Science Teachers Favor Males in Class, Study Finds

By Una Meirin on March 27, 2014 4:20 PM

Two Illinois researchers found a way to gauge high school students' thoughts and feelings at precise moments during science class—and in doing so uncovered some alarming differences between the way male and female students experience instruction. Perhaps most strikingly, they found that science teachers spent 39 percent more class time directly addressing boys than girls.

Jennifer Schmidt and Lee Shumow, professors at Northern Illinois University in DeKalb, recently published a book, Enhancing Adolescents’ Motivation for Science, with instructional strategies for teachers based on the results of this research, which they completed in 2011. The pair of researchers are currently doing the professional development and conference circuits nationally.

I had a chance to chat with Schmidt and Shumow a few weeks ago about the specifics of the Science-in-the-Moment Project, which was funded by the National Science Foundation.

To conduct the study, the women explained, their research team visited 12 classrooms—three each of general science, biology, chemistry, and physics—for 10 days each. Students received pagers that beeped twice randomly during the class period, at which time they filled out a short questionnaire.

"They told us in that moment what kind of motivational and emotional state they were in, how interested were they, how challenged did they feel, how hard were they working," said Shumow.

The classes were videotaped, so the researchers could later go back and determine exactly what was happening at the moment the student was beeped. The researchers also gave out pre- and post-surveys and conducted individual interviews with the teachers.

Thousands of Observations

While the sample size may seem small at first glance—244 students and a dozen teachers—Schmidt said the 100 hours of videotape, which they painstakingly coded, produced 4,000 observations. "It was actually a very large data set on microprocesses in classrooms," she said.

In going through the data, they found that the teachers (five male and seven female) overwhelmingly spoke more to boys than girls during class time. "Some of the worst offenders were female teachers," said Schmidt.

When asked whether there were gender differences in student capacity for learning science, teachers tended to say no. "But then when we asked them to tell us about their best students in science, more teachers described boys than girls," said Shumow. "One science teacher I interviewed could not remember the name of [even] one female student in her class."

The researchers also asked teachers to describe their best male and female students.

"When you compare the list of characteristics, for boys it was always things like, 'He's really curious, inquisitive, a good thinker,' all intellectual [descriptions]," said Shumow. "Girls were described as they work really hard, they always turn in homework, they get papers in on time, their papers are really neat."

Teachers also were more likely to offer girls help during class time when they didn't need any, said Shumow.

Bias May Be Inadvertent

The professors were quick to add that the teachers were not intentionally treating students differently.

"Teachers live in a society where we have more examples of male scientists, where stereotypes do exist and persist," said Shumow. "They're not consciously doing this in any way."

Overall, students reported not feeling very challenged when they were beeped. But when the work was more difficult, the genders dealt with the challenges differently. For boys, engagement levels rose when they felt challenged, as did their concentration and effort; for girls, the pattern was the opposite. Girls also reported feeling more stress in the moment than boys.

"Just about any way we looked at it, girls felt less skilled in spite of the fact that, in terms of every objective achievement measure, they were doing just as well as boys," said Schmidt.

The researchers said the findings could be relevant to other content, but emphasized that the research was limited to science courses.

Recent international test results show that U.S. girls perform evenly with boys in math and science. However, as this research corroborates, the data from the Program for International Student Assessment, or PISA, also showed that girls felt less confidence and more anxiety about their math and science abilities than boys.