

Talking About Entering

Why Women and Men Choose/Reject Computer Science

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Research questions

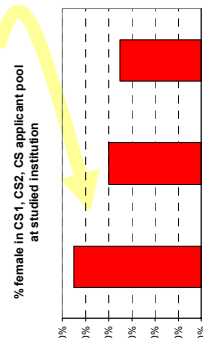
What are introductory CS students' perceptions of computer science?

What aspects of the CS major do they find attractive/unattractive?

...and how do the answers correlate with gender?

Surveys and interviews with CS1 students

- Setting: CS1 at a large, research university
- Prerequisite for CS, engineering, and other majors
- Early and substantial pipeline leakage
- Survey sample (N=205)
 - First week of class
 - First- and second-year undergraduates
 - 25% F, few ethnic minorities
 - Less than 20% interested in CS major
- Prior programming experience
 - 65% with none (no gender difference)
 - Significant* gender difference only for extra-curricular/self-taught

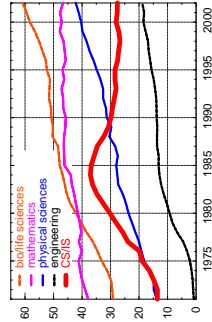


- Survey with free-response questions
 - Responses coded to assess frequency of themes (recurrent ideas)
 - Identified themes for detailed exploration in semi-structured interviews (2005 Spring)

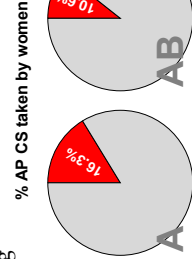
*Statistical significance determined by Fisher exact test, $p \leq 0.05$

Background: Computer Science's growing gender gap

- Only in CS, not other math/science fields (National Center for Education Statistics, 2003)
- Worse at research universities: 18% F among CS bachelor's recipients in 2003 (2002-2003 CRA Tuulsee Survey)



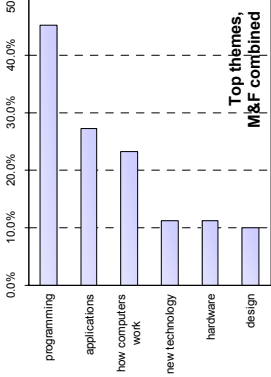
Discouraging high school statistics (College Board AP Program Summary Report, 2004)



Preliminary survey findings

Students' definitions of "computer science"

- Gender differences* in themes
- Creativity: 0% F vs. 10% M
- Breadth/versatility of CS: 9% F vs. 1% M

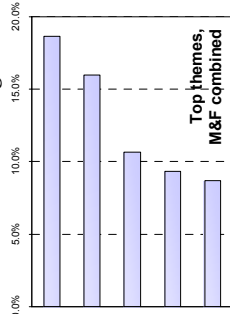


"the knowledge of how programs are created and how they run"

"study of how to use computers to solve problems and/or do productive work"

What makes CS more interesting

- Gender differences* in themes
- Creativity: 12% F vs. 3% M
- Logic/math: 12% F vs. 1% M

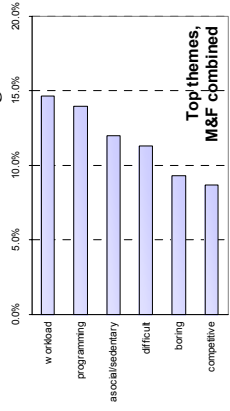


"job opportunities in the end, I like working with computers..."

"a lot of different directions you can go with programming knowledge"

What makes CS less interesting

- No significant* gender differences



"I have heard [this] is the hardest intro class ever. I feel like I am already behind because I have no experience."

"It's hard, takes a long time...have to be on a computer 24/7 (eyes hurt)..."

Findings in context: Past research and popular opinion

- Preliminary findings consistent with literature:
 - Perception that CS = programming (CMU; Cohoon et al.)
 - Creativity as a draw for women (Guzdial et al.)
 - Math/logic as a draw for women? (Cohoon et al.)
 - Stereotype of asocial, sedentary work
 - CS1 unreasonably hard for true novices? (Bunderson & Christensen; CMU; Sackowitz & Parulis)
- Some findings contrast with popular opinion
 - Both genders attracted by applications of computing.
 - Weak tech industry not cited as disincentive.

Open questions for interviews and beyond

- Which aspects of programming make CS attractive, unattractive?
- What do students think it takes to succeed in CS?
- How do students perceive and respond to competitive climate?
- ...and, of course, how the above vary with gender