

Demographic effects on student-reported satisfaction with teams and teammates

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Abstract

This study used team feedback responses (ratings of self/peers and of team satisfaction, all collected via CATME) from 11 sections of Engineering 100 offered between Fall 2009 and Winter 2014. The analysis looked for relationships between team satisfaction, peer ratings, team scores on reports, and student characteristics measured from Registrar data (gender and race, international student status, and first-year GPA).

Relevant Literature

Other studies of student self- and peer-assessments have found evidence of various biases, including a tendency of female undergraduate engineering students to report lower engineering self-efficacy on a variety of instruments (Marra et al., 2009; Hutchison et al., 2006), a tendency for women on engineering teams to be more critical in their assessments of other women (Okudan et al., 2002), and a tendency for male students to over-estimate other males' abilities in undergraduate biology (Grunspan et al., 2016). Self- and peer-assessments typically show an over-valuing of one's own contributions relative to peers (Davis et al., 2010).

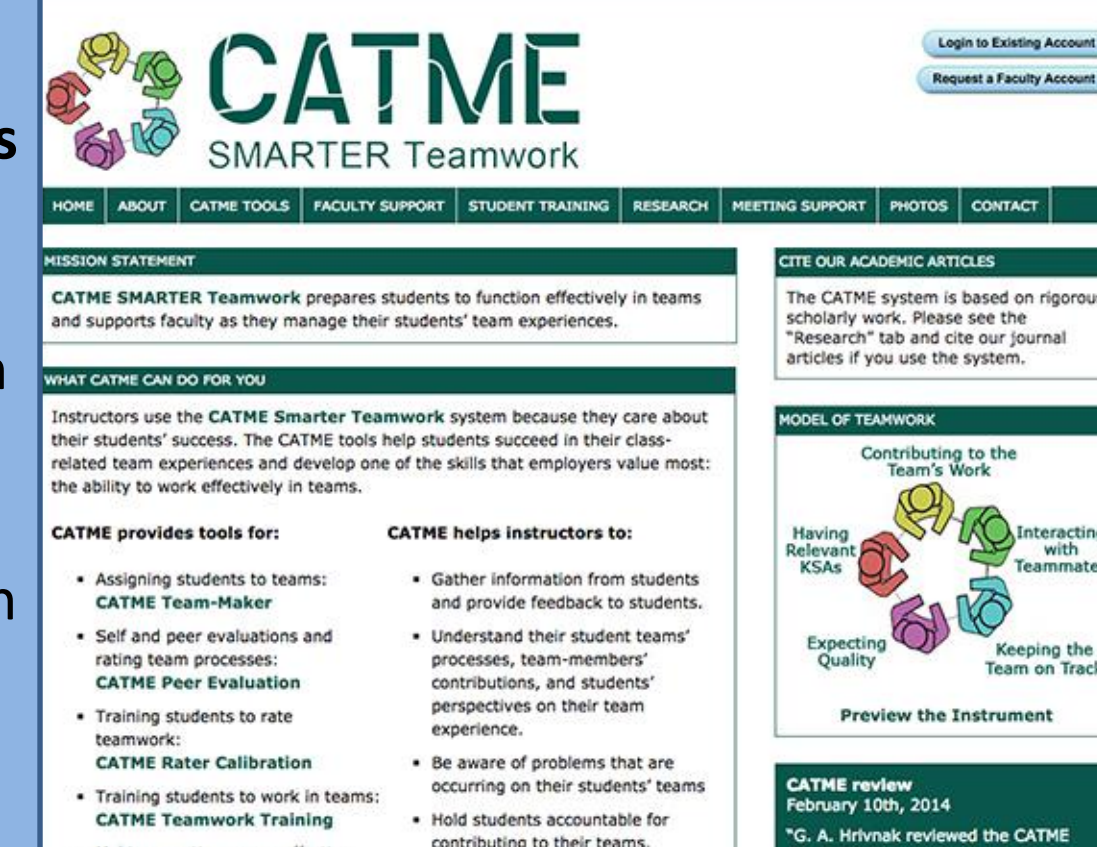
A study similar to the analysis conducted here, using team assessments following a first-year introductory project, found no gender differences and attributed the finding to the support available at a small school focused only on engineering (Van Tyne et al., 2011).



