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A threatening intellectual environment: Why females are susceptible to experiencing

problem-solving deficits in the presence of males

Michael Inzlicht

Brown University

Talia Ben-Zeev

Williams College

Abstract

Does placing females in environments in which they have contact with males, cause them to experience deficits in problem-solving performance? Is a situational cue, such as gender composition, sufficient for creating a threatening intellectual environment for females-- an environment that elicits performance-impinging stereotypes? To explore these questions, participants completed a difficult math or verbal test in 3-person groups, which consisted of two people of the same sex as the participant (same-sex condition) or of the opposite sex (minority condition). Minority females experienced performance deficits in the math test only, whereas males performed equally well on the math test in both conditions. Further investigation showed that females' deficits were proportional to the number of males in their surrounding. Even females who were placed in a mixed-sex majority condition (2 females and 1 male) experienced moderate but significant deficits. Findings are discussed in relation to theories of distinctiveness, stereotype threat, and tokenism.

A threatening intellectual environment: Why females are susceptible to experiencing

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Females currently comprise a small minority in the natural and physical sciences. A

recent NSF report (1996) showed that in academia, females constitute 35% of undergraduate

students enrolled in physics, math, and computer science classes, 16% of undergraduate students

enrolled in engineering classes, and less than 10% of graduate students in physics and

engineering. Moreover, this report shows that females suffer from higher attrition rates in their

academic careers so that by the time women reach the workplace they occupy only 22% of jobs

in mathematical and scientific domains. Does females' problem-solving performance diminish

when females are placed in an environment in which males outnumber them? If so, are such

performance deficits specifically linked to domains, which are associated with negative

stereotypes about females' intellectual capacity? Examining these questions is informative both

with respect to theories of how given social stereotypes affect the intellectual processing of

individuals who are the targets of these stereotypes as well as to educational practice.

Being outnumbered may cause females to suffer from stereotype threat, which is a

situational phenomenon that occurs when targets of stereotypes alleging intellectual inferiority

are reminded of the possibility of confirming these stereotypes (Aronson, Lustina, Good,

Keough, Steele, & Brown, 1999; Aronson, Quinn, & Spencer, 1998; Spencer, Steele, & Quinn,

1999; Steele & Aronson, 1995; Steele, 1997). The experience of stereotype threat may, in turn,

interfere with intellectual performance, especially when individuals are highly identified with

success and achievement in the given domain. For example, Spencer et al. (Experiment 3, 1999)

showed that high-achieving females performed significantly worse than males on a standardized

math test when the stereotype about their math ability was made salient. Saliency was

manipulated by informing participants that the test they were about to take had elicited sex-

differences in the past, presumably favoring males. These findings are relevant to explaining

sex-differences on the math SATs (see Brown & Josephs, 1999), because females who are highly

identified with pursuing a college education may underperform as a result of a heightened test anxiety and loss of motivation, due to stereotype threat (e.g., Steele, & Aronson, 1995). The effects of stereotype threat on academic achievement have been demonstrated across different stereotyped groups, such as African-Americans (Steele & Aronson, 1995), Latinos (Aronson & Salinas, 1997), and students of low socioeconomic status (Croizet & Claire, 1998).

There may be no need to elicit stereotype threat by "hitting participants over the head," either by directly presenting people with the stereotype (Spencer et al., 1999), or by reminding participants of their membership in a stereotyped group (Steele & Aronson, Study 4, 1995). Instead, we contend that stereotype threat may be evoked by any factor that increases the saliency of group stereotypes. Deaux and Major's interactive model of gender-related behavior (1987), suggests that the situation or environment can serve as a causal factor (in addition to attributes associated with the perceiver and the target), in determining whether gender stereotypes will be activated. We predict that one such environmental factor, being outnumbered by members of the opposite sex, will suffice to cause females to experience the detrimental effects of negative stereotypes about their mathematical ability. We refer to any such environment, which can activate the threatening effects of gender stereotypes as a threatening intellectual environment.

