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Women in Science: Tanner Day TEDx

Whatever we think about the furore surrounding Tim Hunt's unfortunate comments about female scientists, whether UCL overreacted to an ill-judged yet benevolent stream-of-consciousness from a Nobel Laureate trying to be funny, or whether he got what he deserved, two things are resoundingly clear: firstly, the nerves touched by this episode are exquisitely raw, and secondly, the results are unpredictable – more of this later.

The privileged scientific “elite” is almost exclusively male, despite the fact that around half of PhDs in scientific disciplines are awarded to women (47.3% of science PhDs were awarded to women in 2012 in the US, according to National Science Foundation statistics). Hence the raw nerve.

It's no good, top women scientists saying that women are having a wonderful time in science, and that we should all rally around Tim Hunt and not be so rude. Clearly women are not having such a good time, otherwise why the fuss? Why do appointments committees for academic jobs struggle to get women on their short lists? Why has the Royal Society had to spend so much time and effort attempting to redress the gender asymmetry of its early career fellowship awards? Why are the Research Councils worried about gender inequality in grant success rates? Women are extremely angry about all of this, and so they should be, hence the reaction.

Women at the top of the academic career ladder (particularly in the sciences) are very fond of saying two things. The first is that they have never experienced discrimination on the grounds of their gender, and the second is that scientific academic careers are great for women because they are so flexible, so can be successfully combined with raising children.

Let's look at both of these things in turn. It is of course true that the women at the top of the tree are unlikely to have been discriminated against, because otherwise – obviously – they wouldn't be there, but hang on a minute, any scrutiny of the statistics when it comes to women in top scientific jobs would perhaps tell a different story. I myself like to think I have never suffered from gender discrimination; I have had some fantastically supportive male colleagues throughout my career and all my major mentors have been men (perhaps that is unsurprising, given the surplus of men in science), but I do wonder sometimes what it would be like if I replayed my entire scientific career with a Y chromosome on board?

Now what about flexibility? I don't think my job is flexible at all. While it's true that I can go to the odd school assembly and sports day without filling in a load of forms or upsetting a boss, I lurch from deadline to deadline and these are anything but flexible: funding deadlines, writing commitments, project deadlines, teaching commitments, conferences abroad. There is no end to the constant cycle of these demands: it is not possible to duck in and out of the slow lane.

I can't see how it would be possible to do my job part-time. I often look back to the periods of maternity leave I took after having my two children. This university has a pretty generous maternity leave arrangement and at the time I had both of my children (2003 and 2007) I was able to take 6 months leave on full pay each time. But these periods coincided with the establishment of my research group – the need to publish important papers to demonstrate productivity from the first major research grant I had been fortunate enough to get in 2001, to mentor graduate students and postdocs in my lab at crucial stages of their careers – these sorts of activities cannot really be undertaken by any kind of “maternity cover” staff, the roles are far too specialist.

So I worked a lot, and worried a lot, while I was on maternity leave. I think at the time I thought this was part of “having it all” – I love my research so wanted to stay in touch with it. Now, looking back, I feel a bit cheated. I would have liked to spend more time occupied entirely with my children. I hurried back to work full time at the end of the generous 6 months because I felt I had to. And it's true that my career would definitely have suffered if I hadn't: a funding opportunity missed, a collaboration passed by, an idea no longer new.

My toddlers' first steps were reported second hand. I don't think the children suffered for one minute, they had fantastic childcare, but now, several years later, I feel that perhaps I did. The issues surrounding working motherhood don't disappear as the children grow, either, if anything they get more complicated, because they are not all to do with the logistics of "cover"- my pubescent daughter needs me now more than she has ever done, and no substitute will do.

Do these issues only apply to women? No, they most certainly do not, and I have several male colleagues facing similar challenges. But I think women feel them more viscerally somehow. I think women tend to feel more guilt, feel less justified in putting their career first when the need dictates. Men also seem to be much more successful in being very brazen about fatherhood, and admired for the sacrifices they make, rather than vilified. One thing I have noticed on many occasions over recent years is the ways in which men and women use images of their children at work. It is very common for men to have photographs of their children (and spouses for that matter) on their desks. Do women do this as much? And what does that say? When scientists give talks about their work they nearly always use Powerpoint. Men very commonly have pictures of their children as wallpaper on their laptop desktop which is very visible to the audience before they begin their talk. It's a kind of advert, isn't it – look at me, brilliant scientist, potent, fertile and a great dad to boot. I've never, ever seen this when a woman gives a talk.

