

The Paradox of Science and Engineering Women's Career Values and Behavior

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Background and Objectives

- In the U.S., a decline in women's participation in science and engineering (SE) disciplines occurs at the transition from graduate school to first occupation¹. This drop raises questions about the career and family values, intentions, experiences, and challenges of female SE graduate students, as compared those of their male peers.
- This study examined SE female and male graduate students':
 1. Values motivating their educational and career choice;
 2. Intentions to complete a SE doctorate; and
 3. Current parental status, and plans for children.
- A factor in women's underrepresentation in SE occupations, relative to their presence in SE graduate school, may be the socialized career and family values and behavior they endorse, and commit to during graduate school. Building on past studies², it was hypothesized that:

H1: Female and male graduate students would differ in the values driving their SE career choice, with women placing less importance on career prestige and pay than men.
- Based the literature, we also expected women and men to report different SE educational intentions and ambitions³. Specifically, it was expected that:

H2: Fewer female than male Master's-level graduate students would report plans to pursue a SE doctorate.
- Finally, based on past studies of work-family gender ideologies and behavior^{4,5,6}, we expected that:

H3a: Female SE graduate students would be less likely than male SE graduate students to have children while in graduate school; and also that,

H3b: Among students without children during graduate school, female graduate students who highly valued the prestige and pay of a SE career would be less certain about having children than female graduate students who gave less importance to SE prestige and pay.

Method

Participants: Participants were 128 physical science (52%) and engineering (48%) graduate students ($M_{age} = 26.40$, $SD_{age} = 4.23$) from two major research universities, one public and one private. Women represented 59% of the sample. Fifty-nine percent of participants identified as White/European American, with 20% being international students. Seventy percent of respondents reported being in a committed relationship, and 10% had children. Participants were recruited primarily via department-wide email announcements.

Method (continued)

Procedures and Materials: Demographic, educational, career, and family values and intentions data were collected via a written survey, which individuals completed privately prior to an interview. The importance of prestige and of pay in career choice (i.e., "How important was [prestige/pay] to you in making your career decision?") were measured on 6-point Likert scales, ranging from "Not important" to "Extremely important." The prestige/pay value items had a Cronbach's $\alpha = .712$, and were averaged to make a career values scale. Doctorate intention (i.e., "If you are currently enrolled in a Master's program, do you think you will continue your education in this field to earn a doctorate?") and plans for children (i.e., "If you do not currently have children, do you plan to have children?") were measured on a 4-point scale, ranging from "definitely yes" to "definitely no."

Results

1. Female and male SE graduate students were similar in the degree to which they valued prestige and pay in their SE career choice, $t(109) = -.423$, $p = .673$ CI [-.570, .369]; see Figure 1.

