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‘Why Aren’t More Women in Science?’

The year 2006 may be remembered for unprecedented attention given to issues related to women in science. Numerous expert panels — most notably one appointed by the National Academies — examined barriers facing female scientists. A new collection published by the American Psychological Association aims to add to the knowledge base. Why Aren’t More Women in Science: Top Researchers Debate the Evidence, features essays on both biological and societal explanations. The editors Stephen J. Ceci, a professor of developmental psychology at Cornell University, and Wendy M. Williams, a professor of human development at Cornell. Ceci and Williams responded to questions about the new collection.

Q: As Larry Summers can testify, the subject of your book can be controversial. What were you goals with this collection? As the Summers furor set off a national debate, were there parts of the discussion that struck you as missing?

A: For us, the worrisome aspect of the debate was not so much its *substance* as its *tone.* Defenders of Summers’s remarks were vilified and dismissed. This does not serve the purpose of science — it led to muzzling of the scholarly debate, with one side effectively silenced by the other. When we first sent out invitations to contribute essays to our book, we were saddened by the stories of some scholars who felt that they could not contribute because their views were scorned, and had resulted in personal attacks against them on their campuses. If you read between the lines in several of the essays, you will detect this theme even among those who did contribute essays.

Q: Many women in science fear that discussion of gender differences can easily end up perpetuating stereotypes and limiting their opportunities. Are they right to be worried?

A:
No. It is only by open and honest consideration of all types of evidence that society can hope to navigate this issue. What, if anything, should be done to increase the representation of women in certain fields? The answer to this seemingly simple and straightforward question is anything but simple, and it requires consideration of multiple viewpoints and diverse types of data. (Note that we said data, not rhetoric.) It should not be left to a coterie of science policy aficionados to decide whether the current state of affairs is unfair, and if it is unfair, to decide what should be done to encourage greater participation by girls and women.

Q: To what extent are there biological gender differences that matter in exploring this topic?

A:
In our book we discuss the biological evidence — hormone effects on spatial cognition, both as a result of prenatal hormone baths and postnatal surges associated with puberty, time of day, and menopause; sex differences in brain organization; and evolutionary arguments. We also discuss the limitations of the biological evidence. Putting aside the validity of this evidence, there are societies in which females have done far better than U.S. females do. For

example, girls in Singapore, Japan, and Taiwan do much better in advanced math than American girls their age, and sometimes better than American boys. And over the past 30 years, American females have made tremendous gains in all scientific fields, including the most male-dominated ones. We mention this trend because if one argued for biological constraints on women's underrepresentation in science 30 years ago they would have been wrong. None of this means that biology is unimportant, but it does mean that the story is complex and not apt to be reducible to single factors.

Q: What do you see as the main societal barriers that limit the advancement of women in science?

A:
We have given a lot of thought to this question and discussed it among ourselves, and it is the subject of a book we are now writing. The bottom line is that the pipeline leading females into mathematically-intensive science careers leaks at every step along the way, from elementary school through post-Ph.D. tenure decisions. If you look only at the women who earn doctorates in the sciences, a smaller proportion of them are in satisfying, successful careers than is true of men. Either they managed to get tenure, but express lower levels of satisfaction with their jobs, or they never go on tenure track, or they quickly go off tenure track to raise families, care for elders, or follow partners. The "barriers" they face are those associated with being asked to perform maximally at jobs at a time in their lives when other needs compete for their energy and time, such as family care. Some opine that if women had the flexibility to move slower at first until their family needs were met, they could be very productive later in their scientific careers. As evidence for this assertion there are some very limited small-scale data from one or two fields showing that mid-career and older female scientists produce articles that are cited more highly than articles by their male colleagues — thus leading to the argument that women would excel, if only they could be allowed delayed start-ups. As we see it, there is no easy solution to this situation, and if delayed start-ups were permitted, it would raise a host of other serious issues having to do with gender equity and ensuring and evaluating progress in professional fields.

Q: Which of the essays in the book most surprised you and why?

A:
Our biggest surprise was not found in any one essay but in the class of essays about biological differences between men and women. We had anticipated greater agreement among these essayists, but what we found was quite divergent, with some arguing strongly in favor of sex differences in brain organization, hormones, etc., as causative factors in women's underrepresentation among those who score the highest on standardized mathematics tests, and others arguing against such views.

Q: We have seen more progress in some fields (medicine, for example) than others (engineering). Does research point to explanations?

A:
Amidst the debate over whether women are underrepresented in certain fields of math and science is an inescapable fact: women have made huge advances in virtually every field of science and math during the past three decades. Granted, the progress in some fields (e.g., medicine, veterinary medicine, biological sciences) has been far greater than in others (engineering, chemistry, physics, and computer science). Some believe that the dearth of women in these latter fields is the result of their greater dependence on cognitive skills that are assumed to be more prevalent among males (e.g., spatial abilities), while others have argued that the reason has more to do with sex differences in personal preferences, with men gravitating more toward object-oriented fields and women toward person-oriented ones. Our review of the evidence leads us to conclude that the reason fewer women are in certain fields has to do with many factors, not just one or two.

Q: If a president or dean called you and asked 'How can I tell if my institution is doing as well as it should in promoting equal opportunity in science?' what would you advise him or her to examine?

A:
We would start by looking at the "pipeline" in various fields of science, and asking whether the university was hiring women in proportion to the applicants for positions who are female. (N.B., NSF publishes science indicators periodically, and this is a good source of information for the proportion of women earning Ph.D.'s or completing postdocs in various fields of science.) We do not believe an institution is biased solely because its recent hires include

more males — perhaps, for example, more applicants were male, or perhaps the more talented applicants were male. Legitimate reasons for hiring more men include the possibility that male applicants have higher citation rates or more sole-authored articles, or perhaps that disproportionately more women in the postdoc pool desire less than full-time jobs or defer their own career aspirations to those of their partners (and thus do not compete across as wide a geographical area as do males). When such factors exist, women end up in adjunct posts in locations that are not good for them, even if the locations are good for their partners.

Our experience over several decades of training many very talented women is that they are far more likely to put their own careers on hold to facilitate the careers of their partners. Sadly, research documents that if you start out in a part-time or adjunct position with the goal of later becoming full-time and tenure-track, you are going to be disappointed. It doesn't usually work out that way, as Mary Ann Mason and Mark Goulden's research demonstrates. So, the bottom line for us is to recommend looking not just at the pool of Ph.D.s produced, but also at the applicants who actually present themselves for recent tenure-track science positions. Interview the search committees and ask why their members preferred a male applicant over a female one. Were the men stronger (e.g., more productive; and if so, how was productivity defined — in terms of a product of articles and citations, perhaps weighted by being first or sole author?). Once you have ascertained answers to these questions, next ask others external to your university to review the same applicants' CVs and see if they agree with your search committee's analysis. What we all wish to guard against is talented, committed women being bypassed because of their gender.

— Scott Jaschik

The original story and user comments can be viewed online at http://insidehighered.com/news/2007/01/03/women.