Gendered transitions, career identities and possible selves: the case of engineering graduates

Introduction

Career identity, that is, "how individuals define themselves in the context of a career and can provide an internal compass promoting self-direction in career-related behaviour" (Simosi, Rousseau and Daskalaki 2015, 135) is considered crucial in the early phases of a career for career progress and well-being (Praskova, Creed and Hood 2015). However, in the knowledge-driven, post-industrial economy (Drucker 1993) careers, in particular those of graduates, are increasingly becoming discontinuous, fluid and 'boundaryless' (Arthur 1994). As a result, individuals are required to be self-directed in managing their career, cultivate their knowledge and skills, set goals, accumulate experiences and build networks in order to sufficiently prepare for the education to work transition and increase opportunities for employment (Tomlinson 2007; Strauss, Griffin and Parker 2012).

It has been noted that within the engineering industry in particular, workers are required to develop distinctly proactive career behaviours (Brown 2004). This is not only because engineering is technology-dependent but also because, as a profession, it has become increasingly globalised and as a result the employment prospects of a skilled worker in the sector at all stages of their career are considerably more challenging (Brown 2004). STEM career trajectories have been also often described by the 'ever-narrowing pipeline metaphor' in order to highlight the notion that only a small number of people persevere in the sector. One group that most often tend to 'leak out' is this of young female engineering graduates (WISE 2015). STEM organizations, especially in the engineering sector, are argued to be

structured and function in ways that do not support women's career patterns, thus maintaining and reproducing the gender-segregated status quo in formal or covert ways (Martin and Barnard 2013). For example, workers in STEM industries are expected to be able to work long hours and be mobile, prerequisites that are incompatible with childcare and family duties and as a result, many female engineers choose to take a career break (Herman 2013). This, along with the UK enrolling only 15% of women to undergraduate engineering degrees in 2014 (HESA 2015), leaves the UK labour market with the lowest proportion of female engineering professionals in the EU (Kiwana, Kumar and Randerson 2011) accounting for only 7% of those working within the sector (IET 2013).

The aims and the contribution of the paper

The paper mainly contributes to the scarce literature on the transitions of engineering graduates out of university and into the workforce (Jungert 2013) and offers insights not only into how the male and female participants formed their engineering identities while at university but also how these identities evolve during the first four years in the workplace. Additionally, the paper contributes to the occupational change and withdrawal literature by highlighting the role that organizational factors (e.g. team/role allocations) might play in graduates' career aspirations, intentions and possible withdrawal from the occupational field. Moreover, we highlight the challenges that young female engineers in particular might face at the early stages of their careers and how these might influence their experiences and career choices. Finally, we challenge the belief that male and female engineering graduates must follow a uniform sequence of career steps in order to become an engineer and we argue that this notion of career development works as an obstacle to those who have an unclear or interrupted view of what is possible for their careers post-graduation. Our findings would be

of particular interest for those with the desire for social justice who devise policies and influence practice through designing work interventions in engineering and other STEM professions where loss of human capital can have negative consequences for the economy as a whole (Fouad et al. 2016).

Research questions

In this paper the following questions have guided our analysis of the data:

(i) how have male and female engineering graduates experience the transition from undergraduate student participation to working life?

(ii) how have male and female engineering graduates construct their graduate career identities and occupational interests? And

(iii) what gendered elements are evident in the development of such identities, career trajectories and aspirations?

Career development and career identity: Gender and engineering

A career is broadly defined as a lifelong process of work-related activities (Hall 2002) while 'career development' embodies an on-going series of stages characterized by unique concerns, themes and tasks (Greenhaus, Callanan and Godschalk 2000). Traditional models of career development have been argued to be based predominantly on the career experiences of men (O'Neil and Bilimoria 2005), with men often seen as the 'ideal' and 'unencumbered' worker (Acker 1990; Lewis 1997) and women as lacking ambition and commitment (Smithson and Stokoe 2005). Nevertheless, women's choices in the labour market, occupational destinations and career trajectories are not entirely unconstrained (Evetts 2000;

Durbin and Tomlinson 2010). Evidence shows considerable fluctuation in the work and career orientations of the majority of women over their working life (Tomlinson 2006). O'Neil and Bilimoria (2005) called these new career patterns 'emergent' as their career changes could be characterised as more reactive than proactive, with interruptions to accommodate other, often non-negotiable, aspects of their lives, such as domestic labour and childcare (Mayall 2001; Bradley 2013). In spite of this, and often without regard for context, it is still often argued that young women are in control of their own careers, taking steps in order to ensure their career progresses in ways they desire it to (O'Neil and Bilimoria 2005).

Career identity theory refers to how individuals define themselves in the context of career and can provide a 'cognitive compass' promoting self-direction in career-related behaviour (Fugate, Kinicki and Ashforth 2004). Praskova, Creed and Hood (2015, 146) argue that "[i]dentity represents the central agency mechanism in career development" and an explicit sense of identity is related to better reasoning about future career opportunities, less career self-doubt and future occupational attainment, especially in the current turbulent economic market (McArdle, Waters, Briscoe and Hall 2007). The key point for the identity formation of graduate engineers in particular is that

> from the outset the (new) graduate learns her or his role is about producing change – forging an identity, creating a role, helping others change- rather fitting into a pre-ordained 'slot' (Brown 2004: 266).

