Psychology of Sport and Exercise 32 (2017) 54–57

Contents lists available at ScienceDirect

Psychology of Sport and Exercise

journal homepage: www.elsevier.com/locate/psychsport

The effect of stereotype threat on student-athlete math performance

Shaina Riciputi [a, b, 1], Kristi Erdal [a, *]

[a] Department of Psychology, Colorado College, United States
[b] Department of Health & Kinesiology, Purdue University, United States

ARTICLE INFO

Article history:
Received 19 February 2016
Received in revised form
30 May 2017
Accepted 5 June 2017

Keywords:
Stereotype threat
Student athlete
Identity
Task performance
Competing identities

ABSTRACT

Objectives: To assess whether a subtle stereotype threat of student-athletes would cause a decrease in both academic effort and performance.
Design: A 2 (Male/Female) x 2 (Athlete Prime/No Athlete Prime) design was used to assess effort and performance on a math test.
Method: A subtle threat manipulation was used to prime half of 60 NCAA Division III student-athletes with their athletic identity prior to taking a difficult math test.
Results: Supporting the hypotheses, student-athletes who were primed with their athletic identity attempted significantly fewer problems and received lower mean math scores than those who were not primed. Contrary to hypotheses, gender did not impact effort or performance, and there was no evidence of buffering effects of priming non-athlete identities.
Conclusions: The results of this experiment provide evidence for stereotype threat effects across genders and into Division III athletes, which potentially impact student-athlete academic performance.

Stereotype threat is felt by members of any stigmatized group when the realization that one's performance may confirm a negative group stereotype detracts from actual performance (Steele & Aronson, 1995). Performance decrements under stereotype threat may be due to anxiety (Steele & Aronson, 1995) or reduced working memory (Schmader & Johns, 2003), and are potentially mediated by effort and self-handicapping. Although Nussbaum and Steele (2007) found evidence of above average effort when confronted with negative stereotypes and feedback, internalization of negative stereotypes has also led to decreased investment and reduced effort (Massey & Owens, 2014). Self-handicapping strategies, such as alleging unfair testing or choosing not to practice, have been found in both academics and athletics (Keller, 2002; Stone, 2002). Stereotype threat effects likely emerge from a combination of these factors.

Stereotype threat can manifest itself without explicit priming if a stereotype about a group is strong enough. Subtle cues that people are being evaluated on a stereotyped dimension can have a significant effect on performance (Stone, Lynch, Sjomeling, & Darley, 1999), suggesting that stigma consciousness, or the cognitive availability of stereotypes, is particularly important. No identities are globally adaptive or maladaptive (Shih, Pittinsky, & Trahan, 2006), as a person may belong to a group negatively stereotyped in one domain but not in another.

Collegiate student-athletes represent one group not always associated with negative stereotypes (Simons, Bosworth, Fujita, & Jensen, 2007). Similar to other stereotyped groups, however, prejudice toward student-athletes in higher education, in their characterization as “dumb jocks,” has been documented among both faculty (Engstrom, Sedlacek, & McEwen, 1995; Simons et al., 2007) and students (Engstrom & Sedlacek, 1991). Faculty have shown strong disapproval for student-athletes who receive full scholarships (Espenshade, Chung, & Walling, 2004), and students have also expressed disappointment, worry and annoyance when assigned a hypothetical “student-athlete” rather than a “student” to be their lab partner (Engstrom & Sedlacek, 1991). Negative attitudes from non-athlete peers may further encourage student-athletes into a counterproductive anti-academic, pro-athletic subculture (Adler & Adler, 1985).

Student-athletes can often identify cases in which they felt their academic competence was questioned (Adler & Adler, 1985; Simons et al., 2007). Two-thirds of student-athletes have reported hearing a faculty member make a negative remark about athletes in class. Furthermore, 60% reported feeling that they were negatively

* Corresponding author. Department of Psychology, Colorado College, Colorado Springs, CO 80903, United States.
E-mail address: kerdal@coloradocollege.edu (K. Erdal).
[1] Now at the Department of Health & Kinesiology, Purdue University, United States.

http://dx.doi.org/10.1016/j.psychsport.2017.06.003
1469-0292/

perceived by their fellow students, while only 15% reported positive perceptions. Student-athletes have also reported being taken less seriously by professors than members of non-athletic groups (Aries, McCarthy, Salovey, & Banaji, 2004), consistently feeling a culture in which their academic skills are questioned.

In Division III (DIII) schools, there are no scholarships for athletic participation and there is presumably less institutional emphasis on athletics. DIII student-athletes may be able to better reconcile their academic and athletic identities (Miller & Kerr, 2003); however, in a direct comparison of DI and DIII athletes, athlete and student identities were significantly negatively correlated in both divisions (Sturm, Feltz, & Gilson, 2011), and DIII athletes have specifically noted greater identity strain (Cantor & Prentice, 1996). In both DI and DIII student-athletes, priming student-athletes with their identity as a student increased their math test scores, while priming them with their identity as an athlete caused an equivalent reduction in scores (Dee, 2014; Yopyk & Prentice, 2005). Scores for student-athletes who were not primed to any identity were similar to those primed with their student identity, suggesting that students may shift between identities in response to tasks, assuming an identity that is most facilitative.

