Negating Stereotype Threat: Autonomy Support and Academic Identification Boost Performance of African American College Students

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Using a 2 × 2 factorial design, we examined the effects of stereotype threat and autonomy support on the test performance of 190 African American college students. Participants completed a set of 7 easy and 7 difficult problems from Raven's Progressive Matrices and a survey including measures of Academic Self-Concept, Learning Climate, and Perceptions of Stereotype Threat. ANOVA results revealed that among African American men, those who had a stronger academic identification performed worse than those with a weaker identification; however, the reverse was true among African American women, as those who had stronger academic identification performed better than those with a weaker identification. Finally, both stereotype threat and autonomy support improved test performance for all participants (on easy items), except when women received both conditions. Our results indicate that the deleterious effect of stereotype threat is not consistent, and that performance may be boosted by providing greater autonomy support and strengthening academic identification (especially for female African American students).

Research across various domains has confirmed that students from minority and stigmatized groups fail to perform to their full potential when situational threats create working memory overload (Croizet et al., 2004; Schmader, 2010; Schmader & Johns, 2003; Steele & Aronson, 1995). In particular, African American college students face numerous obstacles, and national statistics indicate that only about 40% complete college (Aud, Hussar, & Grace, 2011) and about 43% fail to persist (Ross et al., 2012). Stereotype threat is a situational hazard faced by minority students and stems from negative stereotypes held about a group's ability within a specific domain. Eliciting the threatening stereotype creates heightened arousal and fear that performance will confirm the negative stereotype and this lowers task performance. Common examples of stereotype threat include women being tested on difficult math tests, African Americans being tested on intelligence tests, and White men being tested on athletic ability. Yet, recent research indicates that the effects of stereotype threat are inconsistent (Nguyen & Ryan, 2008; Stoet & Geary, 2012) or nonsignificant at best, suggesting that other variables need to be investigated. There is some evidence that degree of perceived social support (Cole, Matheson, & Anisman, 2007) and strength of students' identification with the academic domain significantly influence the impact of stereotype threat on performance (Aronson et al., 1999; Steele, 1997)

However, it is important to go beyond understanding how and why performance deficits occur and construct academic environments that enable all students to perform to the best of their ability (Stoet & Geary, 2012). There is some indication that stereotype threat can be ameliorated or reduced by creating a positive social identity trait (McIntyre, Paulson,

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& Lord, 2003; Rosenthal & Crisp, 2006; Rydell & Boucher, 2010), educating participants about stereotype threat (Johns, Schmader, & Martens, 2005), shaping students' theories of intelligence and spotlighting successful stereotyped individuals (Aronson, Fried, & Good, 2002; McIntyre et al., 2003). Within this context, we investigated the effect of stereotype threat on performance and applied self-determination theory (Deci, Vallerand, Pelletier, & Ryan, 1991) in examining how autonomy support might reduce the effects of stereotype threat for African American students with varied degrees of identification with the academic domain.

STEREOTYPE THREAT IN STIGMATIZED GROUPS

Several researchers (Brown & Day, 2006; Schmader, 2010; Steele, 1997; Steele & Aronson, 1995) have provided empirical support for the negative effects of stereotype threat on academic performance for members of minority groups. More specifically, the effect of stereotype threat on performance appears to be influenced by the difficulty level of the task that is performed. Originally, Steele and Aronson (1995) used a difficult verbal GRE Test, and since then, a majority of stereotype threat studies have replicated their findings using performance tests with high levels of difficulty (Brown & Day, 2006; Steele 1997; Steele & Aronson, 1995). However, O'Brien and Crandall (2003) found that participants in a stereotype threat condition performed better than those in a non–stereotype threat condition when taking an easy test, and performed significantly worse when taking a difficult test, suggesting that stereotype threat may be a situation specific threat that influences performance negatively only when the test is difficult. Difficult tests may create greater concerns about conforming to a stereotype as students are aware of the challenges they face, whereas easy tests create less anxiety because students may feel more confident about their competence.

SOCIAL AND AUTONOMY SUPPORT

Social support is credited with providing a buffer for performance within a variety of stressful situations and prior research suggests a significant positive relationship between perceptions of social support and student academic achievement (Syed, Azmitia, & Cooper, 2011). Social support appears to be particularly important for safeguarding against the effects of stereotype threat as students who experience the most stereotype threat are also the students who need the most social support from family, friends, and members of the academic setting at both the college level (Cole et al., 2007) and middle school level (Wooley, Kol, & Bowen, 2009). Students from minority backgrounds who report stronger social support from friends and fewer unsupportive interactions with others (faculty, staff, teachers, students) report a higher sense of belonging and have higher grades or better academic performance (Cole et al., 2007; Walton & Cohen, 2007).

