

THE SCIENTIST: PERPETUATING STEREOTYPES

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ABSTRACT: The Draw-a-Scientist Test (DAST) has been used over the past twenty years primarily to assess attitudes of elementary and secondary school students toward science and scientists. In this test individuals are asked, without previous instruction or comment, to draw a picture of a scientist. Drawings elicited from college students enrolled in Basic Science Skills for Elementary Teachers reveal stereotypic images similar to those produced by younger students. Many of these images might be considered negative. Recognizing and discussing their own misperceptions of science and scientists is an important part of preparing preservice teachers to present science to their students as a positive endeavor.

INTRODUCTION

Recent reports based on studies by groups such as the National Science Foundation (1983), the American Association for the Advancement of Science (1989), and the National Assessment of Educational Progress (1988) all alert us to the fact that science education in this country needs attention. Students in the United States are far behind in achievement in mathematics and science when compared with students from other developed countries. Three major themes emerge from these reports. If the United States is to produce enough scientists and engineers to meet future needs, more students will have to be attracted to the fields of science and mathematics. Secondly, there is a need for all citizens in a technological world to be scientifically literate, and finally there is a significant gap in performance levels between girls and boys and between minority and white students. In order to address these concerns, studies agree that science instruction must undergo some major changes, and these reforms must begin in the elementary school.

At the present time science teaching in the elementary schools generally is inadequate both in terms of amount of time spent and quality of instruction. Among factors which limit the effectiveness of science teaching is lack of interest in or dislike for science on the part of the teacher. Developing a positive attitude toward science is a goal throughout the science curriculum for elementary education majors at Indiana University East. Early emphasis is placed on an appreciation for the processes of science being part of ordinary life experiences.

PROCEDURE

Mead and Metraux, in (1957), were the first to try to define the high school student's image of a scientist through written statements. The use of drawings rather than words to express images was developed by Chambers (1983) and is now widely known as the Draw-a-Scientist Test (DAST). To help pre-service teachers become aware of their own perceptions of science and scientists, I use the Draw-a-Scientist Test in a class called

Table 1. Total number of indicators present in each drawing.

Number of indicators	Number of drawings
7	3
6	5
5	27
4	25
3	19
2	15
1	10

Table 2. Percentage of drawings including each indicator.

Lab Coat	55%
Glasses	76%
Facial Hair	29%
Lab Equipment	44%
Items in pocket	19%
Wild Hair	58%
Male	89%

Basic Science Skills for Elementary Teachers. This entry level course is prerequisite for courses in Biology, Earth-Space, and Physical Sciences required in our program.

The test is administered on the first day of class prior to any discussion of course content. The directions are simply, "Draw a picture of a scientist and then name your scientist." After the drawings are completed, students' papers are redistributed and together class members identify features in the pictures before them which they consider to be stereotypes of "a scientist".

Once the list is generated, the question is raised, "Where do these stereotypes come from?" Many are easily identifiable as products of television and movies. Students also cite cartoons and books as other sources of their images. Discussion then centers on what positive and/or negative messages are conveyed by each stereotype.

RESULTS

Several characteristics are routinely present in the 104 drawings collected over a period of 5 semesters (Figure 1). Based partly on Chambers' list of seven indicators of the standard image of a scientist (2), I chose the following features as representative of stereotypes:

1. lab coat
2. glasses
3. facial hair
4. traditional laboratory equipment (flasks, beakers, burners)
5. items (pens, pencils, hand lenses) in pockets
6. wild or unkempt hair
7. male

The data were tabulated in two different ways: 1) the number of indicators present in each drawing, and 2) the percentage of drawings including each indicator. Tables 1 and



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Figure 1. Student drawing showing many stereotypical features.

2 present these results. Particularly interesting is that 89% of the drawings depicted males, even though most of the artists were female, and greater than 50% of the drawings contained four or more of the indicator features.

In addition to these seven indicators, others which occurred with some regularity were bow ties, chemical symbols, and light bulbs or other representations of sudden and amazing discoveries. Names given to the scientists ranged from common first names to exotic inventions. More than half of the scientists were "Doctor" or "Professor"; some were actual scientists (though frequently misspelled). If the nationality of the scientist could be identified by the name chosen, it was most often German.

A recent survey done by NSTA (Fort and Varney, 1989) in which elementary and high school students participated in Draw-a-Scientist Tests reports for the most part a positive perception of what scientists do. Drawings from my Basic Science Skills students follow this pattern also. Though physical stereotypes are present, most drawings portray benign or helpful activities. Only occasionally is the "mad scientist" depicted in monstrous form.

DISCUSSION

Through our discussion of their drawings, my students become aware that they possess certain stereotypes, many of which may be interpreted negatively. Lab coats indicate that science is messy; glasses symbolize intellectual requirements (braininess) or work resulting in eye strain; unkempt appearance implies that scientists have no time to consider personal needs. Students frequently use the term "nerd" to describe their pictures.

In order for elementary students to develop an interest in and positive attitude toward science, teachers must project positive images of science and scientists to them. Sources of negative images are widespread in the environment of elementary students. Teachers need to be aware of the impact of such images and make conscious efforts to expose students to lives of real scientists including women and minorities. The idea that all of us behave as scientists as we perform everyday activities must be reinforced; an opportunity to pursue science should not be denied to anyone. One drawing of the 104 collected depicted the "real" scientist - a child with a puzzled look on his face surrounded by a variety of toys and objects. His name - Quentin Q. Question.

LITERATURE CITED

- American Association for the Advancement of Science. 1989. Science for all Americans. AAAS. Washington, DC.
- Chambers, D.W. 1983. Stereotypic images of the scientist: The draw-scientist test. *Sci. Ed.* 67(2): 255-265.
- Fort, D.C. and H.L. Varney. 1989. How students see scientists: mostly male, mostly white, and mostly benevolent. *Science and Children* 26(8):813.
- Mead, M. and R. Metraux. 1957. The image of the scientist among high school students: a pilot study. *Science* 126:384-390.
- National Assessment of Educational Progress. 1988. The science report card: Elements of risk and recovery. Educational Testing Service. Princeton, NJ.
- National Science Foundation. 1983. Educating Americans for the 21st century. National Science Foundation. Washington, DC.