

**TRANSITIONS IN THE GENDER COMPOSITION
OF HISTORICAL OCCUPATIONS:
THE ROLE OF CULTURAL FORCES**

In this brief paper, we identify issues that we believe deserve more complete consideration in future research and papers. Our guiding questions have been:

1. In the United States, what are the broader historical and cultural contexts for understanding the entry of women into previously male-dominated professions and occupations? To take a relatively recent historical case, how could an understanding of history and culture illuminate the accelerating entry of women into the medical profession that began during the 1970's?
2. What role have historical moments and larger cultural forces (e.g. social movements) played in such advances?
3. In what ways can an examination of historical cases benefit or inform current efforts to increase women's representation in the field of Information Technology?

We suggest that larger cultural forces may play a critical role in producing the present situation in which the fields of IT and computer science have in effect become gendered "male." These larger forces lie beyond the personal

characteristics of women themselves, including their preferences, choices, educational aptitudes, and credentials. (Of course, we recognize that these personal characteristics are to varying extents themselves also shaped by culture.) We suggest that by analyzing historical occupations in which shifts in gender composition have already occurred we may be better able to recognize the contemporary cultural forces at work in the fields of IT and computer science, especially gender ideology, the structure and culture of the workplace, and U.S. stereotypes about males and females, including assumptions about women's abilities, interests, and roles in society. To return to the example of medicine, what cultural forces contributed to the widespread 1950's assumption that women were unsuited for careers as doctors?

SOCIAL MOVEMENTS. We believe that we should not underestimate the effects of popular social movements on historical shifts in gender composition within occupations. Of course, we would expect to find that the suffrage movement of the 1920's and the civil rights movement of the 1960's had significant effects on the entry of women and minority groups into traditionally white male occupations. Again taking the more recent case of medicine, we ask how and in what ways did the women's movement during the 1970's contribute to the opening of that profession to women? And in general, how does a pervasive social movement "translate" into concrete effects within specific

professions? How and why do these effects differ from one profession to the next?

LAW & POLICY. What are the effects of changing law and policy on shifts in gender composition within specific occupations? Many trades and occupations, from telephone workers to airline pilots, would still be gender-segregated (and gendered male) if not for Affirmative Action legislation. Both national and state law and policy, including Title IX and civil rights legislation, have affected gender composition within occupations. We believe we need to recognize the contribution of contemporary social movements (see above) to the creation of new law and policy. In addition, we will also need to consider the resources allocated for enforcement and implementation of new law and policy, as these would mediate their effects.

HISTORICAL MOMENTS. In addition to the effects of social movements and law and policy, “historical moments” are also larger cultural forces that serve to accomplish change (or maintain stasis) in the gender composition of occupations. Perhaps one future “historical moment” is now taking shape in the aftermath of Harvard President’s Lawrence Summer’s 2004 comments on women’s suitability for careers in science. In the growing public debate following Summer’s remarks, the subject of gender and science has claimed a new audience and gained new scrutiny.

According to the March 7, 2005, edition of *Time*, data from Iceland demonstrate that girls there consistently outperform boys in math and physics. The interpretation of this phenomenon is that women experience these subjects as a means to leave small isolated towns for an alternative life in distant cities and the bigger world. Because males are expected to remain in their hometown and work as fishermen, they are not similarly motivated to focus on math and science. Motivation is clearly an important factor in determining which persons and genders engage in the study of math and science – and motivation is clearly culturally and historically bound.

“For most of the 1800’s, for example, physics, astronomy, chemistry and botany were considered gender-appropriate subjects for middle and upper class American girls. By the 1890’s, girls outnumbered boys in public high school science courses across the country, according to the Science Education of American Girls, a 2003 book by Kim Tolley. Records from top schools in Boston now show that girls outperformed boys in physics in the mid-19th century. Latin and Greek, meanwhile, were considered the province of gentlemen – until the 20th century, when lucrative opportunities began to open up in the sciences.” (*Time*, March 7, 2005.) As this demonstrates, historical period is critical context for considering women’s entry (or departure) from specific occupations.

A more recent example of the effect of the historical moment on occupational opportunities for women can be seen during World War II, when as in the case of “Rosie the Riveter” women entered traditionally male trades in the

absence of men, who were away in military service. While labor market effects deserve careful consideration in this case and in the opening of any other occupation to women, the power of the historical moment – the publicized image of a woman performing a man’s job – is undeniable. Other historical moments will in the future initiate the opening of other traditionally male-gendered occupations to women. The ability of the media to establish new images in the public mind – perhaps a woman climbing aboard a space shuttle (Sally Ride) or taking the oath of high office (Sandra Day O’Connor) -- may define future “historical moments,” critical turning points in the gender composition of occupations.