The existence of this particular threatening intellectual environment for females is consistent with distinctiveness theory (Abrams, Thomas, & Hogg, 1990; McGuire, McGuire, & Fujioka, 1978; McGuire, McGuire, & Winton, 1979; McGuire & Padawer-Singer, 1976). This theory suggests that a minority status can evoke a sense of group identity, which is then incorporated into the working self-concept. For example, by manipulating the sex-composition of three-person groups, Cota and Dion (1986) found that whereas 34% of participants in the minority conditions noticed their own sex, only 16% of those in the same-sex condition did the same. Furthermore, McGuire, McGuire and Winton (1979) found that as the relative numbers of opposite-sex individuals increased, the spontaneous mention of gender increased proportionately. This last finding raises the possibility that as females are increasingly outnumbered by males, a situation which is common to many advanced-level quantitative high school classes, university

courses, and work place environments, females may become more aware of their gender. We predict that the increased awareness of one's group, and the negative stereotypes that are associated with this group, will cause poorer performance.

According to the theory of stereotype threat, a minority status should only disrupt cognitive functioning on a stereotyped task. However, according to tokenism theory (Lord & Saenz, 1985; Saenz, 1994; Saenz & Lord, 1989), a minority or token status- being a token minority in an otherwise homogeneous group- should elicit cognitive deficits in all domains (Lord & Saenz, 1985; Saenz & Lord, 1989). Saenz (1994) argued that a token status invokes the feeling of being responsible for representing one's minority group favorably in any given domain. Saenz suggested that the feeling of responsibility or self-consciousness diverts the token's attention from the cognitive task at hand and therefore can result in deficits in problem solving and memory.

Tokenism and stereotype threat make differential predictions regarding the effects of a minority status on cognitive performance (Steele & Aronson, 1995). Stereotype threat posits that it is the stereotype itself that causes evaluation apprehension. When people are placed in the minority and are asked to perform in a stereotyped domain, people are reminded of the stereotype that detracts from their group's reputation. It is the cognizance of the stereotype that then leads to performance deficits. In contrast, tokenism posits that the token status itself causes self-consciousness, regardless of whether individuals are asked to perform in stereotyped or non-stereotyped domains, and therefore feel the pressure of being responsible for representing other members of their group in a positive light. Thus, both stereotype threat and tokenism would predict that females would experience performance deficits when they comprise of a numerical minority. Stereotype threat, however, would make the qualification that a deficit would only occur in a negatively stereotyped domain, such as mathematics.

Goals and the experimental paradigm.

The main goals of the current study were to test whether: (a) placing females in the minority, or in an environment in which they are outnumbered by males, is sufficient to create a threatening intellectual environment that causes deficits in females' intellectual performance; and (b) whether minority-induced performance deficits, if any, are specific to a stereotyped domain or generalize to stereotyped and non-stereotyped domains just the same. The experimental paradigm consisted of asking participants to take a test with either two people of the same sex (same-sex condition), or with two people of the opposite sex (minority condition). The test comprised of items from either a stereotyped (math) or non-stereotyped domain (verbal). If being in the minority affects females' performance negatively, then females in the minority condition would experience decrements relative to females in the same-sex condition, whereas males would perform similarly in both conditions. If performance decrements occur, and are mediated by stereotype threat, then they would only occur in the stereotyped domain (stereotype threat hypothesis). In contrast, if performance deficits occur as a result of being a token in a group, then they should occur in both stereotyped and non-stereotyped domains (tokenism hypothesis). Experiment 1 was designed to examine these hypotheses with female participants. Experiment 2 was crafted to control for the performance of male participants as well as to examine whether females' math performance would decrease in proportion to the relative number of males who are present in their environment.

Experiment 1

This experiment was designed to examine whether females who are outnumbered by males (the minority condition) experience performance decrements relative to females who are placed in a gender-homogeneous environment (the same-sex condition) and to tease apart the stereotype threat vs. tokenism predictions outlined above.

Method

Participants.

Seventy-two female undergraduate students at Brown University participated in this study in exchange for course credit. Participants were randomly assigned to one of the four conditions of the Sex Composition (minority condition and same-sex condition) X Test Type (math test and verbal test) between-subject factorial design.

Materials

Math and verbal tests. The math and verbal tests were composed of 20 and 25 items, respectively. The two tests consisted of equally difficult multiple-choice items taken from the Graduate Records Examination (GRE) test guide (Educational Testing Service, 1994). Out of earlier samples, only 36.6% and 32.5% of examinees answered all of the math and verbal items correctly, respectively (Educational Testing Service, 1994).