Working men also seem to be held in much higher regard by their families than I ever am. I have male colleagues whose spouses feel sorry for them when they have to travel for work, to conferences and the like. Worry about them overworking and being away from home. It's not like that for women: every trip I make is an act of abandonment and I'm not allowed to forget it. And children can sometimes see "super-hero" working dad and "inadequate" working mum in very different lights. I was very struck when one of my daughters came back from the after-school "mad science club" extremely excited: "I've seen real scientists", she said, "With white coats and goggles and explosions and everything!". "Oh that's great", I replied, "Now you know a bit more about what I do at work – I'm a scientist too". "Oh no you're not", cried Emily indignantly, "You're my mum!".

So do all the problems arise when the children come along? That is an interesting question, and I suspect the answer is "not quite". Although it is definitely true that childless women are over-represented at the top of the ladder in science, as well as, I suspect, in other fields, I think there are some fundamentally stylistic, shall we say, differences between men and women in the workplace that favour male success. Now, I'm going to generalize widely at this point, even more than I have done in the last few minutes, and will probably therefore upset at least half of you. Let me say at the outset that I am no misandrist. On the contrary, people who know me well will know that I very much enjoy the company of men, and have some fantastic male colleagues and collaborators who I simply wouldn't be without.

After all, we women scientists obviously have an awful lot to learn from their success. Men are extremely good at congratulating each other, loudly and in public. Women can be extremely supportive of each other in the workplace too, but they don't tend to lavish praise publically. I'm not saying this in any kind of derogatory sense (although it can be extraordinarily irritating sometimes), quite the opposite, as it seems to work so well.

Men also love committees and do extremely well in them. They love clubs with nice little rules: knocking on the table when they heartily agree (why would you do that?), orating at length at the drop of a hat, even on subjects they know little about. They make a big song and dance about having to leave early for the school play, and everyone coos sympathetically, thinking what wonderful husbands and good fathers they must be (I said I was generalizing, remember?). But I don't seem attract such sympathetic coos. I was asked a few years ago to serve on an influential departmental committee. I was flattered and readily accepted (I've since discovered that the department was embarrassed by the lack of representation of women on the committee), but then discovered that the committee met late on a Friday afternoon. I told the Chair that this wouldn't work for me because I needed to leave early on a Friday to pick up the children. He was most accommodating. Don't worry, he said, we'll move the meeting to earlier in the day. Great! But what happens just before my first meeting? School phone to say Emily has been sick and I must go

immediately to collect her (my husband was travelling, of course, at the time). Schools do this. Even if you are a brain surgeon in the middle of a complicated operation or an airline pilot flying a fully loaded jumbo jet over a capital city, you must abandon your post at once and be at school within 30 seconds if little Jonny feels sick. If you do not attend within 5 minutes your children will immediately be taken into care and you will be tarred and feathered in the playground.

It sounded so lame. Everyone makes the right noises when you have to cancel at short notice, but you know what they're thinking...

The most obvious thing that men do better than women in Science, though, is hyperbole. I have male colleagues that often tell me I should have sent a particular paper to a more prestigious journal, or that I should just publish work earlier, not worry about it being too preliminary. I think they might be right. I'm buoyed up by their confidence. But then I have this awful nagging doubt that actually I (and by extension women scientists in general) am actually a realist. That I understand the limitations of a particular piece of work, have a balanced view about where it fits in the wider context.

But many men don't seem to have these kinds of doubts, or at least choose not to develop those thoughts. The language of scientific papers is totally hyperbolic, and very theatrical. Your gene has to be the "key player" in a particular process to make it sound more important. It can't be just "a" player, part of the myriad of controls that regulate a particular process, and, by the way, we need to do more experiments to work out quite how it works, and how important it is. That is not the way to publish in high impact journals. Your work has to be groundbreaking and paradigm shifting all of the time, and I think male scientists are better at believing this than female ones. If everyone (so mainly men) were more realistic about the relative importance of their work, there would be no need for women to shift into hyperbolic mode in order to compete.

Now I don't want to leave you with the impression that we women scientists are crying in labs (as Tim Hunt unfortunately quipped), nursing our working mother angst and missing the point in our research all the time – I still love my job. There is no greater privilege than having an intellectual life. The science still gets me out of bed in the mornings (hey – we get to find out how the world works!) and all the other trappings of academia are, while deeply frustrating at times, stimulating, always new, often exciting. Every single day is different – how many people can say that? We women make fantastic role models for our daughters and develop great new skills: I can pack (and polish a talk) for a trip to the US while assisting with Maths homework, advising on friendship issues and talking on the phone simultaneously to a graduate student who has just discovered that their "paradigm shifting" work actually turns out to be an artifact, and an undergraduate who has the heebiebies about their forthcoming exams. Not to mention cleaning out the guinea pigs, doing a quick online grocery shop and taking a firm line with students who have been arrested for climbing the spire of the university church. I wouldn't swap my job with anyone.

