

Mentoring and sponsorship in higher education institutions: Men's invisible advantage in STEM?

Higher Education Research and Development (2019) 39 (4): 1-14.

Doi.org/10.1080/07294360.2019.1686468

Pat O'Connor, Department of Sociology, University of Limerick, Limerick and Visiting

Professor, Geary Institute, University College Dublin, Ireland. Corresponding author:

Pat.oconnor@ul.ie

Clare O'Hagan, Department of Sociology, University of Limerick, Limerick Ireland.

Eva Sophia Myers and Liv Baisner, Human Resource Services (Gender Equality Team)
University of Southern Denmark, Odense, Denmark.

Georgi Apostolov, Rectorate and Irina Topuzova, Department of Psychology,
South-West University, 'Neofit Rilski', Blagoevgrad, Bulgaria.

Gulsun Saglamer, Former Rector, Mine G Tan and Hulya Caglayan, Centre for Women's
Studies in STEM, Istanbul Technical University, Istanbul, Turkey.

Abstract

This article is concerned with the source of men's invisible advantage in the male dominated disciplines of Science, Technology, Engineering and Mathematics (STEM). It is suggested that this advantage has been obscured by combining sponsorship and mentoring. The research asks: Are men or women most likely to be mentored? Is it possible to distinguish between mentoring and sponsorship? Is there gender variation in either or both of these depending on the source – whether from the academic supervisor, line manager or other senior academics. This qualitative study draws on interview data from 106 respondents (57 men and 48 women) at junior, middle and senior levels, in four universities: one each in Bulgaria, Denmark, Ireland and Turkey. It shows that both men and women received mentoring from their PhD supervisor, albeit with slightly different reported nuances. Men were more likely than women to receive sponsorship in that relationship. Both men and women received sponsorship from the Head of Department, whose wider responsibilities may have reduced homophily. Men were more likely than women to receive sponsorship and mentoring from senior men, with most women indicating a lack of access to such senior academics. By distinguishing between mentoring and sponsorship, this article contributes to our understanding of the way male dominance in STEM is perpetuated and suggests the source of men's invisible advantage in STEM.

Key words: Career related support; higher educational institutions; invisible advantage; men; mentoring; sponsorship; STEM; women;

Introduction

Academic women are under-represented in Science, Technology, Engineering and Mathematics (STEM) in higher education institutions (HEIs). Various explanations have been put forward including women's preferences and biology (Ceci and Williams, 2011); gendered organisational cultures (O'Connor, 2011); gendered evaluative practices (Nielsen, 2016; Van den Brink and Benschop, 2012a) and a long hours' culture which militates against those with caring responsibilities (Adamo, 2013; Fox, 2010). This article is concerned with men's career related support, and particularly with whether sponsorship gives men an invisible advantage in STEM: a pattern that may have been obscured by combining sponsorship with mentoring, since there is some evidence (Ibarra et al. 2010) that women are more likely than men to be mentored.

The research questions include: are men or women most likely to be mentored? Is possible to distinguish between mentoring and sponsorship? Is there gender variation in either or both of these depending on the source? (i.e. from the academic supervisor, line manager, other senior academic). Drawing on interview data from a total of 106 people (57 men, 49 women) in early, middle and senior positions in the academic hierarchy in four HEIs (one university each in Ireland, Turkey, Bulgaria and Denmark), this article disentangles these elements to show how men's invisible advantage is maintained.

Theoretical Perspective

Kossek et al. (2012) define workplace support as the degree to which individuals perceive their well-being as being valued by their superiors and other senior members of their organization. HEIs are not simply bureaucracies staffed by automatons (Weber, 1947), but gendered structures (Acker, 1990; 2006) where positions are hierarchically ordered so as to constitute a career. Career related support facilitates access to or progression in that hierarchy through relationships involving homosociality, coalitions and networking (Morley, 2008) involving a patriarchal support system (Bagilhole and Goode, 2001), with men being most likely to associate and bond with those whom they see as similar to themselves (Grummell et al. 2009). A gendered social order in which men predominate (Ely and Meyerson, 2000) is maintained. The implications of such processes for women are substantial in male dominated STEM contexts, where peer evaluation is crucial and where career success reflects evaluative (and often gendered) judgements.

