

(Some) women are tired ...

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I considered the title *Women are tired* for this essay. But because I don't want to offend or alienate anyone of any gender, I decided to add the parenthesis. That's the thing with writing about gender representation in science. The area has become so infused with political correctness that it is easy to put a foot wrong. And while my musings on the subject are unlikely to cause the controversy unleashed by Timothy Hunt in 2015, I feel I am about to step on some toes. So, I apologize for this (and also my obsession today for foot metaphors).

There are so many efforts to address gender balance in science and technology. Women only initiatives. Gender quotas. Support for maternity and paternity leave, support for back-to-work initiatives after child-rearing. All very laudable and I also benefitted. We've come a long way in Ireland since the ban on married women working in the public service was lifted in 1973. But how about the views of the women who are being targeted for these new gender initiatives? How do women who decide to take a career break, not apply for that promotion, decline to get involved in the race to get published, actually feel about the glittering targets being readied for them? For there is surely a gap between the number of women who take up STEM subjects at college and the number who remain to develop a lifelong career. And there is also a gap in research as to why women bow out.

I began by looking around for social studies on how working mums cope with the myriad tasks of bringing up baby and running a career. I looked for social studies on division of household tasks, taking time off for the inevitable calls from the crèche about a raised temperature, getting up at night to a fractious child. These are the unglamorous realities of combining career with child-rearing. There seems to be very little about the nitty-gritty in peer reviewed literature (which as a scientist, I always check first). There are sponsored studies, like the *Mother and Baby* magazine sleep survey and countless blogs. Unscientific as they may be, there is a theme of women having to cope with baby issues at the expense of mums wellbeing, even where there is a supportive partner. I know that these sources are unscientific. I know that they are not fully representative. But the pervasive sentiment is tired, tired, tired. And this, I suggest, is a fruitful area of enquiry as to why gender imbalance is as it is today. 150 years of the women's rights movement has not been able to make sufficient inroads into centuries of biological or social evolution of woman as care-giver. Peer-reviewed studies tend to consider more abstract concepts in gender balance. Caryn Medved (2016) looks at changing gender roles in households where there is a female breadwinner. Medved says:

“Gendered social change often is a slow, contradictory and tension-filled process”

and this surely borne out in her research of primarily Caucasian, heterosexual couples, where the women interviewed both resisted and perpetuated gender hegemonic roles. Interestingly, the women found themselves defending their roles to co-workers and clients but were largely comfortable in the notion of themselves as breadwinner and deferring primary caregiving to their partner. Medved cites Pamela Stones 2007 study of why high-powered working mothers leave the workforce. Stones research found that the push to stay at home

was because of the untenable tension between career and home demands in other words, women were tired. Shani Orgad (2016) also finds that the incompatibility of a demanding career with family life is the reason that many women leave the workplace to become a primary care-giver. Her interviews are conducted in reference to the TV series *The Good Wife* as a sanitized depiction of a woman combining stressful work and home life. Interestingly, while Orgad's interviewees had themselves given up careers to be primary carers, they still admire the idealized vision of a woman who could have it all.

And can women have it all in a (controversially) gendered science world? Second wave feminism embarked on a quest into whether and how science is gendered and how that might change. Through feminist empiricism to feminist standpoint theory (and their possible merger) the question of how science has been assigned a gender which leads to marginalization has been thoroughly though not exhaustively dissected (I am conscious of using scientific language here, dissection does not necessarily lead to an endpoint!). Feminist perspectives run from that expressed by Virginia Woolf (1938):

“science, it would seem, is not sexless: he is a man, a father and infected too”

to Luce Irigaray's more enigmatic view that there is no sexual difference per se but that its absence, located in model of sexual difference as same, different or complementary gives rise to the divergence in sexual equality. Evelyn Fox Keller's observations (1986) that bias in science is seen in gender inequality in representation, situation of scientific endeavour and the goal orientation of science still holds true. Is it unfair to lay all these charges at the foot of science itself? Surely the role of women in a wider societal context is also involved here? Yes, it is, and this is where provision of maternity leave, parental leave and institutional practices offer supports to women to expand their role beyond the biological. But I would agree with the argument of Michèle Le Doeuff (1998) that the issue in science is the pack-like mentality which perpetuates inequality and this is not susceptible to political initiatives or quotas. There are many hills to climb for women who embark on a career in science. So, we should celebrate the women who made it through a system stacked against them, maybe while acknowledging that placing them on a pedestal as role models for others to achieve similar excellence is more likely to chafe rather than chivvy women who are tired.

