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Citation: Yates, J. & Skinner, S. (2021). How do female engineers conceptualise career advancement in engineering: a template analysis. *Career Development International*, 26(5), pp. 697-719. doi: 10.1108/cdi-01-2021-0016

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Link to published version: <https://doi.org/10.1108/cdi-01-2021-0016>

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How do female engineers conceptualise career advancement in engineering: a template analysis

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Abstract

Purpose: Existing research has established that women drop out of engineering careers in part because of a dissatisfaction with their career development, but women's understanding of career development in engineering has been as yet largely unexplored. This study explores female engineers' experiences of navigating their careers and their perceptions of barriers to career advancement, through the lens of the Intelligent Career Framework (ICF).

Methodology: In-depth interviews were conducted with female engineers in the UK and analysed using template analysis.

Findings: We identified three structural barriers that participants felt hinder women's career advancement in engineering: 1) promotions are more likely to be given to people who are widely known - more often men; 2) promotions are more likely to be given to people on whom high status is conferred in this context - more often men; 3) promotions are more likely to be given to people who conform to the ideal worker ideology - more often men. The women also offered a series of counter-narratives in which they reframed the behaviour they witnessed as something other than sexism.

Originality: The findings highlight the significant and systemic bias against women's career development through gender work stereotypes and an implicitly gendered organisation which hinders the development of the three competencies needed for career advancement. We describe a range of counter-narratives which the participants use to help them to make sense of their experiences. Finally, we illustrate the application of the ICF as a lens through which to view the career development culture of an organisation.

Keywords: Intelligent Career Framework; Women in Engineering; Career advancement; Career capital

Introduction

The under-representation of women in engineering is well documented. Only 11% of the UK engineering workforce are women (WISE Campaign, 2017) and just 5% of the registered engineers and technicians are female – the lowest proportion in Europe (Engineering UK, 2018). The problems occur at all stages. Women are less likely than men to join the profession and more likely than men to leave it, with half of female engineering graduates pursuing careers outside the discipline, and women quitting the profession altogether more often and earlier than men (Frehill, 2012; Hunt, 2016; RAEng, 2020). Women are also less likely to make it to the top of their profession than men, resulting in more homogenous leadership teams and fewer role models who could encourage younger women to pursue the profession (Engineers Rising, 2018; RAEng, 2020). Crucially this is not changing and the proportion of women studying, working and progressing in engineering has not materially increased in the last twenty years (Corbett & Hill, 2015; Fouad et al., 2016).

A recent strand of literature has highlighted the importance of women's perceptions of the career development opportunities available to them within the engineering industry. Studies have noted that women's perception of their own career development may offer an explanation both for women leaving the profession and for women's slower career advancement within the profession (Buse et al., 2017; Corbett & Hill, 2015; Singh et al., 2018). Fouad et al., (2017) in a large scale survey of women's experiences in engineering found evidence of the importance of perceptions of organisational support, defined by professional growth, development and advancement opportunities. Hunt (2016) found that the main reason for the excess female exits from engineering (compared both to non-engineering science positions and to male-dominated non-scientific fields) is the lack of pay and promotion opportunities. Buse et al. (2015) identified 'powerful but invisible barriers' (p.151) that limited their participants' career advancement opportunities blaming cultural beliefs about gender, workplace structure and systems that are inherently biased in favour of men.

The existing evidence suggests that this may be a fruitful direction for future research but as yet this has not been explored in depth, and further research is needed, as Schmitt (2020) explains: 'Although the reasons for the underrepresentation of women engineers have been investigated, scholarly attention has rarely been given to women's career experiences in engineering and to the promoting factors that explain their career success'. A useful next step is to hone in on career development of women in engineering and explore it in depth, and our study addresses this theme, drilling down to uncover the nuance of the participants' conceptualisations and experiences of career development and advancement in engineering.

Career development of women in engineering

Explicit bias against women in the engineering industry has decreased significantly over the last decades but implicit bias remains widespread (Li, Rincon & Williams, 2017). Evidence of implicit bias in the engineering industry indicates substantial and entrenched structural sexism, with research pointing to the negative impact of gendered organisations, the ideology of the ideal, male, worker, and the impact of gender stereotypes (Ayre et al., 2013; Buse et al., 2013; Cardador & Hill, 2018; Fouad et al., 2011).

A gendered organisation is one in which 'advantage and disadvantage, exploitation and control, action and emotion, meaning and identity are patterned through and in terms of a distinction between male and female, masculine and feminine' (Acker, 1990, p. 146). In other words, even though organisations may seem or claim to be gender neutral, there are assumptions about gender inherent in the very fabric of way organisations work that render them masculine and therefore confer advantages to men. Faulkner (2009), through an observation study in three different engineering firms in the US and the UK, provides an insight to a gendered engineering organisation. She explains that whilst the cultures she observed were generally respectful, she saw many subtle examples of behaviour which made it easier for men to build relationships and fit in, noting in particular the typically masculine conversation topics, and sexualised and sexist banter. Faulkner gives the example of greetings: men would greet each other using male language (such as 'hey man') and shake hands with each other, but would not do either of these things with women. Those small subtle intimacies are not available for male / female relationships which means that every day in small and subtle ways, women are not able to build up the relationships with their male colleagues that men can with each other.

Gendered organisational thinking assumes a 'universal worker' who is male, and subsumes men's characteristics, family relationships and relationship to work (Acker, 1990), which leads to gender segregation and the marginalisation of women. The ideal, male, worker has been noted widely in the engineering industry, and this ideology makes it easier for men to be admired and promoted (Maji, 2019; Pawley, 2019; Thébaud & Taylor, 2021). Organisations may argue that their promotion processes are fair, transparent and open to women and men equally, but because the ideology of the ideal worker is male, women are less likely to match this ideal, and are less likely to be *perceived* as a match. Acker argues that in this way gender is obscured in organisations by a gender-neutral discourse: the narratives and rhetoric around promotion and participation are gender-neutral, but the processes are not; they are tailored towards the career advancement of the ideal worker, and as such are biased towards men (Acker, 1990).

Dominant ideologies also play a significant part in the barriers to career advancement of mothers, seen through the lens of role conflict theory (Eagly & Karau, 2002). In the engineering industry (in common with many other workplaces) women's career development and participation often tails off once they have children (RAEng, 2020; Roberts & Ayre, 2002; Shing et al., 2018). The prevalent western ideology of the ideal mother is one who is totally devoted to, satisfied by and available for her children (Hays, 1996; Rosen, 1979). This contrasts with the dominant ideology of the ideal worker, who is totally devoted to and available for their work (Acker, 1992; Dingel, 2006; Ely & Meyerson, 2000). These two ideologies are clearly at odds with each other, and mothers trying to combine motherhood and employment are faced with the goal of trying to work as though they have no children, and parent as though they have no work (Parentworld, 2019). This conflict has been reported by women working in a range of different industries (Eagly & Karau, 2002; Eagly & Sczesny, 2019; Johnston & Swanson, 2006) but the contrast is thought to be more marked in male-dominated spheres, where the ideal worker culture is more extremely masculine (Blair-Loy & Cech, 2017), and it has been shown to be a particular issue in the engineering industry (Fouad et al., 2011; Reilly, 2016). In contrast to the ideology of the mother, totally devoted to her children, is the ideology of the father, who is expected to be the breadwinner of the family (Marsiglio et al., 2000). This fatherhood ideology is quite compatible with that of the ideal worker, in that a devotion to the organisation and a successful career allows fathers to be the most lucrative breadwinner and therefore the most perfect of fathers.

