

Women Affected by Male to Female Ratio in Math, Science and Engineering Settings

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Have you ever felt outnumbered? Like there are just not that many people like *you* around? We've all felt outnumbered in one situation or another and walking into a situation in which you sense the possibility of being ostracized or isolated can be quite threatening.

One group that may experience this kind of threat is women who participate in math, science, and engineering (MSE) settings—settings in which the gender ratio is approximately 3 men to every 1 woman. Recently, in the wake of comments made by former Harvard University President, Larry Summers, suggesting that women may not possess the same “innate ability” or “natural ability” in these fields as do men, several leading scientific institutions and university presidents publicly lamented the underrepresentation of women in Math, Science and Engineering fields and put out a call to study the reasons for the numbers gap in these areas.

While previous research offers biological and socialization explanations for differences in the performance and representation of men and women in these fields, Stanford psychologist, Mary Murphy argues that the organization of Math, Science and Engineering environments themselves plays a significant role in contributing to this gap. Murphy contends that situational cues (i.e. being outnumbered) may contribute to a decrease in women's performance expectations, as well as their actual performance.

Murphy and colleagues showed a group of advanced MSE undergraduates a gender balanced or unbalanced video depicting a potential MSE summer leadership conference. To assess identity threat, the researchers measured the participant's physiological arousal during the video, cognitive vigilance, sense of belonging and desire to participate in the conference.

The results are telling. The women who watched the gender unbalanced video—where women were outnumbered by men in a 3 to 1 ratio—they experienced faster heart rates, higher skin conductance (sweating), and reported a lower sense of belonging and less desire to participate in the conference.

They also found that women were more vigilant to their physical environment when they watched the video in which women were outnumbered. Throughout the testing room, Murphy planted cues related to Math, Science, and Engineering such as magazines like *Science*, *Scientific American*, and *Nature* on the coffee table and a portrait of Einstein and the periodic table on the walls. Women were able to recall more details about the video and the test room, indicating that they paid more attention to the identity-relevant items in order to assess the likelihood of encountering identity threat. “It would not be surprising if the general cognitive functioning of women in the threatening setting was inhibited because of this allocation of attention toward MSE-related cues,” write the authors. Thus, it is likely that this kind of attention allocation would interfere with performance and might help explain the performance gap between men and women in these fields.

While men, in either condition, showed no significant difference in physiological arousal, cognitive vigilance, or sense of belonging, both men and women expressed more desire to attend the conference when the ratio of men to women was balanced. Murphy says that while it's interesting that both men and women want to be where the women are, the motivations of men and women for wanting to be there are probably quite different. "Women probably feel more identity-safe in the environment where there are more women—they feel that they really could belong there—while men might simply be attracted by the unusual number of women in these settings. Men just aren't used to seeing that many women in these settings, because the numbers in real Math, Science, and Engineering settings are so unbalanced."

These findings, which appear in the October issue of *Psychological Science*, a journal of the Association for Psychological Science, demonstrates that rather than being endemic to women the experience of identity threat in MSE settings is attributable the situation.

This research underlies the importance of situational cues and Murphy hopes that it will "inspire greater motivation to attend to such cues when creating and modifying environments so that they may foster perceptions of identity safety rather than threat."