

Research Brief No. 7

What Perceptions of Scientists Do Undergraduate Students in Reform and Non-Reform Science Courses Describe?

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The *National Study of Education in Undergraduate Science* (NSEUS), funded by the National Science Foundation, investigated the perceptions of scientists held by undergraduate students in entry-level science courses at an initial sample of six institutions. These institutions were sampled from a population of 103 higher education institutions. These institutions, and one or more of their courses, were involved in the NASA/NOVA Program. The NOVA courses were developed and offered at various times beginning in 1996 in a large professional development effort to create reforms in higher education undergraduate, and mostly entry-level, science courses.

Perceptions of scientists constitute an indicator of one's conception of the nature of science. The Draw-A-Scientist-Test (DAST) (Chambers, 1983) asks students to draw their perception of a scientist. It is assessed according to seven basic standard image elements. The Draw-A-Scientist-Test Checklist (DAST-C) was developed by Finson, Beaver, and Crammond (1995) to further consider alternative images and facilitate assessment.

The initial sample of six institutions used here represented a range of Carnegie types from Research 1 through Bachelor's degree granting, and from large in size through small, with one primarily native American serving institution among them. Reform courses were implemented in interdisciplinary (e.g. aerospace science, natural science) courses as well as single subject area courses (e.g. biology). All of the reform courses were available to non-majors, with elementary education majors forming one large

student component. The DAST was administered to students in the reform course and to students in a matched traditional course at the beginning and the end of each course.

Analysis of undergraduate students' drawings considered four areas; (1) gender portrayed, (2) presence of a variety of indicators, many of which are associated with media stereotypes of scientists (e.g. a white lab coat, symbols of research such as a Bunsen burner, unkempt appearance, captions with wording such as "Eureka", symbols of technology such as a computer etc.), (3) character (e. g. sinister, strongly positive, eccentric etc.) and (4) setting (e.g. laboratory, home setting etc.) Figure 3 below shows the pre- and post-test drawings of two students in reform courses.

Draw a Scientist Test DAST

Figure 3

- A Student 1005 Pre-Instruction
- B Student 1005 Post-Instruction
- C Student 1003 Pre-Instruction
- D Student 1003 Post-Instruction

- Pre-instruction, both students showed stereotypical drawings of nerdy white men in a lab.
- After instruction both students showed a less stereotypical scientist. Student 1005 developed the idea that science can occur anywhere. Student 1003 indicated that anyone can do science

(Student drawings were picked randomly)

The DAST was found to have discriminated between classes. Pre-testing found no differences between students in reform and matched traditional courses while post-testing indicated differences in reform course students' overall positive and appropriate perceptions of scientists. At the end of the course, students in reform courses significantly more often perceived scientists as encompassing all people as each of us tests solutions to problems we encounter throughout life, with resultant reduction in the stereotypes often found in the media. The most persistent stereotype among all of

the undergraduate students were those relating to indicators such as, but not limited to, wearing eyeglasses and a white lab coat, having a shirt pocket full of pencils, having long and messy facial hair, being a Caucasian male, and being surrounded by lab equipment, books, and file cabinets.

References

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Further discussion of NSEUS findings is available in:

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