Sample

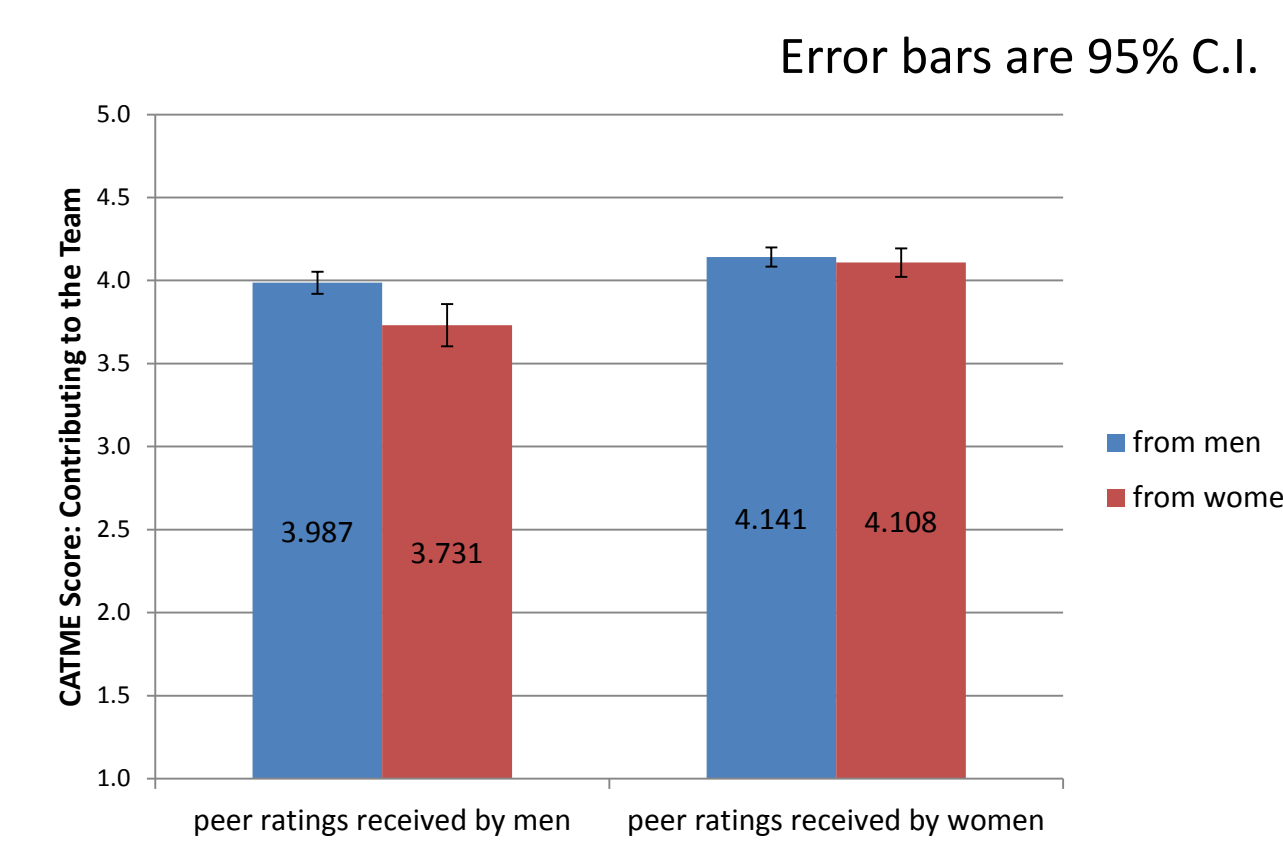
N = 620 students on 132 teams of 4 or 5 students

Team-based, problem-based learning class. All sections represented here are considered "design build test" (DBT) and have significant hands-on building components. Students use CATME to rate themselves and each other, as well as their satisfaction with the team, at the end of an ~8 week DBT project.

