THOSE SAME OLD PREJUDICES? GENDERED EXPERIENCES IN THE SCIENCE WORKPLACE*

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ABSTRACT

As society continues to become more dependent on science and technology, the disparity between women and men in the sciences not only represents a waste of human capital but is also problematic in terms of principles of gender equity. Yet, despite more than three decades of equal opportunity legislation, women remain underrepresented in the public sphere, and this is particularly evident in the sciences. This article builds on earlier research and investigates some of the reasons for the continued gender imbalance in the sciences as more and more women eagerly enter the sciences, achieve academic success, and enroll as PhD students, but ultimately do not remain in their chosen scientific field. More specifically, we use "storying" as a way of presenting the doctoral experiences of several women who, despite the unambiguously gender-based harassment they experienced during the period of their candidature, have successfully completed their PhDs in the sciences in Australian universities. We particularly focus on the experiences of women who completed their PhDs in 2007 and 2008. Their story shows how, as a direct consequence of their experiences, these women left their chosen research areas because they felt that they had little or no choice. Given the extant literature (see, for example, Gutek, 1985; Linehan, 2000; Sappleton & Takruri-Rizk

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2008; Wirth, 2001), we suggest that their stories are not idiosyncratic but are illustrative of more general and widespread societal positions and concerns. Thus we argue that if the problem of women's underrepresentation in the sciences is to be addressed, we need to look to the masculinist culture of organizations as an explanatory factor. We conclude that it is organizational culture that needs to change and suggest that while antidiscriminatory legislation is important, it is not adequate to address both overt and covert discrimination in the workplace.

WOMEN AND SCIENCE: IDENTIFYING "THE PROBLEM"

As society continues to become more dependent on science and technology, the underrepresentation of women in the sciences, not only in terms of absolute numbers but also in terms of visibility in the upper levels of the professions, represents a waste of human capital and continues to alarm policymakers and educators. Thus Simon (2006: 92) has suggested that "In this ever-flattening . . . world, our country cannot afford to lose half of its potential innovators." The fact that in the past many girls "chose" not to study science was seen as problematic, both in human capital terms and in terms of principles of gender equity, given that the sciences tended to act as "gatekeepers" to certain high-status professions. Girls who did not study secondary school physics and chemistry were, therefore, almost automatically excluded from these professions. Alison Kelly (1981: 13) commented:

> Girls who cannot or will not learn science are cut off at an early age from a wide range of careers and interests. By conforming to a feminine stereotype which excludes science they are moving towards traditional women's occupations, and the low pay and low status which frequently accompany such occupations. Girls who succeed in science have a wider choice than those who fail.

Feminist educators in the 1970s and 1980s identified the problem of the underrepresentation of women in the science workplace as a worldwide phenomenon. In Australia it was certainly seen as a problem, and measures were put in place to address it, with systematic attention given to the education of female students (Yates, 1993). As Gill et al. (2008: 224) have pointed out more recently, "there can be no doubt that it was seen as a good thing for girls to stay on at school and to study maths and sciences." On the whole, this push to encourage girls to study science has been spectacularly successful. For example, in the late 1990s, our own research showed that, just prior to entering university, girls believed that there was no gender discrimination, that girls could do anything, that equality had been achieved, and that taking science represented "more options in their future" (Hatchell, 1998). Within the discourse of science as a gatekeeper to the prestigious professions, these girls felt that science was necessary for their own intended future occupations. Participants in our study cited science as one of the most significant subjects to study, important mainly because of its link to future jobs.

However, it was also cited as an important subject even when it was not necessarily needed for participants' future careers. Furthermore, although they were generally aware of previously dominant masculine discourses restricting entry into the sciences for females, these students felt that the restrictions were fading away and that they were now receiving equal treatment in the science classroom (Hatchell, 1998).

These ideas find support in more recent government figures (Australian Government, 2008), which show that by the middle of the first decade of the 21st century, more females than males were completing science degrees (in the category of natural and physical sciences) in Australia and that the number was increasing at a faster rate (at an average of 30% to 37% more females than males). This improvement is further highlighted at the PhD level, where the number of females completing PhDs was also increasing, although still remaining consistently lower than the number of males completing PhDs. Prokos and Padavic (2005: 524) thus suggest that "since scientific and engineering occupations have been growing and are predicted to continue increasing as a rate four times that of all occupations during the next decade . . . women's opportunities should be expanding." However, according to Frome et al. (2006), females remain underrepresented in workplaces for which chemistry, physical sciences, mathematics and computer sciences, and engineering are essential prerequisites. Women's underrepresentation in the public sphere generally, despite more than three decades of equal opportunity legislation, is particularly evident in the sciences (Gill et al., 2008). Looking at the sciences, studies conducted by APESMA (the Association of Professional Engineers, Scientists and Managers, Australia) (2007: 2) found that women scientists "are four times more likely than males" to be working part-time, although this is less than in professions such as engineering, where women engineers are eight times more likely to be working part-time, and Information and Communication Technologies (ICT), where women are six times more likely to be working part-time. Women scientists are also "earning on average significantly less than their male counterparts" (APESMA, 2007: 5), with 25.5% believing that they are not paid equal wages for equal work when compared with their male colleagues. In addition, women scientists "continue to be clustered at the lower responsibility levels, compared to their male counterparts" (APESMA, 2007: 4), with little change in responsibility patterns since 2000.

