Economic, Social, and Cultural Factors in Student Experiences in Upper-Division and Graduate Computer Science Programs

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+50% of Computer Science (CS) students have experienced **academic probation**.

Barbara Martinez Neda, Flor Morales, Kitana Carbajal Juarez, Jennifer WongMa, and Sergio Gago-Masague. 2024. Investigating the Role of Socioeconomic Factors on CS1 Performance. In 2024 IEEE Global Engineering Education Conference (EDUCON). Institute of Electrical and Electronics Engineers, Kos, Greece, 1–8. doi:10.1109/EDUCON60312.2024.10578863

Within CS1 (Introductory Programming)...

- ➔ complex **socioeconomic factors** contribute to underperformance
- ➔ **women leave** the program at a **higher rate** than men
- ➔ students from **racial/ethnic minorities** encounter **academic probation** at a **disproportionately high rate**
  - ◆ more frequently dismissed or withdraw from CS programs

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Research Question

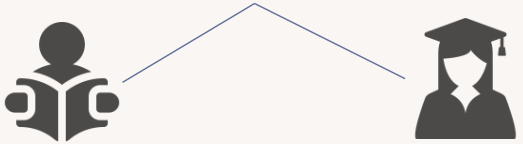
How are continuing CS students by demographic affected by **economic**, **social**, and **cultural factors** linked to underperformance in CS1?

We deployed a **survey**.

**Adapted from Martinez Neda, Morales, Carbajal Juarez, Wong-Ma, and Gago-Masague*

- ➔ two algorithm design courses
- ➔ multiple choice, multiple selection, and numeric input

200
respondents



133
undergraduates

67
graduates

Survey Data

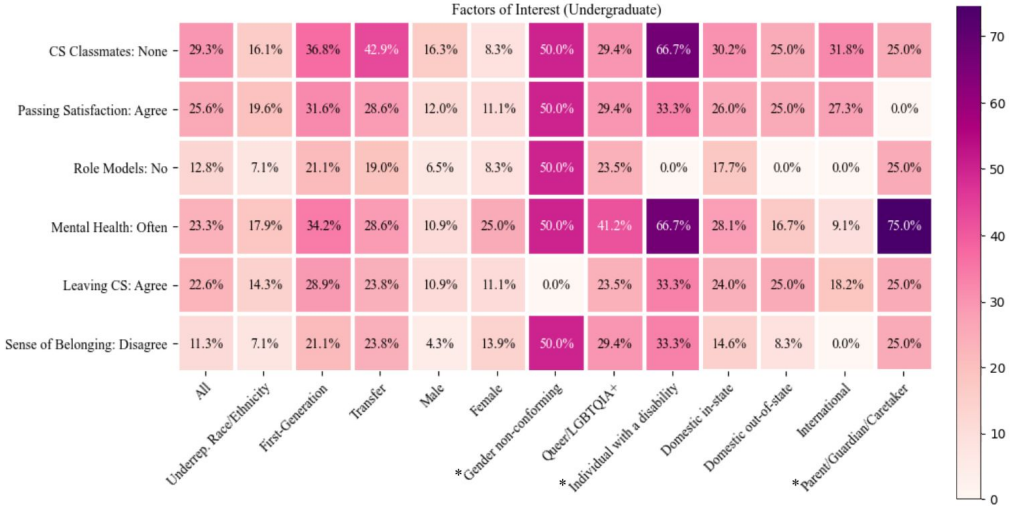


Figure 1: Undergraduate factors of interest. Demographics with an asterisk had very low response rate and were not analyzed.

- ➔ Improved **connections with classmates** and **role models**
- ➔ Transfer students experienced worse rates
- ➔ **Economic factors** remain a barrier

Survey Data

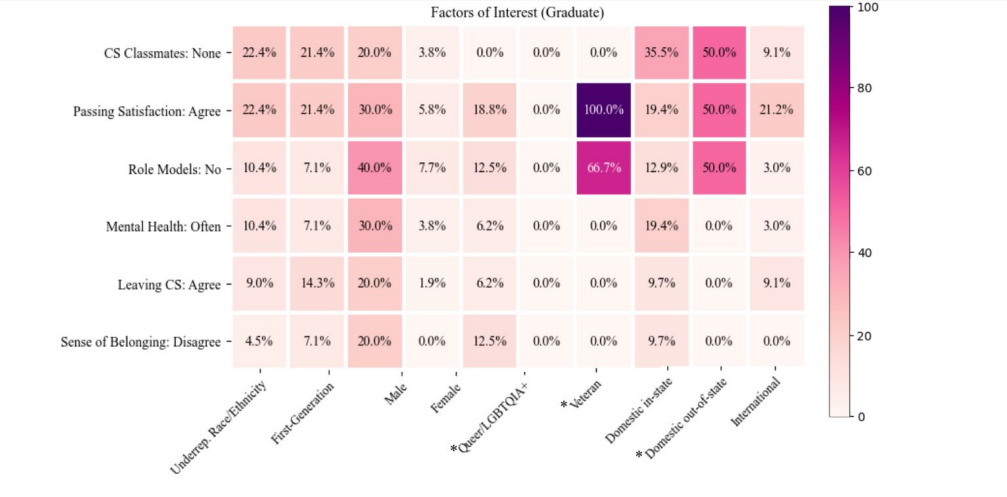


Figure 2: Graduate factors of interest. Demographics with an asterisk had very low response rate and were not analyzed.

