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Abstract

This article describes a typological framework with axes relating to career and (non-work) relationship commitment to show how a specific cohort of women enact femininity (ies) in the context of the institutionalised practices that define science, technology, engineering and mathematics (STEM) as a masculine domain. Based on the accounts of 25 women in such disciplines in an Irish university, four types are identified: careerist femininity; individualised femininity; vocational femininity; and family-oriented femininity. All of these are constituted in relation to the meanings attached to the masculinist STEM career which performatively render women outsiders. The typology moves beyond the career/paid work and work/life dichotomies to encompass both the re-envisioning of career as vocation (Type 3) and the development of a highly individualised lifestyle orientations based on a high commitment to both (Type 2). It points to the variation, complexity and contradictions in how women do femininities in the academic STEM environment. (150)

Keywords: career; case study; career commitment; femininities; Irish; outsiders; relational commitment; STEM; typology; university.

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Introduction

Academia has historically been male dominated in its structures and masculinist in its culture (Morley, 2013). These patterns are still evident in Ireland and internationally (Morley, 2013; O'Connor, 2014), particularly in the male dominated science, technology, engineering and mathematics (STEM) disciplines (Husu, 2013). Acker (1990) shows that a masculine norm is

so built into organizations that an individual has to enact a masculine identity if s/he is to abide by organisational requirements. As such, women's performances of femininities potentially threaten the STEM gender order.

Connell's (1995, 2005) identification of multiple masculinities, although widely critiqued, opens up a more critical and nuanced reflection on variation in types of masculinities within particular contexts (Connell and Messerschmidt, 2005; Hearn, 2014; Schippers, 2007). According to Connell (1987:187), there are no femininities that are hegemonic: 'All forms of femininity in this society are constructed in the context of the overall subordination of women to men' with femininity seen as less valued than masculinity (Schippers, 2007). However, 'defining women primarily as victims of the 'male norm' is problematic' (Billing, 2011) and women's visceral presence presents counter-hegemonic possibilities (Clegg, 2008). Sang et al (2014: 260) note that little work has been done on 'how women may perform their gender in a way that perpetuates hegemonic norms'. For Lewis (2014:1845) femininities are constituted 'through the doing of both masculinity and femininity via the integration and embodiment of conventional feminine and masculine behaviours'. While this suggests ambiguity and fluidity, Paechter (2006:262) suggests that femininities represent 'actual ways that real people construct and understand themselves in terms of how they 'do' boy/man or girl/woman'. The hierarchic gender order requires the location of femininity and masculinity in sexed bodies. Yet, although typologies of masculinities address how power is negotiated in a hierarchical gender order (Connell, 2005; Connell and Messerschmidt, 2005) work on femininities shies away from typologies (Schippers, 2007).

In this article we create a typology based on career- and (non-work) relational commitment axes (O'Connor et al., 2015) to conceptually illuminate the ways in which various types of femininity are insistently inhabited while simultaneously reflexively adapted to a masculinist work environment. It engages critically with Hakim's (2000) typology, endorsing Lewis'

(2016) view that it is embedded in assumptions of individualism, choice and ‘natural’ sex differences. The present study demonstrates how the social practices of women in STEM variously prioritise, reconcile or devalue career and non-work relationships such that the hierarchical relationship between masculinity(ies) and femininity(ies) is largely maintained. Rather than simply accepting gender as a key variable it seeks to problematize it by looking at variation in the enactment of femininity(ies) in male dominated STEM contexts: thus implicitly challenging assumptions that femininities are ‘natural’ and unaffected by the organisational context.

The concept of career traditionally implies an organisational career, defined as a ‘sequence of promotions and other upward moves in a work-related hierarchy during the course of a person’s work-life’ (Hall, 1976: 2). As such, it involves education and training in the context of a linear organisational career path with at least the possibility of upward progression. Counter definitions see career as ‘the evolving sequence of a person’s work experiences over time’ (Gunz and Peiperl, 2007:4), include unpaid work and make no assumptions about career success. Terms such as ‘boundaryless’ (Roper et al., 2010), or ‘kaleidoscope careers’ (Mainiero and Sullivan, 2005) give greater importance to personal or family life, but obscure the wider socio-economic, political and cultural context in which careers are located and the persistence of ‘more or less clearly defined career scripts’ (Rodrigues et al., 2016: 671).

