A Secondary Replication Attempt of Stereotype Susceptibility (Shih, Pittinsky, & Ambady, 1999)

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https://econtent.hogrefe.com/doi/pdf/10.1027/1864-9335/a000193 - Thursday, April 18, 2024 8:28:13 PM - IP Address:18.221.174.248

Abstract. Prior work suggests that awareness of stereotypes about a person's in-group can affect a person's behavior and performance when they complete a stereotype-relevant task, a phenomenon called stereotype susceptibility (Shih, Pittinsky, & Ambady, 1999). In a preregistered confirmatory design, we found that priming Asian women with social identities associated with math stereotypes did not influence their performance on a subsequent mathematics exam, and hypothesized moderators did not account for the effect. The conditions necessary to obtain the original results are not yet fully understood.

Keywords: replication, stereotype susceptibility, gender, ethnicity

The goal of this project is to offer additional insight into the original Shih, Pittinsky, and Ambady (1999) finding that group-related stereotype awareness can affect performance and behavior on tasks related to that stereotype. We conducted a replication following Gibson, Losee, and Vitiello's (2014) registered protocol.

Method

Participants

The registered protocol called for 156 participants for a very highly powered test. We aimed for that number but obtained a total of 139 Asian female undergraduates because data collection took longer than anticipated (i.e., recruitment of participants was slow). Participants were recruited from The University of California, Berkeley for either course credit or \$7. We randomized to condition via Qualtrics, but nevertheless ended up with mismatched sample-sizes between conditions (i.e., Female-prime, $n = 38$; Asian-identity prime, $n = 53$; Control, $n = 48$).

Procedure

After agreeing to participate, subjects signed up for a 30-min in-laboratory timeslot and immediately completed an online pretest (Phase 1) that assessed demographic information, domain identification, and stereotype awareness. Standard consent procedures applied.

The procedure followed the Gibson et al. protocol closely. When participants arrived for their scheduled laboratory session (Phase 2), they were led to an individual cubicle where a laptop, pen, and blank piece of paper were visible. Once seated, participants were instructed to follow the instructions on the online survey and inform the experimenter when they had finished. During the first portion of the Phase 2 survey, participants were randomly assigned (via Qualtrics) to be presented with one of the manipulation questionnaires (Asian-identity, female-identity, or control) before taking the 20-min, 12-question Canadian Math Competition test used in the original study. All experimenters were blind to condition. Participants then reported their scores on the SAT or ACT (standardized tests used for college admissions in the United States), their skill level with mathematics, and how enjoyable they found the experiment. A final question examined whether or not participants picked up on the manipulation or hypothesis.

Differences From Gibson et al.

Several notable deviations from Gibson et al. are reported. First, compensation for completion was either \$7 or 1 hr of research participation course credit for the 30-min task rather than entry into a \$500 draw. Second, due to space constraints, the study was conducted at three different locations on campus depending on the time of the semester in which they signed up. The experimental location was either the Psychology department's research laboratory, the Behavioral Laboratory at the Haas School of Business, or the Haas Computer Laboratory. In each case, participants were seated at individual cubicles. Third, the experimenter

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was a white male, a white female, or an Asian female rather than exclusively a white female (as in Gibson et al., 2014). Finally, participants came from one of the Haas Behavioral Laboratory pool (paid or credit) or the Psychology Research Participation Pool at UC Berkeley rather than at a collection of universities in the Southern US.

Results

We followed Gibson et al.'s confirmatory analysis plan. No participants were excluded. For the primary analysis, we analyzed the data of all 139 participants. Following that, as per the registered plan, we analyzed the data of only the 106 participants that were aware of both gender and racial stereotypes.

We first analyzed the effects of condition on accuracy (i.e., the number of math questions that the participant correctly answers divided by the number attempted). We tested the prediction that the Asian-identity primed group would have the best performance, the female-identity primed group would have the worst performance, and the control group would perform in between. Analyzing the entire sample, those primed with their Asian-identity scored ($n = 53$) .46 ($SD = 0.17$), those in the control condition ($n = 48$) scored .50 ($SD = 0.18$), and those primed with their female-identity ($n = 38$) scored .43 ($SD = 0.16$). Using a linear contrast analysis, there was no significant difference between groups on accuracy, $t(136) = .78$, $p = .44$, $\eta^2 = .004$, 95% CI [.00, .05]. Next, as in the original study, a two-tailed independent-samples *t*-test analyzed differences in accuracy between female-primed and Asian-primed conditions, but did not show a significant difference, $t(89) = .79$, $p = .43$, $d = .17$, 95% CI [−.25, .59].

