Gender, Ethical Voices and UK Nuclear Energy Policy in the post-Fukushima Era

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Section 1: Introduction

How to account for our perceptions of technological, environmental and health risks has been a focus of empirical, theoretical and philosophical inquiry within the field of risk research for almost 40 years. From this work we know that socio-demographic variables such as age or class do not consistently predict either risk perceptions, or the acceptability of nuclear risks. The clear exception to this rule is gender, with a longstanding finding being that male respondents in surveys tend to express lower levels of concern than women when asked about their perceptions of a range of environmental and technological hazards. This gender and risk perception relationship appears particularly pronounced for people's perceptions of nuclear power and radioactive waste as well as other risks, for example those posed by chemicals, which hold the potential for local contamination (Davidson and Freudenburg 1996). Given these findings it is surprising that none of the traditional accounts of nuclear ethics (e.g. Nye 1986; Shrader-Frechette 2000) take account of the issue of gender, or the gendered nature of our understanding of nuclear risks.

In the present chapter we explore how an account we have developed of the gendered nature of risk perceptions might throw light on contemporary ethical and philosophical debates about nuclear energy, a matter that has become of particular policy concern in the UK post-Fukushima. Our argument is that the topic of gender and nuclear ethics is impossible to understand without in-depth consideration of the socio-cultural processes leading to the gendering of knowledge displays and epistemic subjectivity in contemporary life, alongside the need to address more fragmented and plural identities. In advancing these arguments, and in contrast to much of the established survey-based research in this field, we draw on theoretical and qualitative interpretive work within discursive social psychology, social

studies of science and technology (STS), and associated discussions of justice and care ethics within gender theory. This allows us to create a theoretical synthesis for approaching the gender-risk relationship in relation to nuclear power. We see this relationship as arising from cultural and identity work conducted within readily circulating discourses, and the struggles for recognition of differences in ethical positioning they create. Such an analysis shows that a better understanding of the complexly gendered nature of environmental and risk perceptions has an important role to play in current ethical discussions and philosophical reflections on nuclear energy.

Section 2: UK Energy Policy and Public Risk Perceptions - the Devil's Bargain

The UK commissioned the World's first commercial nuclear reactor at Calder Hall in Cumbria, and greatly expanded its reactor programme after the Suez Crisis in 1956 amidst concerns about national energy independence (Welsh 2000). This nuclear dawn proved to be short-lived, however, with the accidents at Three Mile Island and Chernobyl leading to unprecedented levels of public opposition. Rising concerns about nuclear economics also followed in the wake of the privatisation of the UK's electricity supply industry in the 1990s, leading to an effective moratorium on the commissioning of any new nuclear capacity in Britain.

In more recent years the debate about nuclear energy in the UK has taken a different turn, with the country adopting the most ambitious decarbonisation targets in the world and a commitment in the 2008 Climate Change Act to an 80% cut in carbon emissions by 2050. This constraint, alongside a lack of progress in bringing forward genuinely radical low-carbon solutions, means that nuclear power has once more attracted policy attention, with

current scenarios envisaging between 16 and 75 GW of new nuclear power in Britain by 2050 (DECC 2011).

This increased attention to nuclear options has brought with it attempts to reframe the technology within policy discourses. Framing is one of the means by which policy domains become defined and rendered manageable (Jasanoff 2005). Bickerstaff et al (2008) observe that from about 2000 some industry representatives, senior UK politicians, and scientists had begun to advocate the low-carbon credentials of nuclear energy (also Teravainen, Lehtonen, and Martiskainen 2011). While such discourses are not particularly new (pro-nuclear interests in Germany had advocated them long before this; Weingart, Engels, and Pansegrau 2000), the increasingly urgent need to secure low carbon energy has seen them re-emerge.

In seeking to explore this issue, Bickerstaff et al (2008) report that in a series of focus groups with members of the public in 2002 discussing both climate change and radioactive waste disposal, participants became more ambivalent and less antagonistic about nuclear power as an energy source when it was explicitly positioned alongside climate change. Nevertheless, few in the groups supported climate change mitigation through new nuclear build wholeheartedly, with participants eventually arriving at the conclusion that the nuclear option represented the lesser of two evils – a *Devil's Bargain* in the face of the potentially greater risks of climate change. In effect, such support reflected only an ambivalent or 'reluctant' acceptance (see also Pidgeon, Lorenzoni, and Poortinga 2008). Furthermore, this discourse was accompanied by a questioning of the risk-risk trade-off implied, and a desire to explore other policy framings, alongside a preference for a varied and sustainable energy strategy incorporating investment in renewable energy and reduced demand.