Men's relationships with each other are a key element in the perpetuation of patriarchy, which Hartmann (1981, p.14) defines as 'a set of social relationships between men, which have a material base, and which, though hierarchical, establish or create interdependence among men that enable them to dominate women.' Such relationships with other men play an important part in opening opportunities for some and closing them for others. Biases against women have emerged in assessments of applications for positions (Moss-Racusin et al. 2012), for research funding (Wenneras and Wold, 1997) and in evaluations of excellence (Nielsen, 2016; O'Connor and O'Hagan, 2016; Van den Brink and Benschop, 2012a). This patriarchal support system has been obscured by not differentiating between sponsorship and mentoring (e.g. Mc Kay and Monk, 2017). Gardiner et al. (2007) show that mentoring systems involving very senior academics can be effective in facilitating promotion, research output and grant

income, but the extent to which such formal mentors actually provided sponsorship was not explored. Ibarra et al. (2010) and De Vries and Binns (2018) differentiate sponsorship from mentoring, with the former concluding that women are over mentored but under-sponsored, with consequences for their likelihood of being promoted. The focus of the present article is on the differentiation between mentoring and sponsorship in STEM: something that has been little researched.

Mentoring involves the relationship between a more experienced academic staff and a younger, less experienced individual, which provides advice and guidance, a place to discuss anxieties and uncertainties (Rhodes, 2002). Its key elements have been seen as to ‘provide emotional support, feedback on how to improve, serve as role models, help mentees to navigate corporate politics, strive to increase mentees sense of competence and self-worth, focus on mentees personal and professional development’ (Ibarra et al. 2010, p. 8). Similarly, it has been described as ‘guiding, advising, sharing experience and knowledge, supporting development’ (De Vries and Binns, 2018, p. 8). In HEIs it is seen as enabling young academics to deal with the often-conflicting demands of teaching, research and service (Adcroft and Taylor, 2013) and learning the tacit as well as the explicit organisational rules (Trower, 2012). Mentors can be at any level of the hierarchy although Ibarra et al. (2010) found that women’s mentors had less organisational ‘clout’ with mentors and mentees being matched on the likelihood of frequent contact and ‘chemistry’. Mentors typically expect little in return and the relationship involves little reputational risk. In a context where those occupying formal positions of power are providing mentoring, where they are open to detecting common patterns across mentees and have at least some structural awareness of gender inequality, mentoring can promote organisational change (De Vries and Van Den Brink, 2016). Such a context occurs rarely.

Sponsorship has been defined by Ibarra et al. (2010, p.9) as involving senior managers with influence who ‘give their protégé exposure to other executives who may help their careers, make sure their people are considered for promising opportunities and challenging assignments, protect their protégés/ées’ from negative publicity or damaging contact with senior executives, fight to get their people promoted’. Sponsorship involves the leveraging of their own power and influence to advance the career of their protégé, whether by advocating, recommending, protecting or fighting for him/her: ‘leaders drawing on their power, networks, resources, social capital and influence’ (De Vries and Binns, 2018, p. 7) openly recommend their protégé for assignments, opportunities, or promotions, using their power and reputation to advance that protégé’s career (Foust-Cummings et al. 2011). The sponsorship relationship

is an investment that must be earned because sponsors are invested in their protégés/ées' (Hewett, 2013). The benefits to sponsors include an enhancement of their reputation, the effective creation of a dependency which can at least potentially be called on in the future, and a potential ability to delegate parts of their own work load to the protégé. Ibarra et al. (2010) found that men are more likely than women to be sponsored and by a senior member of the management team. Sponsorship can be seen as one of the mechanisms involved in patriarchal reproduction insofar as it reproduces male occupancy of positions of power through reflecting and reinforcing ties between men. Equalising access to such relationships perpetuates a cronyistic basis for advancement (O'Connor, 2018).

Three relational contexts are seen as potential sources of mentoring or sponsorship. The first involves academic supervisors, particularly the PhD supervisor. During the PhD, people are developing their skills in the areas of teaching, research, and becoming an independent member of the academic community. The second involves line management, particularly the Head of Department (HOD), who is important in creating the organisational culture (Obers, 2015) and who is a gatekeeper in the academic hierarchy. He/she depends on the co-operation of staff in delivering teaching and pastoral care, which are not typically seen as important in facilitating individual career progression. The third involves relationships with other senior academics, inside or outside the HEI, in a context where recruitment/promotion often requires endorsement from such academics.

