Stereotype Threat Inhibits Sharing Unique Ideas and Harms Group Solutions

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One of the many touted benefits of increasing the diversity in a field is an associated increase in the diversity of perspectives which in turn improves group problem solving (Hong & Page, 2004). However, this assumes that everyone is uninhibited from sharing ideas that are distinct from their fellow group members’ ideas. Imagine a small group of STEM majors, three males and one female, working together on a complex math problem. The group gets stuck, but then the female student thinks she knows the missing step needed to solve the problem. Yet, she is concerned that no one else in the group has thought of it. Worried about being wrong and sounding like a “dumb girl” in front of her male classmates, she decides not to mention her idea.

Numerous studies have demonstrated that stereotype threat, the fear of confirming negative stereotypes about one’s group, causes members of negatively stereotyped groups to underperform (Steele, 1997). The pervasive negative stereotype of women’s math ability is particularly deleterious for women in STEM fields, who must demonstrate superior math competence. While the pernicious effect of stereotype threat on individual performance is well known, its effect on group performance is yet to be examined. Research on group problem solving shows that introducing unique information in group discussion lowers ratings of self competence compared to repeating shared information. Correspondingly, people evaluate group members as more competent when they repeat shared information than when they introduce new information (Wittenbaum & Bowman, 2004). Discussion biased towards shared information prohibits consideration of all information and consequently, impairs group problem solving ability (Stasser & Titus, 1985).

STEM majors provide an ideal population for examining the role of stereotype threat in inhibiting group performance. There is a push to increase the diversity in STEM fields both for the benefit of disadvantaged groups and for the benefit of these fields. Moreover, group work is a necessary part of problem based learning in STEM curriculum (Hanes, F., n.d.). However, simply increasing diversity in STEM may not be sufficient to see the benefits of increased diversity if members of groups negatively stereotyped in STEM domains are hesitant to share their unique perspective. To address this idea I propose the following research question: Does stereotype threat constrain group problem solving in STEM by inhibiting the degree to which women share unique perspectives? (figure 1)

**Study 1: Stereotype threat inhibits group problem solving ability.** In Study 1, male and female STEM majors will be given an information profile, a subset of facts needed to solve a problem, to review individually and told that they will use the information in a group math problem solving task. Following the hidden profiles procedure, each information profile will have some information that is shared among all group members and some information that is unique to each group member. To correctly solve the problem, each group member must share their unique information in group discussion. To reflect underrepresentation and induce stereotype threat, participants will be put into groups of three men and one woman. Being the only female in a room is sufficient to induce stereotype threat for women taking a math test, unless the women are explicitly told that men and women perform equally well on the test (Ben-Zeev, Fein & Inzlicht, 2005). In the no threat condition participants will be told that men and women perform equally well on the problem. Each group will have a time limit for discussing
and solving the problem. All group discussions will be recorded and coded for how often each member mentioned shared information or unshared information. I predict that groups in the stereotype threat condition will be the least likely to solve the problem and take longer to solve it when they do. This will be mediated by the extent to which women share the unique information from their information profile. Since introducing unique information decreases feelings of competence and women under stereotype threat are concerned about their math ability, they will be less likely to introduce unique information than women in the no threat condition.

**Study 2: Self affirmation buffers threat and promotes sharing of unique information.** Study 2 uses the same experimental design but adds a third condition in which female participants complete a self-affirmation exercise prior to being put into a problem solving group in the stereotype threat condition. Self affirmations have been shown buffer women against stereotype threat in tests of math performance (Martens, Johns, Greenberg & Schimel, 2006). I predict that women in the self-affirmation condition will be more likely to introduce unique information than women in the threat condition but equally likely as men and women in the no threat condition. Group problem solving ability will be mediated by the extent to which female students introduce unique information.

**Institutional Fit and Future Research.** I propose to conduct this research at the University of Massachusetts Amherst because it fits well with current research by Dr. Dasgupta examining the effect of classroom gender composition on female students’ engagement in STEM. In the future research, Dr. Dasgupta and I could examine the extent to which unique ideas are integrated into group solutions once they have been shared. We could also examine the role of group composition and stereotype threat on minority students’ engagement in STEM and group problem solving.

**Broader Impacts.** It is important that efforts to increase diversity in STEM do not stop at recruitment. Increasing the diversity of perspectives shared will lead to better innovation and problem solving in STEM fields. If women are uninhibited from sharing their perspectives, they may be more likely to be successful in STEM (e.g., be selected for leadership positions).

References