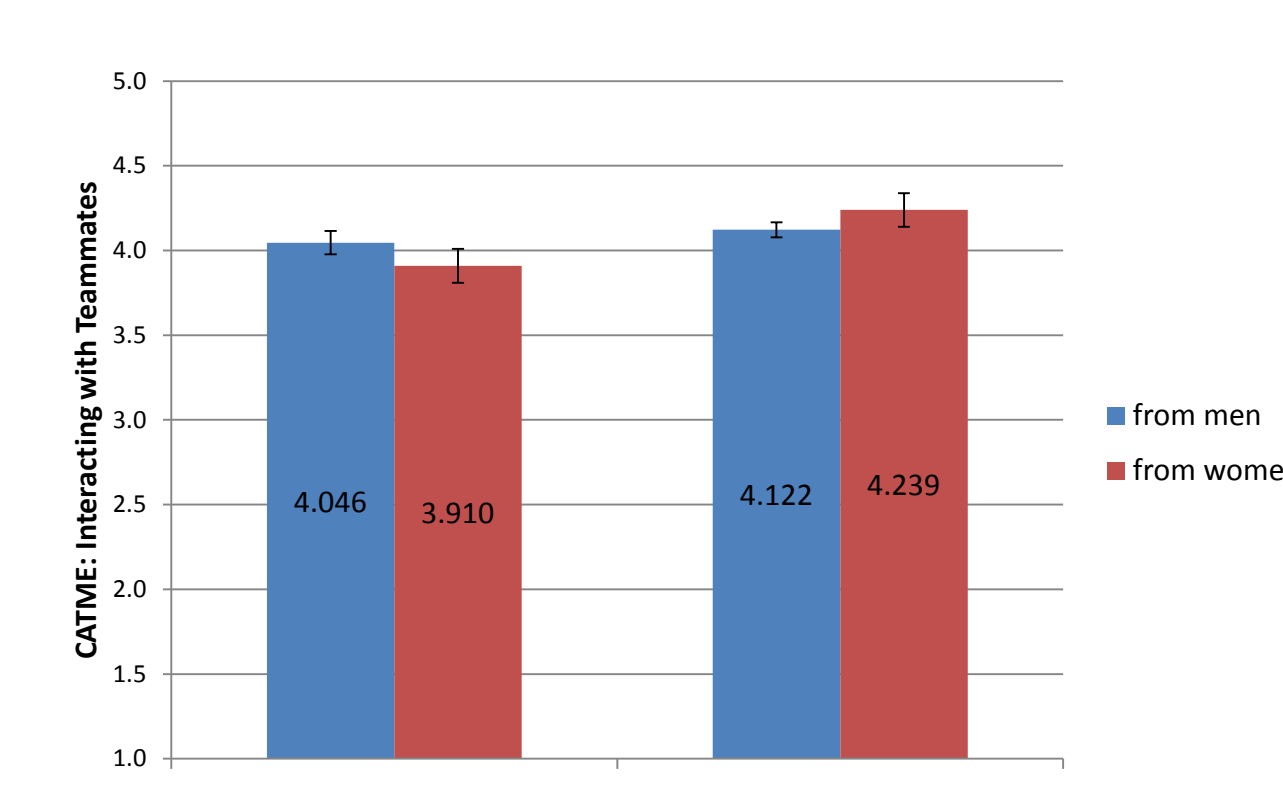


Peer ratings, by gender

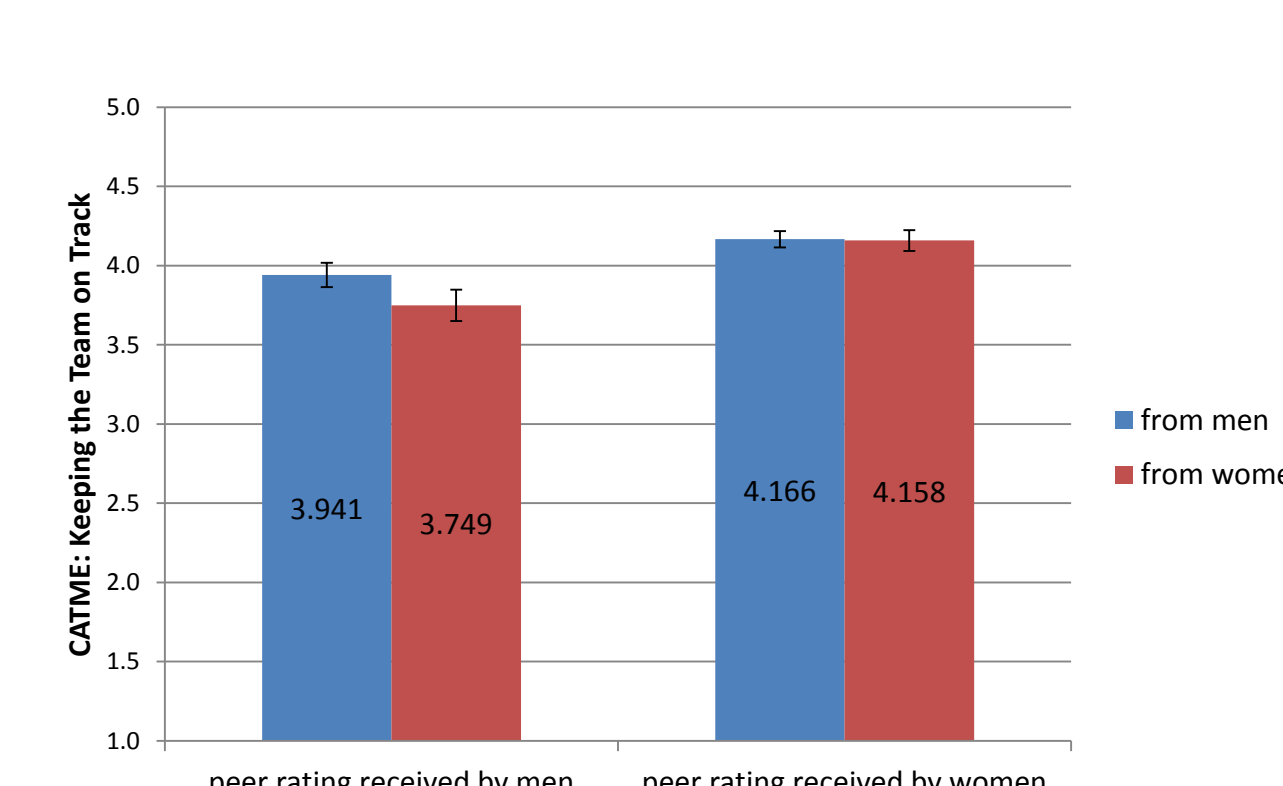
Contributing to the team's work				
1: Does not do a fair share of the team's work. Delivers sloppy or incomplete work. Misses deadlines. Is late, unprepared, or absent for team meetings. Does not assist teammates. Quits if the work becomes too difficult.	2: Demonstrates behaviors described immediately left & right	3: Completes a fair share of the team's work with acceptable quality. Keeps commitments and completes assignments on time. Helps teammates who are having difficulty when it is easy or important.	4: Demonstrates behaviors described immediately left & right	5: Does more or higher-quality work than expected. Makes important contributions that improve the team's work. Helps teammates who are having difficulty completing their work.



Interacting with teammates				
1: Interrupts, ignores, bosses, or makes fun of teammates. Takes actions that affect teammates without their input. Does not share information. Complains, makes excuses, or does not interact with teammates. Is defensive. Will not accept help from teammates.	2: Demonstrates behaviors described immediately left & right	3: Listens to teammates and respects their contributions. Communicates clearly. Shares information with teammates. Participates fully in team activities. Respects and responds to feedback from teammates.	4: Demonstrates behaviors described immediately left & right	5: Asks for and shows an interest in teammates' ideas and contributions. Makes sure teammates stay informed and understand each other. Provides encouragement and enthusiasm to the team. Asks teammates for feedback and uses suggestions to improve.



Keeping the team on track				
1: Is unaware of whether the team is meeting its goals. Does not pay attention to teammates' progress. Avoids discussing team problems, even when they are obvious.	2: Demonstrates behaviors described immediately left & right	3: Notices changes that influence the team's success. Knows what everyone on the team should be doing and notices problems. Alerts teammates on issues. Suggests solutions when the team's success is threatened.	4: Demonstrates behaviors described immediately left & right	5: Watches conditions affecting the team and monitors the team's progress. Makes sure that teammates are making appropriate progress. Gives teammates specific, timely, and constructive feedback.



Expecting quality				
1: Satisfied even if the team does not meet assigned standards. Wants the team to avoid work, even if it hurts the team. Doubts that the team can meet its requirements.	2: Demonstrates behaviors described immediately left & right	3: Encourages the team to do good work that meets all requirements. Wants the team to perform well enough to earn all available rewards. Believes that the team can fully meet its requirements.	4: Demonstrates behaviors described immediately left & right	5: Motivates the team to do excellent work. Cares that the team does excellent work, even if there is no additional reward. Believes that the team can do excellent work.



