

Editorial

Stereotypes

Science isn't the only profession with an image problem. Think of accountants and lawyers. But science is our profession. It has long been known that¹ the common perception among elementary and high school children is that scientists are rather stern-looking white males, middle aged (or older), who have unruly hair and/or a beard, and wear lab coats (usually with pocket protectors) and glasses. A useful tool for identifying children's perceptions of scientists has been the Draw-A-Scientist Test (DAST).² The above characteristics that show up on the drawings are found to be quite consistent with comments solicited from the children during interviews. Sadly, young people's view of scientists seem to have remained about the same for 50 years. Of course, we might hope that older students who have attended college and had direct interactions with scientists would have a different view. But Jrène Rahm and Paul Charbonneau³ found that this isn't really so. They administered the DAST to a number of undergraduate and postgraduate students, and got results very similar to those typical of young children. DAST results for elementary school teachers are equally discouraging. Their perceptions of scientists are basically the same as those of their students.⁴

Some excellent work is going on to try to combat effects of the negative portrayal of scientists in the media. It can be painfully difficult. As a part of the University of Nebraska's Project Fulcrum,⁵ Gayle Buck and her co-workers tested the effect of bringing women scientists from the university into elementary school classrooms.⁶ The scientists worked with the students once a week for three months, leading them in electricity and magnetism inquiry activities. They were introduced to the students (multiple times) as scientists. They took time to describe their laboratories and to discuss their research and their careers. Despite these efforts to identify the women as scientists, questionnaires and interviews showed that the students had difficulty accepting them as such. The students believed they didn't look or behave like sci-

tists. They didn't wear glasses, have gray hair, or wear lab coats. Also, they were too nice—they "try to make things easier for us" and "let us do fun things." Students thought that "real" scientists "talk about more complicated things" and "have cups with all kinds of experiments in them." Even the students' parents were confused. One asked, "When will the real scientists show up?" Another commented that "It was really nice of the scientists to let their wives do this." There are other intervention methods that work better in addressing students' stereotypes.⁵ For example, if scientists are brought in not to teach but simply to discuss their own research, as well as to answer questions about their lives and work, the students seem to more readily identify them as "real scientists."

Fermilab personnel also seem to be having some success with this kind of approach. They bring in some 11,000 pre-college students per year for field trips. One group of seventh-graders, prior to their field trip, was asked to draw a picture of what a scientist looks like and to describe a scientist in words. The drawings were quite consistent with previous DAST results found by others. The students' three-hour visit to Fermilab included a tour as well as some face-to-face time with scientists, during which they asked both personal and science questions. They were then asked again to draw a scientist and to write a description. The results were dramatically different.⁷ We've reproduced, on the cover, the before/after pair produced by one of the students. Admittedly this pair shows the most dramatic change of the group, but others are quite impressive as well. Of course, having just interacted with a scientist, students will be inclined to attempt a representation of that person and in some cases that might just be replacing one stereotype with another. And there are no data to indicate whether the changed perceptions are permanent. But it's hard not to look at Amy's before and after descriptions and not feel uplifted.

All such efforts to change popular perceptions of sci-

entists is important to the future of our profession. More of us should be actively involved.

Karl Manda

References

1. Margaret Mead and Rhoda Métraux, "The image of the scientist among high school students: A pilot study," *Science*, 126(3270), 384–390 (1957).
2. D.W. Chambers, "Stereotypic images of the scientist: The Draw-A-Scientist Test," *Sci. Educ.* 67, 255–256 (1983).
3. J. Rahm and P Charbonneau, "Probing stereotypes through students' drawings of scientists," *Am. J. Phys.* 65(8), 774–778 (1997).
4. Thomas E. McDuffie, "Scientists—Geeks and Nerds? Dispelling teachers' stereotypes of scientists," *Science and Children* 39, 16–19 (May 2001).
5. <http://www.physics.unl.edu/%7Efulcrum/index.htm>
6. G.A. Buck, D. Leslie Pelecky, and S.K. Kirby, "Bringing female scientists into the elementary classroom: Confronting the strength of elementary students' stereotypical images of scientists," *J. Elem. Sci. Educ.* 14(2), 1–10 (Fall 2002).
7. <http://www-ed.fnal.gov/projects/scientists/>