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Sunday Review

# Are College Lectures Unfair?

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Gray Matter

**By ANNIE MURPHY PAUL**

DOES the college lecture discriminate? Is it biased against undergraduates who are not white, male and affluent?

The notion may seem absurd on its face. The lecture is an old and well-established tradition in education. To most of us, it simply is the way college courses are taught. Even online courses are largely conventional lectures uploaded to the web.

Yet a growing body of evidence suggests that the lecture is not generic or neutral, but a specific cultural form that favors some people while discriminating against others, including women, minorities and low-income and first-generation college students. This is not a matter of instructor bias; it is the lecture format itself — when used on its own without other instructional supports — that offers unfair advantages to an already privileged population.

The partiality of the lecture format has been made visible by studies that compare it with a different style of instruction, called active learning. This approach provides increased structure, feedback and interaction, prompting students to become participants in constructing their own knowledge rather than passive recipients.

Research comparing the two methods has consistently found that students over all perform better in active-learning courses than in traditional lecture courses. However, women, minorities, and low-income and first-generation students benefit more, on average, than white males from more affluent, educated families.

There are several possible reasons. One is that poor and minority students are disproportionately likely to have attended low-performing schools and to have missed out on the rich academic and extracurricular offerings familiar to their wealthier white classmates, thus arriving on campus with less background knowledge. This is a problem, since research has demonstrated that we learn new material by anchoring it to knowledge we already possess. The same lecture, given by the same professor in the same lecture hall, is actually not the same for each student listening; students with more background knowledge will be better able to absorb and retain what they hear.

Active-learning courses deliberately structure in-class and out-of-class assignments to ensure that students repeatedly engage with the material. The instructors may pose questions about the week's reading, for example, and require students to answer the questions online, for a grade, before coming to class. This was the case in an introductory biology course taught by Kelly A. Hogan at the University of North Carolina at Chapel Hill. In a study conducted with Sarah L. Eddy of the University of Washington, the researchers compared this "moderate structure" course (which included ungraded guided-reading questions and in-class active-learning exercises in addition to the graded online assignments) to the same course taught in a "low structure" lecture format.

In the structured course, all demographic groups reported completing the readings more frequently and spending more time studying; all groups also achieved higher final grades than did students in the lecture course. At the same time, the active-learning approach worked disproportionately well for black students — halving the black-white achievement gap evident in the lecture course — and for first-generation college students, closing the gap between them and students from families with a history of college attendance.

Other active-learning courses administer frequent quizzes that oblige students

to retrieve knowledge from memory rather than passively read it over in a textbook. Such quizzes have been shown to improve retention of factual material among all kinds of students.

At the University of Texas at Austin, the psychology professors James W. Pennebaker and Samuel D. Gosling instituted a low-stakes quiz at the start of each meeting of their introductory psychology course. Compared with students who took the same course in a more traditional format, the quizzed students attended class more often and achieved higher test scores; the intervention also reduced by 50 percent the achievement gap between more affluent and less affluent students.

Minority, low-income, and first-generation students face another barrier in traditional lecture courses: a high-pressure atmosphere that may discourage them from volunteering to answer questions, or impair their performance if they are called on. Research in psychology has found that academic performance is enhanced by a sense of belonging — a feeling that students from these groups often acutely lack.

Such obstacles also confront female students enrolled in math and science courses; a 2014 study found that although women made up 60 percent of large introductory biology courses, they accounted for less than 40 percent of those responding to instructors' questions.

The act of putting one's own thoughts into words and communicating them to others, research has shown, is a powerful contributor to learning. Active-learning courses regularly provide opportunities for students to talk and debate with one another in a collaborative, low-pressure environment.

In a study to be published later this year, researchers from the University of Massachusetts Amherst and Yale University compare a course in physical chemistry taught in traditional lecture style to the same course taught in a "flipped" format, in which lectures were moved online and more time was devoted to in-class problem-solving activities. Exam performance over all was nearly 12 percent higher in the flipped class. Female students were among those who benefited the most, allowing them to perform at almost the same level as their male peers.

Given that active-learning approaches benefit all students, but especially those

who are female, minority, low-income and first-generation, shouldn't all universities be teaching this way?

Annie Murphy Paul is the author of the forthcoming book "Brilliant: The Science of How We Get Smarter."

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