Self-determination theorists argue that learning environments that support autonomy are critical to maintaining students' motivation to learn and perform, as they provide social backing and facilitate intrinsic forms of motivation (Niemiec & Ryan, 2009). Classrooms in which students perceive choice in what or how they complete a task, empathy from their teacher, and a greater understanding of task relevance are more likely to experience autonomy support (Deci et al., 1991). Autonomy support is associated with numerous benefits including increased academic performance (Levesque, Zuehlke,

Stanek, & Ryan, 2004; Reeve, Jang, Hardre, & Omura, 2002) and lower stress (Reeve et al., 2002). Teachers providing autonomy support tend to generate higher levels of perceived competence, positive emotionality, self-esteem, conceptual understanding, flexibility in thinking, active information processing, and creativity in their students (Reeve et al., 2002). Although there is substantial evidence that having a supportive academic setting is associated with higher grades for all students, it is important to note that minority students report receiving little support from the academic environment (Cole et al, 2007; Walton & Cohen, 2007). Further, autonomy support has been shown to improve student performance, yet there is almost no prior work relating it to stereotype threat research.

ACADEMIC IDENTIFICATION

Identification with academics occurs when students value the academic domain and consider it to be central to their self-concept (Osborne & Jones, 2011). For example, students with a strong academic identification might find it rewarding to be a student and may believe that they are capable of doing well as a student. Empirical evidence indicates that students who have a stronger identification with academics tend to have better academic outcomes including higher GPA, higher retention, lower aversive academic outcomes, increased motivation, and decreased absenteeism (Osborne & Jones, 2011; Walton & Cohen, 2007). Specifically, identification with academics explains significant variance in GPA and is positively associated with self-esteem (Osborne, 1997). Students who consider their academic role to be central to how they define themselves are more likely to perform well and think highly of themselves. Despite this evidence regarding the benefits of academic identification, stereotype threat research has shown that when students have strong academic identification it also makes them more vulnerable to stereotype threat (Aronson et al., 1999; Steele, 1997)

Steele and Aronson (1995) argued that for an individual to be threatened by a stereotype, they must first identify with the domain that has negative stereotypes associated with it. For example, there is a general stereotype in society that African Americans are less intelligent and perform worse in academic domains such as intelligence tests. As such, African Americans who value their identity as a student or as being intelligent would be more strongly identified with the academic or science domain about which they are stereotyped. It appears that degree of academic identification is an important developmental feature as Osborne and Walker (2006) report that high school minority students who were less identified with school were less likely to withdraw; however the more identified they were, the more likely they were to withdraw from high school. For majority students however, the opposite was true. Thus, minority students, who are inherently vulnerable to stereotype threat within the academic arena, were more likely to withdraw if they were more identified with academics. Finally, African American students who were more identified with academics performed less well relative to those who were weakly identified, particularly when completing moderately difficult tests (Lawrence, Marks, & Jackson, 2010). Thus, it is important to note the extraordinary challenges faced by minority students choosing to pursue postsecondary education. Not only do they face stereotype threat, but by identifying with the academic domain they may be more susceptible to losing social support from friends and family and feeling uncertain about their fit within White-dominated academic settings.

In order to protect themselves from being

vulnerable to the effects of stereotype threat, members of minority groups may attempt to disidentify with tests of achievement or ability (McFarland, Lev-Arey, & Ziegert, 2003). Thus, it is critical to assess the extent to which students, especially from stigmatized or disadvantaged groups, identify with the academic domain as this is likely to provide a better gauge of the internal mechanisms that are at play. With this study we attempt to close this critical gap in the literature by examining the influence of autonomy support and academic identification on African American college students' performance under conditions of stereotype threat.

RATIONALE

Previous research suggests that stereotype threat conditions negatively influence the performance of participants with stronger academic identification, especially on difficult and very difficult tests. Additionally, research suggests that minority students who are highly identified with academics report receiving less support in academic situations and having less of a buffer when placed in stereotype threat situations. Though there is research supporting the positive influence that autonomy-supportive environments have on academic performance and motivation, there has not been examination of these environments in relation to stereotype threat conditions nor as a means of buffering the negative effects of stereotype threat, particularly for ethnic minority students. Finally, all of the previous research has focused on the effects of stereotype threat by comparing minority groups with the majority group (White or male in most cases). From a theoretical standpoint, however, if stereotype threat has a negative effect on test performance for minority groups, this could be demonstrated by comparing performance scores between those within a minority group who are subjected to threat with those who are not subjected to threat. By doing this, we will refocus the literature from ethnic differences in the effect of stereotype threat on performance to the actual influence of stereotype threat on performance within a specific ethnic group. Drawing on prior research related to stereotype threat and autonomy support, we tested two hypotheses, using a sample of African American college students:

1. In stereotype threat conditions, participants who have high academic identification will perform worse than participants who have low academic identification.
2. In autonomy support conditions, participants with high academic identification will perform better than participants with low academic identification.

METHOD

In this experiment we used a 2 (stereotype threat and non–stereotype threat) × 2 (autonomy support and non–autonomy support) between subjects factorial design. Test performance was measured using 14 items from the Raven's Standard Progressive Matrices. The effectiveness of the stereotype threat manipulation in the study was assessed by using a modified version of the Perceptions of Stereotype Threat Scale (Ployhart, Ziegert, & McFarland, 2003). In addition, effectiveness of the autonomy support manipulation was assessed by using a modified version of the Learning Climate Scale (Williams & Deci, 1996). All aspects of this study (informed consent, survey items, manipulation scripts, and debriefing forms) were approved by the university human subjects committee prior to conducting the study. After participants provided informed consent, we began the

study and participants were randomly placed into a level of each condition.