However, building a viable career identity as an engineer appears to be particularly challenging for young women due to the powerful cultural images which are reinforced through education, and through parental and peer influence (Desgupta and Stout 2014). Engineering is portrayed as 'male' that is, neutral and rational (Faulkner 2009), physically laborious, uncreative and tough (Powell, Bagihole and Dainty, 2006) and hence unsuitable

for women (Evetts 1998). Post-education, if still desired, these women move on to negotiating themselves through the 'rite of passage' within employment and gain authority and legitimacy as engineers by adjusting and conforming to the dominant –masculine- culture (McIlwee and Robinson 1992). These notions aid gendered occupational segregation (Powell, Bagilhole and Dainty 2006; Stevanovic 2014). Statistics from the UK labour market confirm that a leaky pipeline of graduates is evident (WISE 2015). This is particularly the case at the early career stage where only half (51%) of female STEM graduates go on to work in STEM roles, compared with over two thirds (68%) of male STEM graduates (WISE 2015).

Possible selves and women in STEM professions

Possible selves could be understood as cognitive structures within the self-concept that contains a person's aspirations, motives, and goals (Markus and Wurf 1986). We chose to study career development and identity through the theoretical perspective of 'possible selves' (Markus and Nurius 1986) as we believed that it would enable us to see: (i) how these graduates' past and present influence their career identity and why there is a "tendency for young women to sort themselves", or "allow themselves to be sorted, into different employment spheres" (Lips 2007, 52); and (ii) how these young graduates experience their transition from university to work and 'filter' what behaviours to adopt or drop (Ibarra 1999).

Possible selves involve a complex interplay of current and imaginative self-identities (Henry and Cliffordson 2013) as "they derive from representations of the self in the past and they include representations of the self in the future" (Markus and Nurius 1986, 954). Thus encapsulating ideas of what a person would like to become in the future (the ideal self), what he or she dreads to become (the feared self), as well as what they in reality could become (Markus and Nurius 1986). In other words, possible selves play both a cognitive and an

affective role in motivation and can have a strong impact on how an individual initiates and structures their actions, not only in realising ideal possible selves but also in preventing the feared ones (Markus and Ruvolo 1986). The more developed a possible self is, the more this motivates a person and encourages goal-directed behaviour towards desired results (Oyserman, Terry and Bybee, 2002; Oyserman, Bybee, Terry and Hart-Johnson 2004). Research suggests that possible selves are related to a variety of outcomes, such as academic achievement and self-esteem and that the more vivid and elaborate they are, the more they contribute to the realisation of these ideal selves (e.g., Markus and Nurius 1986; Markus and Ruvolo 1989; Norman and Aron 2003; Oyserman, Bybee and Terry 2006; Ruvolo and Markus 1992).

Possible selves though can only include those selves that are possible to perceive (Stevenson and Clegg 2011). In other words, possible selves derive from "the categories made salient by the individual's particular sociocultural and historical context and from the models, images, and symbols provided by the media and by the individual's immediate social experience" (Markus and Nurius 1986, 954). For example, Lips (2004) found that women in college, despite feeling as though they had the skills and talent for mathematics and science, still could not see themselves in a career in science. Thus supporting the idea that girls and women have negative possible selves for STEM careers or face difficulties when deciphering any possible selves in these spheres.

Methodology: Qualitative approach to career identity

As Tomlinson (2007, 287) argues "[i]ndividuals' experiences of work are subjective" and one's employability "may be seen to be value- and identity- driven, relating to graduates' own dispositions and biographies". For this reason, in order to understand and illuminate the

phenomena examined in context-specific settings (Golafshani 2003) as well as the multi-layered and complex realities of our participants we adopted a qualitative approach (Denzin and Lincoln 2005).

Participants, procedures and data analysis

The data used are taken from both the phases of the Paired Peers project (PP), a large longitudinal qualitative study examining the progress of a cohort of students (n=90) through their undergraduate degree courses in England and their post-graduation experiences in the UK and worldwide labour market, funded by *The Leverhulme Trust*. PP phase one (PP1) (2010-2013) tracked an initial cohort of ninety middle-class and working-class students from eleven academic disciplines through their undergraduate life studying at the two universities in Bristol: the 'elite' University of Bristol (UoB) and the 'post-1992' University of the West of England (UWE)[1]. Students volunteered through an initial questionnaire and information was collected in regards to their parents' occupations and educational level as well as whether students were receiving government financial support. This questionnaire was distributed during induction lectures of subjects taught at both institutions. As the research team felt that relying on occupation as a sole indicator was not enough, a composite measure which took account of other forms of capital and resources was adopted. The students were subsequently classified by the research team into middle-class, working-class or intermediate/unclassifiable. The ninety students chosen came from the polar ends of the spectrum in order to enable clearer comparisons regarding the students' classed experiences.

[1] For more information about participant recruitment, the status and reputation of both universities, as well as how class is defined, please see Bathmaker et al. (2016).

In order to further explore the impact of students' classed and gendered identities on their life and employment trajectories, as well as the effects of institution and subject choice on outcomes and destinations, the second phase of the project (PP2) (2014-2017) followed fifty-five of the original cohorts' first steps into post-graduation life. The interviews were all semi-structured, lasted from one to one and half hours and took place over a period of six years. The interviews were conducted by researchers who worked for the project and the place of interview varied depending on where the interviewee lived. Throughout the first phase of the project most interviews were conducted on the grounds of one of the two Bristolian universities. After graduation most of the interviewees spread geographically around the UK, and the world, hence we then travelled to them to meet them or conducted our interviews via Skype. The data were analysed by utilising NVivo and a content analysis approach. In order to code, classify and analyze data and took the abductive approach throughout the analysis phase. We did this by systematically employing thematic codes that were outlined prior to analysis as well as being aware of subsequent themes that could arise from the data. Some of the codes used that are relevant to this paper are: Career Development, Employment (Hours, Job experience, Recruitment, Salary), Future, Identity (Self-identity, Social identity, and Work identity), Parenthood, Reflections, and Transition from University to Work.