Gender work stereotypes in male dominated work environments can be either descriptive (assumptions of what women are like) or prescriptive (expectations of how women should behave (Heilman, 2012)). Descriptive gender stereotypes can have a detrimental impact on women's career advancement because they establish the perception of a poor fit between women and the attributes thought to be necessary to do the job, and this leads to negative performance expectation. Prescriptive stereotypes can be detrimental because they create social norms which then cause negative judgements when they are violated. Williams and Dempsey (2014) described three types of stereotypes which are shown to lead to bias against women in the engineering industry. The *prove-it-again* stereotype suggests that women are not as competent as men, and this assumption means that women have to outperform men to be considered equal (Fiske & Tayloe, 2013; Heilman, 2012; Knobloch-Westerwick et al., 2013). The *tightrope* stereotype represents the combination of pressure on women to behave in a feminine way and the backlash they experience when they behave in a

more masculine way. The tightrope is the narrow path women have to tread to be sufficiently masculine to be considered competent but sufficiently feminine to be considered likeable (Cuddy et al., 2008; Fiske et al., 2007). The *maternal wall* is the stereotype that mothers are less competent and less committed to their work (Williams, 2016).

Coping Strategies

The women who are working within gendered organisations use a variety of strategies to make sense of the position they find themselves in (Treanor et al., 2020). Women have been shown to adopt “honorary men” identities (Baker, 2016; Hatmaker, 2013) demonstrate the “Queen Bee” syndrome (Mavin, 2006), or choose to leave formal employment, either becoming self-employed or giving up paid work altogether (Braches & Elliott, 2016).

One strategy observed within the engineering industry, is that women deny sexism, offering alternative counter-narratives to explain the discriminatory behaviour they see. Fouad, Fitzpatrick and Liu, 2011 found that whilst their participants, female engineers, all described gender discrimination, they did not conceptualise it as a gender inequality, and Rhoton (2011) and Dryburgh (1999) both found that when they did see sexism, participants saw it as exceptional. Seron, Silbey, Cech and Rubineau (2018) cover similar ground but with engineering students. They found they whilst their female participants recognised that they were being marginalised, they found narratives to explain it away. They blamed themselves, believing in the meritocracy of the industry, and felt that it was down to them to change or improve.

Counter-narratives fulfil an important sense-making function, maintaining an individual’s sense of identity and reconciling contradictory evidence (Coopey et al., 1997). The realisation that they have been on the receiving end of sexist discrimination can have a negative impact on a woman’s identity, positioning her as a victim, who has not been in control, and who is powerless and weak (Leisenring, 2006). A counter-narrative that offers a plausible alternative for the sexist behaviour may allow the woman to preserve her desired social identity and maintain her feelings of self-esteem and self-efficacy (Coopey et al., 1997). Acknowledging the existence of sexism in the organisation more widely might also raise uncomfortable questions for a woman about her own choices: her decision to work for an organisation which does not seem to offer women equal opportunities, or one that is not meritocratic. A counter-narrative may offer the chance to develop a story that can resolve this uncomfortable cognitive dissonance between behaviour and values (Festinger, 1962). These sense-making narratives may be particularly important in the engineering industry whose ideal worker embodies the masculine ideals of strength and rational thought (Fouad et al., 2011; Reilly, 2016), although there has however as yet been limited exploration of this phenomenon within the engineering industry.

It is clear then that implicit bias of the gendered organisation, the ideology of the ideal worker, role conflict and gender stereotypes all contribute to a culture within the engineering industry in which women’s career development and career experiences are negatively impacted. Women cope with this hostile environment in a variety of ways, including denying the existence of the gender discrimination. But our understanding of this topic is as yet partial, and the existing literature does not yet furnish us with a good understanding of the way that women in engineering make sense of career development in their organisations. Our study aims to make a start on closing this gap in the

literature, exploring women's experiences and understanding of career development in one engineering firm.

Theoretical lens

In this study we explore women's perceptions of career development and advancement within engineering through the lens of the Intelligent Career Framework (ICF) (Arthur et al., 1995). Building on Quinn's idea of the Intelligent Enterprise (Quinn, 2005) the model was developed as a framework to help people understand how to further develop their own careers, within contemporary organisations. The model proposes that workers can manage their careers through developing three core competencies: knowing-whom, knowing-how, and knowing-why (Arthur et al., 1995). Knowing-why refers to motivation, identity and other factors related to an individual's profession, role, organisation or sector, as well as their lives, roles and responsibilities outside work. Knowing-how refers to human capital, from both formal education and on-the-job learning, that allows the individual to perform their job well. Finally, knowing-whom concerns social capital and the value that other people can bring in terms of knowledge, comradeship, teamwork, and access to further opportunities (Arthur, Khapova & Richardson, 2017). Evidence supports the claim that high investment across all three ways of knowing will drive career success (Colakoglu, 2011; Eby et al., 2003; Sherif et al., 2020; Van den Born & van Witteloostuijn, 2013).

The ICF has evolved from its original conception in the mid-1990s and the aim of the framework as it is used now is to enable people to take ownership of their careers – those working in organisations, entrepreneurs, and those navigating a career that involves working in a range of different organisations – either concurrently, or sequentially (Arthur, Khapova & Richardson, 2017). The ICF now looks beyond the organisational career and supports individual career ownership, whilst acknowledging and incorporating contextual influences. The ICF approach to navigating careers has in the past been criticised for placing responsibility for maintaining employability on the individual rather than acknowledging the role of the organisation or wider society (Inkson et al., 2012). Yet the contemporary version of the ICF as shown in Arthur et al. (2017) does acknowledge very clearly that contemporary careers are embedded in society and gives full voice to contextual factors.

To date, this model has been widely used to explore and support the career development of individuals. As a tool to help clients with their own career planning and career development it has been used with university students (Wnuk & Amundson, 2003) and leaders (Parker & Arthur, 2004); as a framework to help understanding career success it has been applied within academia (Beigi et al., 2018; Sherif et al., 2020), and within human resources in Korea (Yong-Ho, 2020); and to explore career choices, it has been used with workers in hostile environments (Dickmann & Watson, 2017) and career changers in engineering (Hunter, 2016). Recent publications have been especially mindful of contextual factors and have looked at and incorporated the recursive nature of careers. These include Sherif et al.'s, study of academic career success (2020) which explores why some academics are more restricted in their career development, and Khapova and Korotov (2007) used the ICF to examine the impact of the economic, social and political context on career development in Russia.