Stereotype Threat and Non–Stereotype Threat Conditions

Following prior research (Brown & Day, 2006; Nguyen & Ryan, 2008; Steele, 1997; Steele & Aronson, 1995), the experimenter, a European American male, created the stereotype threat condition by telling participants, "This task is a standardized critical thinking task which is evaluative of your intellectual ability, and has thus far shown to produce group differences in performance. This test has been shown as an accurate measure of an individual's intellectual ability, more commonly known as their IQ. We ask that you take this test seriously, and try your best to complete it as accurately as possible." In the non–stereotype threat condition, the same experimenter told participants, "This task is made up of a series of visual puzzles which you will attempt to solve. We ask that you take these puzzles seriously, and try your best to complete them as accurately as possible."

Autonomy Support and Non–Autonomy Support Conditions

The autonomy support condition was designed to create feelings of choice, empathy, and task relevance for the participants (Deci et al., 1991). Participants were asked to choose either a black or blue binder which contained identical sets of problems, to work through an example problem with the experimenter, and to have the experimenter explain to participants how the task was helpful in clarifying how college students think. In the non–autonomy support condition, participants were assigned a binder with no choice, were only given an example problem which they read within the directions, and did not receive information about why the task was relevant.

After random assignment to conditions, participants completed the 14 problems from the Raven's Standard Progressive Matrices. In both conditions of autonomy support and non–autonomy support, the experimenter left the room while the participants completed the experiment. Though participants were tested individually or in pairs, all participants worked individually in one of two rooms as the experimenter waited outside. Finally, after completing the 14 problems, the participants completed a survey which included the 15-item Learning Climate Scale, 8-item Perceived Stereotype Threat Scale, and the 40-item Academic Self-Concept Scale, and the manipulation checks. To strengthen the manipulation, participants in the stereotype threat condition were asked to report their ethnicity prior to the manipulation. All other participants completed the entire demographics section (including the item about ethnicity) at the end of the survey.

Participants

Participants were 190 students who self-identified as African American or Black from a medium-sized Midwestern university. We selected this specific minority population as this ethnic group's performance appears to suffer most dramatically and frequently from stereotype threat (Nguyen & Ryan, 2008). The sample included 58 men and 131 women, with a mean age of 18.8 years, and was 80% freshmen, 15% sophomores, and 5% juniors and seniors.

Measures

Raven's Standard Progressive Matrices. This is a nonverbal, abstract reasoning, problem-solving test (Raven, Raven, & Court, 2000). A set of 14 problems was selected and were further subcategorized as 7 difficult items and 7 easy items based on prior research with a similar sample of participants (Komarraju, Dial, & Tincher, 2010).

TABLE 1.
Sample Size, Mean, Range, Standard Deviation, and Cronbach's α for All Variables/Measures (*N* = 190)

Variable/Measure	Range	*M*	*SD*	α	*n*
Autonomy Support: Learning Climate Scale	1–7	5.20	1.03	.93	190
Perceptions of Stereotype Threat	1–5	2.72	0.69	.71	190
Academic Self-Concept	1–4	3.01	0.33	.91	190
ACT	0–36	19.46	2.75		182
GPA	0.0–4.0	2.88	0.55		174
Overall Total No. of Correct Responses	0–16	8.08	1.46		190
Total No. of Correct Responses Difficult items	0–7	1.43	1.18		190
Total No. of Correct Responses Easy items	0–7	6.65	0.66		190

Autonomy Support. The 15-item Learning Climate Scale (Williams & Deci, 1996) was adapted to assess the three facets of autonomy support: the degree to which participants felt they had choice in what they were doing, the amount of empathy displayed by the researcher, and their ability to communicate with the researcher. A sample item is, "I feel that my experimenter provided me choices and options." This scale had a rating scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) and a Cronbach's alpha value of .93 in this study.

Perceptions of Stereotype Threat Scale. This 8-item scale (Ployhart, Ziegert, & McFarland, 2003) was designed to measure the degree to which participants are influenced by the stereotype threat manipulation (test-specific threat) and the degree to which participants experience this threat in general (generalized threat). The total scale score was used and was slightly modified by adding one more item to assess the degree of anxiety created by racial stereotyping during the task (Marx & Goff, 2005) and dropping one item to raise the Cronbach's alpha from .69 to .71. A sample item from this measure is, "Some people feel that I have less intelligence because of my ethnicity."

Academic Self-Concept Scale. The 40-item Academic Self-Concept Scale (Reynolds, 1988; Reynolds, Ramirez, Magriña, & Allen, 1980) is a measure of college students' academic self-concept. A sample item is, "All in all, I feel I am a capable student." Students rated items from 1 (*strongly disagree*) to 7 (*strongly agree*) and the scale had a Cronbach's alpha of .89.