The typology of femininities discussed in this article derives from an organisational context which is already established as privileging conventionally masculine career characteristics. Other studies of women in high status male, dominated contexts, including engineering (Evetts, 1994), management (Wajcman, 1998; Kanter, 1993), construction management (Watts, 2009), architecture (Sang et al., 2014), academic careers (Bagilhoile and Goode 2001) and science (White, 2014) identify key challenges as arising from the persistence

of male stereotypes, tension between paid work and caring responsibilities and interactional processes of ‘othering’. These studies also point to the strategies adopted by women in these contexts, including blending in, opting out and trying to deal with conflicting pressures. In this article, we assume the persistence of the positional hierarchical career path, while acknowledging gendered variation in the ways in which career paths are negotiated. Carson and Bedeian (1994) developed a three-dimensional model of career commitment including an emotional attachment to career as vocation (Blau, 1985), career planning (London, 1985) and career resilience, including steadfastness (Lydon and Zanna, 1990). These elements underpin our analysis of participants’ career commitment.

Our qualitative study divides orientations towards career and non-work relationships along two separate axes. The first axis refers to the reported value and level of commitment to family relationships, caring for children, for older family members and friendship relationships in daily practices. The second axis relates to reported commitment to career as an overall abstract value but also in relation to emotional commitment to, planning for and resilience in relation to career in day-to-day decision-making and practices. Our analysis of cases falling into each quadrant suggests four types (see Table 2):

Type 1: Careerist Femininity: Strong career and weak relationship commitment

Type 2: Individualised Femininity: Strong career and strong relationship commitment

Type 3: Vocational Femininity: Weak career and weak relationship commitment

Type 4 Family-Oriented Femininity: Weak career and strong relationship commitment

Gender and femininities

Gender continues to be implicitly or explicitly seen in society and in much work related literature as a set of characteristics or physical attributes that are assumed to attach to particular sexed bodies. As noted already, we understand gender as ‘an ongoing activity embedded in everyday interaction’ (West and Zimmerman, 1987: 130) in which the embodiment and reproduction of gender is channelled by the gender binary into ‘the hierarchical and complementary relationship’ between masculine and feminine in social interaction (Schippers, 2007: 92) across specific social contexts (see also Nentwich and Kelan, 2014). As this is a processual and emergent practice, it involves some ambiguity and fluidity (Butler, 2004). Our concern in this article is with the kinds of femininities that are permitted and enacted in one academic STEM context.

West and Zimmerman argue that ‘[s]ex categorization and the accomplishment of gender are not the same...Women can be seen as unfeminine, but that does not make them “unfemale”’ (1987: 134). Yet, “sex category” is an explicit facet of “doing gender” (Messerschmidt, 2009:86), and problematisations of the gender/sex binary do not eliminate its strategic utility (Haraway, 2004). In this article we explore the ways women are accountable for ‘appropriate’ performance of their sex category; the extent to which this is shaped and regulated by normative conceptions of femininity in the context of careers in STEM, as well as the self-regulating processes women engage in. This kind of approach to gender differs fundamentally from those which accept the idea of innate sex differences in abilities or preferences (e.g. Hill et al., 2010; Ceci et al., 2009; Ceci and Williams, 2011) or which use gender as an explanatory or dependent variable (e.g. Landivar, 2015). An awareness of the extent to which STEM related constructions of gender vary in particular social and cultural contexts is more evident in recent years (Gupta, 2015; Sang et al., 2014).

While gender is assumed to reflect embodied biological sex, in everyday life, men and women inhabit these categories and use tactics to accomplish gender in ways that meet their career and life goals in myriad ways. For Butler (1990:25) gender ‘is performatively constituted by the very "expressions" that are said to be its results’. What comes to seem natural and common sense is a social accomplishment, but through constant citation, repetition and regulation, the conditions of how it comes into being tend to be concealed. Thus, the category women is not a unitary category but a multiple and fractured one that must be constantly renegotiated (Butler, 2004). By looking at variation in how gender is inhabited and practiced we can open up new directions and possibilities of thinking about and doing gender in STEM.

Context: Gender and STEM

What evidence we have suggests that women are under-represented in science, technology engineering and mathematics (STEM). They make up only 13 per cent of the top-level researchers (Grade A) in science and engineering in the EU (EU, 2015). In Ireland, as in the EU, 21 per cent of (Grade A) professors nationally are women. There is no Irish national data on those in STEM although only 20 per cent of Science Foundation Ireland award holders are women (HEA, 2016). In the case study university, despite the high percentage of women professors overall (27 per cent), there were none in STEM.