Given worldwide efforts to get girls into science and technology (see, for example, Kelly, 1981; Yates, 1993), it was expected that, with a larger number of women entering the scientific field, they would naturally filter into the male-dominated upper echelons of science in larger numbers. The metaphor that was frequently used was that of the "pipeline effect," which posited that once women had overcome their reluctance to enter the sciences and gained the requisite qualifications, the gender imbalances noted in the field would become a thing of the past (O'Brien, 1998). However, this has proved to be a false hope as the pipeline turned out to be very leaky indeed. The leaky pipeline remains a "convenient

visual metaphor" (Soe & Yakura, 2008: 178), even though this metaphor posits a straightforward linear career progression that is quite restrictive and does not easily accommodate the more complex life-patterns of females; nor does the metaphor take account of the multiple layers of culture that also need to be taken into account (Soe & Yakura, 2008). Given that culture is a contested concept as well as a contested space (Jordan & Weedon, 1995), in this instance we are defining culture as "a set of material practices which constitute meanings, values and subjectivities" (Jordan & Weedon, 1995: 8) and are "fundamentally to do with power" (Jordan & Weedon, 1995: 11). Furthermore, since the above-mentioned metaphor takes only gender as a variable, that is, the ways in which women are positioned more or less powerfully and are able to engage in particular occupations, gender must always be seen in terms of its cultural context, in which the intersection of gender and culture is closely linked to the issue of power.

While the thrust to encourage girls into science and technology has been quite successful at the school and even the undergraduate level, it is a curious fact that women continue to remain underrepresented in the scientific workplace. As Settles et al. (2006: 47) commented: "Although more women are entering science, there is a parallel and problematic differential attrition of women . . . even at the very highest level . . . [and this] suggests that something about the . . . science environment is problematic for women." It is certainly of concern to educators that women are leaving the sciences in larger numbers than their male counterparts (Goldberg, 2007), although the way in which this phenomenon ought to be understood remains an enigma despite a proliferation of studies that have sought to "explain" the phenomenon. In this article, therefore, we present the stories of seven recent science PhD graduates, and, given their experiences, we argue that if the problem of women's underrepresentation in the sciences is to be addressed, then the masculinist culture of organizations needs to be examined as an explanatory factor. We suggest that it is organizational culture that needs to change, because although antidiscriminatory legislation is crucial, it is not adequate to address both the overt and the covert discrimination in the workplace.

UNDERSTANDING THE PHENOMENON: WHAT THE LITERATURE SAYS

Despite more than three decades of gender reform within the field and an almost commonsense understanding that "women can do anything," the continued underrepresentation of women in the scientific workplace has puzzled and dismayed researchers who earlier held out such hope for the future of women's inclusion in all spheres of public life. This concern for gender equity is particularly important because, since science is one of "the most prestigious occupations, women's poor showing in them [the sciences] contributes to their [women's] lower status in society" (Prokos & Padavic, 2005: 524). While there has been a plethora of studies seeking to understand the phenomenon, the explanations for the lower number of

female scientists compared to males at all levels in the scientific field are often stereotypical, and include ideas such as the following: women are "less career oriented"; women are less diligent in applying for funding; or women are "less productive" (O'Brien, 1998). While society at large tends no longer to posit that "girls should not be taught the physical sciences except at the most elementary level, because the expenditure of nervous energy involved would be injurious to their health" (Kelly, 1981: 1), implicit biases about the sciences continue to be held by both males and females. For example, the perception of the scientist as male continues unabated (Hatchell, 1998; Head, 1985; Jones, 2005; Nicholls, 2005) and, indeed, acts as the "default option" to describe scientists (O'Brien, 1998: 11). With regard to this last-mentioned point, O'Brien (1998: 11) has incisively pointed out that

> Scientists are assumed to be male unless otherwise marked, that is, female scientist. However, the qualifier "female" not only deters us from the default assumption by providing additional information, it designates the persons who are the object of this classification as auxiliary to the main group.

Moreover, normalized discrimination manifests itself in such things as males being more likely than females to be hired or given credit for ideas or work completed (Committee on Maximizing the Potential of Women in Academic Science and Engineering et al., 2007) and women needing to work twice as hard to "prove" themselves (O'Brien, 1998; Soe & Yakura, 2008). The latter is highlighted particularly poignantly by Barres (2006: 134), whose experiences as a transgendered scientist led her/him to make the following discerning comment: "Shortly after I changed sex, a faculty member was heard to say 'Ben Barres gave a great seminar today, but then his work is much better than his sister's.'" This might be amusing, if it were not so devastating in its import. It highlights what women in science have known for quite a while: regardless of how hard they work, or how well they think they do, their work is not valued as much as that of their male colleagues. As Blickenstaff (2005) has convincingly argued, these factors create a cumulative effect, resulting in the imbalance of males and females in the sciences, that has little to do with women's capacity.