Procedure

Female participants were randomly assigned to either the same-sex or minority conditions. In the same-sex condition, the experiment started once all three female participants arrived. In the minority condition, two out of eight male confederates were randomly assigned to each session, and the experiment started once the two male confederates and the female participant arrived. All participants received the same cover story. They were told that the goal of the study was to create an educational training program for enhancing performance on standardized achievement tests. Furthermore, participants were informed that their performance on the test would be reported orally to the other group members. Participants were then given 15 minutes to complete either a math or a verbal test. Finally, they were asked to complete a demographic sheet, which asked them to report their mathematical and verbal SAT scores.

In order to minimize any effects that may be due to experimenter presence, an experimenter was only present in the room when it was absolutely necessary (e.g., to pass out the tests). The experimenter's sex was counterbalanced over participants. That is, half of the

participants were greeted by a male experimenter, whereas the other half were greeted by a female experimenter.

<div align="center">Results and Discussion</div>

Accuracy, which was computed by the number of correct items divided by the total number of items attempted (Steele & Aronson, 1995), resulted in group means that supported the stereotype threat over the tokenism hypothesis. Females in the minority condition tended to experience a decrease in performance on only the math (vs. the verbal) test as compared to females in the same-sex condition (see Figure 1).

<div align="center">

Insert Figure 1 here

</div>

We ran a 2 X 2 ANCOVA on accuracy, using participants' SAT scores as the covariate. This analysis resulted in a significant interaction between sex-composition and test type, $\underline{F}$ (1, 67) = 3.80, $\underline{p}$ < .05. Planned contrasts revealed that, as predicted by stereotype threat, females in the minority condition attained significantly less accurate scores on the math test ($\underline{M}$ = .55, $\underline{SE}$ = .05) than did females in the same-sex condition ($\underline{M}$ = .70, $\underline{SE}$ = .05), $\underline{F}$ (1, 67) = 6.98, $\underline{p}$ < .01. This result constitutes a medium effect size, Cohen's $\underline{d}$ = .73. Conversely, when taking the verbal test, females in the minority condition ($\underline{M}$ = .44, $\underline{SE}$ = .03) did not attain significantly worse scores than females in the same-sex condition ($\underline{M}$ = .44, $\underline{SE}$ = .03). Thus, females in the minority condition scored less accurately than did females in the same-sex condition, but only in the stereotyped domain[1]. The main effect for test type was not significant[2].

These findings show that when females are placed in a threatening intellectual environment, in this case when they are outnumbered by males, females tend to experience

deficits in their mathematical performance, even without an explicit reminder of the ability-impinging stereotype. In contrast to the predictions of tokenism theory, however, being in the minority may not be a sufficient condition for inducing cognitive deficits. Instead, deficits seemed to be specific to the negatively stereotyped task (mathematics but not verbal).

There are two important unresolved questions, however, that we address in Experiment 2. First, would males show the same pattern of decrements as females? In a threatening intellectual environment that elicits negative stereotypes about females' math ability, males in the minority condition should not suffer any decrements in the math domain as compared with males in the same-sex condition.

Second, will females experience deficits only when they are in the minority, or is any inter-sex contact deleterious to their performance? To answer this question we ran an additional female mixed-sex majority condition (two females and a single male). According to distinctiveness theory, group saliency increases with an increase in the relative number of out-group members (McGuire, McGuire & Winton, 1979). Thus, we predict that females' performance would decrease with an increase in the relative number of males in their environment. That is, females in the mixed-sex majority condition would perform worse than females in the same-sex condition, because the environment would still afford the elicitation of stereotype threat, but would perform better than females in the minority condition. A threatening intellectual environment may encompass situations in which females are in the majority, but are still reminded of and suffer decrements from a negative stereotype in the stereotyped domain, even by the presence of a single male.

Experiment 2

The procedure of Experiment 2 was almost identical to Experiment 1, except that: (a) participants were both male and female; (b) participants only completed a math test; and (c) an

additional condition was run where females were in a mixed-sex majority (two females and one male).

Method

Participants.