Public acceptability of energy options, not just nuclear power, is important not only because in a democracy policies must remain sensitive to the views of the electorate (Pidgeon 1998), but also because public and interest group opposition had significantly impacted upon the siting processes for both power stations and radioactive waste disposal in the past (Pidgeon and Demski 2012). In its inquiry *Energy – The Changing Climate* the UK Royal Commission on Environmental Pollution concluded: "we do not believe that public opinion will permit the construction of new nuclear power stations unless they are part of a strategy which delivers radical improvements in energy efficiency and an equal opportunity for the deployment of other alternatives to fossil fuels" (2000, p20). The UK government stated in 2003 that, whilst not including proposals for the construction of new nuclear capacity, it did not exclude the possibility that such an option might be revisited in the future, and that this might indeed "be necessary" to meet the nation's carbon targets (DTI 2003, p. 12). This statement signalled openly the *political reframing* of nuclear power as a potential component of the UK's future energy strategy. This was followed 5 years later by a direct endorsement of the technology in *A White Paper on Nuclear Power* (DBER 2008) and publication of industry nominated sites for new nuclear stations. The stage had therefore been set for the UK to include nuclear power in the future generating mix.

Butler, Parkhill and Pidgeon (2013) recount how the immediate policy response to the Fukushima Daiichi disaster in March 2011 varied in different countries: either (1) amplification of risk and withdrawal of policy support (e.g. in Germany, Japan, Italy and Sweden) or (2) a safety review, then attenuation of risk, followed by continued support (e.g. the UK and USA). Similarly, the impact upon public opinion has varied, with an immediate fall in support in many countries. However, in Britain that fall proved only temporary, such that by December 2011 support had returned to levels seen just prior to the accident. In other

countries such as Switzerland (Siegrist and Visschers 2013) and the USA (Joskow and Parsons 2012) attitudes also appear to have remained remarkably resistant to change. However, aggregate findings can obscure more subtle underlying patterns. There is evidence that people who formerly accepted nuclear power in the UK have now become more uncertain since Fukushima (Poortinga, Pidgeon, Capstick, and Aoyagi 2013), while the average response obscures a large and consistent gender gap (Figure 1).

[INSERT FIGURE 1 ABOUT HERE]

The data series shown in Figure 1, routinely updated at the annual conference of the UK's *Nuclear Industries Association*, served to ignite a policy debate about its significance. In the summer of 2011 the *University of Birmingham Policy Commission* was set up to consider Britain's nuclear energy future (Hunt 2012). In its draft chapter on public attitudes the Commission pointed to evidence of both the gender gap in acceptability, alongside the observation that women's average self-reported knowledge about nuclear was lower than that of men. The initial conclusion in the draft report was that it would be helpful if the government could increase science education for women and girls! Having initially provided evidence to the Commission, the current authors had the opportunity to point out some of the problems with this line of argument, in that it runs the risk of reproducing the idea that men and women view nuclear differently simply because of some fundamental (but unexplained) difference between the genders. We also know that promoting greater knowledge of a technology or risk, the so-called 'deficit model' of science communication (Irwin and Wynne 1996; Sturgis and Allum 2004), does not necessarily lead to greater public acceptance, while research on risk perceptions finds that levels of knowledge typically fail to explain gender

differences in responses (Davidson and Freudenburg 1996; Hitchcock 2001). As a result a more nuanced conclusion was published by the Commission in its final report:

"A range of variables are important in the relationship between the public and an understanding of the nuclear industry, e.g. income, gender, political ideology, cultural values and trust in the information source. Consequently it cannot be automatically presumed that more information will lead to greater acceptance." [The report goes on to conclude that...]. "A greater emphasis on developing an awareness of energy in schools and opening up the nuclear debate could help with engagement in the nuclear industry and energy generation. *However, a better understanding of the diverse values around care, relationships, environmental protection and futures needs to be taken seriously*." (Hunt 2012, p. 97 emphasis added).

Section 3: Fathoming the Complexity of Risk Governance and Nuclear Ethics

The 'public understanding of risk programme', as broadly framed, is testimony to the possibilities that exist for academics and the policy community to work collaboratively on matters of public concern that are subject to risk governance in modern societies. This should not be taken to imply that the subject of risk governance lacks controversy, or that investigating this will necessarily resolve the many ethical questions involved. Real questions exist about opportunities for addressing the question "where do the controversial matters of risk governance lie?", and the possibilities that can be brought into play for paying attention to questions of risk ethics. Equally, the social science community does not always acknowledge the intractability of the problems facing governments when contemplating hard choices about how we should live in the face of depleting energy resources, and potential imposition of new limits on societal organisation and everyday functioning (although for a

useful website on how such shifts are manifesting themselves to academics and other stakeholders involved in energy demand reduction interventions see www.energybiographies.org).

In terms of elucidating the intractable nature of issues of risk governance, there is much to be gained from the environmental governmentalities field, which explores possible shifts in regimes or forms of governance in order to understand their specific and cumulative effects on ecological systems, climate change, environmental citizenship and ethics. It draws on literature incorporating "(s)ocial constructivist and discourse analytical perspectives on climate change that is capable of highlighting the extent to which climate change is a social product of discursive struggles rather than a naturally given problem" (Oels 2005, p185). Highlighting discursive struggles is important as a research strategy in that it seeks to address the consequences of different problem framings, as well as attending to configurations of state and corporate power. In so doing, interpretive practices and claims are introduced about the conflictual basis of environmental politics as a discursive space, and how scientific research too is implicated in this space.

