All analyses were conducted using SPSS 18.0 software.

## Results

We performed a 2 (phase: baseline vs. test) × 2 (condition: stereotype threat vs. neutral) repeated measures ANOVA on the accuracy and reaction time (RT) data, with phase as a within-participant variable and condition as a between-participant variable. Although the main effect of condition did not reach significance, the expected two-way interaction of group × treatment was significant, $F(1,168) = 4.49$, $p = .04$, $\eta^2_p = .03$. (See Table 1, and Figure 1). For the baseline trials, results did not differ for the two conditions, $p > .05$, suggesting that the two groups of students were well matched. For the stereotype-threat group, results in the two phases did not differ, suggesting that RT in both phases did not change significantly, $p = .07 > .05$ . For the neutral group, test RT scores were significantly lower than baseline RT scores, $p < .001$. No significant main or interaction effects were found for the accuracy data. Therefore, our first hypothesis was supported.

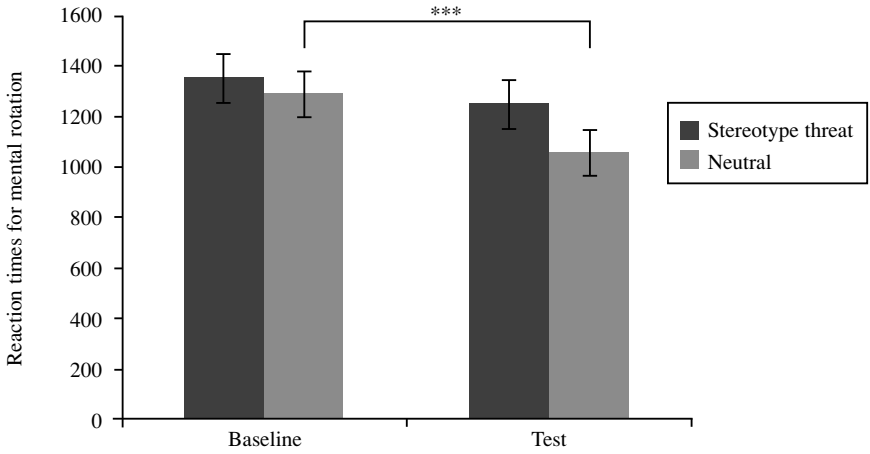


*Figure 1.* Mean reaction times for the mental rotation task by phase of trials and condition. Error bars represent standard errors.
*** $p < .001$.

Table 1. *Summary of Mental Rotation Task*

| Group | Baseline | | Test | |
|---|---|---|---|---|
| | RT(*SD*) | Acc (*SD*) | RT(*SD*) | Acc (*SD*) |
| Stereotype threat | 1356.04 (907.29) | 0.77 (0.19) | 1291.30 (862.74) | 0.77 (0.19) |
| Neutral | 1256.33 (867.29) | 0.74 (0.19) | 1061.85 (748.82) | 0.76 (0.20) |

*Note*. RT = reaction time; Acc = accuracy.

To test for the moderating role of self-esteem in the effect of stereotype threat on performance of the mental rotation task, we ran a two-step regression analysis. Task performance was defined as performance improvement (or reversed RT change ratio from baseline to test trials), where a positive value means an improvement over time.

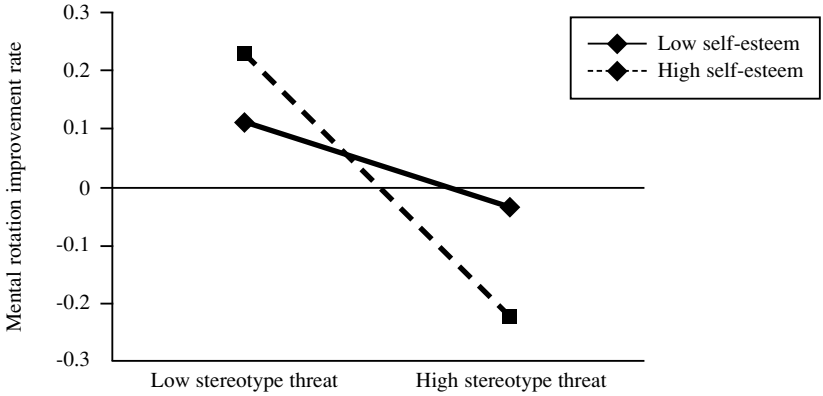


*Figure 2.* Performance improvement as a function of condition and self-esteem.