What can we do to encourage more women into science? Good mentoring and networking is crucial at the graduate and postgraduate level and expectations from scientists need to reflect the stage of life they are in. There is also an awful lot that needs to be done before university. I have been very struck by two contrasting experiences I have had recently giving talks in schools. Both public schools as it happens, not my usual audience. The first was a talk to the science club of a well-known boys school. They had a fantastic science teacher who encouraged 6th form boys to do a research project on the organism I work on, the nematode worm *C. elegans*. They wanted to discuss their findings with me and they were hungry for knowledge - we had a very jolly afternoon and evening discussing their work and science in general. A few weeks later I had agreed to be the guest at the speech day of a very exclusive girl's school. I knew it must be a posh school when I saw some of the parents arriving by helicopter! The contrast could not have been greater. I gave my usual motivational talk about how education is a great liberator and the education of women is the greatest liberator of all, about the joy of intellectual pursuit and the equality of scholarship, and it went down like an enormous lead balloon. Not only did the girls look rather blank but their parents looked positively stony faced. When I gave out the prizes I realized that almost none of the girls actually studied science, or anything else much for that matter. They had all done A Levels I

didn't even know existed, in fashion and film and the like. There was little appetite for learning, no appreciation of intellectual endeavour at all. It was like a finishing school. In this very well resourced school, the girls were being trained to entertain at dinner parties.

It's exciting times for science. We are facing the grand challenges of climate change, food production, the ageing population, the need for new medicines – science offers great hope to all of these problems. New technologies seem to appear with gathering speed, disrupting the ways we do things and creating new opportunities. In my field new game-changing technologies seem to revolutionize the whole edifice every 5 years or so. I tell undergraduates never to use a textbook more than 7 years out of date. Women need to be equal partners in this endeavour.

It's also a nail-biting time for science, as the House of Commons Science and Technology select committee hear evidence from universities, research councils and other important stakeholders in defense of the science budget ahead of likely swingeing cuts across government departments to be announced in the November spending review. Modern science is expensive. But without investment, science will not be able to catalyse productivity. We will not be able to "fix the future". If you think science is expensive, you should try disease!

So to finish, back to the Tim Hunt affair:

Let's think about the reaction the whole thing provoked. Anyone followed #distractinglysexy? It's wonderful; women at their cleverest, wittiest, sassiest best. Women scientists being totally cool, ready to take on all comers, whether in lab or field, exciting role models for schoolgirls and grandmothers alike. And it's mostly incredibly warm, generous and good-humoured. Tim Hunt isn't being vilified in these life-affirming tweets, women scientists are being celebrated. And that is the important thing.

According to Richard Dawkins, this was a "feeding frenzy of mob-rule self-righteousness". Huh? I guess he is used to members of the public who don't agree with his views, but hey – they tend to be fundamentalist anti-science extremists – not women who just want equal opportunities in the scientific workplace. Tim Hunt's faux pas has inadvertently acted as a rallying call for women scientists to stand up and be counted.

My worry about UCL's decision to oust Tim Hunt from an honorary professorship (apart from the fact that they clearly failed in the due diligence department) is that it seems to have radicalized the reaction to the reaction. The talk quickly turned to that of witch hunts, political correctness gone mad, Nobel Laureates pitching in with talk of "ideological fanatics". Women scientists were admonished for speaking out. As is so often the case in the feminist struggle, a new and unhelpful backlash is created.

Yes, moving on is important, and some positive suggestions for improving the lot of women scientists have been made. But let's not forget who started this. I remember Tim Hunt once being supportive of me as a graduate student when I was about to give a talk at a big conference. He realized I was very nervous and said something funny to distract me. Thankfully he didn't mention either love or crying. And after the talk he made a point of coming to tell me I had done a good job. It always stuck with me as a simple act of unsolicited kindness and encouragement. But I guess that one of the problems of membership of the scientific elite is the sense of invincibility that eventually comes with such position. The belief in your own hype. Everyone hanging on your every word, so there is no need to engage brain before opening mouth. It is a bit terrifying, that off the cuff remarks after lunch are so easily transmitted to the rest of the world nowadays for instant reaction, but people will always take note of what the great and the good say, even if they speak in jest. Especially journalists! Tim Hunt is certainly not the first Nobel Laureate to say something daft in public, and I doubt he will be the last, until of course many more Nobel Laureates are women. Let's hope he can take criticism without crying. No doubt the Y chromosome will help with this.