This paper draws on the data from all of the in-depth, semi-structured interviews with the engineering students undertaken in PP1 and PP2[2]. We chose to focus on engineering as it appeared to be the sector where class and type of university had no noticeable impact on the transition into employment, thus allowing us to focus exclusively on the workings of gender. In fact, engineering is considered one the most 'meritocratic' professions in the UK, perhaps

[2] During PP1, researchers conducted two interviews with each participant per academic year (interviews 1 to 6). PP2 consisted of four interviews, interview 7 and 8 in the participants' second year away from undergraduate study, interview 9 in the third and interview 10 in the fourth year away from undergraduate study respectively.

due to the short supply of engineers in the UK labour market (Laurison and Friedman 2015). Initially there were nine engineering students in total but we chose to focus only on those students who were still in our cohort, four male and three female graduates. Of these, four were categorised as middle-class and three as working-class; four of them studied at UoB and three of them at UWE and they are all currently in employment. A summary of the participants by class, university, degree grade, current destination and current salary at interview 9 (PP2) is shown in Table 1.

Table 1: Details of the participants

Pseudonym	**Social Class**	**University**	**Degree Grade**	**Current Destination**	**Current Salary**
Craig	Middle-class	UoB	First	1) Graduate scheme (automotive) 2) Design engineer	1) £28,000 (starting salary) 2) £33,000
Nicholas	Middle-class	UWE	2:2	1) Machinist 2) Graduate scheme (manufacturing) 3) Manufacturing Engineer	1) Not asked 2) £22,000 (starting salary) – payrise to £30,000 3) £34,000
Rob	Working-class	UWE	2:1	1) Graduate scheme (marine technology) 2) Design engineer (marine technology)	1) Mid-20,000s (starting salary) 2) 32,522
Marcus	Working-class	UoB	2:1	1) Graduate scheme (automotive) 2) CAD Engineer	1) £31,000 (starting salary) 2) £37,500
Lizzie	Working-class	UoB	First	1) Internship (aerospace) 2) Graduate scheme (automotive)	1) £14,500 per year 2) £31,000 (starting salary) payrise to £33,500
Jenifer	Middle-class	UoB	First	1) Waitress 2) Graduate scheme (aerospace) 3) Graduate scheme (automotive)	1) Minimum wage – around £1,000 per month 2) £26,000 3) £31,000 (starting salary)

Amber	Middle-class	UWE	2:2	1) Internship 2) Exam Invigilator 3) Cover Teaching Assistant 4) Internship (Design) 5) Pub work 6) Teaching Assistant	1) £10 per day 2) Not stated 3) Not stated 4) £24,000 5) Not stated 6) £22,000

Limitations

Despite the strengths within our work and the contribution of our empirical study to existing literature, we acknowledge certain limitations. We understand that our sample size is small and those in the sample studied at only one of two UK universities. We understand that our findings are not generalizable but the strengths of our study lay with our interview approach which enabled us to penetrate the depth rather than breadth of this social arena. We were able to do this as we conducted a total of sixty-seven in-depth interviews with the seven participants, collecting data from six years of their lives. This approach facilitated a close affinity with the interviewees and thus enabled us to become immersed in the research field which enhanced the validity of our fine-grained, in-depth inquiry (Crouch and McKenzie 2006).

Findings

Career identity, possible and feared selves

The male participants appeared to have a far more established sense of career identity as engineers, even from their childhood, as they had always seen themselves as such. This was mostly due to the influence of their fathers and their interest in cars and machines from a young age. The female participants, on the other hand, did not express comparable alignment to an engineering identity but did often express their longstanding interest in engineering. As

the female participants accessed university they did so with high aspirations (e.g. Lizzie wanted to work in RAF, Amber in Formula 1). However, the longer they spent in university the more space emerged between them and their aspirations. It could be said that as they moved through university they had been "bombarded with subtle (and not so subtle) messages that signal that they do not belong in STEM career tracks" thus cultivating doubts about belonging and ability (Desgupta and Stout 2014, 24). Amber for example, who had begun to construct a possible work self within the Navy in her second year of university study was faced with gender bias (Transcript 3):

> Women aren't allowed on submarines, which I never realised […] people suggested that it was because being stuck under like….under the sea for 8 months with sort of 50 men isn't something that women should be able to…like would do.

Another reason why the female graduates' initial aspirations and possible selves in relation to engineering might have been 'blocked' could be linked to the notion that they were highly concerned about parenthood and the negotiation between their work and personal lives:

> It's something that I've been worrying about actually. I would quite like a family one-day […] It's like you don't want to be a part time mum, part time job. You don't want to have to compromise one or the other. (Jenifer, Transcript 4)

As opposed to their female colleagues, most male engineering graduates appeared to prioritise their career, thus showing that the male breadwinner model is still implicitly leading men to see their possible selves –nearly exclusively- in occupational terms:

> I think it's something you'd have to take into consideration in a career because you wouldn't be able to climb the ladder within a business. I don't think you'd have the motivation for that whilst maintaining a child. (Marcus, Transcript 4)

This finding is further supported not only by Thomson and Holland (2002) who argued that young women hold onto traditional desires for marriage and family but are uncertain about how these dreams can be realised alongside the more immediate concerns of pursuing career goals, but also by Brown and Diekman's (2010, 574) study who found that

> when projecting the distant future, gender differences emerged for possible selves: women more than men listed selves that were categorised as 'family selves' and men more than women perceived their possible selves as relevant to career.

