

Report

Women's Neuroethics? Why Sex Matters for Neuroethics

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The Neuroethics Affinity Group of the American Society for Bioethics and Humanities (ASBH) met for the third time in October 2007 to review progress in the field of neuroethics and consider high-impact priorities for the future. Closely aligned with ASBH's own goals of recruiting junior scholars to bioethics and mentoring them to successful careers, the Neuroethics Affinity Group placed a call for new ideas to be presented at the Group meeting, specifically by junior attendees. One group responded with the idea to probe a new direction for neuroethics focused on the neuroscience of gender differences. In the spirit of full disclosure, two of the authors are a student (Chalfin) and fellow (Murphy) of the program I formerly directed at Stanford University. The third (Karkazis) is junior faculty there. The intellectual ownership of the ideas in the report below, however, are entirely theirs. Like lit torches in a juggling act, there are many directions this project can go. The report is a snapshot of these authors' first iteration of the concept of women's neuroethics. Many thanks are extended to participants of the ASBH Neuroethics Affinity Group meeting whose enthusiasm and feedback was immensely helpful in shaping the concept and moving it ahead.

— Judy Illes, Editor
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How and why women and men are different is a topic of enduring scientific and public interest. Over the past decade, the number of neuroscience studies documenting sex differences in brain anatomy, chemistry, and function, and involving cognitive domains such as emotion, memory, and learning, has exploded (Cahill 2006). Although scholars in the field of neuroethics have explored advances in neuroscience from many angles, few, if any, have paid attention to neuroscientific work on sex differences or to gender as a primary category of analysis.

Why should we pay special attention to the neuroscience of sex differences? Perhaps the most important reason is that this work will prove important for contested ideas about the so-called nature of human nature. One only need look to the Larry Summers debacle in 2005 to see how contentious the topic is and how far-reaching its effects may be. Although the question of how and why women and men are different is an old one, neuroscience's use of cutting-edge technology — coupled with a growing reliance on science to shed light on complex human behavior — increases the likelihood that this work will leap to the forefront of public discussion and debate about social equality.

While neuroscience is concerned with elucidating the origin and extent of behavioral and cognitive differences between women and men, the questions that predominate for us are of a different nature: How ought we disseminate this information into a sensitive social environment that has a history of bias and discrimination against women? What are the implications of this work for our understandings of what makes us women and men? How should this research be applied in educational, medical, and legal contexts, if at all?

The sensitive, careful interpretation and communication of research findings on sex differences in the brain will be critical. This is especially true for findings with the potential to promote discrimination. Researchers, for example, have repeatedly confirmed that men's brains are bigger, on average, than women's. Although today we know that this finding bears no relationship to intelligence, that was not the case 100 years ago when astute scientists such as Francis Galton and Paul Broca championed brain size as a measure of human intelligence, and such knowledge was used to justify social inequities of the day (Gould 1981).

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New technology brings new hope that our more modern and sophisticated techniques will shed reliable and valuable light on sex differences. So what do we make of new research showing sex differences in every lobe of the brain, including in many regions in critical cognitive paths such as the hippocampus, amygdala, and neocortex? The short answer is that we look to history as our cue and proceed with caution.

Research shows differences between women and men in the incidence, prevalence, and symptoms of many central nervous system-related diseases. Neuroscience research may improve our understanding and treatment of these diseases by yielding tailored “his and hers” pharmaceuticals to treat illness. While one of medicine’s primary goals is to provide effective therapies for disease, might this research yield drugs aimed at assisting women and men for their unique cognitive “deficits”? In an era of Western medicine dominated by consumer choice, where will the line be drawn on gender-focused marketing campaigns? Neuroethics discussion may work to form a balanced, informed perspective on the use of emerging medical neuroscience findings and the enhancement possibilities or treatment directives that grow out of them.

How might educators interpret and implement neuroscience knowledge about patterns of cognitive development in the classroom? This is already happening in what some have called *brain-based learning*. A recent article in *Educational Leadership* argues for integrating this research into pedagogy and lists the qualities inherent to “boys’ brains” and “girls’ brains” (Gurian and Stevens 2004). The authors cite research showing that girls use more cortical areas for verbal–emotive functioning than for abstract and physical–spatial functions in an effort to explain “many girls’ discomfort with deep computer design language.” Danger lies in interpretational leaps from basic science data to broad generalities.

In considering the neuroscience of sex differences, we confront a fundamental issue: how do science and society understand female–male differences, or rather, women and men? This question has been the subject of much social science deliberation, but in the realm of scientific research, gender’s complexity has too often been lost to biology’s complexity. Thus, while scientists have asked, “What *causes* female–male difference?” there exists a prior question: “What *is* female–male difference?” Although the answer to this question may appear self-evident, history shows that our answer is subject to the constraints of time and place. Feminist and social studies of science have demonstrated how scientific research, questions, and constructs reflect contemporary cultural presuppositions and beliefs about gender. The point of this work is to show that social resources and contexts are consistently part of the production of knowledge; not only does science take place within specific social contexts, but these contexts form and shape the very style and content of science. Engaging neuroscientists with social scientists and others that wrestle with the complexities of categorization can play an important role in conducting and communicating any research on neurobiological differences between women and men.

Within a social context of unresolved bias and discrimination against women, the neuroscience of sex differences requires explicit ethics attention. Deepening this discussion will help construct the bridge between science and the normative goals of just societies.

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