In this field, discussions of social transformation are predicated on clarity of critique and pursuit of interpretive claims as objects of knowledge. For example, cost benefit analysis can be critiqued for the way that it "obscures moral issues of equity and responsibility" and the emphasis on globalism for the way it "disempowers local solutions" (Oels 2005, p185), criticism which has also been made within the risk ethics fields (Asveld and Roeser 2009) and directed at the related technologies of risk assessment and analysis (see Okrent and Pidgeon 2000; Pidgeon and Butler 2009). We would concur that these are both important objects of knowledge. Our argument, however, is for further exploration of matters of

epistemology and ethics that are implicated in such claims. Specifically, we search for insights from empirical study of how gender positions and discourses lead to differences in perceptions of the acceptability or otherwise of nuclear technology for the production of energy, while considering nuclear power as one among other, related components of climate change and resource depletion risks.

Section 4: Gendering risk: Conceptual issues

Gender is a matter that is both difficult to fathom, and yet has to be taken fully into account by academic risk researchers and policy makers. A messy and complex issue (Benschop et al 2012), it cannot be approached simplistically within research programmes that recognise how, as well as posing scientific questions, risk has moral, cultural, evaluative, affective and aesthetic dimensions (Tulloch and Lupton 2003), and that both are necessary to understanding matters of public concern. Questions of identity and environmental controversy are of longstanding significance in the academic field of risk perceptions research (Douglas and Wildavsky 1982; Joffe 1999; Satterfield 2003; Henwood and Pidgeon 2013) and among non-governmental organisations seeking to influence policy (Compton and Kasser 2009). Particularly important within risk and identity studies is the realisation that there are different ways of framing questions of risk (Henwood et al, 2008b). Within the science and society research community, extensive knowledge of risk framing has led to the realisation that the dictum 'the public should be educated to understand the science' is a route to impoverished risk governance practice (e.g. Rayner 2004). This realisation is testimony to the need for sensitivity to questions of identity, and identity related values (such as stressing the importance of social inclusion and acknowledging diversity), as part of the wider practice of public accountability in science.

Earlier, we noted the very extensive, well established literature on gender and risk perception, which has identified complex empirical effects (Davidson and Freudenburg 1996; Hitchcock 2001). Such studies typically utilise quantitative survey methodologies to elicit judgements reflecting the cognitive and social psychological determinants of beliefs about risk: the so-called 'psychometric' paradigm (see e.g. Pidgeon et al 1992). A frustration often expressed with this literature is that it fails to offer properly theorised explanations of why the observed relationship between gender and risk perceptions might occur. Recently, and in response, attempts have begun to identify models from the risk literature for elucidating theoretical explanation (Wester 2012). Nonetheless, efforts to explain patterns of risk perception in individual (gender) difference terms continue to dominate, even in the face of little empirical support. Three often repeated proposals are that women might be less familiar with science and technology than men; that men are more concerned about their external role as economic providers whereas women with children are more concerned about health risks; and that women tend to be more distrustful of government, science and technology, something which is related to increased environmental concern.

One explanation that does gain some empirical support, according to Davidson and Freudenburg, is the 'safety concern hypothesis': this is attributed to women's role as nurturers and carers of their family unit which is extended to their local community and hence invokes a greater concern for both. According to Flynn, Slovic and Mertz (1994), observed gender 'differences' are due to a small group of men within their sample who hold much lower risk perceptions than other demographic groups, the so-called 'white male effect'. This observation has been related to more general discussion of identities and societal vulnerability (Satterfield, Mertz and Slovic, 2004) together with questions about how to research diverse relationships between gender and marginality (Henwood, 2008).

A critical distance is taken from explaining such observed patterns in individual (gender) difference terms within the field of gender research, where the understandings they foster are typically seen as limited by simplistic interpretations. Merely observing a gender-related difference in a quantitative dependent measure as ipso facto saying something so obvious about men and women that one can report a statistically significant gap without further comment, and without acknowledging its implications for understanding experienced risks, gender norms and stereotypes, is a highly misleading interpretive practice (Hare-Mustin and Maracek 1990). Explaining the significance of gender does not mean automatically treating masculinity and femininity as different variables, of a social and/or psychological nature, that function as causal antecedents or effects. Rather it involves rendering problematic the commonplace assumptions held within particular cultures about what it is to be a woman or a man (Henwood, Gill, and Mclean 2002), and how this can underpin or warrant asymmetries in power between women and men.

