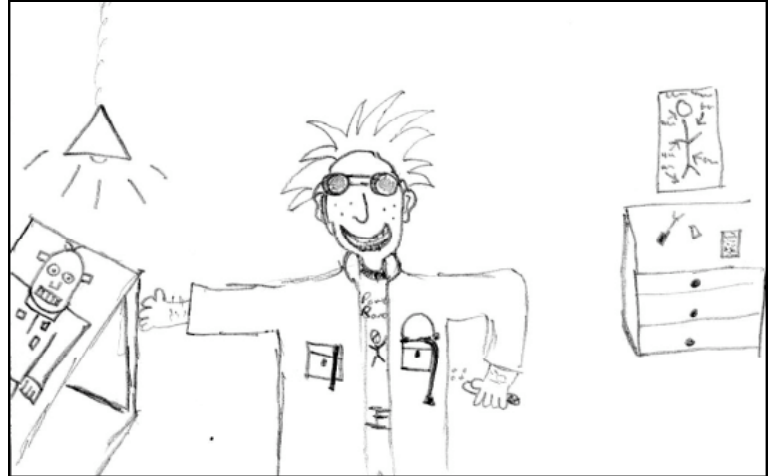


Crazy Research Going On! Public Conceptions of Science and Scientists

Sandra Laursen, April 2008

This brief review summarizes educational research on how people conceive of science and scientists.

It seeks to inform scientists of the stereotypes they may encounter when interacting with the public, especially students and teachers, and to suggest ways to counter those stereotypes.



Views of scientists

One tool that researchers use to understand people's views of scientists is the Draw a Scientist Test. Drawings made in this test match well with views of scientists gathered in detailed interviews. In large-scale tests with K-8 teachers, many teachers portray scientists who:

- Are white, male, and middle-aged
- Are hard-working, intellectual, and theoretically minded
- Are “geeks” or “nerds,” “book smart” but lacking social skills
- Wear glasses, lab coats, and pocket protectors, and have eccentric hair styles and facial hair
- Have serious, crazed, or ominous expressions on their faces
- Work indoors and alone, surrounded by equipment or ideas, but not by other people.



A Norwegian boy drew this laboratory labeled “Danger—crazy research going on!”

Teachers' ideas are substantially the same as those of children and undergraduates in similar studies. Evidently, people's notions of scientists are robust and do not evolve much through education and other experiences. These stereotypes are robust in society too: study results are largely unchanged over the decades since the first Draw a Scientist study in 1957, and startlingly similar across cultures, as seen in studies across US ethnic groups and in many nations. One bright spot (?): children draw fewer representations of Frankenstein today than in 1957.

In another study, young children were shown photographs of people—men and women, white, Black, Asian and Hispanic—and asked to identify which were scientists (in fact, all were). They consistently identified as scientists only the photographs of people who were not smiling.

One study asked teachers the question: “If you could choose only one person to invite to a special social event, would it be a scientist or a social scientist?” Over 80% of participants chose the social scientist. Clearly, scientists are not people that teachers would like to hang out with!

Views of science

Many people also have beliefs about the nature of science that differ from those held by scientists. Observations and inferences, theories and laws, are often confused. Research reveals common misconceptions around several ideas that most scientists would agree are important characteristics of science: scientific knowledge is subject to change and revision; it is based on empirical evidence; it is developed in a cultural and social context that includes scientists' values, prior knowledge and experiences; it is a product of human imagination and creativity.

Images of solitary scientists also highlight that the important roles of collaboration, critique, and peer review are little understood. What a scientist would call a collegial debate about alternate interpretations of evidence, a teacher might describe as a disagreeable confrontation to avoid.

Teachers in the primary and middle grades often report high anxiety about teaching science. They report that their college science courses had negative impacts on their confidence in teaching science. While math is seen as something that is useful in adult life, science is not.

What can be done?

Many people have distorted views of science and scientists. Fortunately, research also shows that these views can be changed! People need *both* to become aware of their own preconceptions and to see alternate portrayals of science and scientists. This may be especially crucial for teachers, who are strong influences on students' perceptions of science and scientists.

As a scientist, you can help. Call attention to stereotypes, then counter them by your actions: talk about your family or personal interests, describe your everyday work, show pictures of you and your colleagues in action. In presenting science, emphasize the investigative process—draw people into the story of figuring out a puzzle, rather than just presenting the ultimate answer, and focus on big ideas rather than nuances and qualifications that you would add for other scientists. In visiting classrooms, involve students in posing questions, gathering and interpreting data themselves. When you describe this as “acting like a scientist” and make the parallel with your own work, you show science as a creative endeavor open to all. And don't forget to smile!

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