The incompatibility between motherhood and career development in engineering (Watts 2009) is further promoted by the existing organizational infrastructures where performance and opportunities for promotion equates with longer hours at work (Durbin and Tomlinson 2010; Martin and Barnard 2013):

> if you are looking at management level then I don't think part time would be plausible, but if you're on the lower band in terms of employment then I think it is easier to do part time. (Lizzie, Transcript 9)

Therefore, we could argue that the female engineering graduates' possible selves are constrained and mediated to a great extent by sociocultural values and expectations (e.g. a possible self as the main child carer). In other words, the female participants seem to develop different schemata about career opportunities and paths than their male counterparts. These constraining and enabling factors (e.g. parenthood, spectrum of jobs available, implicit or explicit sex bias) appear to be closely aligned with the construction of a viable career identity as engineers: the male engineers in our study had always identified with their profession and felt that they had all the options open for them, while the female ones struggled more to establish themselves as engineers while at university. Despite this, the two female participants who stayed in the industry (Amber 'leaked out', see details in section below)

gradually started re-developing their confidence and establishing their career identity as engineers once they started working on graduate schemes:

> I So do you feel as an engineer now?
>
> R Erm….to a certain extent yes, I think because I'm still on the…like the graduate scheme is still classed as training you don't necessarily feel that you have the greatest amount of responsibility that might come with that. (Lizzie, Transcript 9)

Serendipity and the importance of the allocation of a team for the construction of their professional identity are also evident in the narratives of the graduates. While the male graduates were happy with their 'home teams', both Lizzie and Jenifer struggled to see a long-term career for themselves in these roles. Both women were unhappy with their allocations by management and were anxious at the prospect of working within these departments for a prolonged period of time. This was particularly the case for Jenifer who had developed a distinct ulterior goal:

> My concern is having to stay in [department] and then becoming and being thought of as a [title] engineer and finding it hard to get into aerodynamics even if I had the opportunity because, I don't know, they'd think 'you're an established [title] engineer now, you can't do this'. I don't want to sort of become sort of put into that box. (Transcript 10)

While working within these departments, both Jenifer and Lizzie began to question whether the job was 'for them' and began to feel underwhelmed with the career identity that they saw as projected onto them by management:

> I don't want to be stationary. So I like CAE (i.e. computer-aided engineering) but I don't want to say in like 3 years' time to be sat at the same desk doing the same thing (Transcript 10).

What is interesting to note is that all the participants, independently of their gender, shared the same *feared self* of not being creative, thus confirming that the core element of a graduate engineer's career identity is *creativity and innovation* (Brown 2004). For example, Amber (Transcript 7) quit her £24,000 design engineering internship after four months citing that "it just wasn't great and you just kind of felt like playing around rather than an actual job or anything that was very productive". Jenifer left her first graduate scheme as she perceived the work to be irrelevant to her perception of the roles that an engineering professional partakes in and was disappointed by the lack of relevance: "I found it really unfulfilling, it didn't feel like engineering at all. It just felt like an admin job" (Transcript 10). Nicholas quit his graduate scheme too as the changes he proposed kept being blocked: "it was quite depressing knowing I couldn't change something which needed change. And it's purely for human reasons, not engineering" (Transcript 10). Similarly, Craig said that his biggest frustration in his career so far has been to negotiate change as some older engineers get "stuck in their ways" (Transcript 10). Finally, Marcus (Transcript 10) after the end of the graduate scheme felt that he was not creative enough technically and began to consider an alternative possible work self in project management:

> You sort of go from being new, being involved, being like…doing, delivering things in 12 weeks and actually feeling like you're making a difference, to 'oh you've got to slow down, you've got to stay in this job for 5 years before…' […] I've got the view that life's too short for me to be sat around even for a couple of months.

Transitions into the workplace and work culture

The way in which our participants spoke about their transitions into employment differed significantly depending on gender as men appeared, for the most part, more confident about their choices and the steps they had to follow towards their desired career paths (e.g. obtain internships, study abroad):

> I got in for my last exam in my third year and went 'I need experience' and just phoned every company in my area until somebody said yes. And I ended up with two offers. (Rob, Transcript 8)

Indeed, all four male participants secured a place in a graduate scheme either before the end of their degree, or, as in the case of Nicholas, soon after. Nicholas, who got a 2:2, believed that he could not be as competitive as other graduates who were awarded higher degree classifications than him. Due to this, he chose to work as a trainee machinist for six months, a work experience that gave him the necessary knowledge to subsequently apply successfully for a graduate scheme in Manufacturing Engineering. The smooth transition of the male engineering graduates into the workplace distinctly contrasted with the female ones.

The female participants moved into their third year of undergraduate study, they began to doubt their chosen careers and appeared to be less confident in strategically proposing possible movements in and around the employment market, perhaps because they were often unsure about what routes were available and what route they wanted to take within engineering:

> I've not really found anything yet that really interests me enough to think 'yeah I'm going to go straight into that and do it for the rest of my life'. (Amber, Transcript 6)

Tensions became evident later between their juggling of desires and their time spent constructing a career plan, something that McLeod and Yates (1998) also found. Jenifer (Transcript 6) exemplified this by explaining that her university experience had made her realise that "there's more to life than just studying and wanting to be an engineer". This cumulative tension perhaps led the female participants to choose to take a 'break' from engineering in order to plan their next career steps. Jenifer chose to work at a pub for a year as a waitress in order to save up money to go travelling. Quite similarly, Lizzie did a six-months internship at an engineering company in order to save some money to go on to travel. Travelling, for both Jenifer and Lizzie might have served as a means of restoring physical and mental balance (Cavagnaro and Staffieri 2015) but also as a way of postponing the socio-cultural negotiations needed to be addressed in order to move into the engineering sector:

> Everyone is always like "What do you want to do?" and I'm always like, "I'm just going to lie on a beach and watch all the planes go by" (Lizzie, Transcript 5)

However, once both Lizzie and Jenifer returned to the UK, they applied for and secured places in competitive engineering graduate schemes, as mentioned above. Amber's transition into the workplace though was more turbulant than the other female participants. When she began her undergraduate studies she aspired to work for Formula 1 but six months later, towards the end of her first year of study, she described this occupation as "more of a dream" that she felt was "probably never going to happen. So I've been considering teaching or something like that" (Transcript 2. Outlined in the table above, upon leaving university Amber still aspired to work in the engineering profession and did two internships with

engineering companies. She had applied for these roles in order to "get an idea of whether engineering was what I wanted to do" but left because "you just kind of felt like playing around rather than an actual job or anything that was very productive" (Transcript 7). She then moved to London to live with her boyfriend and work in a pub which she would hope would provide her with the space required in order to figure out her next career steps. She then moved into the female-dominated employment sphere of education and worked as a teaching assistant. Although she still needs to work on clarifying her next move, there was no indication of her returning to engineering:

> If I wanted to stay in education I would want to be a teacher, whether that's teaching kids with special educational needs in particular or science or maths or something I haven't decided yet (Amber, Transcript 7)

As far as their experiences of work culture are concerned, neither male nor female graduates felt at ease with the implicit and explicit sexism within the engineering workforce and workplace structures (Dryburgh 1999). While Jenifer noted a 'lad culture' amongst the young men, the male participants felt this behaviour was particularly common amongst older colleagues:

> we still have some of the old guys who might make the occasional cheeky jokes etc but there's none of that in anyone I would say who is under 40-45 (Marcus, Transcript 10)

Nicholas, who found particularly difficult to work with some people on the shop floor because of his young age, acknowledged that being a woman engineer might render engineering even more challenging:

> I overheard some of these old guys who have been working at this company for a long time and they say quite racist and sexist things, which I wouldn't agree with and I think if I was a woman they wouldn't have necessarily taken me seriously because of that.

However, similarly to Fouad et al.'s (2016) findings, the two female engineers did not appear to be deterred by what has been labeled as 'micro-aggressions' (Sue 2010) at the workplace. In response to such micro-aggressions, adaptions were made via the development of a female comradery is evident within what Jenifer (Transcript 10) describes as the existence of a "lad mentality" where one of the most dominant talking points is "talking about going and playing football". When faced with such culture she draws on her female friends to seek comfort and discuss issues:

> You sort of latch onto your female friends a bit more, you sort of need each other a bit more […] and we always get really annoyed when like, you know, white middle aged and like, you know, a lot of emails will be sent to lots of people, like, it'll be addressed to "Gents" and it's like "piss off! How hard is it to just say "hey, hi all". (Transcript 10)

Career planning and development

The data analysis indicated that there were differences in the way the male and the female participants talked about their conceptions, experiences and anticipations of their career over time and this was particularly evident at certain critical moments, such as when they were looking for a job, taking decisions, etc. The male participants seemed to plan ahead for their future careers as, even from their GCSEs:

> I had a major interest in motor sport and ended up looking at quite some different universities for motor sport and sort of ended up choosing my GCSEs and A levels with an aim towards getting into some form of Engineering. (Marcus, Transcript 1)

All the male participants appeared to have a clear career planning attitude as while at university they tried to get the most relevant job experience or knowledge possible through obtaining internships:

> I'd done a placement which I organised myself. I got in for my last exam in my third year and went 'I need experience' and just phoned every company in my area until somebody said yes. And I ended up with two offers. (Rob, Transcript 8)

The male graduates' strategic approach to decision making was carried over from their time in higher education to the workplace:

> I sort of moved on from [company 1] because I thought although I'm enjoying what I'm doing, it hasn't got the longevity there for the size of the company to move up or expand. There's only so far you can go before you hit the glass ceiling and that's you finished. (Rob, Transcript 7)

and they continued planning in advance, often with the help of their managers who acted as mentors:

> that sort of role is what I would like to go towards. It's management but actually of…it is still people but it's more technical and engineering based instead of just doing stakeholder and processes and…yeah. So I think that's the career path I'm on, and that's what my manager in my home department who is responsible for

> what I do and sort of helping develop me, that's what he's planning for me to be doing in a few years' time. (Marcus, Transcript 8)

However, while the male engineering graduates appeared indeed to have a steady and upwardly linear career development trajectory, their female counterparts struggled more due to "[t]he absence of ideas about future employment" (Sanders and Munford 2008, 343):

> my last manager was like 'what's your plan, what's your 5 year plan, what's your 10 year plan' and I was like 'whoa, like I'm just trying to figure out right now what I want to do', like I don't know what I want to do in 5 years, I've not planned that at all. (Lizzie, Transcript 10)

While reflecting, both Lizzie and Jenifer attributed blame to themselves for the delay to their career development. Jenifer noted that it was her own "indecisiveness" and her "not knowing what [she] wanted to do earlier" that had previously become obstacles in her career (Transcript 10). Lizzie, similarly, said that: "I think only my own kind of mentality has been the block in terms of not really knowing where it is I want to go or what I want to do" (Transcript 10). The narratives of these young women demonstrate their ease of refracting blame onto themselves and their own decision-making practices, instead of considering attributing charge to weaknesses in the organizational infrastructure (i.e. lack of career guidance, pastoral support). However, what differentiated these two young women, was that Jenifer, thanks to the support of two "inspirational" female senior members of staff, managed to construct a viable strategic plan and is taking steps towards achieving her aspirations of working in the design engineering of aerodynamics. Jenifer's experience confirms the argument in the relevant literature that access to role models and mentors and a generally supportive environment contribute to successful professional development especially for women engineers (Dasgupta and Stout 2014; Fouad et al. 2016).