It has been argued that organisational career development theories to date have been fragmented, focusing on either agency or structure (Hirsh, 2016; MacKenzie Davey, 2020). Theories that have focused on the individual have been criticised for over-emphasising agency and under-emphasising

the importance of context (Inkson et al., 2012) and this focus on individual responsibility for careers may have led to a neglect of the role of the organisation, resulting in a lack of appreciation of both the importance of the career for organisations, and the importance of the organisation for careers MacKenzie-Davey (2020). Theories that have focused on the organisation have traditionally been concerned with company performance and have been criticised for concentrating on a small group of high performing 'talent' (Dries, 2013) and prioritising the employer's financial gain above all (Bidwell, 2013). A more valuable approach, we argue, is to see career development as a joint project run collaboratively by the individual and the organisation (Hirsh, 2016), moving away from a tension between agency and structure to embrace a wider range of influences including social changes, ideologies and social norms (Gunz et al., 2011; MacKenzie Davey, 2020).

Responding to these calls and building on the developments in the ICF literature which have broadened the framework's focus and now acknowledge the influence of contextual factors, our aim within this study is to extend the possible application of the ICF yet further. In this study, we analyse the experiences of workers in one organisation to assess the structural opportunities for career advancement that are offered within an organisation. Rather than being used as a framework to support individual career ownership, we use the ICF to explore the ways in which an organisation is supporting and facilitating individual workers to progress within their careers. This is, to our knowledge, the first time that this framework has been used to illuminate the career development culture of an organisation.

The literature to date has provided many valuable insights to the experiences of women in engineering, but its exploration of women's experiences and understanding of career development in this industry remains limited. Responding to calls for more qualitative studies of the experiences of women in engineering (Buse et al., 2017); for a specific focus on the career development experiences of women (Makarem & Wang, 2020; Schmitt, 2020) and for more career development theories which examine both individual and organisational career development (Gunz et al., 2011; MacKenzie Davey, 2020), our study contributes to the literature in two key ways. We examine the perceptions of career development and advancement of female engineers, based on the participants' experiences and observations of this within their engineering company, and we use the ICF to help understand the career development culture that women in engineering face.

Specifically, this research addresses two questions:

- RQ1: how do female engineers conceptualise career development in engineering?
- RQ2: what do women feel prevents them from fully developing their career competencies: knowing-why, knowing-how and knowing-whom?

Method

Participants

The participants were female engineers who worked for one global engineering firm based in the UK. The second researcher is employed within the firm and as such was able to gain the support of the organisation and access to communication channels. The firm has over 5000 employees, only 16% of whom are women. The gender pay gap in the organisation is more than 17%, with women making up 9% of the top quartile of earners, and 32% of the bottom quartile of earners. The

selection criterion was that participants should be female engineers and should have been working in the organisation for at least one year, to ensure that they had had time to get to know the organisational culture, and develop a view about the career advancement practices in the organisation. 32 female engineers took part in the study, and reflecting the nature of the organisation, the engineers worked in a range of different specialisms, including aeronautical, defence and software. Participants' tenure in the organisation ranged from 2 years to 38 years, with a mean of 12.9, and 13 of the women had children. Further details of the participants can be found in the supplementary file.

Procedure

Once ethical approval from the university was obtained, the researchers sent an email to all the women currently employed at the organisation, explaining the research and inviting them to take part. Given that the study was taking place with the support and full knowledge of the HR department, particular care was taken to reassure the participants that their details would remain confidential and their data would be pseudonymised and all identifiable details would be removed. 32 female engineers who met the inclusion criteria responded by email and returned completed consent forms and were subsequently interviewed. No incentives were offered.

We developed a semi-structured interview schedule which, aligning with our phenomenological approach aimed to allow participants to talk freely and to offer rich descriptions of their experiences. Further open-ended questions were then used in order to encourage participants to reflect and elaborate on their initial accounts. The questions were designed to explore participants' career development experiences and to examine any barriers they felt they faced. The questions were open and the researchers used prompts to encourage the participants to give full answers. Questions included *'Tell me a bit about your career to date'* and *'What factors have influenced your career path?'*

The participants worked in a number of different offices across the UK, and as such, it was not practical to interview all the participants in person, but interviews were conducted face to face where possible, and via Skype or telephone where geographical distance prevented a meeting with the researchers. All interviews were recorded with consent from participants and transcribed verbatim. Interviews lasted on average just over an hour, and in total we collected and analysed 38 hours of interview data. Data were collected between June and August 2019, and data were collected and analysed by both authors.

Data Analysis

This study is underpinned by phenomenology which is both a philosophy and family of research methodologies (Gill, 2014). This study takes an interpretative phenomenological approach, aiming to describe, understand and explain participants' experience of the phenomenon, and to uncover otherwise hidden meanings (Spiegelberg, 1975; van Manen, 2017). Phenomenology has been used in organisational research looking at, for example, institutional work (Holt & Sandberg, 2011) and organisational identity (Gioia et al., 2013) and has been used to explore gender issues in organisations (Agarwal & Sandiford, 2021; Giazitoglu & Muzio, 2021; Huff et al., 2018; Kirn et al., 2019). As Gill (2014) has argued, phenomenology is a powerful tool for scholars seeking to examine and explore how individuals subjectively experience and give meaning to particular phenomena, including institutions and as such we felt it was suitable for this study.

The data were analysed with a template analysis (King, 2004). Template analysis, as with other forms of thematic analysis, is not wedded to a particular philosophical approach (Braun & Clarke, 2006; Brooks et al., 2015), but can be used flexibly, in keeping with the particular epistemological stance of the researcher and the project, and has been described as a suitable method for analysing interpretative phenomenological data (Benner, 1985; Gill, 2014; King, 2004). An initial template of themes and sub-themes was created based on the first 12 interviews and we then worked through the rest of the data, line by line, looking for text which could be relevant to each of the themes. The data were analysed through the lens of the three competencies of the ICF, and in accordance with King's suggested process for template analysis (King, 2014), we examined words, phrases and ideas which could be helpful in understanding the women's experiences. Where they appeared to relate to one of the three ICF competencies, we coded them as such. We also looked for meaningful aspects in the data that did not relate to the three competencies and coded them separately. The codes were then grouped into meaningful clusters or themes and arranged within a hierarchy. Through this process, the template was refined. New codes were added, a priori codes deleted, labels were renamed, and hierarchical layers were inserted.