A related set of concerns, encompassing more of the scope of gender studies, are the wide-ranging efforts that have been made to understand why gender apparently exerts such a powerful influence within society, set alongside contemporary thinking which tends to eschew essentialist or fixed accounts of gender 'differences'. Rather, researchers ask what empirical findings about sex and gender difference might mean, how they relate to controversy about men and women's positions in society, and how they are related to people's life-projects. Such research seeks to arrive at more contextual, cultural and depth psychological views of masculinity and femininity as cultural binaries (e.g. Frosh 2002), while recognising that gender and cultural binaries can operate interpretively in ways that hide as much as they highlight (see e.g. MacCormick and Strathern 1992). Reflecting these

concerns, Gustafson (1998) has pointed out that the traditional 'gender differences' explanations of the risk and gender effect might be limited by the exclusive use of evidence drawn from quantitative surveys, and so has recommended a more interpretive qualitative approach to analysing how men and women construct understandings of risk issues.

An interpretive, qualitative approach to inquiring into gender and risk perception

Research practice in many fields of interpretive social science involves a more philosophical concern for the relevance of moral questions about risk (Roeser, Hillerbrand, Sandin, and Peterson 2013). One influential approach involves considering the role played by gender discourses and subject/identity positioning in the ways both men and women understand and interpret social and scientific issues in everyday life (see e.g. Fisher and Davis 1993), with a particular concern to avoid essentialising or fixing accounts of gender 'differences' (Henwood, Griffin, and Phoenix 1998; Wetherell 1986). In the course of studying discourse dynamics, people are construed as historically situated subjects whose ways of invoking and reworking meanings complicate the social, cultural and intergenerational transmission of gender and other social/identity categories (Wetherell 1996; Finn and Henwood 2009; Coltart and Henwood 2012). At the same time such discourse research focuses upon the ways in which people constantly create and claim subject or identity positions for themselves and others in the course of social interaction. How identity positions are sustained or discarded as an emergent feature of social interchange, in ways that are accepted or disputed by others in that interaction, can also become a focus of study as such identity positions provide possible sites and means of self perception and reflection.

Such qualitative social psychological work is concerned with what has been called the "most worldly of interpretive practices" (Denzin 1997) that involve asking the types of questions that carry meaning in everyday life. What might empirical findings about sex and gender difference mean? How do they relate to men and women's changing positions in society, and how is it possible to account for the pace (often slow) of cultural and psychological change? For Lohan (2000), working in the field of social studies of science and technology (STS) such social psychological sources (e.g. Segal 1997) have raised questions about how - in breaking down binary oppositions - spaces can be opened up to create 'tolerance' of gender difference as a form of anti-essentialist practice. Lohan invites researchers to attend to the workings of socio-political understandings as a means of analysing how culture and power operate to hold differences in place. Obvious points of connection exist between such theorising and ways of formulating questions, and helping to make sense of empirical findings on gender and risk. One example considered in our own work concerns the examination of gendered 'moral voices' (e.g. Gilligan 1982), as ways of encoding and communicating conventional dichotomies between women and men in perceptions of risk and its acceptability (Henwood, Pidgeon, and Parkhill in press).

These theoretical developments articulate with the proposal by Gustafson (1998) that a more theoretically nuanced, interpretive qualitative approach is needed to understand gendered construction of risk issues. They articulate closely with a conceptually novel approach that we have developed to foster inquiry in the gender and risk domain, called *effects made by gender* (Henwood, Parkhill, and Pidgeon 2008), by which we mean drawing on a synthesised framework (that is capable of further development) for conceptualising gender within social and philosophical theory. We use this framework to interrogate the ways in which pervasive gender categories, codes and discourses define everyday realities, including the taken for

granted 'truths' of risk perception. Insights generated through this research are presented in section 5 of this chapter.

Alongside theory from discursive social psychology, our theoretical synthesis or theoretical platform draws upon the work of Faulkner, in the STS field. Faulkner (2000a&b) discussed technology-gender relationships as social and cultural constructions, shaped by changing historical circumstances and socio-political processes, and functioning as regulatory mechanisms or norms of discourse and conduct. Faulkner places importance on the durability of modernist cultural associations between masculinity and technology – and especially as part of the conviction that social progress is attributable to technological development and its economic role within industrial capitalism. Faulkner argues that processes of gendering at play in technological work (e.g. computer software engineering) result from these associations, and further specific links to cultural and psychological themes of control, mastery and domination (also known as masculine hegemony), which together constitute engineering and technology as a powerful nexus of masculine culture. As part of the workings of this cultural nexus, regulatory ideas of gender (in)authenticity exercise people to show themselves to be appropriately gendered (or not) when expressing interest in, or associating themselves with, science and engineering domains. Faulkner sees masculine culture operating through such a regulatory norm of gender (in)authenticity as explaining women engineers' reluctance to admit that they enjoy technology too much since it detracts from their female identity. Faulkner's approach therefore sees certain forms of technology as culturally gendered in perception which, we argue, pertains to the gender risk effect as originally established in relation to large-scale technological or environmental hazards.