TABLE 1 here

Women’s experiences in STEM in many ways reflect those in the wider academic context. However they are, to an even greater extent, in a minority position at all levels in this high-status area, with implications regarding access to senior positions and to sponsorship, mentoring and networks. Furthermore, the purportedly gender neutral character of science

undermines attempts to problematize: ‘natural’ gender differences; gendered social and cultural barriers; criteria and research metrics which implicitly favour men’s promotional prospects; assumptions of a linear career, based on a male monastic stereotype; and the implications of male dominated work teams involving ‘social relationships of vassalage’ (Etzkowitz et al., 2007:405). These institutionalised assumptions are reflected in salaries, types of appointment and rates of promotion among women in STEM (West and Curtis, 2006; Truss et al., 2012). The effect at the interactional, organisational and wider cultural level is to position women as ‘outsiders’ (Beraud, 2009; HC, 2014; van den Brink and Benschop 2012). By developing a heuristic typology of femininities, our aim is give visibility to how femininities are practiced, identify how femininities are shaped by organisational culture and consider what they can tell us about women’s under-representation in STEM.

In the academic organisation being studied, there is a general academic and a separate research career trajectory. The academic career path has traditionally involved permanent employment. It is hierarchical, consisting of five core academic levels, ascending from entry (lecturer), to the top academic position (full professor). All of these are identified as academics. The research career trajectory is completely separate from the academic one; has a much more attenuated career structure and is more project-based. After the PhD it consists of three positions: postdoctoral researcher, research fellow and senior research fellow. Officially each of these research positions is short term (typically two to five years). Academic managers include those in line management at faculty or university level (i.e. heads of department, deans; vice presidents) who are assigned these responsibilities for a limited period (typically three to five years, with the possibility of renewal).

Methodology

The study on which this paper is based was undertaken as part of a larger international project concerned with women's under-representation in STEM disciplines. Although there has been considerable state concern about the scarcity of women in STEM in Ireland, very little research has been done on their experiences. Hence the importance of this study, despite its small-scale character. The study uses data derived from interviews and focus groups with 25 women in STEM in one Irish university, drawing on a number of sub-studies relating to different aspects of women's experiences there. Thus, in the sub-study of career trajectories, the sample was a random one involving positions at early-, mid- and senior-levels and included eleven women. In the sub-study on institutional decision making, managers were purposively selected and included three women; five women were included from the purposive sub-study of perceptions of excellence; and six female STEM PhD students were included from the random sample sub-study of supervision practices (making a total of 25 women). Thus, although the numbers are small, the approach was systematic and covers all levels within STEM. All of the women were current Irish residents, although some had been born outside Ireland.

Semi-structured interviews and focus groups facilitated an understanding of the depth and complexity of individual experiences over their career and in their day-to-day work and lives. The data comprise responses to questions relating to whether or how gender affected career progression; any obstacles or barriers to career progression; the impact, if any, of domestic or caring responsibilities on career decisions; the kind of advice they might give to someone more junior wanting to advance their career; the highest level they aspired to reaching in their own career; how they would compare their career progression with other women and with men. University ethical approval was received and consent forms were signed. All interviews and focus groups were recorded and transcribed and respondents received transcripts post interview for approval. Because women are a minority in STEM in the case study university, pseudonyms are used and identifying characteristics are obscured. Focus

group and interview transcripts were analysed using a qualitative thematic approach that paid particular attention to recurring themes, words and phrases. These were sorted into emergent categories and themes, and then into meaningful clusters for analysis. In this process the themes of career and non-work relational commitment emerged. Individual transcripts were classified on the basis of these themes. A re-reading of the transcripts generated the titles of the quadrants.

The performance of the gendered self and consequent self-recognition is a central part of the claiming and consequent attribution of gender (Paechter, 2006). Therefore, the everyday performance of gender relies on the spectator perspective, the respondent perspective and social context (Francis and Paechter, 2015). Respondents were asked to identify their gender, describe how it was responded to and /or misrecognized in the work context, including the ways gender production is informed by bodies, gendered behaviour, material objects and scientific discourses, all of which enable, constrain and construct intelligible productions of gender within STEM.

Our focus is on the actual practices of constructing or performing gender in that context (Nentwich and Kelan, 2014). Our aim is to understand better the gendered experience of STEM from the perspectives of women in this area, the ways in which femininities are experienced, inhabited and enacted by these women, the institutional arrangements, interaction and kinds of gendered representations of STEM that shape their experiences and the relationship between their careers in these areas and personal lives insofar as these can be separated. We locate the accounts of participants along the axes of career commitment and (non-work) relationship commitment with a view to developing a heuristic typological characterisation of STEM femininity(ies). Although we use the axis of career and non-work relationships, the typologies developed help undo this dichotomy by highlighting the nuanced ways in which femininities are insistently inhabited and performed as these women simultaneously adapt to their masculinist work context.