Manipulation Checks. The Learning Climate Scale served as a manipulation check for participants' experience of autonomy support and it was expected that those within the autonomy support conditions would score higher on this measure. The Perceptions of Stereotype Threat Scale served as a manipulation check for the participants' experience of stereotype threat and it was expected that those who were in the Stereotype Threat conditions would score higher on this measure. Participants provided demographic information including age, sex, ethnicity, year in college and college grade point average or ACT score (if they were in their first college semester) as indirect measures of cognitive ability.

DATA ANALYSIS

As an initial step, the sample size, mean, range, standard deviation, and Cronbach's alphas were

calculated for all variables and measures; these data are presented in Table 1.

Prior to testing the hypotheses, we conducted an analysis of variance to examine differences due to conditions and to establish the effectiveness of our manipulations. We also computed a correlation analysis to examine significant relationships among variables. After establishing significant relationships, our 2 × 2 experimental designs were tested using ANOVAs. Using theory to drive our analyses, each ANOVA examined the relationship between the test performance (difficult items and then easy items separately) of participants in each condition, while also examining their level of academic identification and gender. Subsequent ANOVAs were conducted to test the effects of stereotype threat and autonomy support conditions and gender and the main effects of the conditions.

RESULTS

An analysis of variance (ANOVA) indicated that the stereotype threat manipulation was effective as there was a significant difference in perceived stereotype threat with participants in the stereotype threat condition scoring higher (M = 2.95, SD = .64) than those in the non–stereotype threat condition (M = 2.49, SD = .66), $F(1, 189) = 21.64$, $p < .001$. Next, the autonomy support manipulation was effective as there was a significant difference in perceived autonomy support (more choice, empathy, and relevance of the task provided by the experimenter) with participants in the autonomy support condition scoring higher (M = 5.40, SD = .95) than those in the non–autonomy support conditions (M = 5.03, SD = 1.07), $F(1, 189) = 6.68$, $p = .012$.

Intercorrelations between all the variables showed that there were no significant relationships between performance (labeled as easy or difficult) and perceptions of threat, support, or academic self-concept (see Table 2). As a result we included participant gender as a factor that might potentially be related to student performance in further analyses.

Next, we tested for differences in performance on difficult items due to gender and experimental conditions (stereotype threat and autonomy support), while also including academic self-concept scores as a continuous moderating variable. There were no significant interactions between main effects for any variable. A second ANOVA was used to test for performance differences on easy items. This analysis revealed a significant four-way interaction between gender, stereotype threat, autonomy support, and academic self-

TABLE 2.
Intercorrelations Among All Variables

Variables	Learning Climate	Stereotype Threat	Academic Self-Concept	Total Correct	Difficult	Easy
Learning Climate	—					
Stereotype Threat	–.11	—				
Academic Self-Concept	.16*	–.14	—			
Total Correct	.13	.01	.07	—		
Difficult	–.11	.00	.08	.93**	—	
Easy	.11	.04	.03	.63**	.38**	—

* $p < .05$. ** $p < .01$.

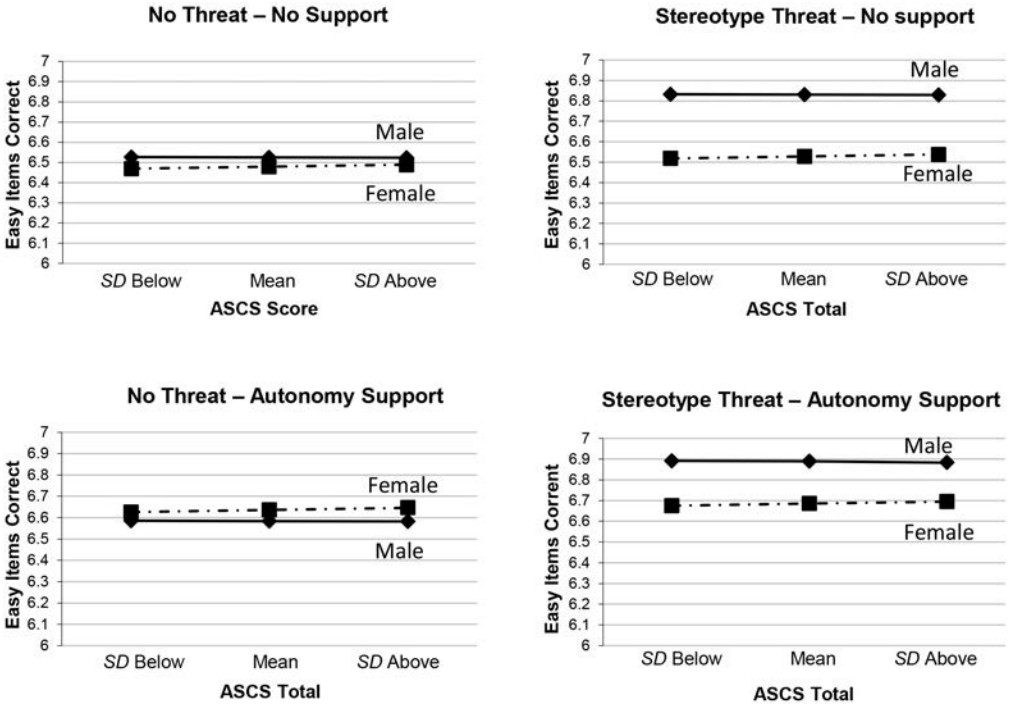

FIGURE 1.