Ironically, academically-identified student-athletes are most susceptible to stereotype threat (Keller, 2007; Stone, Harrison, & Mottley, 2012). Thus, DIII student-athletes, who might provide evidence against the "dumb jock" stereotype, may actually underperform relative to student-athletes who do not value academics as much. This increased susceptibility to stereotype threat might also predict outcomes in male versus female athletes. While female student-athletes are less prone to the "dumb jock" stereotype, stronger academic identities than males (Sturm et al., 2011) may mean females are more susceptible to stereotype threat (Stone et al., 2012).

1. Hypotheses

It was hypothesized that student-athletes exposed to a prime making athletic identity salient would exhibit less effort and perform more poorly on a math test compared to student-athletes without this prime. It was hypothesized that female student-athletes would show more negative performance decrements than male student-athletes when primed, but that the two would perform equivalently when participants were not primed.

2. Method

2.1. Participants

Participants were 60 student-athletes (M_{age} = 20.22 years, SD = 1.20) recruited from NCAA Division III varsity athletic teams at a single institution. Both male (n = 33) and female (n = 27) student-athletes were identified through the college's public athletic website and were recruited through classes or email. To avoid unintentional priming, students were requested to participate in a mathematics performance and cognitive processing study, but the request did not specify that the study was limited to student-athletes.

2.2. Procedure

Institutional Review Board approval and informed consent were obtained for the study and access to participants' standardized math scores. Scores were converted to percentiles using the College Board (2014) and ACT Inc. (2014) official websites.

Participants met individually with the experimenter and completed a brief demographics questionnaire and a multiple-choice 10-item math test composed of sample questions from the official GRE webpage (Educational Testing Service, 2013). Participants were told that they had 10 min to complete the test, but that it was difficult and that they were not expected to finish in the allotted time. The experimenter provided a standard scientific calculator and then exited the room. At 10 min, the questionnaires and tests were collected.

The manipulation of stereotype threat was embedded in the demographics questionnaire. Participants randomly assigned to the no prime condition were simply asked to provide age and class year. In the athlete prime condition, participants circled any of the listed activities in which they participated. Following student government and campus publications, the last of these activities, directly before beginning the math test, was "varsity athletics." Participants were debriefed via email following collection of all data and were told the true nature of the study.

3. Results

A 2 (prime) x 2 (gender) factorial design examined the number of problems attempted and number of problems correct on a 10-item math test. The means and standard errors of the problems attempted are presented in Table 1. The means and standard errors of the number of problems correct are presented in Table 2. Participants' standardized college entrance math tests were used as covariates in all analyses.

Participants' problem attempts were submitted to a 2 (prime) x 2 (gender) factorial ANCOVA. The ANCOVA revealed a significant main effect of prime, F (1, 54) = 4.64, p = 0.036, η^2 = 0.079. Consistent with the hypothesis, participants who were primed with their athletic identity attempted fewer problems than participants who were not primed. There was no significant main effect of gender, F (1, 54) = 2.65, p = 0.12, nor interaction between gender and prime on math problems attempted, F (1, 54) = 2.48, p = 0.12. Standardized math score was not a significant covariate, p = 0.103.

Participants' number correct were submitted to a 2 (prime) x 2 (gender) factorial ANCOVA. The ANCOVA revealed a marginally significant main effect of prime, F (1, 54) = 3.61, p = 0.063, η^2 = 0.063. Consistent with the hypothesis, participants who were primed with their athletic identity got fewer problems correct than participants who were not primed. There was no significant main effect of gender, F (1, 54) = 1.54, p = 0.22, nor interaction between gender and prime on number correct, F (1, 54) = 1.80, p = 0.12. Standardized math score was a significant covariate, $p < 0.001$.

In order to assess whether there was a buffer effect of being primed with non-athletic identities, two ANCOVAs compared those who circled other identities on the prime (n = 10) to those who did not (n = 20). Those who circled other identities did not differ from those who did not circle other identities on number of problems attempted, F (1, 27) = 0.82, p = 0.37, nor on number correct, F (1, 27) = 2.75, p = 0.11, showing no evidence for a buffer effect.

4. Discussion

The hypotheses that student-athletes who were primed with their athlete identity prior to taking a difficult math test would

Table 1
Mean number of math problems attempted (out of 10 ± SE) controlling for standardized math scores.

	Male	Female
No Prime	8.90 ± 0.35	8.91 ± 0.37
Athlete Prime	7.56 ± 0.33	8.71 ± 0.38