TABLE 2 here

Type 1: Careerist Femininity: Strong career and weak relationship commitment

Those whose accounts fell in this category were characterised by strong career commitment, which was prioritised over non-work relationship concerns. This type is stereotypically seen as a masculinist orientation (Collinson and Hearn, 1996). Typically, these women had high career ambitions and strong career commitment. They were in many ways similar to Hakim's (2000) work-centred women. Of the fourteen women who enacted careerist femininity in this study, most (as in Hakim, 2000) were at the early stages of their careers and, as in Wajcman (1998), the majority did not have children. Hakim (2000) suggested that only a minority of the female population of working age are in this category. In our study it accounted for more than half of the informants, arguably reflecting their respondents' high education and occupational location. Although such women might be considered more likely to become effectively pseudo-males, with all the ambiguities of that positioning (Lewis, 2016), persistent efforts to accomplish femininity(ies) are evident in the accounts below .

Beth, (academic: in her 30s, Irish born, no children) completed her PhD at the case study university and, after a number of temporary teaching contracts, acquired a permanent academic position. Her work commitment was reflected in her working hours: 'I rarely leave here before six or seven and that would be quite rare. And I bring work home with me, or I go home and have dinner and come back in here. I work all weekends as well'. She struggled not to 'let work rule your whole life' and worried about how she will maintain that commitment if she has children. Similar anxieties emerged in Evetts' (1994) study. Bonnie (researcher: Irish born, in her 40s with children) suggested that the masculinist organisational culture and its

implications means that 'being a different type of girl' was necessary to succeed in that environment:

I am a girl and I don't deny it and I'm a real girly-girl. I won't deny it either. But I think society and maybe this environment expects that if you are going to be a girl in this position, you have to be a different type of girl. You have to be [single minded]. Nothing else comes in your way and you have to fight harder. You do. If you want to get places as a woman.

For Lewis (2014) the enactment of both feminine and masculine behaviours and attitudes is necessary, with 'overly feminine femininities' being devalued and this devaluation impacting on 'women's experience of organizations' (2014:1059). Some women, such as Leslie (academic: Irish born, in her 20s with no children) noted that transgressing traditional gender roles by being 'a different type of girl' was problematic in the male dominated culture: 'A strong female is seen to be intimidating, but a strong man is a strong man'. Although the practice described by Leslie can be read as a feature of hegemonic masculinity when embodied by women, such practices were 'stigmatised and sanctioned...When a woman is authoritative, she is not masculine; she is a bitch – both feminine and undesirable' (Schippers, 2007: 95). Sheila (academic: Irish born, also in her 20s with no children) noted hostility from male colleagues towards women but not men. Other women were also aware of gendered behaviours in their work group:

I find males to be more confident regardless of ability. And I think that holds females back.... I would have two male colleagues at the same level as me, who would be streets apart, totally different from each other.... the only thing they have in common is their gender and this confidence.

Some of the participants, such as Catherine (academic: non-Irish born, in her 40s with no children) had strong career ambitions - aspiring to be a full professor- and did not see the system as discriminatory in terms of gender: 'I think I've been treated fairly... I wouldn't see really any discrimination.... I don't think gender may be an issue. I don't think so'. Similarly, Claire (academic manager: in her 40s, Irish born with young children) emphasised gender neutrality: 'gender has never come up in discussions... doesn't even come into play'.

As in Evetts (1994) study of women in engineering, some informants, while identifying gendered practices, were keen to downplay their impact on career progression. Wanda (academic: in her 30s, non-Irish born with no children) having done two post-docs overseas, got her first permanent position in the case study university. She had relatively high career ambitions and referred to sexist comments from colleagues, but dismissed these as irrelevant to her career progression:

I mean there are a few sexist people in the department. Every now and then you get these sorts of comments but I wouldn't say that it has affected my career. It's just sometimes, em, yes anyway (laughs). A couple of people in my department certainly treat me differently because I'm a female.... I just sort of, I just ignore it.

For Wanda it was important to 'blend in' and not draw attention to her gender difference: 'I'm not really into this kind of separating gender like that. I know that it's probably important... But it's sort of like if someone is making a big key point then I'd rather just sort of blend in'. Although critical of the 'sexist people' she works with, and seeing gender as 'probably important', Wanda's strategy was to actively ignore being treated differently.