Vera Rubin who died in 2016 was a pioneer in the male-dominated field of astronomy. Entering a science that she loved, Rubin had to overcome institutional hurdles and biases to attain her position as a highly-respected astronomer. She was the first female allowed to use the Palomar Observatory in 1965 and became an advocate for women in science, encouraging persistence in the face of adversity. Her own persistence enabled her to keep her career going while raising four children (she recounts how she made a long drive in snowy conditions with a new-born infant to deliver a paper). She was also fortunate in having a supportive family and partner through her career. Women such as Vera Rubin seemed indefatigable and like *The Good Wife*, appear as the ideal of careerist and nurturer. Indeed, these superheroines sometimes rile women who feel they are not stepping up to their own mark. The story of coping with a sickly baby, ailing parents and a career is less than attractive and remains unheard. As Rubin says, the sad thing is all the women who would have liked to have become astronomers and didn't. I know only from anecdotal evidence that so many women spend at least some time in uncomfortable situations where

career has to take a backseat. I suggest, though, that some of the answers to under-representation of women in science may lie therein. The 2016 Eurostat data show that most EU member states have equal numbers of men and women enrolled in science and technology university education and that women also form about half of the cohort of PhD students in 2014. However, the Gendera study in 2012 showed that female PhD students do not necessarily translate into senior science researchers and that a pool of talent is lost. While the Gendera report made a number of recommendations to encourage gender equality in career promotion, it was acknowledged that progress is slow. But are the wrong questions being asked? Why do women choose to leave careers in science and technology? Indicators provided by Pamela Stones and Shani Orgad's research could well prove to be the case among women in science also. More research is needed into what makes women cede a hard-won career and what would enable them to stay.

A pioneer in CRISPR technology, Jennifer Doudna won the 2014 Lurie Prize in Biomedical Sciences for her work in CRISPR-CAS gene editing (awarded for outstanding work achieved by a scientist aged 52 or under). In an interview with ASBMB TODAY, Doudna refers to the choice of the right life companion as being important for female scientists. She says:

“To make it work between career and family, it's really critical to have a partner who gets it and is willing to share the burdens.”

The notion that such a choice has to be made is sad but the fact that such partners exist is perhaps an encouraging sign of the gradual change in society. The feminist successor epistemology of science, argued by Donna Haraway, Hilary Rose and others is probably not going to become the dominant model but may shape contemporary thinking in ways which allow a less gendered approach to science. Of course, the gender gap exists in areas other than science. Anne O'Brien and Jane Suiter (2017) point out that while gender representation has improved quantitatively in public sector broadcasting, women are still under-represented as expert opinion. Lynn Povich was in a group of women who sued Newsweek in 1970 for sex discrimination (Povich went on to be Newsweek's first female news editor). Interviewed in 2012, Povich says that there is still a cultural perception of ambition in women as a stigma. She also finds that the 24/7 news cycle presents problems to women in their juggling of home and career. Society puts successful women in the spotlight when it comes to their child-bearing choices. In 2009, Rachida Dati, a French government minister received criticism for returning to work five days after giving birth. How many male ministers receive a similar response when working around the birth of a child? Dati's choice was visible because the pregnancy was visible in her appearances in the media. It sparked a discussion of the pressure on women to perform in the workplace despite their role as mother. Some women responded by criticising Dati herself as a bad role model, devaluing motherhood. Others felt challenged, feeling that taking time out for childbearing was, in some way, being inadequate. In developing a career, women face the added hurdle of having personal choices vetted and judged. To take extended maternity leave? To breastfeed? To have a shorter working week? And even how to resolve timing of pregnancy with goals and objectives of projects without jeopardizing funding, recruiting and performance? Until these gendered choices become free from criticism and are supported (not just tolerated), how can we expect women to embrace the challenge of

seeking promotion in science? In *The science question in feminism* Sandra Harding (1986) asks the question whether women would have struggled to enter science if they had known that removal of barriers to study and job eligibility would result in so little equity. Harding correctly points out that just getting there does not instantly correct the gendered nature of science. Feminist critique of science has pointed to an androcentric standpoint which has structured how science is as it is now. Unless androcentrism is at first acknowledged and then rejected, worthy initiatives to improve the gender balance will be a Sisyphean task. Culturally embedded attitudes cannot be changed short term by a piece of legislation. It takes women like Dati to step out of the norm in order to challenge normative roles (and also open-minded institutions and society to respond to the challenge).

Until we come to terms with the fact that its OK for women to prioritize a career if they so want, women will continue to feel uncomfortable with the socially defined conflicting demands of care-giving and career. We cannot prescribe demanding careers for women without letting go of our ideas of motherhood as the primary role. Yes, the initiatives for working mothers are great, but a societal view of women beyond their motherhood function is also required. I dont pretend to have any quick solutions. I do want to point out what might be overlooked in the rush to get the gender metrics right in science. Women who choose a career in science do so in their late teens, a time when reproductive choices tend to be about contraception rather than how to have a family. I dont suggest that every CAO application should come with an Awful Warning that a life in science may be difficult. A warning which in an ideal world would be equally applicable to male and female applicants. But rather than the rush for excellence in physics, biology, chemistry or maths, I believe a more rounded approach to preparation for a life in science is required. I note with interest the calls to add philosophy as a subject to the Irish curriculum. Until we lose our view of the ultimate goal of education being a satisfactory bank balance of points, we will not be adequately equipping young people to make responsible choices or to question the norms of society. We need to stand back and ask more questions about why we have become obliged to become invested in the effort to have more women represented in science before getting worked up about raising the figures. Some women, even when they are worn out, will continue to pursue this question. And that is what will bring change.