Having related knowledge, skills, and abilities				
1: Missing basic qualifications needed to be a member of the team. Unable or unwilling to develop knowledge or skills to contribute to the team. Unable to perform any of the duties of other team members.	2: Demonstrates behaviors described immediately left & right	3: Demonstrates sufficient knowledge, skills, and abilities to contribute to the team's work. Acquires knowledge or skills as needed to meet requirements. Able to perform some of the tasks normally done by other team members.	4: Demonstrates behaviors described immediately left & right	5: Demonstrates the knowledge, skills, and abilities to do excellent work. Acquires new knowledge or skills to improve the team's performance. Able to perform the role of any team member if necessary.

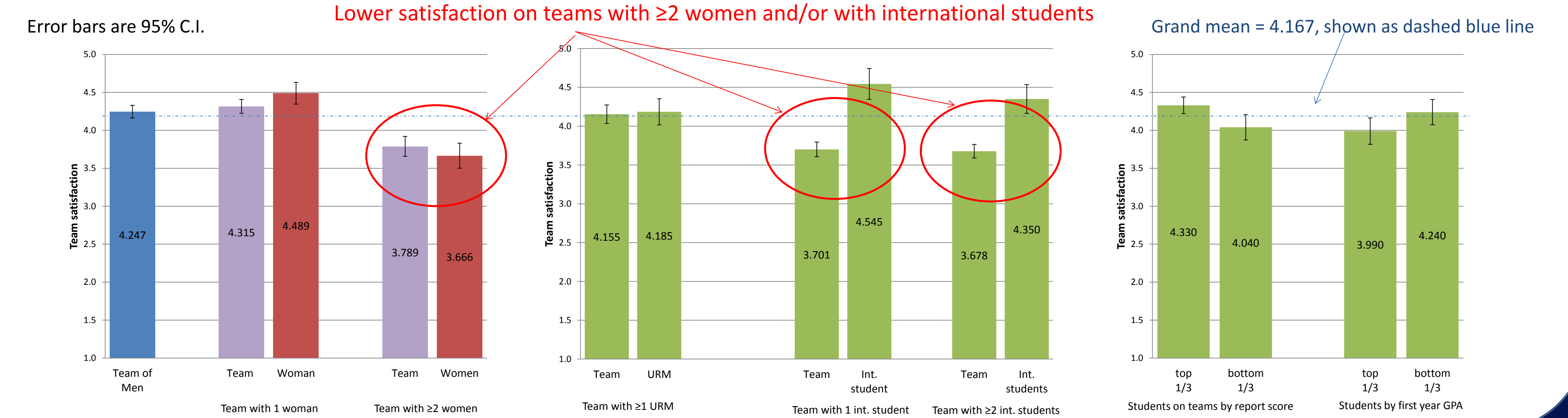


Likert Scale (1=not at all true/5 = very true)

- I am satisfied with my present teammates.
- I am pleased with the way my teammates and I work together.
- I am very satisfied with working in this team.

CATME asks each student these three Likert scale statements and averages them to give each student a satisfaction score (1-5)

Team satisfaction, by various factors



There are a lot of statistically significant effects. Here are things that "matter" by effect size (Cohen's *d*)

- Students on teams with two or more women are less satisfied than students on teams without women or teams with a single woman. This is true for both the men and the women on teams with these gender breakdowns. (Cohen's *d* = 0.67)
- Students on teams with international students are less satisfied than students on teams without international students. This is true for the non-international students but not the international students on the teams. (Cohen's *d* = 0.74)
- Men rate women lower on "having related knowledge, skills, and abilities." (Cohen's *d* = 0.69)
- Women are rated higher than men on other CATME categories by both genders. Men rate men higher than women rate men. (Cohen's *d* ranges from 0.12 to 0.32)

Important caveat: The existence of mean differences in ratings by student gender or other identity factors does not necessarily mean the ratings are biased. I have no measure to show that gender and other demographic factors are unrelated to performance in the various CATME categories. Further research should look at ways of controlling for or measuring different contributions and background knowledge so that differences in mean peer ratings can be better interpreted.

Implications/Issues for further study

The team satisfaction findings that teams with two or more women, and teams with international students, are less satisfied than others require further research. Perhaps by identifying issues these teams face better, we can better support students on teams with these demographic characteristics.

I will reconsider my use of peer feedback to scale project scores. I have always thought that I am rewarding people for good team contributions, but I need to be careful that I am not allowing students' identity characteristics to affect their grades.