 "Explanations" such as those mentioned above are grounded in a deficit paradigm that blames women for their own lack of "success" and is blind to the realities of a masculinized organizational culture that acts to deter women from continuing in the sciences; thus, we find that it is more appropriate to move the gaze away from women and their purported failure to make it in the science workplace, and to focus instead on organizational aspects as explanations for women's continued underrepresentation in the sciences. To add weight to our argument, it should be remembered that the more recent literature clearly identifies the problem as one of retention rather than recruitment. That is, the issue is no longer one of attracting women into the sciences but rather one of keeping them there (see, for example, Faulkner, 2001).

Given the false logic of the deficit model, what then is it about organizational culture in the science workplace that works against women's success in the field? Sappleton and Takruru-Rizk (2008) clarify the gendered dimensions of organizational culture, and, following Benschop and Doorewaard (1998), suggest that structural, cultural, interactional, and identity arrangements, although irrevocably linked, are useful categories in understanding why women's underrepresentation in the sciences can be largely attributed to "the gender subtext of organizations." Our data certainly display elements of these arrangements; however, a more powerfully explanatory framework is hinted at by Amancio (2005: 65), who suggested that "gender representations are embedded in the organizational forms and dominant culture of science" and that "scientists and scientific institutions have contributed to the perpetuation of gender representations, in particular the representation of women as a sexed category." The key idea here is the concept of "women [rather than men] as a sexed category," with women always and already constructed as the gendered other who is positioned as "less than" the male, or, alternately, idealized "as a caring, nurturing mother, whereas the male is seen as primarily occupying an economic role" (Sappleton & Takruru-Rizk, 2008: 292). In other words, the genders are positioned in opposition to each other, with one being valued more highly than the other. While the advent of feminism has problematized such thinking, we would argue that vestiges of it remain within everyday cultural practices. In fact, the association of women with the private and men with the public sphere has important implications for the ways in which organizational cultures have developed. Whether or not these attitudes are "natural" is debatable; what remains is the fact that a gender-based separation of the public from the private domain provides males with a strong power base that is resistant to change (see, for example, Connell, 1987).

The idea of "women as a sexed category" and the power that is inherent in belonging to the dominant group is captured lucidly in the comments made by two of our respondents when discussing their postdoctoral experiences in the science workplace. The following quotations illustrate the ways in which women are always and already represented as a sexed category within the context of a masculinized—read powerful—culture.

> And then people would make these comments about your dress, which they wouldn't to male colleagues, not offensive, nothing I had to pick people up on. But it's another layer of stuff you had to deal with. And then there's another whole spectrum of things, the phenomenon of going to conferences and being hit on by middle-aged male scientists away from their families, and that's very real. I think I just accepted that. I think I'm an adult and I'm quite capable of rebuffing unwanted advances from wherever they come from. That's part of your professional life. I mean perhaps that's part of any professional environment, but I found it not to be so bad in places where there's more women, where the mixture is even. When you're just one in a room full of men you're a bit of a target, and that's always annoyed me, and it just pisses me off

> when people somehow assume that . . . that because you're female you're somehow available. So I mean I certainly had those types of experiences, not sort of every day, but enough. But it's mainly the aggressiveness, being in a seminar where all the men attack each other and try and establish status by showing the other person's wrong. That's how the men operate. That's the male world to me. But I just hate that, the male adversarial way of doing things.

> It was a real macho lab where people used to brag, "Oohh, I spilt radioactive ion in the lab today"; now that's a really nasty one, "Oohh, I spilt some radioactive ion on my thumb and I had to steel wool the skin off the top of my thumb 'cause I couldn't get the reading down on the meter." And all sorts of crap like that. So I just didn't want to deal with it in the end. One of the things people said to me when I quit, they said, "Oohh, you won't be using your brain as much," and I said, "Actually, I use my brain 90% of the time." I don't spend any time shovelling, grinding, digesting plant samples; there's a huge amount of routine, mindless work associated with science, and because women tend to be in these contract positions, trying to prove themselves, they haven't got much authority, they haven't got access to resources to have technical assistants, they do all that work themselves, they do a lot of that. I used to spend a small amount of time thinking as a scientist and a lot of time doing routine work.

These quotations graphically illustrate the ways in which gender-based harassment continues within a field that can often be totally masculinized. Not only has the playing field been demonstrated to be far from level (O'Brien, 1998), but it is also glaringly obvious that, despite the increased number of women in this field, discrimination remains normalized. One of the women above, for example, accepted relatively unproblematically that as an adult it fell to her to deal with unwelcome advances and that these advances were "part of your professional life," while she acknowledged that this was not something her male colleagues had to endure. The other woman was not immune to this sort of sexual innuendo. However, what finally drove her out of the lab and into administration was the infantile "macho" laboratory environment in which she found herself. While currently working in professions where they are able to utilize their skills, both of these women, for various reasons, have abandoned careers as active researchers. In a nutshell, the organizational culture of the science workplace remains firmly masculine and, as O'Brien (1998) has argued, gendered discrimination and prejudices remain prevalent in this workplace. These prejudices were captured in their most virulent form in Harvard President Larry Summers' speech at the National Board of Economic Research Conference in 2005, when he "questioned women's 'intrinsic aptitude' for high-level science" (quoted in Settles et al., 2006: 47). Summers' comment, coming from a university president, emphasises the insidious and deeply entrenched nature of such ideas.