HISTORICAL ARRIVALS & DEPARTURES OF THE GENDERS. In the analysis of change in the gender composition of historical occupations, we believe that the entry of women into traditionally all (or mostly) male fields cannot be considered independently of the departure of men. If as women arrive, men depart that occupation for another, where do they go and why? Do they seek more lucrative employment, taking the prestige of their former occupation (or their gender?) with them? We believe, therefore, that it is important to consider the historical effects of the entry of women on overall wages and salaries, and on the status of that occupation within the greater hierarchy of occupations.

Of course an extreme example of historical shifts in gender composition is the “feminization” of a field through the departure of men and their replacement by women. The prime case of this phenomenon is the 19th century feminization of the occupation of secretary: As women increasingly assumed positions as secretaries, which was an occupation traditionally held by male “clerks,” both wages and status plummeted. A different case is the occupation of primary and secondary teacher, which originated as a thoroughly feminized field. As that occupation became bureaucratized and institutionalized, males who entered the already feminized field of teaching assumed positions as more highly paid administrators and bureaucrats. In both of these examples we can see the effect of “cultural forces,” especially the power of entrenched gender ideology and hierarchy. And, to return to our more contemporary example: Did women enter the field of medicine in the 1980’s-90’s only as men were leaving it for more secure and lucrative professions?

The field of biology provides an interesting comparative case. Currently more women receive B.S. degrees in biology than men (which is surely a factor in the rising numbers of women entering medicine). Biology is also a particularly instructive example because it is a “natural science,” hence male-typified, and yet it is labeled a “life science,” meaning that it is not perceived as “hard.” Thus, women’s inroads into scientific fields are relegated to the more feminine life sciences, as opposed to the hard sciences. Biology is also an interesting case

because most people are unaware that it has become a female-dominated field and major at the undergraduate level.

Psychology is another example of a field transformed by a shift in gender composition. Formerly a very male-dominated field, it is now extremely female-dominated, even at the doctoral level. However, the influx of women has brought with it a decline in the prestige of the field, as well as in compensation. Male-dominated enclaves remain within psychology, for example in psychophysiology and neuropsychology. The most female-dominated areas in psychology are those that are aligned with the stereotypical female values of nurturance and caring, i.e. clinical psychology and developmental psychology. Similarly in medicine, there are few female surgeons and anesthesiologists (the most respected and highly compensated specialties), but many female family practitioners and pediatricians (the lowest prestige and pay). Clearly it is important to examine the entry of women into a traditionally male-dominated occupation within the complete context of demographic changes occurring, including the departure of men and the feminization of the field. This will entail systematic historical and comparative research, both within and across occupations.

Math is another instructive example because of the stereotype that females are inferior to males in math ability. At the undergraduate level women have made clear gains. According to the U.S. Department of Education (2002), 46.7% of bachelor's degrees in mathematics are conferred on women. This represents a

tremendous increase in women's representation in math over the last thirty years. What has driven this increase? Here, as in the case of biology, the public is not yet aware of women's advances. One reason why the increase in women math majors deserves focus is that the public (and Larry Summers) believes that women are underrepresented in careers in math, science, and IT because of their relative lack of quantitative ability. Clearly, these new female math majors have quantitative ability. Of course the interesting question remains: Why aren't female math majors flocking to lucrative careers in IT or engineering?

ETHNICITY AND GENDER. In addition to gender, we suggest that equal attention should focus on the arrival and departure of racial/ethnic and immigrant groups. The entry of women into IT and computer science occupations must be analyzed in the fuller context of other demographic changes in the field. Specifically, the arrival of women should be considered alongside the departure of men *and* the arrival of foreign-born workers, both male and female. How are changes in the gender, racial/ethnic, and immigrant composition of the field manifest in salary levels, new glass ceilings, and the general status of the occupation within the complete category of occupations? We believe that a focus on historical occupational shifts in gender (and racial/ethnic and foreign-born) composition will help us to tease out the critical role played by cultural forces in the shaping of "opportunity" and skewed gender composition in the contemporary fields of IT and computer science.

Here, one question that deserves close examination is: How is outsourcing affecting women's participation in IT?

In sum, we believe that it is important to consider historical and cultural contexts and forces in the framing of research focused on the contemporary situation of women in IT. We have identified several areas that seem especially critical, including the effects of social movements, law & policy, historical moments, historical arrivals & departures of the genders, and ethnicity and gender.

Bibliographic References: We are attaching a list of references sent to us by Lucy Sanders, entitled "The History of Women and Science, Health and Technology. A Bibliographic Guide to the Professions and the Disciplines."

Additional Note: This paper should be read in tandem with the paper on global perspectives on women and technology.

This paper was submitted by Jane Margolis and Janice Stockard, and incorporates comments by Gerhard Sonnert and Sylvia Beyer.