In explaining gender-culture-technology-risk relations, it matters that gendered associations (e.g. between large scale technology and masculinity) are symbolic positions - arising through the workings of tacit knowledge, expectations, thought and reflection, imaginative understanding, subject positioning, figurative meaning, but with individuals rarely taking up such a clear position in any practical context. For Jeanes (2007, p554) regarding gender as a norm means looking at how it "operates in social practices as an implicit (though occasionally explicit) standard of normalisation: a norm that is difficult to read and discernible most clearly in the effects it produces".

In our own analytical work, we have endeavoured to make visible such difficult to discern effects while taking the view that, once brought to one's attention, they are likely to appear as commonsensical – even to exist everywhere. In addition to the work of discursive social psychologists, and Faulkner (as discussed above), our work has drawn on the feminist philosophical work of Scheman (1993) and her notion of epistemic subjectivity. This refers to taking on an identity as an authority on a subject in discourse, or conversely hesitating over expressing personal authority or pleasure in the activity of knowing. Scheman proposes that, while widely and legitimately contested within philosophy, recognisably masculine epistemic frameworks often remain culturally placed as the "best positions to know" (1993, p. 4). A relevant example in the sphere of risk knowledge is the tendency for groups exerting powerful influences within society to place epistemic authority in technical-rational approaches to understanding and managing risk problems, rather than in worldviews stressing practical values of responsibility and care as part of broader social and ecological considerations. Following Scheman's argument, different forms of knowing may lead people to construct risk problems in ways that are recognisably gendered. Accordingly, this analytical insight provides an original strategy for investigation. Epistemic subject

positioning is a potentially significant issue in public evaluations of nuclear power, discussions of environmental/energy policy and ethics, and the gendering of risk perceptions.

Section 5 Explaining the gender-risk effect: Findings from a UK study

With the benefit of an Economic and Social Research Council supported project (Pidgeon et al 2007), we sought to overcome the criticisms in section 4 of explanations of the empirically substantiated gender-risk effect. Having developed our conceptual synthesis out of wider theorizing about gender, and taking a qualitative empirical approach, we conducted a discourse analytic study of dynamic, socio-cultural (and to some extent, deeper psychological) aspects of processes of epistemic and identity positioning as manifest in social interactions occurring among focus group members (Henwood, Pidgeon, and Parkhill in press).

Returning to original focus group transcripts where the Devil's Bargain frame was first identified in public discourse (discussed in section 2),we analysed various aspects of cultural and identity work in these data, which took the form of extensive discussions about environmental and technical risk issues. Radioactive waste[RW], nuclear power[NP] and climate change[CC] were the specific topics discussed in a sub-set of 4 of these groups. Although these topics would be expected to produce the gender-risk effect in surveys, the focus groups themselves were not planned with this in mind.

The women and men who took part in the study were average citizens (not experts in energy or technology) and occupied a range of occupational and social positions. For one of the groups professionally qualified men and women were interviewed together, and the groups discussing nuclear power and climate change were all mixed gender. Sustained group

discussions took place over the course of two meetings of two hours on consecutive evenings. For many reasons, including the way focus group methodology is highly interactive for participants, the data took a very different form to discrete, decontextualised statements about who perceives the most risk as collected in surveys.

In what follows, we present fragments of the gendered nature of the conversations, including where women engage with a technological viewpoint and men a care point of view in a non-essentialising way. We have selected extracts of data to illustrate the interpretive analysis we developed in two main studied topic areas.

Epistemic subjects: Positions, knowledge and risk

A pro-technoscientific epistemic form was commonly articulated across the risk issues by some participants who endeavoured to speak authoritatively about science and technology. A number of the men in the focus groups, from early on, took up apparently authoritative and confident positions, as actual, aspiring, or potential knowers – as people who are interested in talking from a perspective of knowledge about the matters under discussion. By contrast, while it was far rarer among the men, the women overtly expressed doubts, hesitancies and uncertainties. Our analysis not only portrayed this strikingly gender differentiated pattern, but showed how taking an essentialist view of it belies the operation of cultural work and identity dynamics involved in creating and contesting power-knowledge claims and gender hierarchies.

For example, in response to Ethan's repeated claims that techno-scientific ways of resolving safety issues with radioactive waste make its management unproblematic, Elizabeth objects

by drawing attention to the inherent uncertainties involved when making such long-term claims.