The interaction between self-esteem and condition emerged as a significant predictor of RT change ratio from baseline to test trials ($\beta = .17$, $p < .05$). When the participants' self-esteem was high (one standard deviation above the mean), condition was significantly related to RT score improvement ($\beta = -.54$, $p = .02 < .05$), when threat appeared, students with high self-esteem performed worse; however, for students whose self-esteem was low (one standard deviation below the mean), condition was not significantly related to RT score improvement ($\beta = -.32$, $p = .11$). For students with low self-esteem, there was no evident difference. Therefore, our second hypothesis was supported.

Table 2. *Hierarchical Regression for Mental Rotation Task Improvement*

| Step and predictors | $\Delta R^2$ | Unstandardized coefficients | | Standardized coefficients | | 95% CI |
|---|---|---|---|---|---|---|
| | | *B* | *SE* | β | *t* | |
| Step1 | .11*** | | | | | |
| Self-esteem | | -.01 | .09 | -.01 | -.09 | [-.19, -.17] |
| Condition | | .30 | .07 | .33*** | 4.25 | [.16, -.44] |
| Step2 | .03* | | | | | |
| Self-esteem | | .02 | .09 | .02 | .22 | [-.16, -.20] |
| Condition | | .30 | .07 | .33*** | 4.27 | [.16, -.43] |
| Self-esteem × Condition | | .39 | .18 | .17* | 2.19 | [.04, -.74] |

*Note*. CI = confidence interval. * $p < .05$, *** $p < .001$.

## Discussion

Using a mental-rotation-task paradigm, in the current study we found that stereotype threat had a significant effect on LA students' performance, and that the magnitude of this effect increased with students' level of self-esteem. Just as for other stigmatized groups, for LA students stereotype threat may generate suppressed or controlled outcomes, such as anxiety, uncomfortable feelings, or unrelated thoughts (Schuster, Martiny, & Schmader, 2015), which might have depleted their working memory or other aspects of their executive control resources (Hutchison, Smith, & Ferris, 2013). Consequently, their performance on the mental rotation task was adversely affected.

The literature on the relationship between self-esteem and effects of stereotype threat for LA students consists of studies with differing results. Our results showed that the effect of stereotype threat increased with higher self-esteem. For students with low self-esteem, there was no evident effect, perhaps because these students had already been under threat from their low self-esteem. We point out here that, on average, the LA students had lower self-esteem than did their peers (see, e.g., Martin, 2011), so that it is likely that the students in our participant group who were classified as having low self-esteem would have had lower self-esteem than the average for LA students. It is possible that these students might have experienced so much anxiety that additional stereotype-threat information no longer posed a threat. In other words, they had already had a negative view about themselves for so long that these stereotypes only served to confirm their own low self-evaluation. In contrast, for those LA students in our study who were classified as having high self-esteem, the effect of stereotype threat was strong enough that their performance was greatly affected negatively, whereas, in the control group—as would be expected based on findings in previous research (Ghazvini, 2011)—the students with high self-esteem recorded a significantly better performance than did their low-esteem counterparts.

In our study we have contributed to the literature in three ways. First, we extended the research on stereotype threat to LA students, a group that had not been previously been studied with this approach. Further research should be conducted to replicate our findings with LA students from other populations. Second, in our study we used just one task to introduce and, at the same time, measure the effect of stereotype threat. The advantage of this approach is that negative stereotypes were presented throughout the whole task, which helped to ensure that the effects of stereotype threat did not fade away as the study progressed. Third, we found a significant interaction between level of self-esteem and the effect of stereotype threat. In our view, our results suggest that stereotype threat operates when self-esteem is high enough to be threatened. We surmise that some of the mixed findings in the literature might have occurred because the

samples in certain studies consisted of individuals who had low self-esteem and, thus, these people could not be threatened further. Therefore, future research on this topic should consistently consider potential interactions between the effect of stereotype threat and level of self-esteem.

Because there has been relatively little research conducted on the effects of stereotype threat on LA students, there are many more aspects of the topic to be explored in future studies. Because the number of participants in our study was limited, we were unable to analyze other variables, such as self-identity, nor did we utilize statistical methods, such as structure equation modeling. Future work would benefit from a sample of a larger size. Also, in our study we focused only on a population of LA students and did not compare their responses with those of students who are not LA under the same stereotype threat. One potential direction for future research would be to examine whether students who are not LA are more immune than are LA students to stereotype threats, or are better able to compensate for potential negative effects.

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