Discussion and concluding remarks

Cumulatively our findings suggest that there are complex processes –cultural (e.g. gender stereotypes and sex bias) and structural (e.g. allocation to 'home teams', opportunities for career progress, opportunities for creativity and innovation, lack of career guidance and pastoral care)- that contribute to the shaping of the career identity and development of, especially, female engineering graduates. Male engineering graduates appeared to have easily accessed their career identities while the female ones struggled to construct theirs and establish themselves as engineers. This shows that gender still plays a significant role in the way in which young engineering graduates perceive and construct their careers as well as the career pathways taken. Despite this, once the graduates established their career identities as engineers, they all appeared to have one thing in common: the desire to create. In fact, all the graduates expressed their worries of ending up doing repetitive, technical tasks instead of managing projects, solving problems and contributing to change and innovation. The 'stagnant' nature of some engineering roles was found to deter some graduates from engineering, even those with very strong career identities, such as Marcus (see 'Career identity and possible selves' section above), who is now thinking of moving into project management.

The data also illustrate that the transitions into the workplace for the male engineering graduates appeared to be smoother and initially more financially lucrative compared to the female ones. Moreover, the four male participants, who had a very strong sense of belonging to their profession even before university, took the appropriate initiatives in career preparation (i.e. job experience, careful career planning, strategic choices) as opposed to the female ones, who struggled more to construct viable engineering 'selves' and establish a

career within the industry. We also found that the male engineering graduates appeared to have considerably more proactive career behaviours and were able to maintain their motivation throughout their studies and their first career steps, which can be linked to their more salient future work selves (Strauss, Griffin and Parker 2012). All the three female engineering graduates though felt the need to take shorter or longer 'breaks' from engineering in order to reflect and plan their next career step, thus confirming that STEM career trajectories are not uniform (Cannady, Greenwald and Harris 2014). However, we argue that, this need of theirs for a break, should not be seen as weakness or a 'leak', but as an alternative career planning strategy. The fact that Lizzie and Jenifer went back to engineering and most importantly see themselves as engineers shows that female engineers *are not deficient* in possessing aspirations to enter and work in engineering which is argued in some literature (Mau 2003).

The possible selves formulated by both the male and female participants were undoubtedly influenced by the dominant social norms. Furthermore, the female engineering graduates could be also argued to have a wider range of possible selves which were not related exclusively to work (e.g. travellers, mothers). Therefore, female engineering graduates could be described as more flexible in terms of career identity as they were adapting their career plans to a more realistic option for the selves they have grown into since they originally committed to an educational plan. All four male participants on the other hand, constructed future possible selves as engineers from a very young age while the female ones were interested in engineering but struggled to see themselves permissible engineers. The absence of a viable plan alongside of the implicit and explicit gender bias they encountered during their studies and first years of employment (see the 'Transition into the workplace and work culture' section) and to a lesser extent, gender stereotypes and expectations (i.e., men seen as future managers and women as prime carers) led female engineering graduates to have

difficulties in creating possible selves in engineering and "navigate the path" from university to engineering careers, (Dasgupta and Stout 2014, 24). This, along with the undesired allocation to almost-random 'home teams', created tension and anxiety for these young women's trajectories in the workplace. As Jenifer's narrative indicates (see 'Career planning and development' section) the presence of a female mentor appears to be indeed very important as it provided her with provided her with structured support, exposure, acceptance and protection (Ehrich 2008; Durbin 2010; Lopes, Durbin, Neugebauer and Warren 2015).

To conclude, it can be argued that there are structural constraints (e.g. the organizational culture, ways of working established by older colleagues) impacts the agency of all the graduates and the possible selves they allow them to form. However, it is worth noting that the profession *is* vocal about the need to effect change. Explicit gender bias appears to be receding as companies are seemingly actively trying to change towards a more gender-balanced workforce, though, unfortunately, we foresee that the social climate will take some time to alter as there is great difficulty in acquiring mentors for women, especially in male-dominated industries, such as engineering (Durbin 2010; Lopes et al. 2015).

Acknowledgements

Earlier versions of this paper were presented at the 2015 British Educational Research Association Conference, the 2016 British Sociological Association conference as well as the 2016 European Sociological Association mid-term conference; thanks to the audience for the comments and feedback. Special thanks to Professor Harriet Bradley, Professor Sue Durbin and the anonymous reviewer for their insights, thoughtful criticism and feedback on earlier versions of the paper.

References

Acker, J. 1990. "Hierarchies, Jobs, Bodies: A Theory of Gendered Organization". *Gender and Society* 4(2): 139–58.

Arthur, M. 1994. "The boundaryless career: A new perspective for organizational inquiry". *Journal of Organizational Behavior* 15: 295-306.

Barber, B. and T. Odean. 2001. "Boys will be boys: Gender, overconfidence, and common stock investment". *Quarterly Journal of Economics* 116: 261–292.

Bathmaker, A.-M., N. Ingram, J. Abrahams, A. Hoare, R. Waller, and H. Bradley. 2016. *Higher Education, Social Class and Social Mobility: The Degree Generation*. London: Palgrave and MacMillan.

Bradley, H. 2013. *Gender*. Cambridge: Polity Press.

Brown, A. 2004. "Engineering Identities". *Career Development International* 9(3): 245-273.