While there was some variation in relation to how gender was perceived and inhabited by those falling in this category, most showed ambivalence towards or refused gender relations as a lens for framing their experience, while at the same time demonstrating an awareness of

gender. The three women who had achieved academic manager positions were all in this quadrant, and for these women, gender was not perceived as an issue, arguably reflecting an individual response to the gender discrimination encountered in sexist organizational cultures. Overall, most of those in this category were early-career women without children, with some at a later stage having already laid down a strong career path. While their accounts emphasised career commitment through strong identification and career planning, they varied regarding the perceived implications of gender for their career progression. Collectively, they reveal the myriad ways in which femininities are individually and privately managed to achieve a credible work persona (Gray, 1994; Gray et al., 2017).

Type 2: Individualised Femininity: Strong career and strong relationship commitment

Those characterised by a strong commitment both to career and to family and (non-work) relationships were in this category. Their accounts suggested highly individualised strategies to maximise the opportunities and rewards from both, hence the label ‘individualised femininity’. This category can be seen as similar to Hakim’s (2000) adaptive category insofar as they suggest the potential at least to simultaneously hold a high level of commitment to both. Hakim (2000) differentiated between those who prioritised motherhood (on the ‘mommy track’) and those who made paid work preminent. As noted by Lewis (2016), both of her types rely heavily on naturalised sex differences. In the present study, the gender stereotype of women’s nurturing role was evident in these women’s unwillingness to compromise their relational concerns, even while they maintained high levels of career commitment. They attributed value to both work and non-work activities and were determined that their lived lives reflect this. All acknowledged that their situations involved compromise, and they used considerable ingenuity in maintaining commitment to both areas. While the majority of

Hakim's respondents were in this category, only a small minority of our respondents fell into this category and the majority of these were in research positions (Table 2). It is possible that the conventional masculinist linear career trajectory that marks the STEM domain means that a higher level of ingenuity and creativity is required in order to achieve contemporaneous strong relationship and career commitments.

Dana (researcher: in her 50s, Irish born with children) completed a PhD as a mature student. Despite considerable obstacles, she maintained a high level of commitment to both her career and family. A full-time researcher, she divided her time between the university and her home base. She was highly committed to her career and relished her move out of domesticity: 'I was so bored, I had to do something'. A similarly unconventional solution was exemplified by Anne (researcher: in her 40s, non-Irish born with a child) whose high level of career commitment was reflected in her job-related international geographic mobility, bringing her only daughter with her. Her husband came to see them every two months and they went to see him every six months. Her individual solution was to postpone international post-doctoral research until her daughter was old enough to travel with her. She was now effectively a single parent, making it difficult to attend international conferences and other events important for career progression. Jacqueline (academic: Irish born, in her 30s with young children) also had a strong commitment to her career and to her family. The extent of her career commitment was reflected in her successful promotion application submitted two weeks after giving birth to her second child: 'You're given six weeks [to apply]. I'd just had a baby two weeks before...it was a lot of pressure...I had the added pressure that my husband was also applying for it [promotion] as well....So I couldn't kind of land anything on him and then I had a small boy as well who was a year and a half'.

Carolyn (an established international award winning researcher, Irish born, in her 30s with a young child) made the more conventional choice of working part-time on her return

from maternity leave, in an attempt to retain a high level of career and relational commitment. Because she remained highly committed to research, she saw going part-time as restricting her career: 'they're going to look less favourably on somebody who works part-time than somebody who works full-time'. She effectively put herself on a 'mommy track' with any possibility of promotion looking remote: 'I've certainly kind of resigned myself to the fact that my career will never really reach what it could if I was working full-time'. Although she is paid for part-time work, she works longer hours, despite her attempts to curtail this by 'out of office' messages on her email: 'people are looking for you so you tend to [respond] and then when you're in there's just so much work to do'.

These respondents varied in terms of how they saw gender impacting on their work lives. Carolyn (researcher: Irish born, in her 30s with a child) thinks that gender was 'not a major factor.... across the board within the university'. Anne (researcher: in her 40s, non-Irish born with a child) suggested that being a woman might be seen as an advantage in other countries, but that it made no difference in an Irish context. Dana (researcher: in her 50s, Irish born with children) was most conscious, highlighting the ways in which gender inequality was maintained through interactional patterns:

I find that if you are in a group discussion, they listen to you - but the man in the group will be listened to more, I definitely find that now.... You have to be very certain in what you say to come across as competent as a fella can. They will listen to you of course but they won't say 'oh that's a good idea (.)' [but] 'anyone else?' and then suddenly the guy who says something.... he will be listened to.

