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On the lack of women in science: Numbers do matter

By Ashutosh Jogalekar | October 3, 2013



Henrietta Swan Leavitt, even today an underappreciated female scientist, whose work led directly to the discovery of the expansion of the Universe (Image: Wikipedia)

There is an excellent [article](#) on the lack of women in science in the NYT by Eileen Pollack which is worth your time. Pollack herself was an embattled physics major at Yale at one point so she is quite well-versed in these issues. Using her own experience as a springboard she explores three of Yale's female professors who talk about the hurdles they faced in their own careers. One of these is Jo Handelsman who conducted a rather well-known [study](#) last year about the way faculty members react differently when they encounter resumes from men and women which except for gender are the same. The study revealed that women applicants would routinely lose out when it came to essentials like space, funding and salary.

One of the take-home messages from the article is that gross numbers aren't the only problem, and beyond a point they can even be a red herring. Higher numbers does not necessarily translate to lower barriers for entry and advancement. The article really hones in on two factors that Pollack thinks are responsible for the lack of women in science. One is self-esteem. It is clear that women's treatment – both subtle and sometimes blatantly non-subtle – at the hands of their male peers, parents and society at large leads to low self-esteem and lack of self confidence in their ability to succeed in science. It starts from childhood when boys are encouraged to play with lego sets and girls are taught to dress up dolls. Many of the women interviewed – including Pollack herself – said that their professors in college did not encourage them to attend graduate school, even when they were doing as well as the men in their class. This lack of self-esteem feeds into “imposter syndrome”, the feeling that you are successful quite undeservedly and not on your own merits. Imposter syndrome is a serious problem that rightly sparks intense discussion and conferences, and it's certainly something that many women feel.

The other problem is also well-known, and this is the perpetuation of cultural stereotypes as portrayed for example in *The Big Bang Theory*. Even today many women are consciously or unconsciously discouraged from studying especially the hard sciences by their parents and peers because these sciences “are for nerds and losers”. I do not think this problem is limited to girls – nerdy boys are also supposed to have trouble fitting in – but it's definitely worse for girls.

I think one of the most interesting parts of the article deals with how perception of women in science can differ between cultures and countries. In general American and Asian men seem to have a problem regarding beauty and intelligence in a woman as co-existing qualities. European men seem to take a more nonchalant view. Meg Urry who is the chairman of Yale's physics department recounts her experience:

“Urry told me that at the space telescope institute where she used to work, the women from Italy and France “dress very well, what Americans would call revealing. You'll see a Frenchwoman in a short skirt and fishnets; that's normal for them. The men in those countries seem able to keep someone's sexual identity separate from her

scientific identity. American men can't seem to appreciate a woman as a woman *and* as a scientist; it's one or the other.”

This actually seems to me to be a very significant point. Most women do care about what men think about them, just as most men care about women's views about them. If a woman thinks that a man will always look at her intelligence and her looks as mutually exclusive properties, she will feel much more pressure to pick between the two. Men have to consciously change this attitude. As an aside this unnecessary choice between beauty and brains may lead to the slovenly looks sometimes seen among scientists and noted by stereotypical portrayals and TV shows; in this case the scientists have probably made their choice.

It's worth noting that discrimination against women in academia has persisted for hundreds or years, so even policies that make it favorable for them to enter fields like physics right now are not going to bear fruit until a few years down the line. I am always amazed that Princeton's astronomy department did not enroll its first female student until as late as 1975. If you want to have an idea of how hard even very smart women in science had it, you should read Sharon Bertsch McGrayne's study of famous women scientists, including Nobel Prize winners. Highly accomplished women like Gertrude Elion, Emmy Noether and Gerty Cori had to play second fiddle to their less accomplished male counterparts even after publishing groundbreaking research. The example of Jocelyn Bell Burnell is well-known. Bell discovered the first pulsar while working for her advisor, Anthony Hewish. Ideally she should have shared in Hewish's Nobel Prize but she didn't, even when there was a place for a third recipient. The interesting side-story to Bell's discovery concerns the brilliant and controversial astronomer Fred Hoyle who publicly supported Bell and denounced the Nobel Prize awarded to Hewish alone. In 1983 Hoyle's colleague William Fowler received the Nobel Prize for ideas which Hoyle had significantly contributed to; Fowler himself expressed astonishment that Hoyle had not shared the honor, and again there was a place for a third recipient. While it's hard to say for sure, one cannot escape the nagging doubt that Hoyle was being punished by the Nobel Committee for his advocacy of Bell and criticism of the prize. Thus, not only women but even men who support women in science can see themselves being formally and informally reprimanded.

The fact that there is a lack of women in science is almost certainly a function of policy and environments in higher level institutions. As the article indicates,

many studies indicate that girls do as well as boys on math and science in high school and college. However there seem to be both subtle and non-subtle cues at the college level that discourage women from pursuing graduate studies, leading to the well-known “leaky pipeline”. Both male peers and male professors seem to be culprits according to the article, sometimes quite unintentionally so. Thus it is clear that the simple solution- having more female role models in academia – will certainly go a long way in helping boost women’s confidence and opportunities in the higher echelons of science. In this context the work done by female scientists and educators like Danica McKellar and Lisa Randall is highly commendable.

While the article does not address this, another important question deals with the disproportionate number of women in biology as compared to physics, math or computer science. While this has been held up by many as a matter of difference in aptitude, I think the explanation is much simpler. For a long time biology was regarded by men in physics and math – the reigning sciences of their time – as a “soft” science. Thus, and although I don’t have data to support this, I suspect that even if it was for the wrong reasons, biology started out with a lower barrier for women’s entry and consequently with more women in it. This led to a positive feedback effect that continues today, with women biologists on the faculty of top universities encouraging other young women to major in the discipline. This means that equivalent numbers of women in physics and engineering might accomplish the same thing. Chemistry is probably somewhere in between.

The importance of numbers was driven home to me on a personal level a few years ago when I attended a conference on astrophysics. Astrophysics is a field which has traditionally been male dominated, and in fact 90% of the attendees and speakers at the conference were men. After about 15 talks by men spread over two days a female speaker from a well-known researcher took the stage. She was both intelligent and attractive and her research was as interesting as the research described by the other speakers. To my horror, as the talk wore on I found myself analyzing her words, her mannerisms and the content of her talk with a fine toothed comb. I found myself being much more judgmental and critical of her than I would have been of equivalent male speakers. This was doubly shocking since I had always thought of myself as a fair and unbiased person who had been raised by a father and mother who were both accomplished college professors.

What was happening here? The simple explanation emerged when I thought of another conference – this time on biochemistry – that had been the last one I attended a few months ago. This time the pool of attendees and speakers included at least 50% women. None of the female speakers at that conference had produced the same overly critical behavior in me. I realized that the simple difference in numbers was making a big difference in perception. Simply being used to having women in a different field had changed my perception of them and I don't see why it would do anything different for other men. A lack of women in astrophysics does not provide an excuse for my attitude, but it taught me to be much more watchful and to appreciate the importance of simply having more women role models in science. It was then that I decided that if I have a daughter I will try to get her interested in physics or math. The fact is that numbers do matter, and articles like Pollack's provide useful road maps for how to improve them.



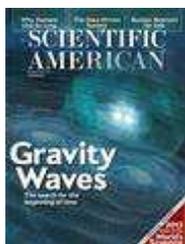
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