Brown, E. R., and A. B. Diekman. 2010. "What Will I Be? Exploring Gender Differences in Near and Distant Possible Selves". *Sex Roles* 63: 568-579.

Cannady, M. A.; Greenwald, E. and Harris, K. N. 2014. "Problematizing the STEM Pipeline Metaphor: Is the STEM Pipeline Metaphor Serving Our Students and the STEM Workforce?". *Science Education*, 98(3): 443-460.

Cavagnaro, E., and S. Staffieri. 2015. "A study of students' travellers values and needs in order to establish future patterns and insights". *Journal of Tourism Futures* 1(2): 94-107.

Crouch, M., and H. McKenzie. 2006. "The logic of small samples in interview-based qualitative research". *Social Science Information* 45(4): 483-499.

Dasgupta, N., and J. G. Stout. 2014. "Girls and Women in Science, Technology, Engineering, and Mathematics: STEMing the Tide and Broadening Participation in STEM Careers". *Policy Insights from the Behavioural and Brain Sciences* 1(1): 21-29.

Denzin, N., and Y. Lincoln, 2003. *Collecting and Interpreting Qualitative Materials* (2nd edition). California: Sage Publications.

Drucker, P. F. 1993. *Post-capitalist society*, Oxford: Butterworth Heinemann.

Dryburgh, H. 1999. "Work hard, play hard: women and professionalization in engineering – Adapting to the culture". *Gender and Society* 13(5): 664-682.

Durbin, S. 2010. SET Women and Careers: a case study of senior female scientists in the UK, in A. Cater-Steel and E. Cater (eds.) *Women in Engineering, Science and Technology: Education and career challenges*. IGI Global.

Durbin, S. and J. Tomlinson. 2010. Female part-time managers: networks and career mobility. *Work, Employment and Society* 24(4): 621-640.

Durbin, S and Tomlinson, J. 2014. Female Part-time Managers: Careers, mentors and role models, *Gender, Work and Organization*, 21, 4, 308-320.

Edvardsson Stiwne, E. and Jungert, T. 2010. Engineering students' experiences of transition from study to work. *Journal of Education and Work* 23(5): 417-437.

Evetts, J. 1998. "Managing the Technology But Not the Organisation: Women and career in engineering". *Women in Management Review* 13(8): 283-290.

Evetts, J. 2000. “Analysing Change in Women’s Careers: Culture, Structure and Action Dimensions”. *Gender, Work and Organisation* 7(1): 57–67.

Faulkner, W. 2009. “Doing gender in engineering workplace cultures I. Observing from the field”. *English Studies* 1(1): 3-18.

Fouad, N. A., R. Singh, K. Cappaert, W. Chang and M. Wan. 2016. “Comparison of women engineers who persist in or depart from engineering”. *Journal of Vocational Behaviour* 92: 79-93.

Fugate, M., A. J. Kinicki, and B. E. Ashforth. 2004. “Employability: A psycho-social construct, its dimensions, and applications”. *Journal of Vocational Behavior* 65(1): 14-38.

Golafshani, N. 2003. “Understanding Reliability and Validity in Qualitative Research”. *The Qualitative Report* 8(4): 597-607.

Greenhaus, J. H., G. A. Callanan, and V. M. Godschalk. 2000. *Career management* (3rd edition). Fort Worth, TX: Dryden Press/ Hartcourt College Publishers.

Hall, D. T. 2002. *Careers in and out of organizations*. Thousand Oaks, CA: Sage Publications.

Henry, A., and C. Cliffordson. 2013. “Motivation, Gender, and Possible Selves”. *Language Learning* 63(2): 271-295.

Herman, C. 2013. “Returning to STEM: gendered factors affecting employability for mature women students”. *Journal of Education and Work* 28(6), 571-591.

HESA [Higher Education Statistics Agency]. 2015. "Students in Higher Education 2013/14" *Higher Education Statistics Agency*. Accessed 22 February 2017. https://www.hesa.ac.uk/data-and-analysis/publications/students-2013-14

Ibarra, H. 1999. "Provisional selves: Experimenting with image and identity in professional adaptation". *Administrative Science Quarterly* 44: 764-791.

IET [Institute of Engineering and Technology]. 2013. "Engineering and technology Skills and Demand in Industry: Annual Survey 2013". *Institute of Engineering and Technology.* Accessed 22 February 2017. http://www.theiet.org/factfiles/education/ skills2013-page.cfm?type=pdf

Jungert, T. 2013. "Social identities among engineering students and through their transition to work: a longitudinal study". *Studies in Higher Education* 38(1): 39-52.

Kiwana, L., A. Kumar, and N. Randerson. 2011. "An investigation into why the UK has the lowest proportion of female engineers in the EU: A summary of the key issues." *EngineeringUK*. accessed 16 December 2016 http://www.engineeringuk.com/_resources/documents/Apr%202011%20An%20investigation%20into%20why%20the%20UK%20has%20the%20lowest%20proportion%20of%20female%20engineers%20in%20the%20EU.pdf

Laurison, D., and S. Friedman. 2015. "Introducing the Class Ceiling: Social Mobility and Britain's Elite Occupations". *LSE Sociology Department Working Paper Series.* Accessed 30 November 2016 http://www.lse.ac.uk/sociology/pdf/Working-Paper_Introducing-the-Class-Ceiling.pdf,

Lewis, S. 1997. "Family Friendly Employment Policies". *Gender, Work & Organization* 4(1): 13–23.

Lips, H. M. 2004. "The gender gap in possible selves: Divergence in academic self-views among high school and university students". *Sex Roles* 50: 357-371.