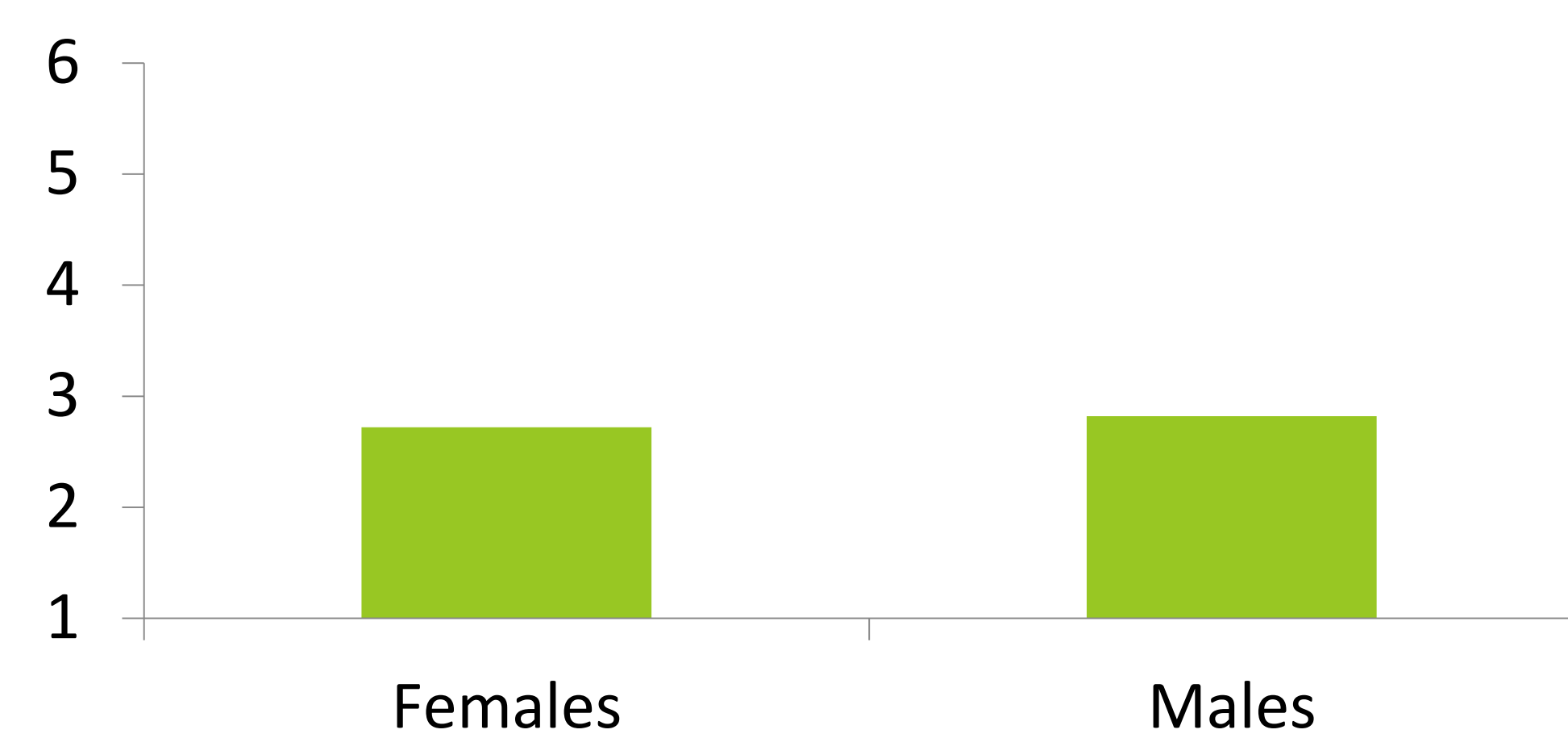


Figure 1. Average rating prestige and pay importance for choosing a SE career (1 = "Not important", 6 = "Extremely important").

Results (continued)

2. Male SE graduate students were 1.72 times more likely than female SE graduate students to plan to pursue a SE doctorate, $\chi^2(1, N = 53) = 9.612$, $p = .002$ (see Figure 2).