It was only when Dana became employed as a postdoctoral fellow that she became aware of being positioned as less competent, specifically as a woman researcher. This type was very much a minority in this study. This may be due to the considerable ingenuity and resilience

required to maintain a high level of commitment to both areas in the context of a conventional linear STEM career trajectory.

Type 3: Vocational Femininity: Weak career and weak relationship commitment:

The vocational femininity category included those accounts which suggested weak commitment to career in terms of ambition to reach the highest levels but also weak commitment to (non-work) relationships. Those in this category emphasised meaningfulness in their work lives and prioritised those aspects which provided the most intrinsic satisfaction. The accounts of one in five respondents (five in total) fell into this quadrant. They indicated imperviousness to organisational goals, procedures and processes. All those falling in this category were on the academic career path (see Table 2), suggesting that such a disposition is dependent on secure employment conditions. In their effective indifference to managerial priorities (including the prioritization of research over teaching) they can be seen as resisting neo-liberal pressures.

Margaret (academic: Irish born, in her 30s with no children) prioritised the intrinsic value of teaching. Margaret's positioning reflected a concern with intrinsic satisfaction rather than with her own career progression: 'the choices I've made is not, I, I certainly, I don't think I'm a career person...I'm not driven by decisions based on my career.' Although she would like to progress in the academic hierarchy, she also thought that: 'maybe this is where I'll stay even though my capacity is much greater than that...I'm not sure if I'd have an issue with it, maybe I would in ten years' time when I see people far less capable running places... maybe, I don't know'. Similarly, Barbara (academic: Irish born, in her 50s, with children) described herself as being more concerned with teaching and knowledge production than with enhancing her promotional possibilities by being visible:

I'm not [visible]. You know when my PhD students - and I'm supervising or co-supervising quite a few PhD students, let's say half a dozen, - if they put my name on something they're writing, that's ok with me, if they leave my name out, that's ok with me, they get the same supervision one way or the other.

Barbara has a strong creative interest in her discipline: 'I suppose the things that I enjoy about my job, I like being able to put in the effort where it interests me... I really enjoy that'. Similarly, Renee (academic: non-Irish born, in her 30s with no children) saw herself as a creative person and was clear that this was unhelpful in terms of her own career progression. Yet she was unwilling to change this. Thus, when asked what advice she would give to a junior colleague, she said: 'Well, advice I wouldn't take myself, and that's just (...), become more technical...The easy solution is do something that can be easily measured especially in terms of ISI' [Institute for Scientific Information]. Renee instead sought opportunities to develop her creative abilities. The seduction of conventional STEM career aspirations were acknowledged, but in relation to the benefits she might bring to her department and more widely: 'I would love to be in a situation where I was a full professor somewhere.... having an impact on a department, having a broader impact'. She did not prioritise moving upwards in the career hierarchy. She enjoyed teaching but would not hesitate to leave if finances allowed: 'If I won the lottery I'd certainly become an independent [creative person]'. Alexa (academic: Irish born, in her 40s, without children) also prioritised the collective project of her school above personal career ambitions.

Margaret's account highlighted the subordination associated with feminine practices especially when undertaken by women: 'certain roles do, do have a gender bias' and those done by women were often not valued. She felt marginalised as a woman in a male dominated STEM world: 'you just feel like this young one, particularly a girl in the room with all these men, you're definitely still an outsider and you are, I definitely have felt the female thing there,

definitely, just like this young girl'. Barrett and Barrett (2011) found a more positive orientation towards teaching among women than men. This was reflected in Margaret's account as she prioritized teaching but saw this as feminised work that rendered her a non-contender in STEM. In contrast to the gendered reading of STEM culture by Margaret, three of the five in this quadrant (Renee, Alexa and Marissa) did not see gender as impacting their careers.

In the context of a neo-liberal university, where the extrinsic rewards of promotions and progression rely on measurable outputs, these women prioritised intrinsic aspects including teaching and creativity. They exemplified a re-envisioning of the traditional concept of career. The ability to do this rested on both being in secure positions and remaining relatively invisible to management who had rather different priorities. They can be seen as re-envisioning the traditional linear STEM organisational career to include the prioritisation of self-fulfilment, authenticity and intrinsic satisfaction (Mainiero and Sullivan, 2005).