A significant interaction between participant gender, stereotype threat and autonomy support conditions, and academic identification on the number of easy items correctly answered. Lines are plotted at the average number of easy items correct for males and females at the mean academic identification score and one standard deviation above and below the mean academic identification score.

concept on test performance, partial $\eta^2 = .023$, $F(1, 173) = 4.04$, $p < .05$. There was also a significant three-way interaction between gender, stereotype threat, and autonomy support on test performance, partial $\eta^2 = .039$, $F(1, 173) = 4.33$, $p < .05$.

To further explore the significant four-way interaction for easy items, regression lines were plotted for men and women respectively, using procedures outlined by Aiken and West (1991). As shown in Figure 1, we plotted the average number of items answered correctly at the mean academic identification score as well as one standard deviation above and one standard deviation below, for both males and females, in each of the four experimental conditions. We found that when men reported stronger identification with academics, their performance was lower in all conditions; however, when women reported stronger identification with academics, their performance was higher in all conditions. Further, men performed better than women in all conditions, except in conditions when there was autonomy support without stereotype threat, when women performed better than men. In demonstrating the significant three-way interaction, Figure 2 indicates that men in stereotype threat conditions performed better than men in non–stereotype threat conditions. Similarly, men in autonomy support conditions performed better than men in conditions without autonomy support. For women, those in stereotype threat conditions performed better than those in conditions without stereotype threat only when the condition did not provide autonomy support. It is interesting to note that when autonomy

support was provided, women in stereotype threat conditions performed worse than those in conditions without stereotype threat. ANOVAs testing for main effects showed that autonomy support conditions significantly improved participants' performance on easy items (regardless of gender), $F(1, 189) = 3.88$, $p = .05$, but showed no influence on difficult items. Finally, stereotype threat conditions showed a significant (positive) effect on performance for difficult items (regardless of gender), $F(1, 189) = 7.01$, $p = .009$, but showed no influence on easy items. These results indicate that overall, autonomy support (on easy items) and stereotype threat conditions (on difficult items) boosted student performance.

DISCUSSION

The results of our study are thought provoking and add to a gathering body of evidence suggesting that the effects of stereotype threat are not consistent (Stoet & Geary, 2012). We found that the performance of African American participants was not significantly impacted under conditions typically known to elicit stereotype threat. Specifically, stereotype threat had no effect when testing the performance of African American participants on difficult items, which are the items on which stereotype threat conditions are likely to have the most detrimental influence (O'Brien & Crandall, 2003). These findings point to a more nuanced understanding of stereotype threat as they suggest that the performance of African American students solving complex problems is not influenced by stereotype threat. In addition, our findings also show that an autonomy-supportive learning environment (created and facilitated by the instructions of the experimenter), was only beneficial on easy items for certain participants

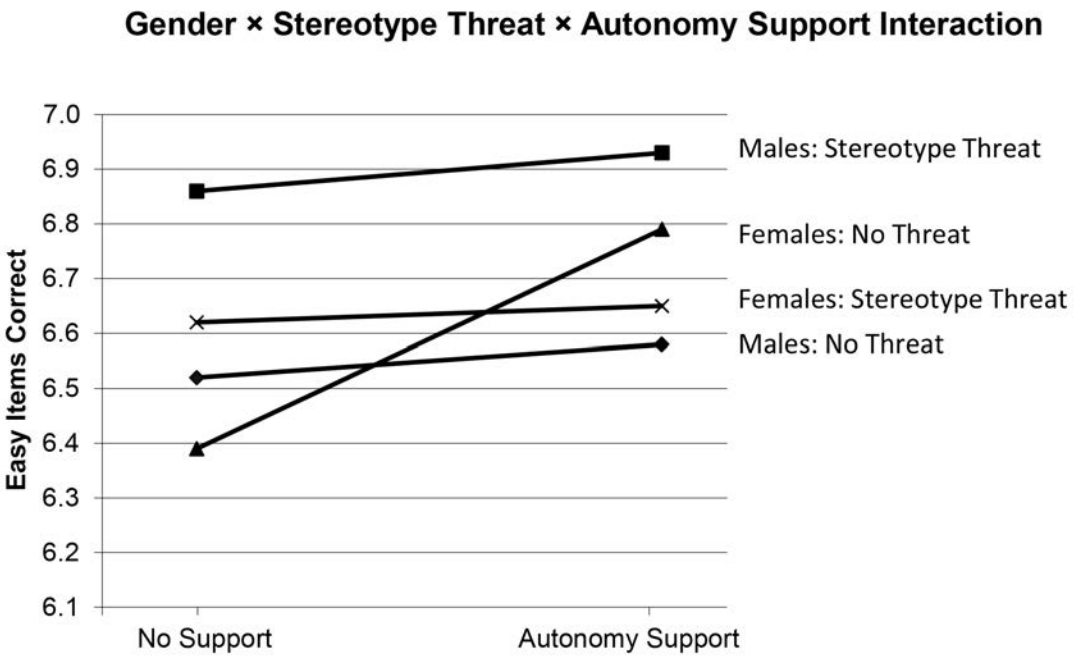

FIGURE 2. Gender × Stereotype Threat × Autonomy Support Interaction

A significant interaction between participant gender, stereotype threat, and autonomy support conditions, on the number of easy items correctly answered.