The data from 32 interviews fitted into the template themes developed in the final stages of analysis, and the analysis of the final scripts, few new constructs, ideas or insights were gleaned; further collection of data was not expected to yield new insights, and it was thought that data saturation had been reached (Suri, 2011). The number of participants is within the recommended guidelines for template analysis (King, 2004), for interpretative phenomenological studies (Gill, 2014) and for qualitative studies within work-related research more generally (Saunders & Townsend, 2016).

Every effort was taken to ensure the trustworthiness of the analysis (Lincoln & Guba, 1985). To ensure consensus, the two researchers coded twelve of the scripts independently, developed their own themes independently and discussed their findings until they agreed on the initial template. The first author then coded the remaining scripts, and incorporated the new codes within the existing template, making changes to the template where needed. In addition, the data analysis was shared with a colleague who had not been involved in the project for comment, and to check that the assumptions were reasonable and the data analysis made sense. The researchers were meticulous in their detailed analysis of all interview transcripts and both kept reflexive journals throughout the research process, updated after each interview and throughout the process of data analysis.

Findings

The analysis of the data revealed three overarching themes which represent the women's understanding of career development in their organisation: first that promotions come to those who are widely known (seen in the narratives of 30 of the 32 participants), second that across the organisation, men are given a higher value than women (28 of the narratives), third, that mothers have to contend with the conflicting ideologies of a good worker and a good mother (27 of the narratives). We also identified a series of counter-narrative which seemed to help the women to make sense of the career advancement processes they witnessed in which they identified mitigating

explanations for sexism-in-action (31 of the narratives). A table detailing which themes were identified in each participants' narratives can be found in the supplementary file.

The focus of the study was on perceptions of career development broadly, and participants were asked about their own 'careers', 'career paths' and 'career development'. It was notable that the participants' responses generally focused on measures of career advancement, in terms of pay, promotion and access to career enhancing opportunities. In keeping with a phenomenological approach, we have kept with the use of the term 'career development' whilst acknowledging that the participants defined this in a more specific way.

Barriers to career advancement

1. Promotions come to those who are widely known – more often men

1.1. Opportunities come to those who are audible

Across the data, the participants seemed agreed that people are only be promoted if they can make themselves heard, as Kim explained, *'the world tends to promote more confident, more outgoing-type people'*. Tamiko's conclusion after some years in the organisation was that you need to make yourself heard to get on: *'you just get forgotten about because you're not shouting'*. Micky had no complaints at all about the process or the support she has had but acknowledged *'I do think you have to fight for it a bit, and if you don't say anything, it's very unlikely you will just get promoted because you're doing a good job'*. The strength of the language used by the participants was notable. The words 'fight' and 'shout' were used numerous times in the narratives perhaps illustrating how alien this style is for them.

A number of the women seemed to feel that the issue was not explicitly about gender; as Julia said, whoever you are, *'if you make enough noise [...] you can usually get it'*. Mary emphasised that it was personality rather than gender, explaining the value of having what she described as *'a show-and-tell type personality'*. But although the women felt it was not explicitly about gender, they recognised the implicit bias, concluding that this behaviour comes to men more easily than to women, as Caroline said: *'men are more inclined to do the pushing'*. Mary observed that *'I have been noticing when I've been to certain events recently that quite often just naturally the men take the lead and do the talking and the women fill in the gaps'*. Corinne concluded that *'men are pushier about what they want'* and Juliet put it down to confidence, saying that men are more vocal about what they want because they *'feel confident'*. Julia said that *'men tend to speak up more.'* and Ruth, that *'men manage to get promotion more quickly because they put themselves out a bit more sometimes'*. It seems that this kind of behaviour, the behaviour you need to get noticed, is easier for men.

The women were aware that being audible was important for their career development but found that in different ways, their voices were silenced. Some found that they were not invited to meetings. Tamiko felt sure that she was not invited because the men found her *'difficult'*. Michelle was less clear about the reasons, but did observe: *'you do find sometimes that you haven't got invited to meetings and you're surprised because you're the person who's got the information they*

need. More frequently, the women felt that although they were invited to meetings, they were not listened to. Ella said *'I find it hard to be listened to'*, and Michelle lamented that *'even just being able to get your voice heard in meetings can be difficult'*. Soraya said that she often felt *'over-spoken at meetings'* and Corinne echoed this, saying that *'people speak over me at meetings'*. Ruby concluded that *'there is no point even talking, is there?'* Mary observed that as a woman, just speaking isn't enough to make yourself heard *'you actually have to do something to be heard, something out of the ordinary'* and Sarah said that *'I have to push to talk'* and that more than once *'I actually put my hand up'*.

One strategy used by some of the women was to adopt what they saw as more masculine behaviour – Katrina explained that *'you need to adopt a laddish mentality – just putting yourself forward'*, but whilst this ensures that their voices are heard, for these women it came at a price. Tamiko explained that she has had to become more assertive: *'I've had to change in terms of being more bolshie, and being more outspoken'* but observed that this is *'seen as too direct and confrontational'*. Caitlin was paid less than her male predecessors but was told it was *'highly distasteful'* to raise this. Juliet says that *'I think women can often be seen to be a bit too pushy and aggressive maybe'* and Robin explained that she felt very judged when contributing at meetings, saying that people *'turn round and look at you like "how dare you!"'*.

1.2. Opportunities come to those who are in the right networks

On top of the importance of being heard, the participants felt that promotions, pay rises and career-enhancing opportunities tended to come to those in the right networks. Alison suggested *'people look after their own'* and Caroline observed that people like to hire in their own image, favouring *'a mini-me'* when selecting people from promotion. Penny explained *'I think quite a lot of the time it's got to do with who you've been involved with.'* and Jenny echoed, *'a lot of the time it will come down to who you know not necessarily what you know'*. A number of the women (Robin, Julia, Melanie, Hayley, Michelle and Katrina) mentioned phrases such as *'boys' club'* or *'old boys' network'* and Mia stressed *'it's all MEN there in this natural club'*. Robin explained the value of these informal networks, saying *'it kind of feels like, yeah, maybe they're getting favours done for them - pull a few strings'*. The women in this study felt that their male colleagues were more easily able to manoeuvre themselves into the right circles, in large part because it seems to be easier to make same-sex friendships, as Jenny put it, *'people probably do feel more comfortable, maybe, with their own gender'*. But although they may have understood the reasons, a number of the women spoke about feeling deliberately excluded, Juliet lamenting *'you've got that whole network happening without me'*, and Ruby describing occasions when male colleagues have stopped their informal conversations when she entered the room saying to each other *'oh we'll talk about this later'* which made her feel *'a bit put out really because, why would you want to have a joke without me?'*

The first reason put forward for the prevalence of same-sex friendships was shared interests. The women observed that men just had more in common with other men, and often mentioned sport as a conversation opener *'did you see the football?'*, or a bonding pastime *'golf weekends'*, *'football games'* (Sarah, Caroline, Robin, Ella, Juliet, Grace, Mary, Julia and Katrina). Julia saw that this allowed men to form natural, informal networks with other men *'they become part of the lads, they join the golf club'*, Caroline talked about her (male) team-mates all *'playing football together'*, and Robin linked this explicitly to career opportunities suggesting that a connection between two men,

grounded in sport could make a difference to their chances of promotion: *'if there was three people being put forward for promotion, but "oh I know this guy, he's a really good guy – he talks about football"'*. Although sport was the most common male hobby discussed in the narratives, it was not the only topic described as the preserve of men, and Neena spoke of the challenges in developing friendships with her male colleagues explaining: *'I don't have a huge knowledge of or love of tanks or aircraft that a lot of the chaps do'*.