Type 4 Family-Oriented Femininity: Weak career and strong relationship commitment:

Those accounts falling in this category were characterised by a strong relationship commitment, particularly to family and a weak commitment to career. Although in terms of priorities and ideas about 'natural' sexual difference, they are similar to Hakim's (2000) home-centred women, they differ insofar as they are committed to paid employment. Indeed, the option of moving completely out of paid employment is one that is now available only to a select few. In the present study, there was a recognition that maintaining a high level of family commitment came at a price for women in career terms. Only eight per cent of the women were in this type, a pattern that again arguably reflects their educational background and occupational position.

Diana (academic: non-Irish born, in her 40s with children) saw her situation as reflecting a male-dominated society and university. She believed her career had been affected negatively by her family responsibilities:

not doing enough research, not publishing hard enough, not networking hard enough, not going to conferences enough, those are all the obstacles. And spending too much time with my family and preferring to be a mother and not... not putting enough time into my job. Those are the obstacles.

For Diana, the difficulty of combining an academic career with family responsibilities forced her to choose one over the other. She said of herself: 'I wanted a career but not that much' and noted that she got 'stuck in her current position'. Yet, she identified with domestic responsibilities as an important part of her construction of herself as a woman. She contrasted this with the domains of STEM which she saw as male-dominated: 'They are all men and they are kind of perhaps more ambitious, more driven, and maybe they put more into their work'. Melissa (academic: Irish born, in her 40s with children) also noted the difficulty of combining relational concerns with an academic career and suggested that women were forced to choose between these domains because of gendered expectations, with such expectations being reinforced in day-to-day interaction. She recalled a seminar in which a number of senior academic women gave career advice and during which she became very conscious of the sacrifices required of women to succeed in that environment:

And I'm thinking that's [wrong]. I don't want to, when I'm in my 70s and retired, be thinking I didn't spend enough time when my children were small and now they're in jail, you know. I don't want to be in a situation where I'll have regrets and I have to remind myself [of this]. And there are little jibes here there and everywhere about it.. I'm still doing the job and doing right by my family but I'm losing out in terms of potential progress.

As noted by Lewis (2014), prioritising a commitment to relational activities is seen as reflecting excessive femininity and is suspect. For Melissa time is required to prevent the children's potential future deviance. Both women in this category identified women and femininity with

the familial and domestic. Diana compared her life experience with that of her male colleagues: ‘they’re not torn by the whole family thing...the other guys I guess they’ve got families, but yeah, men, men are never as torn as much. They never are’. Reflecting many studies pointing to the multiple cultural barriers faced by women in masculine STEM structures (White, 2014), Melissa noted that: ‘It is a system that is stacked against women I think and stacked for men because it promotes that sort of drive’. While these women perform the most stereotypical form of femininity, they have reluctantly forgone career ambitions and made relational concerns a life priority.

Concluding Discussion

The typological framework in this study demonstrates that femininities are not inevitable or ‘natural’ but are insistently inhabited, although reflexively adapted and expanded (Butler, 2004; West and Zimmerman, 1987) so as to make women’s lives liveable within the masculine culture of STEM. It also identifies some of the patterns that contribute to institutionalising women’s under-representation in STEM.

The accounts of most of these highly educated women fall into Type 1, *Careerist Femininity*. Although this involves accepting characteristics associated with masculinity and their enactment by women, there is a simultaneous insistence on femininity. Most of those in this category were early career and did not have children (with a small number having already achieved career success in academic manager roles). Their current life circumstances come into least conflict with the heightened masculinist culture, values, career structure and metrics in

STEM. This type is not sustainable in a societal context where women are seen as the main care givers. Thus the under-representation of women in STEM is not simply an individual problem. Careerist femininity as articulated in these accounts demands ‘blending in’ while being ‘single-minded’ and ‘fighting harder’. Thus although potentially it lines up with liberal feminist agendas, it is located outside of feminist or gender politics which are seen as ‘not important’ or ‘probably not important’. The women’s experiences in this type demonstrate the work done by the symbolic meanings of femininity to (re)legitimate the ideal masculine STEM academic or researcher: something that has attracted little academic attention.