In Australia, female scientists are purportedly protected from discrimination, not only by Australian law but also by APESMA, particularly through the

Professional Women's Network within APESMA. Thus, APESMA (2009) states that "Members who experience unfair treatment, be it discrimination, harassment or something else, can be reassured that APESMA is there to provide confidential advice and support." In terms of legislation, we have seen the introduction of the Affirmative Action (Equal Opportunity for Women) Act 1986, which was later replaced by the Equal Opportunity for Women in the Workplace Act 1999 (Strachan, Burgess, & Sullivan, 2004: 196). This legislation was an acknowledgment of the disadvantaged and unequal positions that women experienced despite their increasing participation in the workplace.

While equal opportunity legislation enjoyed a certain amount of bipartisan support, the conservative coalition, through its Workplace Relations Amendment (Work Choices) Act 2005, reversed some of the earlier gains and left the most vulnerable workers (particularly women) unprotected (Kelly, 2006). The mood of the electorate ensured that the Work Choices Act was short-lived; nevertheless, we would agree with Sappleton and Takruri-Rizk (2008) that even though legislative mechanisms can either impede or enable harassment, in reality, legislation seems to have little effect on the more covert forms of discrimination, because these are so difficult to prove in a court of law. As we argue later in this article, Australian legislation has a crucial role to play in changing some of the thinking on discrimination in the workplace; however, what is missing is a focus on attitudinal change at both the individual and organizational levels, because as Bennington and Wein (2000) suggest, legislation does not appear to have a significant impact in respect of actual behaviour and outcomes. Indeed, Bennington and Wein found that employers did not feel that antidiscrimination laws were particularly relevant or important, as they were able to "find a way around" current Australian legislation. Bennington and Wein (2000: 24) further suggest that "it may be that legislation drives discrimination underground, that is, it becomes more covert." As the results of our study confirm, much of the discrimination is covert. For example, the women in our study talked about continued sexual discrimination, sexualization, evidence of male privilege, and the existence of a boys' club, as well as an obvious glass ceiling. Consequently, these aspects of organizational culture tended to generate feelings of powerlessness and also anger in these scientists.

METHODOLOGY

Although we found that much of the literature tried to explain why females are leaving the sciences and what could be done to retain them, very few studies give women scientists a voice to highlight their experiences (with exceptions such as Povey, Angier, & Clarke, 2006; Preston, 2004; Rosser, 2004). In fact, the literature that attempts to understand the reasons for the persistence of discrimination within the science workplace has, more often than not, taken a quantitative approach. While this approach is able to identify existing discriminatory practices and measure the extent of certain types of discrimination, quantitative

methodologies cannot demonstrate the nuances of gender-based harassment. As Prokos and Padovich (2005: 541) conclude: "we found that the pay gap for scientists and engineers scarcely abated through the 1990s but that it has less to do with an earnings glass ceiling barrier than with the likely presence of other, unmeasured types of discrimination."

Given that the complexities of discrimination are obscured when simplified into quantifiable attributes, we chose to interview seven women who have successfully completed their PhDs in the sciences in Australian universities, in order to get a feel for the range of discrimination that women working in the sciences have experienced. We present the stories of the women whom we interviewed using a phenomenological perspective (Crotty, 1996, 1998; Grbich, 2007; Holstein & Gubrium, 1994; Patton, 1990) and more specifically through the device of "storying." Through this methodological approach, we have focused on what these women have experienced and how they have interpreted their world in the science workplace (Patton, 1990). A phenomenological approach allows us to get at "the essence of the experience of some phenomenon" (Patton, 1990: 71).

As we have indicated, the women's responses are highlighted in this article through the device of storying, that is, as "composite characters brought to life" (Denzin, 1997: 266), where storying "offers a way to gain insights into [the] complex relation between individuals' particular experiences, meanings and action strategies and their social and societal contexts" (Stroobants, 2005: 49). Story-telling has long been an important element in research, because stories "reveal the ways in which the actors make meaning of their situation through narrative" and are "an unparalleled method for reaching participants' mindsets" (Gill et al., 2008: 226), while at the same time they uncover "common threads of understanding" (de Carteret, 2008: 242).

While we have not changed the actual words the scientists used, because of the small number of participants we agreed to their requests not to attribute particular quotations to individual women, in order to allay their fear of further discrimination. It is this fear that led us to use storying as a way to present the data. We value these women's stories for the knowledge they generate, but we also place the utmost importance on protecting their anonymity, because the fear of further discrimination, should they be identified, was of real concern. Even though none of the women were working with people who had been involved in the laboratories in which they had completed their doctorates, the nature of the scientific community in Australia is such that word gets around. It is this concern that ultimately convinced us that storying should be our method of choice for a project that sought to drill deep to provide "the thick description of a particular cultural domain" (Peterson, 2007: 174). This "thick description" (Geertz, 1973; Patton, 1990) is presented in "such a way that others reading the results can understand and draw their own interpretations" (Patton, 1990: 375). Furthermore, to give voice to one's respondents means that as researchers we value "the views, perspectives, opinion, prejudices and beliefs of the informants, actors or

respondents [we are] studying, and [are] going to take them seriously." In fact, our job is to "find out how the people [we] are researching understand their world" (Delamont, 2002: 7).