Alongside the importance of interests in common, there were a few participants who commented that cross sex friendships are more difficult because they are open to misinterpretation: Jo recounted incidents where she was asked whether she was having an affair with a male colleague because she was *'chatting to him outside the office'*, and Robin, who described herself as *'a tactile person'* felt that a touch on the arm could help to connect with others, but pointed out that *'with a guy you couldn't do that for so many different reasons'*. Grace was more explicit saying that although she is naturally more drawn to men than women, she sometimes avoids them *'because they try to hit on me'* and notices the problem from both sides, saying that *'I'm quite jokey, sometimes it might come across as flirty'*. This is particularly interesting given then widely vaunted notion of 'banter' which seems to characterise the male interactions in the office. Men develop friendships through joking and teasing each other, and if this behaviour is interpreted as flirtation when it occurs between men and women, then professional cross-sex relationships are bound to be more difficult to establish.

Men therefore may feel that not only do they tend to have less in common with women, but that these cross-sex friendships have to be handled more carefully – as Robin summed up, *'guys feel safer with guys'*. Jo noted that the issue of networks was not necessarily *'a gender thing'* and several women mentioned that they themselves found it easier to develop friendships with other women - Robin described the relief she feels when she interacts with women *'oh she's one of me'*; but with fewer numbers of women overall, and fewer still in senior positions, the male networks are bigger, and more likely to be useful and as Grace summarised *'there's men higher than them, like you can socialise with these men and then you get in that circle and then your name gets passed around and then it goes on and on'*.

2. Promotions are more often given to those with high status – more often men

The second overarching theme identified in the data is the idea that in different ways, men have a higher status and are thought to be more valuable within the organisation and therefore more likely to be promoted than women.

2.1. Women are not valued

There were examples across the data of comments and incidents which showed that the culture was one in which women were given a lower status than men, summed up by Robin who said that in any given context *'the guy has more influence than the girl'*. Jo, highlighting that these attitudes are held by the women themselves as much as by their male colleagues, said that she always preferred to work with men because she felt *'more confident in their abilities than the women'*.

The participants felt that, because they were women, there was an automatic assumption that they would not be as good as their male counterparts, as Olivia explained *'the guys always had this*

perception that I can't do it' and so the participants felt that they had to work harder to be valued equally. Tamiko felt that she has to *'go the extra mile to be seen as equal to those just doing their nine to five'*. Juliet has felt she has *'had to kinda prove myself a lot'* and believed that *'women do have to go that extra mile to compete'*. Jenny said that as a woman *'I feel a constant need to have to prove myself all the time'* and Ruby lamented that *'this has been my eleventh year and every day I've come into the company and had to prove myself [...] you've got to come in and prove why you're there and why you've got that job or why you're in the room'*.

The women reported numerous occasions on which others assumed that they were less capable, or less senior than they actually were. Ruth felt that her bosses were protecting her by preventing her from taking on particular tasks because they were not sure she could manage it: *'I just felt as if they didn't have confidence in my ability'* and there were several examples in which the female engineers were asked to undertake low level tasks: Paula was asked to do a *'male colleague's admin'* and Ruth was asked to *'tidy the stationery cupboard'*. Other women had experienced or witnessed assumptions that the women in a group would be in low status roles; Michelle observed that people assume she is more junior, explaining, *'they assume that the woman they can see is the administrator'*.

2.2. Negative discourses about women

The women were all asked about their experiences of working in a male-dominated environment, and for many of them this had been the norm since their university days. A number of them, however, had spent some time working with women and there was a common narrative about how difficult women are to work with. Olivia stated *'I would hate to work with women, they are so horrible'* and Charlotte said that she found it *'frustrating'* to work with women as *'they just don't see the bigger picture'*. Caitlin said that she preferred male-dominated working environments because women are *'two-faced and silly'* explaining: *'a certain kind of person will go into a science background because they want facts, they want to get to the truth, and those kind of people are less likely to be bothered by girlishness and frippery and therefore the minutiae of rubbish in life that isn't important.'* This is quite a damning indictment on all women who are not scientists, and identifies scientists as a group that seems to transcend gender and certainly is at odds with people who are *'girlish'*. Melanie used well-worn stereotypes to describe a female colleague, saying that *'she felt that she was going to bring the pink into engineering; ballet dancing and getting dressed up'* and Paula described women using similar terms *'all covered in glitter and rainbows'*. Notably, the word *'bitchy'* was used a number of times by the women participants to describe their perceptions of all-female environments (Grace, Hayley, Ella, Robin, Caroline, Caitlin and Michelle). The participants too mentioned positive characteristics that define relationships with male colleagues (and by implication distinguish them from relationships with female colleagues), Norah commenting that with men *'you can have a laugh and a joke'* and Claire observing that men are less likely to *'hold a grudge'* after a work disagreement. Juliet noted the double standards in which when women lose their temper they are described as being *'unstable'* or *'having a hissy fit'*, but when men behave in the same way, it's excused as *'blokes just being blokes'* and Michelle spoke about how easy it is for women to get a reputation as being *'feisty'* for behaviour *'that would be entirely normal for a man'*.

3. Promotions are more likely to be given to people who conform to the ideal worker ideology - more often men

Within this theme we highlight the conflict that women face as they try to conform to the competing ideologies of being a good worker and a good mother.

3.1 *The ideal (male) worker*

The ideology of the kind of person who makes a great worker within the organisation came up frequently in the women's narratives and always looked the same. This ideal worker is full time, prepared to work long hours, and able and willing to travel at a moment's notice. And he is male. Joanna explained that managers ask themselves *"Who is reliable, who can we call on at a moment's notice?" And nine times out of ten it's the guys'*. The organisation is a global company, and international travel is an integral part of many engineering roles. Sarah observed *'You're more likely to be promoted if you are willing to move around the country, work longer hours'* and Norah described the culture as one in which *'you stay till the job's done'*. Penny and Hayley both explicitly linked this to gender, explaining that men are more likely to be promoted because *'they don't have family pressures so they can afford to travel a lot.'* The assumptions that male workers would be more able to travel seems to be enhanced by the company's links with some of the major oil producing countries, which can be less welcoming to female engineers, as Juliet noted *'if you go to Saudi or Kuwait, you know, then you can't send women'*. The gulf between the ideal worker and mothers seemed particularly wide. Mary observed *'people make assumptions and think because you have children, I guess we will go with the guy.'* and Joanna highlighted the perceived importance of being able to work full time saying *'you can't promote someone who's part time'*, a sentiment echoed by Charlotte who said *'if you're doing part-time, you're not necessarily going to get more roles'*. Katrina spoke about the challenges of keeping women who are on maternity leave involved with work, explaining that engineering *'moves incredibly quickly'* and that projects in this industry *'are really really complicated'*.