Analyzing just those who were aware of the stereotype, those primed with Asian-identity ($n = 42$) had an accuracy score of .47 ($SD = 0.18$), those in the control condition ($n = 37$) had an accuracy score of .50 ($SD = 0.17$), and those primed with their female-identity ($n = 27$) scored .43 ($SD = 0.16$). There was no significant difference between groups on accuracy, $t(103) = 1.10$, $p = .28$, $\eta^2 = .012$, 95% CI [.00, .08]. Likewise, an independent samples *t*-test showed no difference between female-primed participants and Asian-primed participants, $t(67) = 1.09$, $p = .28$, $d = .27$, 95% CI [−.22, .75].

Shih et al. (1999) also used the total number of questions answered correctly as a dependent variable but did not observe significant differences. We likewise did not observe significant differences with this dependent variable. Those primed with Asian-identity answered 4.75 ($SD = 2.16$) questions correctly, those in the control condition answered 5.21 ($SD = 1.91$) questions correctly, and those primed with their female-identity answered 4.50 ($SD = 1.96$) questions correctly. In a linear contrast with the full sample, there was no significant difference between groups, $t(136) = .59$, $p = .55$, $\eta^2 = .003$, 95% CI [.00, .04]. An independent-samples *t*-test showed no difference between Asian-primed and female-primed group on correct responses, $t(89) = .58$, $p = .57$, $d = .12$, 95% CI [−.29, .54].

Including only those aware of both stereotypes, there was no significant difference between groups on number of questions answered correctly, $t(103) = 1.06$, $p = .29$, $\eta^2 = .011$, 95% CI [.00, .08], and the means followed the expected pattern: Asian-primed ($M = 4.83$), Control ($M = 5.19$), and female-primed ($M = 4.30$). Asian-primed participants did not have more correct responses than female-primed participants, $t(67) = 1.02$, $p = .31$, $d = .25$, 95% CI [−.23, .74].

Math Identification as a Moderator

The original analysis plan also suggested analyzing math identification as a possible moderator. Using the entire sample, we ran an ANCOVA with math identification as a covariate to test math identification as a moderator. This test failed to reveal a significant identity salience by math identification interaction, $F(2, 133) = .08$, $p = .92$. Math identification was also not a moderator when analyzing data from participants who were aware of both stereotypes, $F(2, 100) = .27$, $p = .76$.

In sum, scores between conditions did not significantly differ. Importantly, Asian-identity salient participants' scores on the math test did not significantly differ from female-identity participants' scores. In addition, math identification did not moderate accuracy on the test.

Discussion

We did not observe significant differences between Asian-primed, female-primed, and control conditions on math performance by Asian women. Further, the ordinal relations between conditions did not follow the original results – control participants performed nonsignificantly better than both Asian-primed and female-primed participants. Finally, neither awareness of these stereotypes nor identification with mathematics moderated this effect.

There were some differences between our replication attempt and that of Gibson et al. that could be moderators for observing this effect. However, none of those differences are presently part of the theoretical expectations of when stereotype susceptibility results are understood to occur. Another limitation of our study is that we were unable to collect the target number of participants for an extremely high-powered test. Thus, our study may have been underpowered relative to expectation. Nevertheless, the study was highly powered ($n = 139$) relative to the original study ($n = 46$).

These studies were conducted with a preregistered confirmatory design providing greater confidence in the interpretability of the reported *p*-values. They suggest that priming Asian women with social identities associated with math stereotypes does not influence their performance on a subsequent mathematics exam adding to the cumulative

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results investigating the possibility of this interesting phenomenon.

Note From the Editors

A commentary and a rejoinder on this paper are available (Moon & Roeder, 2014; Shih & Pittinsky, 2014; doi: 10.1027/1864-9335/a000207).

Acknowledgments

The authors contributed equally to this article and are listed alphabetically. Designed research: A. M., S. R., Performed research: A. M., S. R., Analyzed data: A. M., S. R., Wrote paper: A. M., S. R. We report all data exclusions, manipulations, and measures, and how we determined our sample sizes. The authors declare no conflict-of-interest with the content of this article. The project was funded by a grant from the Center for Open Science. All materials, data, and the preregistered design are available at: osf.io/b9pkj/

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Received October 8, 2013
Accepted February 7, 2014
Published online May 19, 2014

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https://econtent.hogrefe.com/doi/pdf/10.1027/1864-9335/a000193 - Thursday, April 18, 2024 8:28:13 PM - IP Address:18.221.174.248