- ➔ Lower rates of all negative factors we investigated → persistence
- ➔ **Economic factors** remain a barrier

Survey Data

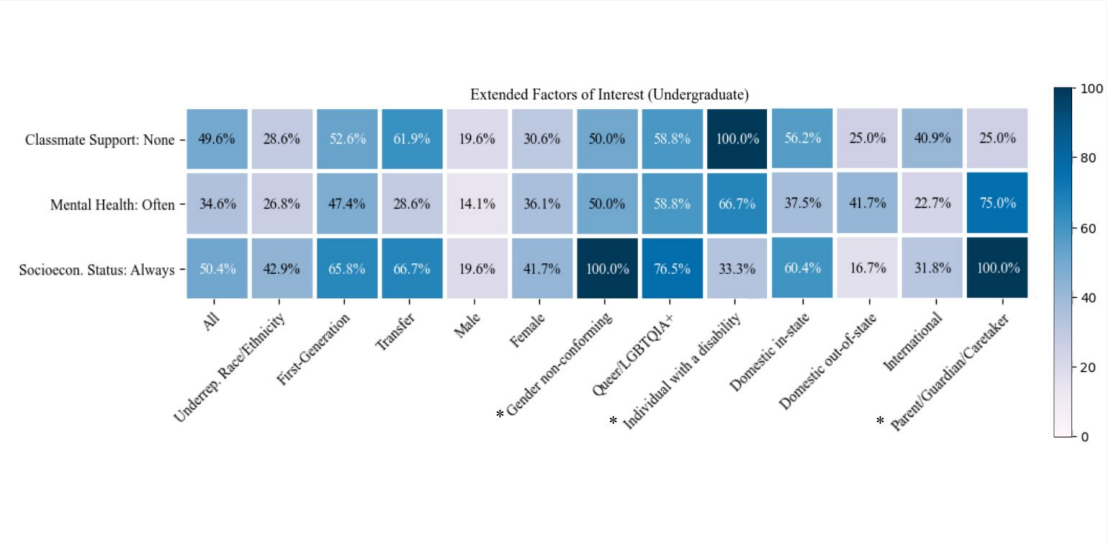


Figure 3: Undergraduate extended factors of interest. Demographics with an asterisk had very low response rate and were not analyzed.

- ➔ Increases across **mental health interference** and **socioeconomic factors**
- ➔ **Lack of classmate support**

Survey Data

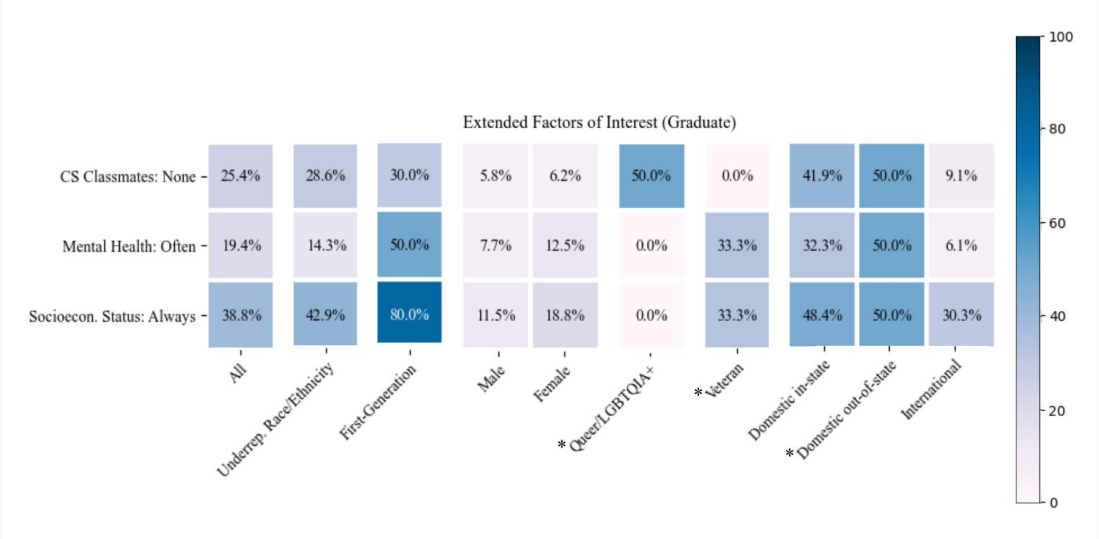


Figure 4: Graduate extended factors of interest. Demographics with an asterisk had very low response rate and were not analyzed.

- ➔ Mental health interference
- ➔ **Socioeconomic factors** remain a barrier
  - ◆ First generation and Underrepresented racial/ethnic groups

Current Work

- ➔ Identify factors associated with “**positive experience**”
- ➔ Exploratory interviews

Feedback or Questions?

Contact Information

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Abstract (666/1500 characters)

This study extends research on the associations between early CS student experiences and demographics and focuses on the motivations of continuing students and the factors contributing to these students' ongoing academic success. We deployed a survey (133 undergraduates, 67 graduates) to glean insight into these motivations and factors. We aim to elucidate correlations between student demographics, academic environment, and socio-economic-cultural background. Our results suggest that factors related to student experiences and relationships with the CS program differ between the different demographics we investigated and between early and continuing students.