in specific conditions and had no influence on performance on difficult items. Importantly, our findings shift the focus from comparisons of group differences (minority versus majority) in performance and explore this phenomenon in a different way.

Though the main finding of this study is not supported by stereotype threat theory, our results are supported by Rivardo, Rhodes, and Klein (2008) who found that stereotype threat does not always have a negative effect on the performance of women taking difficult math tests. These researchers reported no significant differences in math performance between participants in stereotype threat conditions and stereotype threat conditions in which participants were given instructions informing them or teaching them about stereotype threat, or problem solving conditions. Likewise, more recently, several other researchers (Forbes & Schmader, 2010; Good, Aronson, & Harder, 2008; Grand, Ryan, Schmitt, & Hmurovic, 2011; McIntyre, Paulson, & Lord, 2003; O'Brien & Crandall, 2003) have also failed to replicate the negative effects of stereotype threat on test performance. It should be noted, however, that this prior work was done by comparing two groups from different race/ethnic backgrounds, whereas in our study, there was only one group of male and female African American students.

With regard to the role of academic identification and stereotype threat, we found that on easy items, the performance of participants who had weaker identification with the academic domain did not suffer under stereotype threat conditions; instead, they performed better in stereotype threat than in non–stereotype threat conditions. We also found that women who had higher academic identification, performed better in stereotype threat conditions, a result not found for men. A possible explanation for this effect may be the participants' level of prior achievement. In our study, participants' average ACT score was around 20, which would not be considered high achieving. Perhaps, low-achieving students, regardless of their academic identification, are more accustomed to lower expectations and more stereotypical assumptions about their academic ability. As a result of these past experiences, participants may not have experienced the stereotype threat condition as a threat to their ability, as they have already demonstrated that they can achieve, simply by being admitted to a university. Thus, these experiences in combination with our conditions only worked towards boosting their performance on easier items, as they had already demonstrated they do not fit the stereotype. Another potential explanation is that in our study, African American students constituted 21% of the student body with about 30% of the overall student body from minority backgrounds. Hence, given that the African American students in our study were part of a fairly diverse student body, it is possible that the stereotype threat created in the experimental condition may not have been strong enough to have a detrimental effect on their performance.

Response to stereotype threat conditions also appears to be influenced by the difficulty level of test items. For example, O'Brien and Crandall (2003) showed that for easy items, females receiving stereotype threat performed significantly better than participants not receiving stereotype threat; and for difficult items, women in stereotype threat conditions performed significantly worse than those in non–stereotype threat conditions. Although our study did not completely replicate the latter finding, we found that participants in stereotype threat conditions performed significantly better on easy items, but not on difficult items. These results support the notion that stereotype threat can have an enhancing effect when tests are easy. Our findings that

stereotype threat did not seem to affect African American students on difficult items are of particular interest as performance on difficult items is what separates the successful and unsuccessful college students. Thus, our results suggest that the phenomenon of stereotype threat is complex and nuanced and demands closer attention and consideration.

Another interesting aspect of our results is the influence of gender on test performance. On easy items, men performed better than women in all conditions, except in conditions when there was autonomy support without stereotype threat, when women performed better than men. These findings suggest that relative to African American women, the performance of African American men on easy items was facilitated by stereotype threat and autonomy support conditions. Perhaps, relative to women, this finding again supports the idea that men respond to stereotype threat as a challenge that they have already overcome by being admitted to college. Potentially then, men are more likely to experience threat conditions as motivating, as these remind them of their previous successes and this leads to stronger performance. Further, it appears that African American women college students are more likely to achieve performance gains by receiving autonomy support and strengthening of their identification with the academic endeavor.

Perhaps one of the unique contributions of our results is the insight into potential strategies for providing supportive learning conditions for ethnic minority students. We found that under conditions of autonomy support (experimenter providing choice, empathy, and task relevance) participants reported higher levels of perceived autonomy support relative to participants in the non–autonomy support condition. These results call attention to the importance of instructors providing support for minority students and are congruent with prior work (Cole et al., 2007). In particular, African American women who value academics are likely to need the most support, because of the negative stereotypes that are typically associated with their group within this domain. Prior research suggests that due to a sense of a cultural mismatch in academic settings, African American students with stronger identification with the academic domain are likely to experience cognitive dissonance (Stephens, Fryberg, Markus, Johnson, & Covarrubias, 2012). These students are likely to need support on campus, not only to deal with stereotype threat, but also to feel a sense of affirmation of their identification with academics. Additionally, this support may facilitate a feeling of "fit" within the classroom and enhance feelings of self-efficacy for performing at school. Thus, as evidenced in our study, African American women students with high academic identification are likely to achieve significantly higher performance on easy items when they receive autonomy support compared to their peers in non–autonomy support conditions. To facilitate a sense of autonomy support faculty, staff, and administrators working in a classroom or planning curriculums could consider structuring classroom assignments and options that enhance choice, empathy, and task relevance.