The storying approach is not new, nor indeed is it startling, given that it is grounded in a long tradition that has its origins in life-history research, memory work, biography, and autobiography, as well as oral history narratives. Presenting one's data through narrative has long been the preferred method when "stories that are untold and therefore absent" (de Carteret, 2008: 237) need to be told.

Certainly, these women's experiences cannot be explained away in terms of their "deficits," because these are high-achieving women in their respective fields. What we hope their composite story will do is to create the "hermeneutic opening" that allows us to present what, for too long, has been "misrecognised and/or excluded" (de Freitas, 2008: 282). While their stories provide specific examples in specific places at specific moments in time, we nevertheless have a sense that these women's stories are not idiosyncratic, but rather that they are illustrative of more general and widespread societal positions and concerns (see, for example, Barres, 2006; Frome et al., 2006; Goldberg, 2007; Jones, 2005; Nicholls, 2005; Povey et al., 2006; Rosser, 2004).

The scientists whose experiences form the basis of our story were interviewed either face-to-face, with their interviews transcribed verbatim, or by e-mail, where face-to-face interviewing was logistically impossible. We knew some of these women because they had participated in our earlier research (Aveling, 2002; Hatchell, 1998). All of the women whom we already knew and were able to contact agreed to participate. Other interviewees were colleagues of the women already known to us who approached us after discussing the project idea with their fellow scientists. All of the scientists we interviewed had completed a PhD but none of them were working in their specific field at the time of the interviews. Some had "moved sideways" into other areas of research, while others had moved into administration. They gave us to understand that they believed that a study such as this was long overdue.

We wanted to leave these interviews as open-ended as possible to allow our respondents to structure the agenda with regard to how they wanted to answer and the extent to which they wanted to elaborate on issues of concern to them within the context of a number of focus questions. These questions related to their experiences in the science workplace and included the following: What are your experiences as a female in the science workplace? Have you ever experienced discrimination in the workplace? Describe any instances of discrimination that you have experienced. In what ways do you think you would have been treated differently if you were male? Finally, the women were invited to include any other experiences or comments they might want to add.

The following two sets of stories—those of overt discrimination and covert discrimination—focus on the experiences of the young women PhD graduates

whom we interviewed. At the time, they were in their 20s, and they had completed their PhDs in 2007 and 2008.

STORYING SCIENTISTS: OVERT DISCRIMINATION

The first set of stories reveals a number of instances of overt discrimination. Overt discrimination is the type of discrimination that is blatant and includes instances of verbal abuse and sexualization. These instances of overt discrimination are captured in the following stories:

> I found it hard as a young female PhD student in a laboratory dominated by males at the "higher" positions, and females at the "lower" positions. Such an arrangement left many of us (all female PhD students) feeling as if we were treated as angry young female (read "feminist") PhD students, who were acting irrationally when requesting attention, advice, and resources in order to complete their studies.

> For the most part, the conflicts I experienced that I felt were most persuasively gender-based were those with the senior post-doc, a male. Taking his lead from our mutual supervisor, he treated me with a reasonable amount of contempt, which was usually combined with breast-talking and posturing such as hands on head or crossed ankles with his feet resting on a table. It was a favourite phrase of his to say, "Women, you know what they're like" or "Who'd have 'em?" and I could never decide whether he was trying to be deliberately inflammatory or whether he honestly felt that was a reasonable, accurate, and appropriate comment to make in a lab that was mainly female. . . . It seemed to me that this particular post-doc was capable of dealing with women in either of two ways—flirtatiously or condescendingly, as if to an enemy. . . . The main reason I elaborate on the post-doc in question is that I think his attitude to me and to the other women in the group reflected a wider tolerance to sexism in our workplace.

> I have heard more obvious discrimination, where a woman was told that her presentation was enjoyed "only because you're blond"; one woman post-doc was told she shouldn't be funded to go to a conference "because you're just going to have babies anyway"; another female post-doc had her name simply left off journal articles submitted for publication (she was forgotten about) even though she had contributed a substantial figure to the journal article; one woman was sent flowers from her supervisor to "cheer her up" when experiments were not following the intended plan. In all of these cases, nothing was done to address these comments; the women remained silent that these things had happened to them and only discussed these issues with friends, rather than people with the authority to attend to the situation.

> The most apparent male privilege is being invited to attend and participate in scientific meetings with the highest-ranking and most powerful senior male scientists, in which decisions concerning scientific direction—for everyone,

> including my own—are discussed. This is where I can see through the glass at what is happening, but cannot seem to reach that level myself.

All these women worked in science labs where lab heads and post-docs were mainly male and PhD students were mainly female. To what extent this exacerbated their discriminatory experiences can only be speculated about, but in social justice terms, this should not even be a factor. These women tell of how they experienced verbal abuse, being called a "moody PhD student" or a "scumbag student," or were made to feel like "angry feminists." As such remarks were never heard in respect of males, these women consequently came to the conclusion that these were gendered remarks that devalued females as PhD students. Sexualization also remains dominant in the science workplace, with these women highlighting many instances of sexualization in their stories. One woman revealed how a particular post-doc, taking a lead from their mutual supervisor, would treat her with contempt, "which was usually combined with breast-talking and posturing such as hands on head." Another woman talked of situations she had witnessed, in which, for example, one woman scientist was told that her presentation was enjoyed "only because" she was "blond." In another example, a woman "was told she shouldn't be funded to go to a conference 'because you're just going to have babies anyway.'" All these examples captured moments of overt discrimination.