Ethan: *"We can't carry on just storing it at the power stations, something's got to happen and they can't make their minds up. Why not bury it in a mine or something or salt mines like the Swedes do, 300 years under store. You know, you could think about, you've got 300 years to think about it. ... they case it in glass and put it in stainless steel drums and put it in the salt mine ... and they could still bring it out and do something else with it, when they know how to sort of cope with it better. So I mean, I can't see the problem."*

Elizabeth: *"How do they know it's safe in 300 years?*

Ethan: *"Pardon?"*

Elizabeth: *"How do they know it will be safe in 300 years?"* (Cromer[1], RW & NP)

Elizabeth's remarks are counter-posed to Ethan's repeated claims that techno-scientific ways of resolving issues with radioactive waste from nuclear power stations makes management of the risk unproblematic. Her remarks discredit the position he had taken up as a technocentric epistemic subject by pointing to the detectable flaws in his argument, and effectively shut down the exchange between the two conversationalists at this point in time. Overall, the effect of the exchange is to bring two very different kinds of epistemic position into conflict. What is also interesting about this (and other similar) instances of talk is the way Elizabeth's position is not overpowered by the established gender pattern assuming superiority of technical risk and safety practices. In other examples, along with pointing out flaws in technocentric arguments, wit (sarcasm, irony, flippancy and ridicule; see Parkhill et al 2011) was another highly effective epistemic form discursively deployed by both men and women

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[1] The names of towns where the focus groups took place appear first inside the brackets followed by acronyms indicating discussed topics.

in efforts to disallow knowledge and identity claims that seemed to activate forms of gender-dualism.

Our analysis of the data on epistemic speaking, or identity positions, points to an ingrained association between knowing, as a form of masculine subjectivity, and technocentrism, which configures a culturally recognised form of masculinity. Speaking in culturally authoritative ways on scientific and technological matters, may create the possibility of powerful, identity-affirming positions in encounters if they succeed in bolstering a desired, gender authentic form of epistemic subjectivity: in the case of masculine subjectivity, this would be one connoting mastery and control. However, as we have seen, this kind of epistemic positioning can occasion moments when gender identities are contested in discourse-power relations, and where epistemic plurality is articulated and valued within displays of different forms of knowing.

Technocentrism, responsibility and care

The ways in which women and men often spoke differently about technology, risk and the environment was also considered in relation to the ways in which they constructed their ideas out of cultural repertoires (specific ideas, arguments, risk and value framings, subject forms) made available by popular, gender marked discourses of technocentrism, responsibility and care. At the centre of a masculine marked discourse (termed technocentrism) was the establishment of the modernist, world-making and risk-controlling power of technology, confidently articulating the value of technologies and grand technological visions operating across extended scales of technology, geography and time. As part of a gender binary, it was both distinct from, but also coexisted with, a feminine marked discourse attaching importance to a range of different matters such as individual and collective responsibility as a safeguard

against possible harm, the value of small-scale technologies and efforts at remediating the effects of large-scale technological risks, and generally perceiving a role for affect, morality, self-other connections, and a concern for future generations in everyday, societal and political decision making about risk.

The idea of countervailing and coexisting discourses that can be gender-marked resembles Gilligan's (1982) ideas about how it is possible for women and men to speak in different moral voices: an abstract, universalistic, voice underpinned by the application of rules, logic and reason (on the one hand), and a more contextual, relational and concrete/particularistic voice about how actions can be appropriately guided by a concern for others *(known as a moral voice of responsibility/care)* (see also Sevenhuijsen 1998). In our study, technocentric and care discourses, similar in kind to Gilligan's abstract-concrete moral voice binary, contributed as meaning-making resources to identity processes within the matrix of culture-technology-identity relationships (in our terminology, creating 'effects made by gender'; Henwood, Parkhill and Pidgeon, 2008). We were able to study the dynamic role played by discourses of care/technocentrism both with regard to the ways in which women and men displayed their understandings of risk in the focus group setting, and in (de)stabilising what might otherwise have been taken for granted as truths about the gendering of risk. Care discourses were evident, following a binary gender logic, when women objected to technological solutions to risk problems on the grounds of their epistemic failings (as too risky), as illustrated in the next quotation from Beth (where she is primary concerned with contamination from nuclear power stations, and people dying from a catastrophic accident).

Beth: *"Nuclear power … I just see it as being negative. … if you hear anything about it, it's either costing a lot of money or there's waste that they're dumping in the sea, or there's*

leakages, I mean you've just got to look at Chernobyl. ...how many were at Chernobyl? And they're still dying of cancer now." (Norwich, Professionals, RW and NP)

But, with equal conviction, technology's use was endorsed within care discourses. This happened where technological possibilities and intended benefits were perceived (e.g. as useful for risk remediation), by taking action to modify behaviours and practices that had been constructed as risky. Nuclear power was talked about in this way but at this point we can better exemplify our argument by referring to a different technology discussed by other groups in this series. Genetic modification simply to improve the aesthetics or taste of a food gained support only very rarely from women (and also men), while its use for the purpose of improving nutritional content of foods was seen as beneficial, for either their own children, or less fortunate individuals in third-world countries. A further pattern emerged when technologies or behavioural change were said to be futile, and women responded vehemently to this by deploying discourses of responsibility and care:

Olivia: "*if each local authority had a target to produce their own … over the next 50 years or whatever, just small things like building houses with solar panels, places …wherever there is water and what have you to make use of …we could make one of those. It doesn't have to be a huge solution surely."*

Christopher: "*Unfortunately we're not all blessed with having a nice fast stream going through the garden are we?"*

Olivia: "*We've all got roofs that we can put solar panels in."* (Cromer, CC).