Lips, H. M. 2007. "Gender and Possible Selves". *New Directions for Adult and Continuing Education* 114: 51-59.

Lopes, A., Durbin, S., Neugebauer, J. and Warren, S. (2015) Mentoring professional women in aviation and aerospace. *CESR Review*, Available from: http://eprints.uwe.ac.uk/25240 [Accessed on 16 December 2016]

Markus, H., and A. Ruvolo. 1989. "Possible selves: personalised representations of goals". In L. A. Pervin (ed.) *Goal concepts in personality and social psychology*, Hillside, NJ: Erlbaum.

Markus, H., and E. Wurf. 1987. "The dynamic self-concept: A social psychological perspective." *Annual Review of Psychology*, 38, 299-337.

Markus, H., and P. Nurius. 1986. "Possible Selves". *American Psychologist* 14, no. 9: 954-969.

Martin, P. and A. Barnard. 2013. "The experience of women in male-dominated occupations: A constructivist grounded theory inquiry". SA Journal of Industrial Psychology, 39(2). Art #1099.

Mau, W.C. 2003 "Factors that Influence Persistence in Science and Engineering Career Aspirations." *The Career Development Quarterly* 51: 234-243

Mayall, B. 2001. "Understanding Childhoods: a London study." In L. Alanen and B. Mayall (Eds.) *Conceptualizing Child-Adult Relations.* London/New York: Routledge/Falmer.

McArdle, S., L. Waters, J. P. Briscoe, and D. T. Hall. 2007. "Employability during unemployment: Adaptability, career identity and human and social capital" *Journal of Vocational Behavior* 71: 247-264.

McIlwee, J. S., and J. G. Robinson. 1992. *Women in engineering: Gender, power, and workplace culture*, Albany: State University of New York Press

Norman, C., and A. Aron. 2003. "Aspects of possible self that predict motivation to achieve or avoid it." *Journal of Experimental Social Psychology* 39(5): 500-507.

O'Neil, D. A, and D. Bilimoria. 2005. "Women's career development phases." *Career Development International* 10: 168-189.

Oyserman, D., D. Bybee, and K. Terry. 2006. "Possible selves and academic outcomes: How and when possible selves impel action." *Journal of Personality and Social Psychology* 91(1): 188-204.

Oyserman, D., D. Bybee, K. Terry, and T. Hart-Johnson. 2004. "Possible selves as roadmaps." *Journal of Research in Personality* 38: 130-149.

Oyserman, D., K. Terry, and D. Bybee. 2002 "A possible selves intervention in order to enhance school involvement." *Journal of Adolescence* 25: 313-326.

Powell, A., B. Bagilhole, and A. J. R. Dainty. 2006. "The Problem of Women's Assimilation into UK Engineering Cultures: Can Critical Mass Work?" *Equal Opportunities International* 28(8): 688-699.

Praskova, A., P. A. Creed, and M. Hood. 2015. "Career identity and the complex mediating relationships between preparatory actions and career progress markers." *Journal of Vocational Behavior* 87: 145-153.

Ruvolo, A., and H. Markus. 1992. “Possible selves and performance: The power of self-relevant imagery.” *Social Cognition* 10: 95-124.

Sanders, J., and R. Munford. 2008. “Losing self to the future? Young women's strategic response to adulthood transitions.” *Journal of Youth Studies* 11, 3: 331-346.

Simosi, M., Rousseau, D. M., and Daskalaki, M. 2015. “When career paths cease to exist: A qualitative study of career behaviour in a crisis economy.” *Journal of Vocational Behavior* 91: 134-146.

Smithson, J., and E. Stokoe. 2005. “Discourses of Work-Life Balance: Negotiating ‘Genderblind’ Terms in Organisation.” *Gender, Work and Organisation* 12(2): 147–68.

Stevanovic, B. 2014. “Recruitment and workplace integration of men and women engineers in France: the case of EPF Ecole d’Ingenieurs graduates.” *Journal of Education and Work* 27(3): 243-264.

Stevenson, J., and S. Clegg. 2011. “Possible selves: students orientating themselves towards the future through extracurricular activity.” *British Educational Research Journal* 37(2): 231-246.

Strauss, K., M. A. Griffin, and S. K. Parker. 2012. “Future Work Selves: How Salient Hoped-For Identities Motivate Proactive Career Behaviors.” *Journal of Applied Psychology* 97(3): 580-598.

Sue, D. W. 2010. *Microaggressions in everyday life: Race, gender, and sexual orientation*. Hoboken, NJ: John Wiley.

Thomson, R., and J. Holland. 2002. *Youth Values and Transitions to Adulthood: An Empirical Investigation. Families and Social Capital ESRC Research Group Paper 4.* London: London South Bank University.

Tomlinson, J. 2006. "Women's Work-Life Balance Trajectories in the UK: Reformulating Choice and Constraint in Transitions through Part-Time Work across the Life Course." *British Journal of Guidance and Counselling* 34(3): 365–82.

Tomlinson, M. 2007. "Graduate employability and student attitudes and orientations to the labour market" *Journal of Education and Work* 20(4): 285-304.

Watts, J. H. 2009. "'Allowed into a Man's World' Meanings of Work-Life Balance: Perspectives of Women Civil Engineers as 'Minority' Workers in Construction." *Gender, Work & Organization* 16(1): 37-57.

WISE [Women Into Science and Engineering] (2015) "Women in Science, Technology, Engineering and Mathematics: The Talent Pipeline from Classroom to Boardroom, UK Statistics 2014." *WISE.* Accessed 02 February 2017 https://www.wisecampaign.org.uk/uploads/wise/files/WISE_UK_Statistics_2014.pdf