Our results indicate that, especially for African American males, academic identification does not always have a positive influence on academic performance. Steele and Aronson (1995) discuss this phenomenon as *disidentification*, which, it appears, could emerge earlier than in college as indicated by Wooley, Kol, and Bowen (2009), who found it occurs even as early as middle school among minority males who believe they are not expected to succeed in the domain of academics. As their peers disidentify with academia, minority males find less support for their academic identification, thus academic identification is much more

difficult and burdensome for them. Ethnic minority students especially need support and care from members of the academic environment such as instructors, as they are susceptible to disidentifying because of lack of support from peers.

One limitation of our study may be the choice of the Raven's Progressive Matrices as a performance measure, as it was specifically created to be a culturally unbiased measure of intelligence. As a result, the effect of stereotype threat may have been difficult to replicate using this test. Also, although we did decenter the norm of comparing all groups to the White majority by having only one ethnic minority group in our sample and were able to investigate differences between members within the same ethnic group, future researchers could extend our findings to other ethnic minority groups in different types of academic institutions (large, small, private, and public colleges and universities). We also acknowledge that the results of our study are limited in generalizability to African American students who are in college and may not pertain to those who are still in high school and have not as yet achieved the success of gaining admission to college. Future researchers could also include measures of a pretest and posttest as this would help establish the strength of an intervention, such as providing autonomy support.

Taken together, our results make an important contribution to the literature by emphasizing the complex, nuanced, and often null effects of stereotype threat for ethnic minority students. Further, we have highlighted the importance of examining differences due to gender, identification with the academic domain, and difficulty level of the task. Finally, perhaps our most important contribution is demonstrating that instructors and teaching assistants can improve the performance of students from stigmatized groups by providing autonomy support, particularly to those who may be experiencing stereotype threat.

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REFERENCES

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interaction.* Newbury Park: SAGE.

Aronson, J., Fried, C. B., & Good, C. (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of Experimental Social Psychology, 38*, 113-125.

Aronson, J., Lusting, M. J., Good, C., Keough, K., Steele, C. M., & Brown, J. (1999). When White men can't do math: Necessary and sufficient factors in stereotype threat. *Journal of Experimental Social Psychology*, *35*, 29-46.

Aud, S., Hussar, W., & Grace, K. (2011). *The condition of education* (NCES 2011033). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Brown, R. P., & Day, E. A. (2006). The difference isn't black and white: Stereotype threat and the race gap on Raven's Advanced Progressive Matrices. *Journal of Applied Psychology*, *91*, 979-985.

Cole, B., Matheson, K., & Anisman, H. (2007). The moderating role of ethnic identity and social support on relations between well-being and academic performance. *Journal of Applied Social Psychology*, *37*, 592-615.

Croizet, J. C., Despres, G., Gauzins, M. E., Huguet, P., Leyens, J. P., & Meot, A. (2004). Stereotype threat undermines intellectual performance by triggering a disruptive mental load. *Personality and Social Psychology Bulletin, 30*, 720-731.

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, *26*, 325-346.

Forbes, C. E., & Schmader, T. (2010). Retraining attitudes and stereotypes to affect motivation and cognitive capacity under stereotype threat. *Journal of Personality and Social Psychology, 99,* 740-754.

Good, C., Aronson, J., & Harder, J. A. (2008). Problems in the pipeline: Stereotype threat and women's achievement in high-level math courses. *Journal of Applied Developmental Psychology, 29,* 17-28.

Grand, J. A., Ryan, A. M., Schmitt, N., & Hmurovic, J. (2011). How far does stereotype threat reach? The potential detriment of face validity in cognitive ability testing. *Human Performance, 24,* 1-28.

Johns, M., Schmader, T., & Martens, A. (2005). Knowing is half the battle: Teaching stereotype threat as a means of improving women's math performance. *Psychological Science*, *16*, 175-179.

Komarraju, M., Dial, C., & Tincher, C. (2010). "I can't do that!" Task difficulty and students' implicit/explicit cognitions of success and belonging. Poster presented at the Association for Psychological Science Convention in Boston, MA.

Lawrence, J. S., Marks, B. T., & Jackson, J. S. (2010). Domain identification predicts Black students' underperformance on moderately difficult tasks. *Motivation and Emotion*, *34*, 105-109.

Levesque, C., Zuehlke, A. N., Stanek, L. R., & Ryan, R. M. (2004). Autonomy and competence in German and American university students: A comparative study based on self-determination theory. *Journal of Educational Psychology, 96*, 68-84.