Ninety-two male and female undergraduate students at Brown University participated in this study in exchange for either course credit or for a payment of $6.00. Seventy- four participants were assigned to one of four conditions of a Sex-Composition (minority condition and same-sex condition) X Sex (male and female) between-subject factorial design. Additionally, eighteen female participants were assigned to a mixed-sex majority control condition.

Materials and procedure.

The procedure was the same as in Experiment 1, with two exceptions: (1) participants were only asked to take the math test, and (2) participants were given 20 minutes to complete the test rather than 15 because they only answered an average of 8.32 math items in the first experiment.. After participants completed this test, participants were asked to fill out a demographic sheet, which asked participants to report their math SAT score.

Results and Discussion

Test Performance

The group accuracy means support the existence of a threatening intellectual environment for females (see Figure 2). The 2 X 2 ANCOVA on accuracy, using participants' self-reported SAT scores as the covariate revealed a marginally significant interaction between sex and sex-composition, $\underline{F}(1, 67) = 3.12$, $\underline{p} = .08^2$. No other effects were significant or close to being

significant. Planned contrasts showed that females in the minority condition ($\underline{M}$ = .58, $\underline{SE}$ = .03) scored significantly less accurately than females in the same-sex condition ($\underline{M}$ = .70, $\underline{SE}$ = .04), $\underline{F}$(1, 67) = 5.64, $\underline{p}$ < .02. This result constitutes a large effect size, Cohen's $\underline{d}$ = .80. In contrast, males in the minority condition ($\underline{M}$ = .67, $\underline{SE}$ = .04) did not score significantly more accurately than males in the same-sex condition ($\underline{M}$ = .66, $\underline{SE}$ = .04). Thus the present results replicated the previous accuracy findings from Experiment 1. Females who were placed in the minority condition experienced a deficit in accuracy vis a vis females who were placed in the same-sex condition. In contrast, male participants were not affected by the sex-composition manipulation[4].

Insert Figure 2 here

<u>Females' test performance as a function of number of males</u>

In accordance with distinctiveness theory, we predicted that females' math performance would decrease as a function of the relative number of males in their environment. A linear contrast analysis, adjusting for self-reported SAT, testing the prediction that female participants in the minority condition scored the lowest ($\underline{M}$ = .58, $\underline{SE}$ = .03), female participants in the mixed-sex majority condition scored in the middle ($\underline{M}$ = .64, $\underline{SE}$ = .03), and female participants in the same-sex condition scored the highest ($\underline{M}$ = .70, $\underline{SE}$ = .04), revealed a significant pattern, $\underline{t}$(51) = 2.42, $\underline{p}$ < .02, $\underline{r}$ =   -.32. Thus, females' math performance decreased as a result of increasing the relative number of males in a room.

This experiment provided additional evidence for three ideas. First, minority status can cause intellectual deficits in stereotyped domains. When placed in the minority, females, but not males, experienced math performance deficits. Second, stereotype threat can be evoked by environmental cues, such as simple changes to the sex-composition of the environment, even

without an explicit reminder of the negative stereotype. These environmental cues thus create a threatening intellectual environment. Third, females increasingly experience math performance detriments with an increase in the relative number of males in their surrounding; their performance declines as they increasingly depart from an all female environment. This interpretation is consistent with distinctiveness theory's assertion that group salience increases with an increase in the relative number of out-group members in the immediate social environment (McGuire, McGuire & Winton, 1979).

Conclusion

Simply placing high-achieving women in an environment, in which men outnumber them, can cause women to experience performance deficits in a stereotyped problem-solving domain, such as mathematics. Furthermore, in this threatening intellectual environment, performance deficits tend to increase as the relative number of males increases. It seems that sex composition, therefore, may act as a causal situational factor in determining whether gender stereotypes will be activated, such as negative stereotypes about females' mathematical ability (also see, Deaux and Major, 1987). This activation, in turn, may then cause high-achieving females to experience performance deficits.

The current study suggests that these decrements in performance, consistent with the predictions of stereotype threat, but contrary to those of tokenism, were specific to the stereotyped domain (math but not verbal). Thus, being in the presence of males appears to be a necessary but not a sufficient condition for the occurrence of females' math performance deficits. These results contribute to a growing body of research, which shows that minority effects are mediated by variables such as sex and domain of performance (Yoder, 1994; Yoder, Aniakudo, & Berendsen, 1996).

