

The Truth About Science and Sex

From The Guardian
Thursday January 27, 2005

Why are women under-represented at top levels of science? According to comments by economist Lawrence Summers, president of Harvard - which have caused uproar - there are three factors: first, women need to take career-breaks to have children and are not supported. Second, women are "innately" less able as scientists, so that, third, the pool of women to recruit into top-level scientific posts is smaller.

After an outcry Summers issued an apology. But this issue is not going to go away. If, as one index, only 5% of Royal Society Fellowships have gone to women, what is going on? And is there any truth to Summers' three factors?

Let's take factor one. There is no question that science, especially at the top levels, is competitive. Money is so short in the sciences that only about 25% of grant applications get funded. Scientists need to have lots of time (not just to write grant proposals, but also to accumulate the necessary track record with publications in top journals) to have a chance at receiving funding. If, laudably, you are an involved parent, how are you going to juggle proposal writing and publishing too?

What about factor two? Do women have less aptitude for science? There is no evidence to suggest that scientific ability is wholly genetic, or that men are more likely to have the relevant genes than women. There is, however, evidence that on average women's and men's brains are subtly different, that they function differently, and that at the psychological level, males and females are interested in different aspects of the environment.

For example, men's brains are larger and heavier. Women's brains interestingly have a thicker corpus callosum (the connective tissue between the two hemispheres, which allows for better communication between them), and women tend to use both hemispheres for some language tasks. Girls also talk earlier than boys. When given a photo of a person's eyes to judge how the person in the photo is feeling, women on average do better than men. And when asked to find a target shape hidden in a complex pattern, women are on average slower than men.

But do these differences reflect aptitude, or interest? Some intriguing personality questionnaire data suggests it is the latter. On the empathy quotient (EQ), which asks a range of questions about how interested you are in people and their emotional lives, and how involved you become in other people's feelings, women as a group score higher than men. On the systemising quotient (SQ), which asks you how interested you are in systems of different kinds (maps, gadgets, car engines, forecasts, structures), men as a group score higher than women. This has given rise to the idea that in a

typical female brain, interest in empathy is stronger than interest in systems, whilst the typical male brain is more interested in systems than in empathy. Of course, a proportion of both sexes are equally interested in emotions and systems.

Our research group has recently analysed the proportion of each sex with each of these profiles, and the results are striking. For every 10 men, 6 will have a male brain, two will have a balanced brain, and two will have a female brain. In contrast, for every 10 women, four will have the female brain, four will have the balanced brain, and two will have a male brain. This leads to certain conclusions. First, the sexes do differ on average. Second, women seem to have specialised more (as a group) to be better at empathy, and men seem to have specialised more as a group to become better systemisers. Third, more women seem to be balanced. These differences may be the result of evolutionary selection pressures on the two sexes. Finally, and most importantly, we can conclude that you cannot tell what kind of brain a person has from their sex. This is a satisfying result because it works against stereotyping the sexes.

So what of Summers' claim that these differences are innate? It turns out that presented with a face or a mechanical mobile to look at, more newborn boys look for longer at the mobile, and more newborn girls at the face. And the amount of testosterone produced by the foetus and measured in the amniotic fluid during pregnancy predicts how much eye contact the baby will make, or how quickly their language will develop. So Summers may be right that biological factors are producing sex differences in the mind, which are further acted upon by the social environment. Evidence that genes are shaping sex differences in the mind has come from the study of women with Turner's Syndrome, who have only one X chromosome instead of the usual two. In these females, if they got their X from their father they appear to have better social skills than if they got their X from their mother, a finding that David Skuse in London's Institute of Child Health interprets as evidence for genes related to social skills residing on the X chromosome but needing two to produce the typical female advantage in empathy. At the moment, there is no equivalent evidence for genes related to systemising or scientific ability. If Summers meant to imply that it's all down to the genes, this is unlikely to be correct and is certainly going beyond any available evidence.

But what of factor three, the idea that the pool of talented females in which to find and train top scientists is just much smaller than the male pool? Recall even from the EQ and SQ data above, that two in 10 women have strong interests in systemising. And a further four in 10 women have equally strong interests in systems as they have in emotions. So, if a university is looking for talented women, they have more than half of the female population to choose from. Surely that's enough? And if a lab wants to retain women so that they get to the top, there are lots of things that can be done to make the field more women-friendly.

So, was Summers right? It does no harm to draw attention to the existing inequalities in the sex ratio in science, and some good may even come from the ensuing debate. My plea to those entering this debate is that they focus on evidence, rather than opinion. Even while the evidence shows us that the sexes differ, we should recognise that this is distinct from the political and moral issue. If we want equal representations of men and women at the top (in science, or in any other field), then that is what we should be striving for. There is no shortage of talent in either sex.



Simon Baron-Cohen is professor in the departments of psychology and psychiatry, Cambridge University, and author of *The Essential Difference* (Penguin/Basic Books)

<http://www.guardian.co.uk/life/feature/story/0,13026,1398875,00.html>