3.2 *Conflicts for mothers*

Every one of the 13 mothers in the study, as they tried to combine work and motherhood, explained that they found it difficult, unsatisfactory and draining. Kim described it as having *'a second project on top of everything else to try and organise what my son is doing for the next three days'* and Robin said *'I've literally got two jobs in my life. I'm a mum and I'm an engineer and I find it difficult juggling the two'*. She felt that colleagues expect her to stay at work until the work is done, even if that is late in the evening, and are irritated and assume that she is not committed to her job if she does not, and Mary explained the embarrassment and hypervisibility she felt when she left work on time, *'it becomes kind of almost like a spotlight on you if you're walking out the door'*. Juliet talked about her frustration that she feels that she has to choose between being a good mother and a good worker: *'I want to be a good mum, I want to be great at my job; why can't I have both?'* and Vicki illustrated the tensions with this example: *'I can either, you know, read all these documents or I can go home on time and feed my kids'*. Grace suggested that the difference in opportunities was so stark that women have to make a deliberate choice *'You do one thing or the other - you either have a big long career or you have kids'* and Soraya talked about having to make *'that choice between family and career'*.

It was not lost on the participants that the fathers in the organisation did not seem to feel this tension. Lily stated *'I have had to sacrifice work for my babies; for men there is almost no impact'*.

The fathers appeared to manage to combine parenthood with work because the mothers seemed to take responsibility for the home and the children, leaving the fathers still able to fulfil expectations of the ideal worker. Vicki said *'it won't even go through my husband's head how his own children are getting home from school today'* and Juliet observed that *'there's a lot of management who are male and have the support at home'*. Many of the participants talked about the status quo as though it were inevitable. Soraya pointed out that *'someone needs to care for the children, and it's not going to be the men'*. Robin was a lone voice as the only one of the participants who explicitly questions these gender roles. She bemoaned the lack of work life balance in men, suggesting that they should want to *'spend time with their children'* too.

The organisation has introduced a range of family friendly policies. Employees can apply to work part time, and there are short core hours to enable parents to drop off or pick up their children at school. But the culture is lagging behind. Vicki who has taken advantage of the flexible working policies and has negotiated to leave at 3pm two days a week explained: *'it's perceived quite badly, [...] other people find it inconvenient that you have to go'*. which is particularly note-worthy, given the culture, described by some women, of the men taking time out of the working day to socialise together. Ella described the 'Beer and Butty' events which involve all the men in the team being out of the office every Friday afternoon. She commented *'they leave at 12 and I'm like, "alright, have a nice afternoon [...] that's fine, I'll stay at work"'*, which highlights a double standard: men are free to spend the afternoon in the pub, but women feel that they are publicly denigrated for leaving early to pick up a sick child, or going home at their contractually agreed finish time. Within this organisational culture, it is only those who are entirely flexible who are considered to be motivated and even here, there are double standards at play, as flexible working to pick up a child is considered a sign of a lack of commitment, where flexible working to go the pub is not.

The three themes which were identified in the women's narratives suggest that there are systemic cultural and ideological barriers, within the organisation which hinder their career advancement, through curtailing their chances of getting noticed (knowing-whom), and through limiting others' perceptions of their human capital (knowing-how) and motivation (knowing-why).

Counter narratives

4. Mitigating explanations for sexism-in-action

The themes above summarise the women's accounts of their understanding of the process of career advancement within their organisation. These accounts revealed the participants' views that career advancement is a sexist process, that discriminates against women – against the participants themselves and against other women. But alongside these narratives, the participants offered another, an alternative, apparently contradictory account, identifying a number of mitigating explanations for the sexism-in-action in the organisation. The women, without exception, had experienced or witnessed women being disadvantaged in some way at work. Yet the same women who observed and labelled the culture as discriminatory did not conceptualise it or label it as sexism, and instead they put forward numerous alternative explanations for this treatment.

We identified eight different explanations, each supported by the data from at least three of the participants.

- i) Some feel that claims of sexism are overstated. Caitlin said that she didn't understand the gender pay gap report and that she *'never got into those metrics'*, explaining *'stats is smoke and mirrors anyway'* and Jo explained it away as being linked to *'all the hype in the media'*.
- ii) Some acknowledged that women are under-represented in the higher ranks, but saw this as the result of their own choice, not any discrimination. Lucy explained that *'it's because women don't want to get there'* and Robin argued *'You're assuming that women want to get promoted - I know for a fact that many don't.'*
- iii) A number of the participants see that women don't get to the top, but they think it's not about gender. Jo said *it's down to how much you want to push yourself forward, how flexible and how career-minded you are'*, Mia, Ruth and Juliet said it was down to *'personality'*, rather than gender, and Charlotte explained that it was down to how *'pro-active'* a person is.
- iv) Some noticed that they were excluded at times, but felt that it was for reasons other than gender including age, personality or level of seniority. Janey and Frances blamed the role, Frances explaining *'There's times I have been excluded, but I don't think it's a female thing, it's just the nature of the job I do.'* and Grace felt that her lack of training is not down to gender *'it's probably just budget or whatever'*.
- v) A group of the participants acknowledged that there was some sexist behaviour within their teams, but found explanations that would soften the intentions behind the behaviour, Michelle finding it possible to admire their colleagues' honesty (*'at least they are being honest'*), Julia seeing their attitude as old fashioned paternalistic charm (*'he's harmless, he's delightful, but some people could take offence'*), or for Paula and Neena, downplaying the significance, Paula saying *'it's all good fun, they don't mean anything by it'* and Neena explaining *'there's nothing dreadful going on, it sounds more dramatic than it is'*.
- vi) Some laid the blame outside the organisation, saying that it is simply because not enough women are not coming through from the education system, and that is a much more widespread problem. Micky argued that *'it's not necessarily the company's fault'* and Kim felt that the situation in the organisation was *'no different from the rest of society'*. Claire said that she has seen no discrimination at all in the organisation; she noted that in meetings she is always the one who takes the minutes, but said she doesn't mind, because she quite likes it, and that it's just a *'society thing'*.
- vii) A group of the women found ways to make the best of the situation, either because they are so used to it, it has become the norm, or through minimising the impact the incidents have had on them. Charlotte said, *'I'm fine, I'm over it now, it's all good'*, Grace explained *'you just laugh it off'*, and Juliet seemed not to mind when men took her ideas and claimed them as their own, saying *'you can think it's your idea, that's absolutely fine'*.
- viii) Finally, some managed to see the positives, feeling grateful for what they have. Tessa quite likes it when she's excluded from meetings *'I'm probably happier that way, not being dragged into lots of meetings'*, Neena felt that being on the receiving end of discriminatory behaviour led to the development of *'closer working relationships than we might have formed otherwise'* and Juliet felt that following a demotion, she was happier in the lower role explaining *'I don't want the badge'*.