Even though the stereotype-threat hypothesis explains the data better than does tokenism theory, a few words of caution are in order. First, the predictions of tokenism theory may not

have been supported because of the relative size of the majority and minority groups in the current study. The majority members outnumbered minority members by only one person. Thus, it is possible that the minority group did not feel as "tokenized" as they would have felt in a larger group. Second, the dependent measure, performance on a written test, may have been too private to elicit a tokenism effect. It is possible that if participants were required to take an oral, instead of a written test, participants would have experienced greater self-consciousness in both the stereotyped and non-stereotyped domains.

The present study also has several implications for educational practice. The first concerns the controversy surrounding the merits of single-sex over coed education. Advocates of single-sex education argue that separating the sexes can minimize the deleterious effects of gender stereotypes and bolster females' attitudes towards more "masculine" subject matters such as math and science (AAUW, 1992, 1998; Riordan, 1990). Although the current study was not designed to assess whether or not females would benefit most from single-sex education, the finding that females' math performance tended to decrease as the number of males in their environment increased, suggests that females may in fact benefit from being placed in single-sex math classrooms.

Second, although a person need not be chronically targeted by stereotypes to be impaired by them (Aronson, et al, 1999), a person who is highly identified with a given domain and is continuously in the minority may be more likely to be impaired by stereotypes. Women who are placed in advanced math courses in high school and those who take undergraduate and graduate level courses in mathematics are often exposed to an everyday reality of being in the minority. These women are especially vulnerable to the negative consequences of stereotype threat because they tend to be more highly identified with the math domain. Steele (1997) suggested that groups that suffer from stereotype threat might embrace an adaptive response of "disidentification." That is, they may reconceptualize their values and identity so as to remove the stereotyped domain as a basis for self-evaluation. Females who are highly identified with mathematics, on the other hand, do not have such recourse, and are therefore more vulnerable to

the effects of negative stereotypes. It may not be surprising, then, that the largest gap on the math SATs between males and females can be found in the gifted population (Benbow & Stanley, 1980; 1983; Hyde, Fennema, and Lamon, 1990).

The data from the current study support the existence of a threatening intellectual environment for stereotyped groups, in which women experience math deficits as a function of the number of males in their environment. However, this study still leaves a number of important questions unanswered. First, what is the nature of the mechanism that mediates these performance deficits? Although Steele and Aronson (1995) suggest that evaluation apprehension may be the underlying causal mechanism, it is possible that performance expectations (e.g. Stangor, Carr & Kiang, 1998) or stereotype activation (e.g. Dijkserhuis & van Knippenberg, 1998) play important roles as well. Second, although males usually find themselves in advantaged social groups, they are considered less able than females in some domains, such as performance on verbal tasks (Skaalvik and Rankin, 1994; Smelder & Torestad, 1996). Would a male who is asked to perform on a verbal task experience deficits in the presence of females? If not, minority effects may be confined to chronically stereotyped groups (Yoder, 1994).

In sum, merely placing high-achieving females in a stereotyped setting, in which they are in contact with males, causes a decrease in their performance. This phenomenon highlights the indirect environmental effects of negative stereotypes on the targets of these stereotypes (e.g. Stangor, et al., 1998; Steele & Aronson, 1995) and adds to the growing literature on the social and cognitive effects of belonging to a stigmatized group (e.g. Crocker & Major, 1989; Major, Spencer, Schmader, Wolfe, & Crocker, 1998). For females who pursue quantitative-related vocations, this phenomenon has real-world implications. The gender makeup of an environment alone, be it in a classroom or on the job, can create a threatening intellectual environment for females. This environment, in turn, can have an adverse impact on females' intellectual performance and well being.

References

Abrams, D., Thomas, J., & Hogg, M. A. (1990). Numerical distinctiveness, social identity and gender salience. British Journal of Social Psychology, 29, 87-92.

American Association of University Women Educational Foundation. (1998). Separated by sex. A critical look at single-sex education for girls. Washington, DC: Author.

American Association of University Women Educational Foundation. (1992). How schools shortchange girls. Washington, DC: Author.