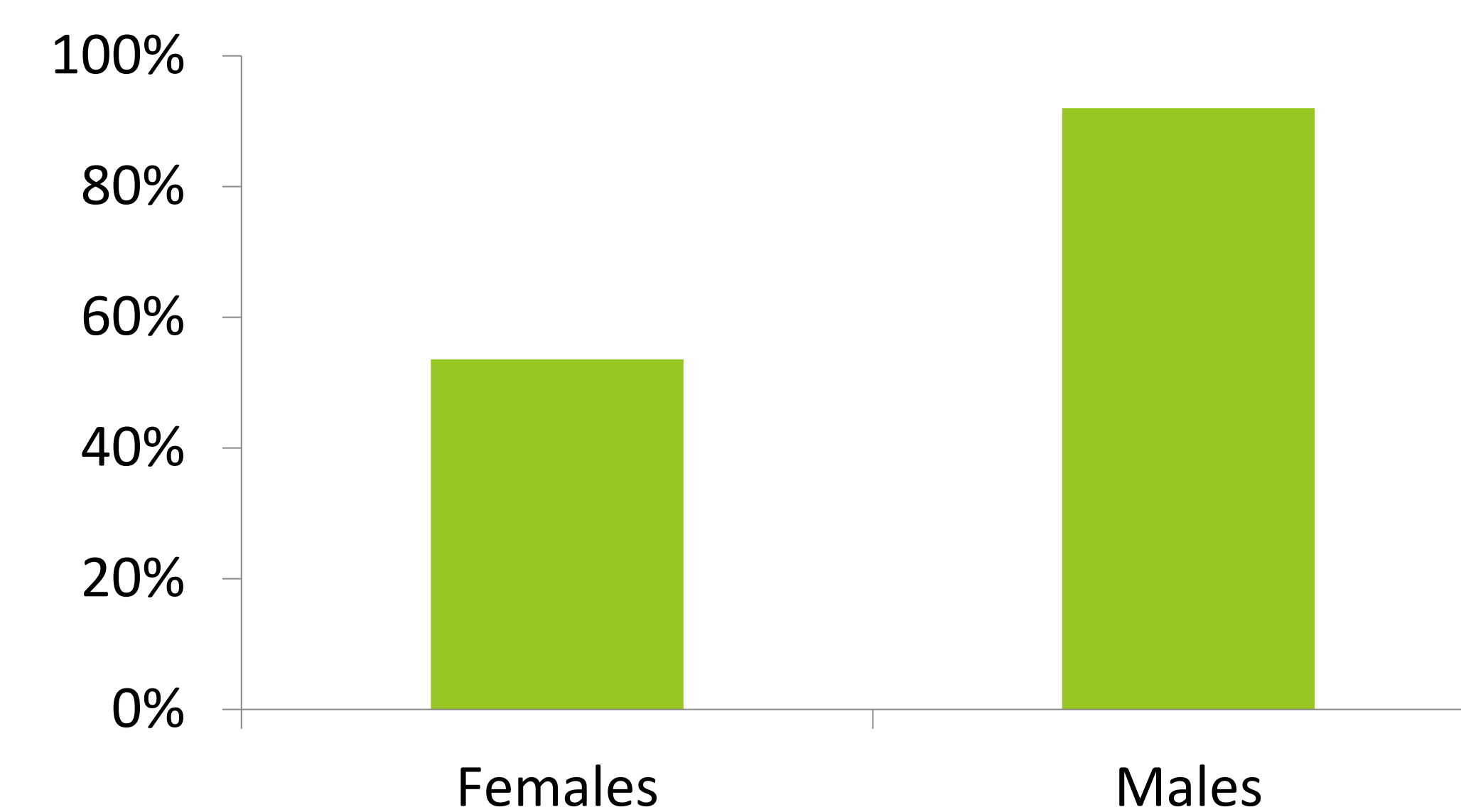


Figure 2. Percentage of SE Master's students with intent to pursue a SE doctorate.

3. Female and male SE students expressed similarly strong intentions to have children, $\chi^2(1, N = 110) = 0.069$, $p = .792$. However, male SE students were 3.61 times more likely than female SE students to be parents while in graduate school, $\chi^2(1, N = 125) = 4.559$, $p = .033$ (see Figure 3). The value given to prestige and pay by female SE students' did not have any bearing on their intentions for children, $F(3, 95) = 1.115$, $p = .347$.

