Sense of Belonging Increases Performance Expectations among Women in STEM Fields

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INTRODUCTION
Although there is a shortage of qualified individuals to fill STEM positions, women and ethnic minority groups are still underrepresented in science fields (Morrison et al., 2011).

Science Identity:
- Science identity is how strongly an individual identifies with a specific STEM discipline (e.g., chemistry, biology).
- Science identity is associated with positive academic outcomes including greater persistence in STEM, higher grades, and higher self-efficacy (Chermers et al. 2011; Estrada et al. 2011; Syed et al., in press).

Sense of Belonging:
- Sense of belonging is the strength of acceptance an individual feels regarding a specific group or environment.
- Individuals who continue in STEM majors expressed a greater sense of belonging in the science community than those who left for a non-STEM major (Rainey et al., 2018).
- Underrepresented groups receive subtle and overt messages that they do not belong in science and academia which leads to negative outcomes such as lower science identity, lower grades, and switching to a non-STEM major (Ong et al. 2011; Robnett 2016; Rainey et al., 2018).

Science Expectations:
- Science expectations reflect the confidence level an individual has regarding their performance in science-based environments (e.g., research, academics, networking).
- In previous research, risk-taking predicting math/science expectations, sense of belonging, and self-esteem. Research has shown that women are less likely to take risks which results in lower math/science expectations, sense of belonging, and self-esteem than males (Petzel & Casad, 2020).
- Lower science expectations relate to lower risk-taking behaviors which leads to lower overall well-being for women (e.g., sense of belonging and self-esteem).

AIM
To better understand how women’s sense of belonging within STEM relates to their expectations for their performance, and ultimately their underrepresentation in STEM.

HYPOTHESIS
Hypothetical: Sense of belonging will moderate the relationship between science identity and science expectations. Women in male-dominated STEM fields (i.e., engineering, technology, and mathematics) with a stronger sense of belonging in their field and a stronger science identity will have higher expectations for their science performance compared to women with who have weaker sense of belonging and science identity.

METHOD
Participants: Participants (N = 213) were women in male-dominated STEM Majors (i.e., engineering, kinesiology, math and statistics, computer science, biotechnology, chemistry, and physics), aged 18 years and older who attended a western university. Participants included Asian/Asian Americans (29.6%), Caucasians (26.6%), Latinas (22.1%), Multiracial (9.5%), African Americans (5.0%) Pacific Islanders (3.0%), Middle Easterners (2.0%), Other (1.5%), and Native Americans (0.5%).

Procedure: Participants completed a 45-minute online survey, hosted by Qualtrics (Provo, Utah). Participants were asked to self-report their experiences in their math and science classes, including attitudes, classroom experiences, and university curriculum.

Hypothesis: Sense of belonging will moderate the relationship between science identity and science expectations. Women in male-dominated STEM fields (i.e., engineering, technology, and mathematics) with a stronger sense of belonging in their field and a stronger science identity will have higher expectations for their science performance compared to women with who have weaker sense of belonging and science identity.

RESULTS
In support of the hypothesis a regression analysis showed a two-way interaction between science identity and sense of belonging on science performance expectations. The model was significant F(3,195) = 19.08, p < .001, b = .266, ΔR² = 0.23, 95% CI [0.110, 0.423].

Simple slope analysis showed that when women in male-dominated STEM fields had a stronger sense of belonging and a stronger science identity had higher expectations for their science performance (b = .543, p < .001), moderate sense of belonging also predicted higher science performance expectations (b = .350, p < .001). However, among women with lower sense of belonging, science identity did not predict higher expectations of science performance (b = .157, p = .127).

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