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

Aronson, J., Quinn, D. M., & Spencer, S. J. (1998). Stereotype threat and the academic underperformance of minorities and women. In J. K. Swim & C. Stangor (Eds.) Prejudice: The target's perspective (pp. 83-103). San Diego, Ca: Academic Press.

Aronson, J., & Salinas, M. F. (1997). Stereotype Threat, Attributional Ambiguity, and Latino Underperformance. Unpublished manuscript, University of Texas.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84, 191-215.

Benbow, C. P. & Stanley, J. C. (1980). Sex differences in mathematical ability: fact or artifact?. Science, 210, 1262-1264.

Benbow, C. P. & Stanley, J. C. (1983). Sex differences in mathematical reasoning ability: more facts. Science, 222, 1029-1031.

Brown, R. P. & Josephs, R. A. (1999). Stereotype relevance and gender differences in math performance. Journal of Personality and Social Psychology, 76, 246-257.

Cota, A. & Dion, K. L. (1986). Salience of gender and sex composition of ad hoc groups: an experimental test of distinctiveness theory. Journal of Personality and Social Psychology, 50, 770-776.

Crocker, J. & major, B. (1989). Social stigma and self-esteem: the self-protective properties of stigma. Psychological Review, 96, 608-630.

Croizet, J. C. & Claire, T. (1998). Extending the concept of stereotype threat to social class: the intellectual underperformance of students from low socioeconomic backgrounds. Personality and Social Psychology Bulletin, 24, 588-594.

Deaux, K., Major, B. (1987). Putting gender into context: an interactive model of gender-related behavior. Psychological review, 94, 369-389.

Dijksterhuis, A., & van Knippenberg, A. (1998). The relation between perception and behavior, or how to win a game of trivial pursuit. Journal of Personality and Social Psychology, 74, 865-877.

Educational Testing Service. (1994). GRE: Practicing to take the general test (9th Ed.). Princeton, NJ: Educational Testing Service.

Hyde, J. S., Fennema, E., Lamon, S.J. (1990). Gender differences in mathematics performance: a meta analysis. Psychological Bulletin, 107, 139-155.

Lord, C. G., & Saenz, D. S. (1985). Memory deficits and memory surfeits: Differential cognitive consequences of tokenism for tokens and observer. Journal of Personality and Social Psychology, 49, 918-926.

Major, B.m Spencer, S., Schmader, T., Wolfe, C. & Crocker, J. (1998). Coping with negative stereotypes about intellectual performance: the role of psychological disengagement. Personality and Social Psychology Bulletin, 24, 34-50.

McGuire, W. J., McGuire C. V., Child, P., & Fujioka, T. (1978). Salience of ethnicity in the spontaneous self-concept as a function of one's ethnic distinctiveness in the social environment. Journal of Personality and Social Psychology, 36, 511-520.

McGuire, W. J., McGuire, C. V., & Winton, W. (1979). Effects of household sex composition on the salience of one's gender in the spontaneous self-concept. Journal of Experimental Social Psychology, 15, 77-90.

McGuire, W. J., & Padawer-Singer, A. (1976). Trait salience in the spontaneous self-concept. Journal of Personality and Social Psychology, 33, 743-754.

National Science Foundation. (1996). Women, minorities, and persons with disabilities in science and engineering: 1996 (NSF Publication No. 96-311). Arlington, VA: National Science Foundation.

Neter, J., Kutner, M. H., Nachtsheim, C. J., Wasserman, W. (1996). Applied linear regression models (3rd ed.). Chicago: Irwin Book Team.

Nosek, B. N., Banaji, M. R., & Greenwald, A. G. (1998, June). Gender Differences in Implicit Attitudes toward Mathematics and Science. Paper presented at the 10th Annual Convention of the American Psychological Society, Washington, DC.

Pyszczynski, T., & Greenberg, J. (1983). Determinants of reduction in effort as a strategy for coping with anticipated failure. Journal of Research in Personality, 17, 412-422.

Riordan, C. (1990). Girls and boys in school: Together or separate?. New York: Teachers College Press.

Saenz, D. S. (1994). Token status and problem-solving deficits: Detrimental effects of distinctiveness and performance monitoring. Social Cognition, 12, 61-74.

Saenz, D. S. & Lord, C. G. (1989). Reversing roles: A cognitive strategy for undoing memory deficits associated with token status. Journal of Personality and Social Psychology, 56, 698-708.