STORYING SCIENTISTS: COVERT DISCRIMINATION

This second, much larger, set of stories reveals glimpses of more subtle acts of discrimination. Covert discrimination, by its very nature, being concealed, insidious, clandestine, secretive, is sometimes much more difficult to recognize or detect. However, as the following stories show, these scientists could identify many instances of covert discrimination:

> Blatant sexual discrimination is not always apparent; it is just little things and side-comments, for example: finding it hard to enter into a prearranged and unspoken-of power network which is often only filled by males; not being invited to play soccer with all the "boys" (where all the males including lab heads play, and where there is further opportunity for development of male networks); having male colleagues whistle at female colleagues "as a joke."

> There are times when I have felt penalized for being too feminine, and I have seen other women also penalized. It's like if you're female, you need to "be" a certain way. You need to look a certain way, dress a certain way, and talk a certain way, and all of these are what our society is generally pushing how females should act, look, and talk; such role models can be found in common women magazines. But then, at the same time, if you are "successful" at being all these things, then you are expected to be an idiot who can't think (and who wants to get married and have kids). People are happy when you act your gender, when you dress, look, and talk a certain way. In fact, the most common chit chat in the lab seems to me to exist in order to constantly remind each

other of this: "Women are just like this," "Men are just like that!" When you act like a "girl" during scientific meetings, people's reactions to you are more fun and pleased, but, while you are listened to, you are then often not taken seriously. If you turn around and try to play their game and act more serious, less feminine and more masculine, then it feels like you are pushed to the bottom of the ladder so to speak, as if you don't know as much as they do; nor are you any good at being a girl (looking pretty, being pleasing). I haven't yet worked out which way enables me to get as close to the power networks (and thus determine my own scientific direction and assert myself as a worthy scientist) as I would like. My current opinion is that women who do not act all "girly" seem to be given less opportunity than a woman who can be it all because, even if she usually "can't" be as good a scientist in their eyes, at least she's pretty, happy, confident, and pleasing.

Although I love science, I still don't see it as a long-term career, partly because I think I will always be fighting men that don't want me to succeed because I am female. . . . When I suggested that we send the paper to a more suitable journal of lower impact, because I was anxious to publish something of my PhD in the interests of my future career, I was informed in very short terms that it was "my lab, and things will be done with a view to what I want for my lab, and not for your future." At no time had he [my supervisor] ever made me feel as though my career was of any consequence to him, although I suspect he would have been more accommodating towards a male student who was moving on to a lab in the U.S., with an eye to returning to [this lab] as a grateful junior ally.

The only alliances that arose not between office mates were those between the senior post-docs (male), the male technician, the male PhD student, and the lab head (male). These could all be explained away by other things that these people had in common—including a frequent cause to discuss the direction of research with the lab head, and a mutual interest in football and cricket probably cemented the bond.

Once I helped out a young male honours student to do a set of experiments which were technically very difficult, and only a few people knew how to do; somehow I was deemed to have the time to show him what to do (funny, as I was a PhD student with limited time and funding, whereas the other people were employed researchers). In return he promised that my name would be on any paper that came out of the work. He turned out to be a rather lazy student, and I essentially did two weeks of work for him, and at the end explained the results clearly to him. A couple of years later I was at a seminar and one of my figures was presented as a PowerPoint slide by someone I did not know, and it was attributed to him. While it was too late to do anything about it, I have always wondered if I had been someone else, been more "chummy" with the student or more loud about my helping him out, would people have thought to remember that I had actually helped him (I realize no one would ever say that I had actually done the entire experiment) and put my name on the paper (even as an acknowledgment) that did come out of it?

In the lab I was in, female PhD students were silently paired up with male post-docs, who were essentially pre-promised a high authorship on any papers to come out of the project. Because all the students were female, and all the post-docs were male, it's hard to know if it would have happened anyway even if the gender roles had been reversed; however, because we were both younger and students we were more easy to take advantage of. When I once brought up this issue with one of them he agreed he had been given an "easy way out," that up until then I had done the hard work, but that ultimately "this is how you play the game," to which I had no comeback.

It seems to me that, as a female, as you work your way further along the career path in science, it seems to get harder, rather than easier: there are less female role models at every stage; the "game" becomes more competitive and complex and involves not just what you know but who you know (or who you are buddies with); the job requires you to work long hours (while these are not fruitless, they are strenuous and often not possible if you have out-of-work commitments); you are required to publish consistently excellent results in order to stay competitive with the field; and this is all on top of the complexities of finding the time to start and raise a family, and time for general life-work balance.