Three of the participants highlighted their awareness of the conflict between the two narratives (the sexism and the mitigating explanations) and the tension they felt. Neena reflected that *'I don't like to think that I would put up with it'*, Grace said *'if you let it be real then you're just going to get upset'* and Michelle observed *'I just laugh it off, or whatever, but if you really think about it, it's weird'*. We will pick up on this in the discussion below.

Discussion

This study examines the narratives of 32 female engineers working in one engineering firm in the UK. The research aimed to answer two questions: how do female engineers conceptualise career development in engineering, and what do women feel prevents them from fully developing their career competencies: knowing-why, knowing-how and knowing-whom? The template analysis revealed three themes which reflect the women's understanding of career development and advancement in this organisation: promotions come to those who are widely known, to those who have a higher status and to those who conform to the ideal worker ideology; and people in all three categories are more likely to be men. In addition, we identified an additional theme which appeared to serve as a sense-making mechanism - a set of alternative mitigating explanations for the sexism-in-action they witnessed.

The study makes three key contributions to the literature. First it illustrates the systemic implicit bias against women's career development, illustrating the gendered nature of the organisation, and the gender work stereotypes the women contend with, and showing how they impact on each of the three competencies that are needed for career advancement. Second it illustrates the value of the application of the ICF as a framework to help understand an organisational culture of career development. Finally, it identifies a series of counter-narratives that women use to make sense of their experiences.

The first key contribution is an examination of the women's understanding of career development based on their experiences in the engineering firm. The narratives of the women offered a clear model of career advancement within their engineering firm in which men are favoured. The women explained that promotion is more likely to go to people in three categories: 1) those who are friends with or are heard by senior managers (more likely to be men), 2) those who are accorded high status in the organisation (more likely to be men) and 3) those who most closely embody the organisations ideology of the characteristics that make a good worker (more likely to be men). These three categories resonate with the three aspects of the ICF (knowing-whom, knowing-how and knowing-why) which are shown to help career advancement (Beigi et al., 2018; Parker & Arthur, 2015; Sherif et al., 2020), so it is no surprise that women in this engineering firm are less likely to be awarded the same pay rises and promotions as men because they have to contend with structural disadvantages on all three fronts.

The implicit bias of a gendered organisation

The data show that whilst policies, structures and discourses in the organisation appear to be gender-neutral, in reality, the systems are geared towards offering opportunities to men (Acker, 1990; 1992). The findings clearly illustrate the gendered nature of career development in the

organisation, which is systematically and implicitly biased against women. The three core competencies of the ICF each illustrate aspects of implicit bias.

In terms of Knowing-Whom, the participants described a culture in which people get heard and relationships develop not because of gender but because of personality; not gender but shared interests; not gender but same-sex friendships. Whilst these explanations may appear to be gender-neutral, each favours men and excludes women: in practice, it is a masculine personality, masculine interests and male-male friendships which bring the advantages. The high number of men in the organisation means that women have less chance to develop same-sex friendships, and the dominance of men in senior roles means that women have fewer opportunities to develop useful same-sex friendships (Elsesser & Peplau, 2006). Broader social cultural norms mean that the shared interests (sport, drinking beer and discussing tanks) are likely to exclude women (Hartmann, 2003). Social role expectations mean that reliance on personality excludes women, as they are both less likely to behave in the *'pushy'* way required, and, evoking Williams and Dempsey's tightrope stereotype (2014), they are criticised if they do.

In terms of Knowing-How, the company policies suggest that promotions, pay rises and career-enhancing opportunities are awarded to those who are believed to be capable. Yet the data show that in this organisation gender stereotypes mean that women are assumed to have lower value in the organisation, and are deemed less well-suited to the work. They are assumed to be less capable than they are, more junior than they are, and less likeable than men. The stereotypes therefore place women at an automatic disadvantage, as people expect them to perform poorly and so women have to work harder, be more committed and achieve more than their male colleagues to be considered equal (Heilman, 2012). This aligns with Williams and Dempsey's prove-it-again stereotype (2014) and echoes Valian's assertion that 'women's credentials do not buy them the same positive evaluations than men's credentials buy them' (Valian, 2000, p.30).

In terms of Knowing-Why, the accepted discourse in the organisation is that regardless of gender, people will be promoted if they are committed to the organisation, but the way that this commitment must be shown implicitly favours men (Acker, 1990). The ideal worker in the organisation shows their commitment through full time work, long hours and through prioritising their work for the organisation above other aspects of their lives. The mothers in the study had reduced their work for the company through taking maternity leave or working part time, and revealed the importance of their children by taking phone calls from their children's schools during work meetings, and leaving on time to go home and feed their children. Yet these women remained highly committed to their work and put in considerable efforts to make sure that neither work nor family suffered through their choice to combine the two roles (Eagly & Karau, 2002) but, as predicted by the maternal wall stereotype (Williams & Dempsey, 2014), their behaviour sets them apart from the ideal worker, and therefore their commitment was questioned.

The second key contribution that this study makes is to extend the application of the ICF as a lens through which to view the career development culture of the organisation. Responding to calls in the literature to reject the distinctions between career development theories which focus on the individual, and those which focus on organisations, this study has used the ICF, a framework which has to date been used to help understand individuals' careers, to examine the culture of career

development in an organisation (Hirsh, 2016; MacKenzie Davey, 2020). The framework has proved a valuable tool for highlighting structural barriers within the organisation, identifying the gendered nature of the organisation and the gender work stereotypes at play, and the negative impact that these have. The ICF as a framework has exposed the extent of the discrimination that the women face, showing that they face barriers to developing each of the competencies that has been shown to lead to career advancement (Beigi et al., 2019; Sherif et al., 2020). The framework has also revealed the challenges the women face in being recognised for the competencies that they have developed, as the gendered organisation and stereotypes allow senior managers to expect lower levels of knowing-how and knowing-why from women.

Sense-making counter-narratives

The third key contribution of the study stems from the counter-narratives identified in the women's evaluations of their experience. Alongside descriptions of what could be argued to be quite clearly sexist behaviour, the women found alternative explanations. These either minimised the sexism within the behaviour, reframing it as something that was not intended to be harmful, or minimised the impact the behaviour had, saying that it did not really matter.