In Type 2, *Individualised Femininity*, the accounts show attempts to balance the often mutually exclusive values and practices of caring relationships and career commitment. Reconciling these within the narrow parameters of STEM careers often involves life experiments, such as moving family across national borders. Once again, structural obstacles linked to masculine ideals are individually negotiated and in ways that revalue femininities. In Type 3, *Vocational Femininity*, the women prioritise sources of intrinsic satisfaction. They can be seen as resisting managerialist priorities, including the prioritization of research over teaching and attributing value to those aspects of their work that are meaningful to them. Since their priorities are not shared by management, they have to remain largely organisationally invisible to survive (a position facilitated by holding permanent positions). This solution has typically been ignored in work on femininities in STEM.

The tensions between constructions of femininity and the ideal masculinist STEM academic/researcher are also indicated by the fact that women were least likely to be found in Type 4: *Family-Oriented Femininity*. It is striking that, in contrast to assumptions about the ‘naturalness’ of the prioritization of relational commitment (Hakim, 2000), the women in this category reluctantly chose relational commitment over career commitment. Whereas this

category was the most common type in the masculinities study (O'Connor et al., 2015), Family Oriented Femininity is enacted by only a tiny minority of women. This implicitly suggests that 'feminine' orientations are more acceptable among men and that breaking the link between 'gender performance and sexed bodies' (Francis, 2010) is more available to men than to women in STEM (see also Sang et al., 2014).

The identified types are dynamic and processual for individual women who may well move from one type to another over the life course. They demonstrate variation in the way femininities are enacted in STEM contexts both individually and collectively and over time. They underline the importance of recognising the ingenuity required of women to enact femininity. Femininity, as the constitutive outside of STEM, works to maintain it as a masculine domain. It is not surprising then that considerable work is required to both occupy this domain and to identify with and 'do' femininity (ies). This article reframes the career/paid work and work/life dichotomies and broadens these to encompass both a re-envisioning of career as vocation (Type 3) and the development of individualised lifestyle orientations that facilitate a high commitment to both (Type 2).

There are obvious limitations to our study. It is based on a small sample in one academic context in a particular society at one moment in time. However, we see the case study typology as a heuristic device that opens up questions about how the STEM context shapes the ways in which femininities are inhabited and lived, and how this affects the underrepresentation of women in a field that tends to naturalise femininity as outside this masculinised scientific domain.

Risman and Davis (2013:747) asks if 'we could explore when people refuse to do gender whether they 'undo' it or simply do gender differently'. By developing a typology

based on career- and relational commitment, we show that while the women participants are doing femininity differently, there is little evidence of undoing gender in the sense of increasing the valorisation of femininities in the STEM workplace. Instead, femininities are valorised as maintaining gendered self-identities, while adapting to the differently gendered demands of their workplace. Thus the career orientation of most of the women in this study involves adopting characteristics associated with masculinity (although experienced and read as feminine); it requires remaining silent about sexism and making constant and creative efforts to ‘blend in’. The typology presented here sensitises us to particular patterns and practices of femininity as shaped by the career experiences and cultural demands of STEM, with its implicit expectations as regards the importance of career commitment to the exclusion of other commitments; expectations that the reconciliation of the competing demands of STEM and (non-work) relationships is an individualised responsibility; assumptions that the prioritization of family commitment is unacceptable for women in STEM; and that it is not necessary to look for intrinsic satisfaction outside a linear hierarchical STEM career. As such, it highlights the need for a re-envisioning of STEM careers: a re-envisioning that is crucial to meet the objective of increasing women’s participation in STEM in a sustainable way.

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Table 1: Proportion of women by position in case study university as a whole and specifically in STEM (when research undertaken: 2013)

	Overall University % Female	STEM Faculty % Female
Academic Managers	22	8
Academics		
Professors	27	0
Associate Professor	16	8
Senior Lecturer	35	16
Lecturer above the bar	50	17
Lecturer below the bar	47	29

Researchers		
Senior Research Fellow	0	0
Research Fellow	29	24
Postdoctoral Researcher	41	27

Table 2: Positioning of Women in a Typology of Femininities (n=25)

	Strong			
		Type 1: Careerist 14 (56%)	Type 2 Individualized 4(16%)	
		Catherine *	Sheila *	Carolyn **
		Beth *	Laurie *	Anne **
		Wanda *	Leslie *	Dana **
Career		Andrea **	Debbie *	Jacqueline *
Commitment		Bonnie **	Mary *	
		Claire ***	Dawn ***	
		Patricia ***	Paula *	
		Type 3: Vocational 5 (20%)	Type 4: Family Oriented 2(8%)	
		Renee *	Diana *	
		Margaret *	Melissa *	
		Alexa*		
		Barbara *		
		Marissa *		
	Weak			Strong
		Relationship Commitment		

*Academic; **Research ***Academic Managers