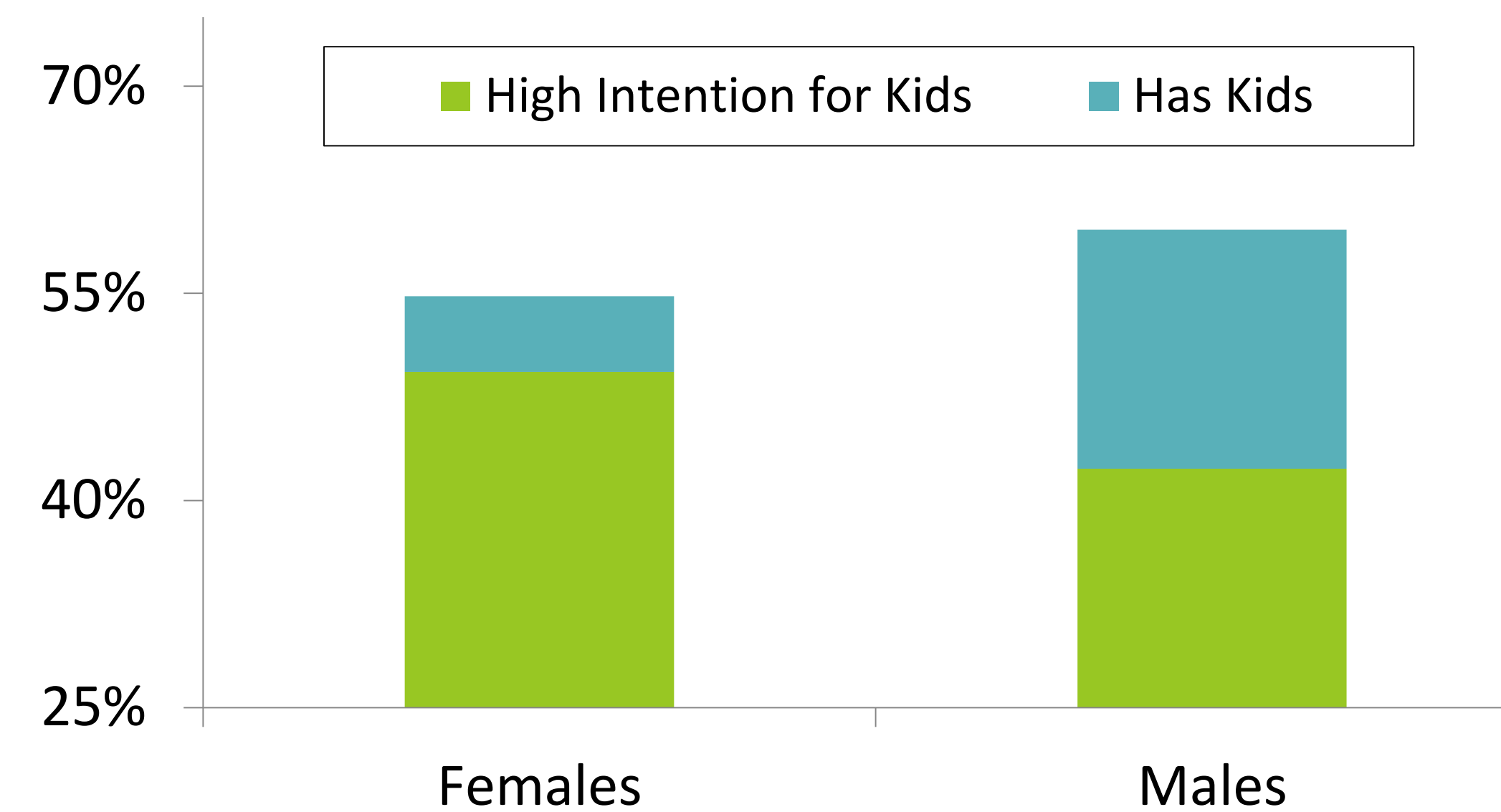


Figure 3. Percentage of students indicating they "definitely" wanted children, and percentage of students indicating they already had children.

Discussion and Implications

Summary and Discussion: Female and male SE graduate students in this study reported equally valuing the prestige and pay of a SE career (**H1**). In addition, female and male SE students did not differ in their intentions to have children, though male students were more likely to have children while in graduate school (**H3a**). Furthermore, female students' intention for children was independent of the value they attributed to the prestige and pay of a SE career (**H3b**). Finally, female Master's-level students were less likely to express an intention to pursue a doctorate than male Master's-level students (**H2**). The finding that female students valued SE careers' prestige and pay at the same level as their male peers was unexpected (given past studies suggesting that career prestige and pay are more important to men than to women²), and may even seem paradoxical considering that the majority of female students in this study expressed high intention to have children. Perhaps during SE graduate school women and men equally value career and family, and think they can have it all. This study's finding that female graduate students were less likely than male graduate students to express an intention to pursue SE doctoral studies, however, suggests that female students might start scaling back their SE career ambitions and commitments while in graduate school—perhaps to make room for the family responsibilities they expect to assume, given their intention to have children, and in consideration of dominant gendered norms and expectations of parenting.

Limitations: The sample may be selective in unknown ways because participation in this study involved completing a written survey as well as an interview. Also, the importance of prestige and pay in career choice were measured via one item each; and the importance of family relative to career was not measured via the written survey.

Future Research Directions: This study's findings address and raise questions about the career values, expectations, and behavior of SE women and men. Interview data might help clarify what, from the survey data, seem as incongruent values, intentions, and behaviors.

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