According to Faulkner (2000a&b), gender dualistic discourse and positioning – in her case in relation to the identity work regarding notions of gender authenticity, symbolically guards

against threats to gender identity. Faulkner's work is concerned with configurations linking masculinity with technology and with understanding engineering identities. Her work also promotes the idea that gender - functioning as a regulatory norm of conduct – may not fully explain its effects in producing highly invested (i.e. psychologically and emotionally committed) identity formations (also called – especially in the feminist cultural studies and psychosocial literatures - subjectivities). Likewise in our study, the regulatory powers of technocentrism, and the countervailing and coexisting notions of care, gave rise to cultural and identity work potentially deepening the mode of regulation of men and women's conduct and subjectivities (Masco 2006).

Our study was concerned with people talking about technical, environmental and social risk issues in everyday life, not in an occupational setting such as engineering or nuclear industries, and we witnessed instances of increasingly invested, or emotively charged, conflictual encounters which seemed to be related to a perceived erosion of boundaries between technological and care as valued speaking/identity positions and epistemic forms of knowing. In such instances, there did seem to be a possible identity protective role for participants in the way they spoke or reacted to the epistemic speaking positions taken up by others in connection with the importance, or otherwise, of practices of technological world-making and risk-taking culture. Sometimes this took the form of distancing oneself from hubristic, hegemonic forms of masculine identity. For example, Joshua seems to distance himself from such a position when alluding to human beings as the "second plague" because of their dominance and responsibility for harming the planet.

Joshua: *"You [moderator] asked who was the planet for. Is it for humans, or is there a bigger meaning? So perhaps what's wrong with the planet is the humans. Get rid of all the humans."*

Abigail: *"And then it will be alright."*

Joshua: *"And then it will be alright."*

Jacob: *"Where will I be? [Laughs]"*

Joshua: *"Well I suppose if I have to sacrifice myself I think to save the whole Earth [laughs]." "We're the second plague aren't we? That's one way to look at it."* (Heysham, CC).

Our observations suggest that enjoyment of hegemonic cultural forms of masculinity as part of identity formation within the social, political and economic institutions of late modern societies (as emphasised by Faulkner) can be a complex phenomenon. Regarding the study of gender and the perceptions of risk, its significance may lie in opening up the possibility that gendered, binary thinking rests on a contestable value base, and that when displayed it is part of the struggles for recognition that take place within gendered discourse.

Section 6: Gender, risk and policy making: a question of nuclear energy or nuclear ethics?

In keeping with the orientation of the present volume, the arguments advanced in this chapter can revitalise and strengthen ethical analysis of nuclear issues in the C21 where diverse identities, interests, aspirations and conflict dynamics bear upon risk, energy and environmental decisions and policy. Hansson (2012) stresses that a variety of approaches are needed for approaching normative risk assessments in such contexts. Some seek to establish new philosophical principles for analysing the continuing deployment of nuclear technology,

for example, strengthening the no harm duty and balancing obligations to future generations with contemporary social interests (Taebi 2011; Taebi, Roeser, and van de Poel 2012). Doyle (2010) has initiated mapping ethical landscapes by highlighting morally justified differences of motivation and conflicting obligations at different levels of ethical analysis. But this is methodologically complex work involving studying how ethical disagreements about nuclear issues emerge in particular contexts, and discussing their significance in policy and public realms. The present chapter, by developing theoretical understanding of the gender-risk relationship in everyday settings, and presenting empirically informed and enriched ethical analysis, starts to elucidate such methodologically complex work.

Our findings concern when, why and how the empirical gender-risk effect was reproduced in group discussions, as a means of fathoming the complexity of gender and risk. The approach taken in the study involved considering discursive struggles over epistemic values and identity (or subject) positioning. A number of matters of controversy emerged in the groups relating to the way different epistemic positions came into play, resulting in a patterning of discourse response around conflicting arguments. Epistemic diversity was mobilised as one among other discursively articulated values and spoken identity positions. Analysis focussed upon occasions where technoscience and care ethics were discussed and, from other less culturally archetypal and recognisable kinds of values, we have started to introduce the importance of mutual recognition (see also Benjamin 1988). This patterning of talk would be expected in contexts where democratic values, attaching importance to disparate voices, come into play. In this sense, what our analyses have shown is not remarkable. But there are important implications when such values are part of discussions about things that matter to people (Sayers 2011), and where the epistemic and other value positions in question are connected to matters of wider policy relevance (Pidgeon 1998). Of particular concern to us in

this chapter are effects that are made – or mobilised - when different issue framings linking to matters of gender are heard to communicate attenuated or amplified perceptions of risk. Our reported findings suggest that, while in certain contexts prevalent forms of knowledge and values may appear as legitimate or dominant, they may appear in others to be opportunistic, supporting one particular group or set of subjective interests, in the thrall of identity dynamics, and thus unlikely to work in an appropriately motivated fashion for a diverse populace or for the collective good. This 'effect made by gender' applies equally to care values and technoscientific ones, suggesting that matters of energy and risk policy are not best approached within either of these frames singly.