These scientists were able to clearly identify many instances of covert discrimination in the form of sexual discrimination, sexualization, male privileging, and the existence of an obvious glass ceiling. For example, in the labs, women were expected to "dress, look, and talk" in certain ways, based on role models depicted in women's magazines. It seemed that the women were disadvantaged both if they acted in too feminine a way (and thus were treated as if they were not able to think) and if they did not act in a very feminine way (in which case they were "pushed to the bottom of the ladder"). From one woman's observations in her lab, it seemed that being "girly" led to a slight advantage, in that such a woman was given more opportunities "because, even if she usually 'can't' be as good a scientist in their [men's] eyes, at least she's pretty, happy, confident, and pleasing." Thus, by means of sexualization, women are tolerated because they are women but are not necessarily treated as serious scientists.

In one lab, alliances were formed between male lab members often because of mutual interests such as those in football and cricket. This meant that male post-docs were able to frequently "discuss the direction of research with the lab head." A similar problem was also seen in another lab. One woman found fewer role models as females worked their way further along the scientific career path, and it seemed that at each stage it became more complex and more competitive and involved "not just what you know but who you know (and who you are buddies with)." Thus, this scientist found that only males were included in the decision making on the direction of future scientific research (including her own) in her lab. She could see what was going on, could see the glass ceiling, but was

unable to go through it and take part even in any discussions of the direction of her own research.

The issue of power and feelings of powerlessness were also dominant in these women's stories. One woman was made to feel powerless in terms of submitting research for publication, which she knew was essential for her future career. Her (male) supervisor stated emphatically that it was "my lab, and things will be done with a view to what I want for my lab, and not for your career." This scientist revealed that events in the lab showed her supervisor would have been more accommodating to a male student. Indeed, male privileges remained at many levels in these labs and seemed entrenched within the scientific workplace. This is clearly evidenced by one woman's experiences. Although she had completed the hard work for one specific experiment, it was the male post-doc who was credited with this work. Even this post-doc admitted that he had been given more credit than he deserved and that he had been given an "easy way out," but that "this is how you play the game." There was no way this woman could receive any justice. The structure of the scientific workplace meant that this, like other, similar issues, could not be addressed.

CONCLUSION

All of the women whose composite story we have told loved science and were committed to their work. One quotation sums this up particularly poignantly:

> I love science, it's very challenging, and the reason for doing science for me [is] those moments where you have worked on a problem for a long time, finally worked it out, and seen something for the first time that no other human has ever seen, understood or thought about before.

Had this particular woman and women like her been supported in their endeavours, what creative and productive scientists they might have become. It is not too far a stretch to suggest that here is a case study in microcosm of immeasurable loss of human capital. This particular woman, like many of her contemporaries, had gone into the field believing that gender inequality had been fought and the case won, but over time realized that this was simply not so; that discrimination on the basis of gender was, in fact, alive and well. Our conclusions are inevitably that "gender representations are embedded in the organizational forms and dominant culture of science" (Amancio, 2005: 65) and that "sexual harassment can be used as a way of maintaining the existing power structure" (Settles et al., 2006: 48). That sexualization and actual sex-based discrimination remain dominant in the science workplace is highlighted by the story we have told. In fact, a recurring theme in our narrative is "power" and its corollary. "powerlessness." Interestingly, the incidents related are reminiscent of studies in the 1970s and 1980s, which clearly showed male scientists choosing to sponsor "the careers of male protégés" in preference to supporting female scientists (Ehrich, 2008: 32). The privileging of

the male over the female represents, in stark form, an imbalance between those who have power and those who do not. It is, as Settles et al. (2006) point out, typical of specific types of "unfair employment discrimination." Yet it is worthy of note that our narrative shows relatively few examples of explicit sex-based harassment or discrimination. It is almost as if the perpetrators were well aware of existing legislation that protected their female colleagues from blatant sex-based unfairness but felt sufficiently secure within the dominant culture of the science laboratory to engage in more covert forms of gender discrimination. Our findings clearly support Prokos and Padavic's (2005: 539) suggestion that "in contrast to the overtly discriminatory practices of an earlier era, contemporary, 'second generation' discrimination . . . is subtle, often entrenched and unnoticed in organizational structures and practices." Thus, through the process of sexualization, women are tolerated because they are women, but they are not necessarily treated as serious scientists. For the women whose story we told, it was a lose/lose situation not only having implications for their own career trajectory but also representing a tremendous waste of human capital. To repeat the words of Simon (2006: 92), "our country cannot afford to lose half of its potential innovators."

These women are not helpless victims of male domination, but the answers to the question of why they remained silent in the face of discrimination are multiple and complex. The women were disadvantaged if they acted in too feminine a fashion (and thus treated as if they were not able to think) but also if they did not act in a feminine enough fashion (in which case they were "pushed to the bottom of the ladder"). The combined weight of a masculinist organizational culture ("not just what you know but who you know") and the pervasive representation of women as sexualized beings ("only because you're blond") is a powerful force that unsettles women's perceptions of themselves as scientists and as women. In general terms, these women had accepted the liberal feminist pronouncement that women can do anything, but they also understood that this required them to become more like men; that in order to succeed they needed to adopt a "male" style of working and being. In contradiction to this understanding, their experiences in the workplace made it clear to them that to enact a pseudo-male role would not earn them any kudos. Thus, the women who participated in this study were caught in a double bind: not only was it somehow un-scientist-like to complain, but also complaining would act as a black mark against them. In the interests of protecting their already vulnerable position, they decided, not without good cause, to limit discussions about grievances to a circle of trusted friends. As one of them commented, "the women remained silent that these things had happened to them and only discussed these issues with friends, rather than people with the authority to attend to the situation." It is certain that women require clearer and easier opportunities to discuss their concerns and, given the existing power relationships, to discuss these concerns in a safer environment without fear of further discrimination or negative consequences. As one of our participants proffered:

> One absence I felt was of an advisor. When I approached the student coordinator for my faculty, he was dismissive, because there are two options when you have a difficulty with a supervisor: make a formal complaint (and you had better have a serious grievance!) or shut your mouth. Much of what I felt was hard to describe concretely or to give specific examples of, and I had no desire to get involved in a long and messy official complaint. What I really needed was for someone to give me some constructive advice on how to deal with the difficulties I was having, how to cope in a relationship in which the power is all on one side, and in which you will be dependent on the other's goodwill for years to come. Maybe supervisors need to be reminded (perhaps by the university) how to wield power responsibly too. Though the worst ones probably pat themselves on the back about how even-handed and fair-minded they are.

The question of good supervision is central to the project of changing masculinized workplace cultures. It certainly carries with it some urgency if our respondents' accounts are any indication:

> On reflection, my PhD experience was way more miserable than expected. I'm glad I don't have to do another PhD; I don't think I would, after going through what I did the first time.

> My biggest problem was my supervisor; the best thing he could have done was probably just to have taken a very long holiday. . . . I think some supervisors need to take their responsibilities a little more seriously, and the universities need to encourage this a little bit more.

Changing the masculinist workplace culture—the "boys' club" mentality—will not be an easy task; nor will it happen as a result of antidiscriminatory legislation alone, because as White (2003: 50) has remarked, "The debilitating and exclusionist male culture in Australian management is more resistant to change than in most other countries; over the past thirty years there has been little change in the male, Anglo-Celtic executive profile." Whether or not Australian males are more resistant to change is debatable. It could be argued that there have indeed been substantial changes over the last 30 years. However, without wanting to sound overly pessimistic, we would suggest that Kelly's (1981: 13) confident pronouncement that "girls who succeed in science have a wider choice than those who fail" has proved to be false, because the women in our study felt that they had little or no choice but to leave workplaces that denigrated them as scientists and as females. They had no regrets per se, because they enjoyed their new jobs even though these did not directly flow on from the work they had done as part of their doctorates. However, they were angry that their tormentors were able to get away with it.

To actualize the promise of the 1980s that women can do anything, we need to ask different sorts of questions about the nature of gendered social practices and devise solutions that are not grounded in a deficit paradigm. We have argued that greater gender equity in the science workplace is not only a matter of social justice

but also an economic matter and, after storying the experiences of seven women, we conclude with O'Brien (1998: 26) that "the same old prejudices are alive and active in strikingly insidious new forms." Our recommendations are, therefore, that as a society we need, first, to discard the deficit model that was in operation in the early 1980s but is proving to be tenacious, as the comment about women's lack of an "'intrinsic aptitude' for high-level science" (Settles et al., 2006: 47) illustrates. What is urgently required is the motivation and political will to turn around the idea that the problem is located in women themselves and that the solutions are, therefore, up to them, an idea that, in effect, leaves "the university institutions intact even though these institutions are what need to be changed" (Bagilhole, 2000: 143). While the Association of Professional Engineers, Scientists and Managers, Australia, is keen to advance the rights of women scientists, Australian legislation is, as Strachan et al. (2004: 197) have suggested, concerned with affirmative action that is "characterised as an inclusionary or incorporation model, as it relies on the underlying principle of bringing women up to equality with men." In other words, it too is grounded in a model that posits the masculine as normative. Affirmative action legislation is a good start, but, as the women whose story we have told shows, it does not go far enough.

Second, following on from this, we would recommend that we need to devise and implement concrete strategies that do more than provide "confidential advice and support" (APESMA, 2009). Scientists on the receiving end of harassment and/or discrimination require an organization that is proactive rather than reactive. We need to acknowledge that many science workplaces continue unabated in their boys' club mentality. To protect their rights to an equitable workplace, women scientists need an organization that will fight on their behalf when things go awry, but one that will also work systematically with laboratory managers, heads of departments, and academic supervisors to create an environment that does not condone the covert gender-based discrimination and harassment that the women whom we interviewed experienced. Indeed, the women in this study felt that the "long and messy official complaint" system that was in operation in the university worked against any complaints being filed. Had the woman who used these words had access to a fair complaints resolution procedure, she might still be active in the specific scientific area that so appealed to her when she began her PhD research.

While the women we interviewed have all remained within the sciences—albeit having been pushed out of their particular specialities or having moved sideways into administration—the story we have told should nevertheless be read as a cautionary tale if indeed we are concerned about the problem of women's underrepresentation in the sciences. The story of covert discrimination that the women in this story tell should alert us to the possibility that for other women in similar workplace situations the only option they see open to them is to leave the sciences altogether. That would certainly better explain women's attrition from the sciences. If we are serious about not wasting human capital

and are equally serious about justice and fairness, then we need to look to the masculinist culture of organizations.

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