Shih, M., Pittinsky, T. L., & Ambady, N. (1999). Stereotype susceptibility: identity salience and shifts in quantitative performance. Psychological Science, 10, 80-83.

Skaalvik, E. M., & Rankin, R. J. (1994). Gender differences in mathematics and verbal achievement, self-perception and motivation. British Journal of Educational Psychology, 64, 419-428.

Smedler, A. C., & Torestad, B. (1996). Verbal intelligence: A key to basic skills. Educational Studies, 22, 343-356.

Spencer, S. J., Steele, C. M. & Quinn, D. (1999). Stereotype threat and women's math performance. Journal of Experimental Social Psychology, 35, 4-28.

Stangor, C., Carr, C., & Kiang, L. (1998). Activating stereotypes undermines task performance expectations. Journal of Personality and Social Psychology, 75, 1191-1197.

Steele, C. M. (1997). A threat in the air. How stereotypes shape intellectual identity and performance. 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.

Yoder, J. D. (1994). Looking beyond numbers, The effects of gender status, job prestige, and occupational gender-typing on tokenism outcomes. Social Psychology Quarterly, 57, 150-159.

Yoder, J. D., Aniakudo, P. & Berendsen, L. (1996). Looking beyond gender: the effects of racial differences on tokenism perceptions of women. Sex Roles, 35, 389-400.

Authors Note

Correspondence concerning this article should be addressed to either Michael Inzlicht, Department of Psychology, Brown University, Box 1853, Providence, RI, 02912 (E-mail: Michael_Inzlicht@Brown.edu), or to Talia Ben-Zeev, Department of Psychology, Williams College, Williamstown, MA, 01267 (Email: Talia.Ben-Zeev@Williams.edu).

Footnotes

[1] When we considered only the number of questions answered correctly (number correct), we found the same pattern of results, though some were less significant. The 2 X 2 ANCOVA, using self-reported SAT as the covariate resulted in a significant interaction between sex-composition and test-type, $\underline{F}$ (1, 67) = 4.14, $\underline{p}$ < .05. Relative to same-sex participants, minority females showed a trend for producing lower scores on the math test ($\underline{M}$ = 4.57, $\underline{SE}$ = .37 vs. $\underline{M}$ = 5.44, $\underline{SE}$ = .35), $\underline{F}$ (1,67) = 2.01, $\underline{p}$ < .19, a result which constitutes a medium effect size, Cohen's $\underline{d}$ = .56, but attained similar scores on the verbal test ($\underline{M}$ = .23, $\underline{SE}$ = .03 vs. .21, $\underline{SE}$ = .03). It is important to note, however, that accuracy is a more meaningful performance measure than number correct because it takes into account both the number of questions answered and the number of questions attempted (for a similar argument see, Shih, Pittinsky, & Ambady, 1999)

[2] To test whether there was a main effect for test type, we had to adjust the dependent measure to be the percent score (number completed correctly out of all items completed), because there were more verbal than math items (25 and 20 respectively). We thus ran a 2 X 2 ANCOVA on the percent score, using participants' SAT score as the covariate. The results were the same as previous ones and there were no main effects for test type.

[3] As suggested by Neter, Kutner, Nachsheim, and Wasserman (1996), two cases were excluded from this analysis because their absolute DFFIT value exceeded 1, and because their Cook's Distance values were greater than the 20th percentile of the F distribution.

[4] The raw scores, however, do not support our predictions. The 2 X 2 ANCOVA, using SAT scores as the covariate, failed to reveal significant interactions, $\underline{F}$ < 1, or significant differences between minority and same-sex females ($\underline{M}$ = 7.25, $\underline{SE}$ = .93 vs. $\underline{M}$ = 7.96, $\underline{SE}$ = .93) and between minority and same-sex males ($\underline{M}$ = 10.44, SE = .86 vs. M = 10.85, SE = .86). As stated above, however, accuracy is a more telling index of performance as it takes into account both raw scores and the number of items attempted.

Figure Captions

Figure 1. Accuracy of test performance as a function of sex-composition of group and test type.

Error bars represent standard errors.

Figure 2. Accuracy of test performance as a function of sex-composition of group and sex of

participant. Error bars represent standard errors.