Marx, D. M., & Goff, P. A. (2005). Clearing the air: The effect of experimenter race on target's test performance and subjective experience. *British Journal of Social Psychology*, *44*, 645-657.

McIntyre, R. B., Paulson, R. M., & Lord, C. G. (2003). Alleviating women's mathematics stereotype threat through salience of group achievements. *Journal of Experimental Social Psychology*, *39*, 83-90.

McFarland, L. A., Lev-Arey, D. M., & Ziegert, J. C. (2003). An examination of stereotype threat in a motivational context. *Human Performance*, *16,* 181-205.

Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *Theory and Research in Education*, *7*, 133-144.

Nguyen, H. D., & Ryan, A. M. (2008). Does stereotype threat affect test performance of minorities and women? A meta-analysis of experimental evidence. *Journal of Applied Psychology*, *93*, 1314-1334.

O'Brien, L. T., & Crandall, C. S. (2003). Stereotype threat and arousal: Effects on women's math performance. *Personality and Social Psychology Bulletin*, *29*, 782-789.

Osborne, J. W. (1997). Identification with academics and academic success among community college students. *Community College Review, 25*(1), 59-67.

Osborne, J. W., & Jones, B. D. (2011). Identification with academics and motivation to achieve in school: How the structure of the self influences academic outcomes. *Educational Psychology Review, 23*, 131-158.

Osborne, J. W., & Walker, C. (2006). Stereotype threat, identification with academics, and withdrawal from school: Why the most successful students of color might be most likely to withdraw. *Educational Psychology, 24*, 563-577.

Ployhart, R. E., Ziegert, J. C., & McFarland, L. A. (2003). Understanding racial differences on cognitive ability tests in selection contexts: An integration of stereotype threat and applicant reactions research. *Human Performance*, *16*, 231-259.

Raven, J. C., Raven, J., & Court, J. H. (2000). *Manual for Raven's Standard Matrices and Vocabulary Scales*. San Antonio, TX: Harcourt.

Reeve, J., Jang, H., Hardre, P., & Omura, M. (2002). Providing a rationale in an autonomy-supportive way as a strategy to motivate others during an uninteresting activity. *Motivation and Emotion*, *26*, 183-207.

Reynolds, W. M. (1988). Measurement of academic self-concept in college students. *Journal of Personality Assessment, 52*, 223-240.

Reynolds, W. M., Ramirez, M. P., Magriña, A., & Allen, J. E., (1980). Initial development and validation of the Academic Self-Concept Scale. *Educational and Psychological Measurement, 44,* 373-381.

Rivardo, M. G., Rhodes, M. E., & Klein, B. (2008). Lack of stereotype threat at a liberal arts college. *College Student Journal*, *42*, 832-841.

Rosenthal, H. E., & Crisp, R. J. (2006). Reducing stereotype threat by blurring intergroup boundaries. *Personality and Social Psychology Bulletin*, *32*, 501-511.

Ross, T., Kena, G., Rathbun, A., KewalRamani, A., Zhang, J., Kristapovich, P., & Manning, E. (2012). *Higher education: Gaps in access and persistence study* (NCES 2012-046). Washington, DC: U. S. Department of Education, National Center for Education Statistics.

Rydell, R. J., & Boucher, K. L. (2010). Capitalizing on multiple social identities to prevent stereotype threat: The moderating role of self-esteem. *Personality and Social Psychology Bulletin*, *36*, 239-250.

Schmader, T. (2010). Stereotype threat deconstructed. *Current Directions in Psychological Science*, *19*, 14-18.

Schmader, T., & Johns, M., (2003). Converging evidence that stereotype threat reduces working memory capacity. *Journal of Personality and Social Psychology, 85,* 440-452.

Steele, C. M. (1997). A threat in the air: How stereotypes shape the intellectual identities and performance of women and African Americans. *American Psychologist*, *52*, 613-629.

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology*, *69*, 797-811.

Stephens, N. M., Fryberg, S. A., Markus, H. R., Johnson, C. S., & Covarrubias, R., (2012). Unseen disadvantage: How American universities' focus on independence undermines the academic performance of first-generation college students. *Journal of Personality and Social Psychology, 102,* 1178-1197.

Stoet, G., & Geary, D. C. (2012). Can stereotype threat explain the gender gap in mathematics performance and achievement? *Review of General Psychology, 16*, 93-102.

Syed, M., Azmitia, M., & Cooper, C. R. (2011). Identity and academic success among underrepresented ethnic minorities: An interdisciplinary review and integration. *Journal of Social Issues, 67*, 442-468.

Walton, G. M., & Cohen, G. L. (2007). A question of belonging: Race, social fit, and achievement. *Journal of Personality and Social Psychology, 92*, 82-96.

Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology, 70,* 767-779.

Wooley, M. E., Kol, K. L., & Bowen, G. L. (2009). The social context of school success for Latino middle school students: Direct and indirect influences of teachers, family, and friends. *Journal of Early Adolescence, 29*, 43-70.