Counter-narratives and the denial of sexism has been shown elsewhere in the literature exploring the experiences of female engineers (Dryburgh, 1999; Powell et al., 2009; Rhoton, 2009; Seron et al., 2018), but the nature of the counter-narratives previously identified fail to map squarely onto the findings from this study. Seron et al., (2018) identified female college students who denied sexism, holding firm their belief in the meritocracy of the industry. This is somewhat aligned with our narratives which explained that the perceived sexism was due to other factors such as personality, age, or job roles, but the value of meritocracy however was not a strong theme in our study. The differences in the narratives within the two studies could be a result of the different stages of the participants' careers. Seron et al.'s participants were still at college, whereas the participants in this study had on average over a decade of experience in this organisation. It is possible that a longer tenure in the industry led to a more nuanced assessment of the culture. Dryburgh (1999), Rhoton (2009) and Powell et al. (2009) identified women engineers who excused the examples of sexism that they witnessed as being exceptions. This was not identified as a particular theme in our study, perhaps again as a result of the long tenure of many of our participants, who had plenty of time in the organisation to amass numerous examples of discriminatory behaviour, or perhaps could be due to raised awareness of sex discrimination through recent media campaigns such as #MeToo, which may have caused participants to recognise sexism where a decade previously they might not have seen it as such (McElhaney et al., 2019). These differences suggest that this is a topic that needs further exploration.

It was striking that the two sets of stories – the model of sexist career advancement and the counter-narratives in which the behaviour was reframed as less discriminatory, or less malevolent, sat side by side for these women: individual women offered both accounts. One possible explanation for this apparent paradox was implied by the words of one participant, Grace, who said '*if you let it be real then you're just going to get upset*'. This revealing phrase suggests that the participants may have been quite aware of the conflicts or tensions between their two narratives. They saw sexist behaviour in the organisation and saw that it was sexist; they were aware that, as women, they were on the receiving end of this behaviour, and that it may have been detrimental to their career

advancement. But this acknowledgement seemed to make them feel uncomfortable and so they made a decision to think about it in a different way, and developed a series of counter-narratives which allowed them to avoid the negative feelings that they would have felt had they dwelt on this sexism (Coopey et al., 1997).

Neena's comment, that she didn't like to think that she would tolerate working for an organisation in which there was this kind of sexist discrimination suggests a cognitive dissonance and it seems plausible that the development of these alternative narratives could have been a mechanism through which to resolve this cognitive dissonance (Festinger, 1962). Additionally the participants may have been reluctant to cast themselves as victims, and could have used these narratives to allow them avoid some of the stigma that can be associated with victimhood (Leskinen et al., 2015). We know from other settings that it is difficult to position oneself as a strong, agentic victim – inherent in the notion of victimhood is a sense of helplessness and powerlessness (Leisenring, 2006). Perhaps these women are reluctant to conceptualise themselves as weak, and so find an alternative explanation for the behaviour that does not put them in the position of victims.

These counter-narratives may well be an effective approach for the individuals involved, as they allow them to reconcile themselves with the organisational environment that they have chosen, but longer term, this does nothing to change the gender subtext, or disrupt the hegemonic masculinity within the organisation. Women are still considered a lower status category and subject to systematic discrimination, yet even the women themselves choose not to see it for what it is. In practice this further devalues femininity within the industry and reinforces the stereotypes. It serves to disguise and therefore reproduce gender inequality and the gender order is thus maintained by those who have the most to gain from its eradication. Further research could identify whether these counter-narratives are seen elsewhere within the engineering industry and beyond, and could explore the value that women get from them.

Recommendations

One important lesson from previous literature is that organisations need to introduce a range of interventions, targeting gender stereotypes, unconscious bias and selection and promotion at the same time, but identifying specific recommendations is not straightforward, as many of the interventions which are commonly thought to be suitable have had limited empirical support for their value and (Caleo & Heilman, 2019). There are however some suggestions that have more robust support in the literature.

The organisation could introduce interventions that are aimed at reducing gender stereotypes. Some evidence suggests that these have been shown to have only short term benefits (Bezrukova et al., 2016), but Nishii (2012) demonstrated that training that focuses on similarities rather than approaches which aim to encourage participants to see things from other's perspectives have longer lasting benefits.

Unconscious bias training has been shown to have a limited impact because in explaining that these stereotypes are widespread and unconscious, the stereotypical thinking is normalised and made more acceptable (Duguid & Thomas-Hunt, 2015). Instead, training that shows gender stereotypes as

unusual, aberrant and a choice works better, although this will not work if organisational norms foster and support gender bias.

Ensuring that selection processes both for initial roles and for promotion accountable and transparent has been shown to have a positive impact on discrimination (Castilla, 2015; Koch et al., 2015), and with a number of the participants in our study highlighting that the systems as they stand are opaque (Vicki and Penny both describing it as '*cloak and dagger*'), this may prove an approach that could make a significant difference. Castano (2019) suggests that promotions that are granted through a committee, rather than a single manager, are less likely to be subject to biases.

Women-only initiatives have been shown to increase the very problems they are set up to solve, as they can lead to the perception that women are only being given opportunities because they are female, and not because they are capable (Leslie et al., 2013). If career support were offered to all, as a formal process, it might reduce the differential advantage that men get from their informal networks. Going one step beyond mentoring, the organisation could consider introducing a sponsorship programme. Where a mentor is someone who can help and advise, a sponsor is someone who has power and can help by exerting their power in your favour. Ibarra (2006) suggests that this kind of professional support should move from the more private realm of mentoring towards a more public relationship, offering those being mentored or sponsored tangible opportunities or introducing them to the right people, rather than just providing advice.

Limitations and Directions for Future Research

This study explored the experiences of women in a single institution and its findings may be the product of that particular culture, and may be less relevant to other organisations within the engineering industry. The participants were all self-selecting, responding to a recruitment email that was sent to all the female engineers in the organisation. It is quite likely that those who chose to volunteer for the study had a particular interest in the topic, perhaps as a result of their own negative experiences. As such their experiences may not be representative of women working in their organisation, or more widely in the industry. A study that explores male engineers' conceptualisation of career advancement would offer an important comparison. Further exploration of the counter-narratives the women used would also be valuable - a study that sought to find out more about how and why the women accepted both competing narratives would be a useful next step.

Conclusion

A recent strand of research has suggested that the particularly low participation of women in engineering might be due in part to limited perceptions of the career development and advancement opportunities for women. This study has explored the experiences and understanding of career development held by 32 female engineers in an engineering firm in the UK. The study has highlighted the structural barriers that these engineers have faced during their careers, showing that it is more difficult for women to develop the career competencies that lead to career success, and more difficult for them to convince senior managers of their competence and motivation. Alongside this discriminatory model of career development the women described, we identified a series of counter-narratives which the women seemed to deploy to allow them to accept the situation, reframing the

behaviour they witnessed as less than sexist. Further research could usefully explore these counter-narratives in more depth, to examine their purpose and the value that they add to female engineers.

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