A wider issue to which our inquiries speak is what gets omitted from discussions of technology, energy policy, and environmental futures, when and why. Buck, Gammon and Preston (2013), considering the implications of ecofeminism for geo-engineering, have problematised the use of gendered metaphors and discourse in science and policy, and lack of consideration for those who need to be concerned about risk effects either because they are more likely to be vulnerable to them or benefit less from risk adaptation measures. Our own analyses of gendering processes in risk perception likewise engage with some of the same science metaphors (e.g. hubristic attitudes to nuclear power), showing how they can bolster the durable association between masculinity and technology as part of historically constructed realities. However, our study also brings to light epistemic and identity processes by which such associations are re-invoked, re-imagined and reworked in everyday talk - exploring, in particular, how the deepening hold of gender as a form of culturally ingrained and fluid subjectivity holds out different possible interpretations of this long-established cultural association. One way in which our study closely aligns with conclusions drawn by Buck et al is in cautioning against adopting a fundamentally technocratic approach to creating

large-scale system wide interventions for guiding energy transitions and environmental risk management. Alternative, soft energy pathways are capable of avoiding unnecessarily (Parisi 1977) and thoughtlessly (Buck et al 2013) going down risky and uncertain pathways.

Nuclear energy – as we have argued– is not a fixed object of knowledge, but diversely framed over time. Questions of nuclear risk have loomed large in the landscape of public perceptions at certain time periods (e.g. the Cold War), and are awakened in response to everyday incidents prompting awareness of hazards (Parkhill et al 2010), but they do not currently figure in UK nuclear energy frames. Rather, the technology's future role is being determined through its connection with securing energy in the immediate and long term for the population at large, along with achieving decarbonisation targets. Moreover, a clear commitment remains in UK policy discourse that public understandings of environmental and technological risk issues, including risks associated with nuclear technology for the purpose of energy production, are trumped by the objective science of risk should they diverge from it. So it is here where it makes good sense to bring in the gender-risk conundrum from the shadows to centre stage. Buck et al (2013) argue for the need to entertain support for a risky technology all the time it has possible merit in a resource limited and carbon emissions threatened world. They also cover what a concern for gender dimensions can bring to the foreground when "what gets attention" in policy and public awareness are technologically advanced, bold and risky methods, at the expense of gentler, more natural solutions with fewer uncertainties and known risk. This raises the question 'how can gender enhance scientific, technological and risk discourse, and not simply reject such research, in order to consider its possibilities for remediating harm?' Part of the answer is that such discourse needs to change to avoid a gender insensitive research trajectory. Our own research contributes to thinking through how public energy discourses risk gender insensitivity.

Section 7: References

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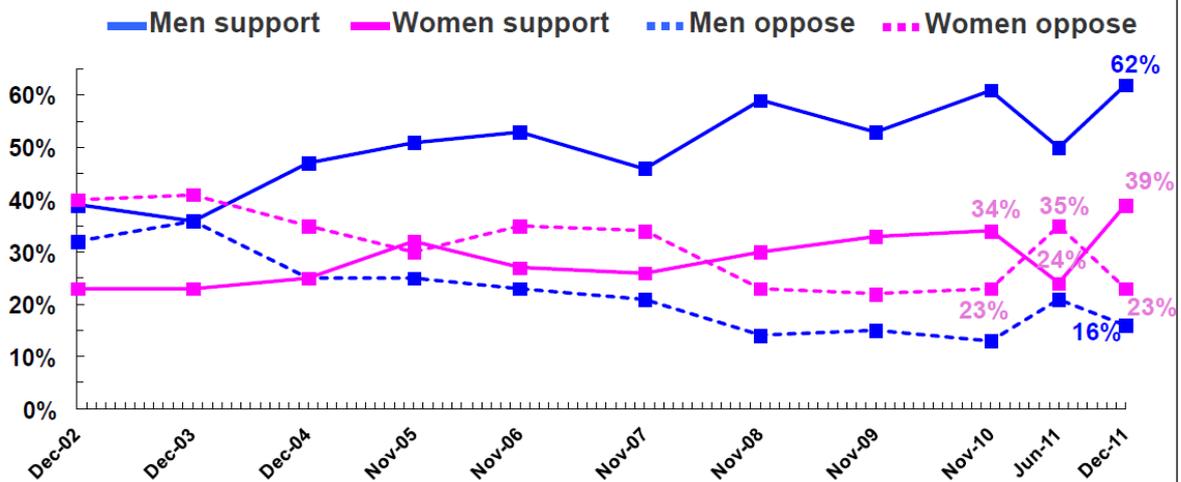
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Figure 1: British Public Views on Replacement of Nuclear Power Station (source Ipsos-

MORI, Nuclear Industries Association)