Why Not Science? Career Choices of Talented Americans*

Yu Xie

University of Michigan

And

Alexandra Achen

University of Michigan

Paper prepared for presentation at the 2009 Population Association of America annual meeting in Detroit, Michigan. Direct all correspondence to Yu Xie, P. O. Box 1248, 426 Thompson Street, Population Studies Center, University of Michigan, Ann Arbor (Email: yuxie@umich.edu).

WHY NOT SCIENCE? CAREER CHOICES OF TALENTED AMERICANS

Richard Atkinson, a former president of the University of California and a former director of the National Science Foundation, published in 1990 a well-publicized article in *Science* magazine predicting "significant shortfalls" of scientists in the near future as "a national crisis" (Atkinson 1990). This sentiment has been widely shared, as well as criticized, by observers and commentators. There are some indicators that validate this concern. For one thing, an increasingly large share of U.S. science degrees, especially at the Ph.D. level in the natural sciences, go to persons who were born abroad (Borjas 2005). In addition, American high school students seem ill-prepared for advanced scientific training, as judged by their relatively poor performance on mathematical tests by international standards in recent decades (National Science Board 2006). Further, America's dependence on foreign-born and foreign-trained scientists has dramatically increased, as the share of immigrants among practicing scientists and engineers has significantly increased. At least according to some observers, Americans' lack of interest in science represents a cultural change from the era immediately following World War II, when American society as a whole became fascinated with science following the launch of Sputnik by the Soviet Union (see Kevles 1977).

The decline of interest in scientific careers, assuming it exists, comes at an inopportune time for today's America. American society is now commonly referred to as a "postindustrial society" (Bell 1973), and the American economy is called a "knowledge economy" (Rooney, Hearn, & Ninan 2005). More than at any other time in history, we depend on science and technology for economic prosperity and national security. In addition, there is evidence that individual citizens in this society now enjoy increasingly large personal returns on their investment in scientific and technological knowledge, in terms of social status and family income (Fisher and Hout 2006; Mare 1995).

Despite a widely-shared expectation of rapid growth in the core scientific labor force (Price 1963), since 1960 it has barely kept pace with the growth of the overall labor force. This flat trend should be interpreted in the context of a rapid increase in the college-educated labor force (shown in Table 1). The contrast means that other professions, such as computer specialists and health-related professionals, have expanded far more rapidly than basic science. At the same time, the proportion of immigrants in the American science and engineering (hereafter S&E) labor force has increased. Reflecting these trends, there has been a sharp decline in native-born, college-educated Americans' pursuit of science. Taking into account the supply of immigrant scientists there is little direct evidence of a *market* shortage of scientists practicing in the United States (Butz et al. 2003). However, examining the supply of American-born scientists from this perspective is too narrow, as this overlooks such factors as macro-level positive economic externalities of a large supply of scientific personnel, national security concerns, and a fear that in the future America will face tougher competition for talented foreign labor and will need to rely more on a native-born S&E labor force (Austin 2002).

Table 1 About Here

Evidence from all sources (including Table 1, presented above) clearly shows that an increasingly smaller proportion of native-born Americans now pursue science careers than in the past. Whether this trend has resulted in a severe shortage of scientists in contemporary America, as characterized by Atkinson (1990), is debatable, as an increasingly large proportion of scientific positions have been taken up by immigrants. Even in the absence of a shortage, the future of American science and technology could still be vulnerable if the flow of immigrant scientists should stop or dramatically decline. In addition, the fact that

many talented, native-born Americans forego pursuing a socially respected and potentially fulfilling occupation is an interesting social phenomenon that is worthy of sociological investigation.

In a larger project, we attempt to address the following question, using data from a variety of sources: Why has there been a marked decline during recent decades in the proportion of native-born American youths who pursue scientific careers? In this paper, we study career trajectories of talented American youth using national, longitudinal education data for three cohorts: NLS-72 (high school seniors in 1972), HS&B (high school sophomores in 1982), and NELS (eight graders in 1988).

A working hypothesis is that, when faced with different career options, *ceteris paribus*, a young person will choose the occupation that yields the highest expected monetary returns. At the societal level, when expected earnings of scientific occupations are relatively low compared to other high-skilled occupations, the overall interest in becoming a scientist decreases. While this reasoning seems straightforward, it actually has strong theoretical roots in different social science disciplines: classic discrete choice model in economics (McFadden 1974; Train 2003); rational choice theory in sociology (Coleman 1990; Xie and Shauman 1997), and social learning theory in psychology (Bandura 1986). Empirical work utilizing this framework for the study of occupational choice can be found in Boskin (1974), Freeman (1971), Manski and Wise (1983), and Xie and Shauman (1997). There is some evidence from our own research that, over the recent history in the U.S. the earnings of scientists have stagnated, while the earnings of other high-status occupational groups -- law, medicine, or the social sciences, for example -- have significantly increased. In this paper, we wish to test if, over the three cohorts of students, talented youth became more interested in pursuing these alternative competing occupations —i.e., gravitating away from science.

We operationalize a talented person as a respondent who scored above the 90th percentile on math and science high school achievement tests. While we recognize the weakness of this measure as an indicator of innate talent, minimally it captures high-achieving students. We examine a variety of career outcomes of these students, including whether they express interest in science in high school, whether they attend and graduate from college, whether they obtain a bachelor's degree in science, and whether they enter a scientific occupation. We study what traits of individuals are relevant for encouraging perseverance in pursuit of a scientific education, including race, gender, parental background, and desired job characteristics. Among high-scorers who do not pursue a scientific occupation, we report common career choices in order to better understand the occupations that compete for those talented in math and science. By comparing results across three cohorts, we will draw inferences about whether top math and science performers have become less likely to pursue education and careers in science in recent decades.

Table 1: Preliminary Results for Non-Academic Scientists 1960-2000

	1960	1970	1980	1990	2000
% Scientists in Labor Force	1.6%	1.9%	1.9%	1.8%	1.8%
% Labor Force with College Degree	10.0%	13.6%	20.9%	24.0%	27.3%
% Labor Force who are Immigrants	5.8%	5.7%	8.1%	8.9%	13.6%
% Scientists Among Native-Born College-Degreed	9.8%	8.4%	5.8%	5.1%	4.6%
% Scientists who are Immigrants	6.5%	8.7%	10.8%	11.9%	18.8%

Source: computed from 1% PUMS from decennial U.S. Census

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