Methodology

The study was undertaken as part of a wider European research project investigating structural and cultural barriers to women's careers in STEM. The overall project involved a higher education research institution (HERI) in each of seven countries: Denmark, Germany, Italy, Sweden, Bulgaria, Turkey and Ireland. Its design was such that a limited number of countries were involved in each of the various sub-projects. The inclusion of a particular country in a particular sub-project partly reflected the interest and the capacity of the team in that country and their involvement in other sub-projects. Researchers from four countries (Ireland, Bulgaria, Denmark and Turkey) were involved in this sub-project, and partly for convenience and partly because the project was an action research project, the focus was on universities with which they already had links.

A constructivist-interpretative paradigm was adopted which assumes a relativist ontology (Denzin and Lincoln, 2013). A qualitative methodology was used in the grounded theory tradition. The majority of the respondents were selected by random sampling on the basis of their gender and position (at early-, mid- and senior levels) in universities in Bulgaria, Denmark, Ireland and Turkey. Purposive sampling was necessary where there were few available respondents. It was initially expected to include 50/50 men and women, but the research team did not include alternative positions (higher or lower) where there was no female comparator in order to highlight women’s under-representation in STEM.

Table 1: Characteristics of the universities and gender of the sample participants

Location of University	Age and Ranking of university on QS: 2017	Size (number of students and staff)	% of full professors in STEM who were women	% of HODs in STEM who were women	Sample size (M; F)	Sample level: High (H); Mid (M); Early (E)
Bulgaria (BG)	New: Unranked	14,000 students; 1,000 staff	25%	37%	30 (16M; 14F)	16 H; 8 M; 6 E
Ireland (IE)	New: 500-550	13,000 students; 1,300 staff	0%	10%	29 (18M; 11F)	6 H; 11 M; 12 E
Denmark (DK)	New: 350-400	31,000 students; 3,800 staff	9%	25%	24 (12M; 12F)	16 (H); 0 (M); 8(E)
Turkey (TR)	Old: 651-700	35,000 students 2,130 staff	35%	40%	23 (11M; 12F)	15 H; 0, M: 8E

The career hierarchies in these countries differed: hence as a preparatory stage, local project leaders identified the points where the numbers of women increased/reduced dramatically (i.e. those at high, middle and senior levels). Interviews were conducted with men and women at these levels. Accessing data broken down even by gender was difficult. The qualitative data showed that some respondents were not born in the country in which they were now employed. Differentiating on this or other bases raised practical and/or ethical issues. Hence, an intersectional analysis was not seen as feasible. Overall the sample included 106 individuals, selected from the 1106 potentially available at these levels in the four universities. They are all public universities, although they vary in age, ranking, size and the proportion of women at full professorial level in STEM and as HODs in them (See Table 1: where staff

includes general/administrative/professional/academic staff: partially derived from Salminen-Karlsson, 2017).

Ethical approval was received where required. In three of the four universities information letters and/or project brochures were provided to respondents prior to interview. Respondents signed consent forms and selected pseudonyms in these universities. In the fourth university, participants agreed verbally to participate. A common interview guide was developed which contained questions specifically designed to provide data on the sources and types of support, for example: *What factors or people were most supportive in helping you achieve this post? Have factors or people been supportive in your overall career progression? Specify; Have work related mentors played any part in your career progression? Specify; – If yes: Have you had male & female mentors? Specify; Have work related networks played any part in your career progression? Specify.* At the time the data was collected (2012-2014) the importance of the distinction between mentoring and sponsorship was only beginning to be recognised. Hence questions were not specifically asked about sponsorship. In the light of the subsequent literature, the data was reanalysed: indicators of mentoring included advice, emotional support, confidence building and career related information while indicators of sponsorship included getting them jobs/promotions, facilitating international mobility, access to research funding and to other senior academics.

All interviews were recorded and transcribed by local partners. Because of the diversity of languages involved, content analysis was done manually. It is a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding (Weber, 1990). Each code was a word or piece of text from the interview transcripts and a (cross-national) coding frame was developed (Holton, 2007). In the case of career support, the initial coding categories included support received from PhD supervisors, line managers, mentors, networks, relationships with powerful others and family support, with data from the four universities coded using these categories by the local project leaders. Analysis of the qualitative data involved extrapolating conceptual categories from the codes, followed by further coding and categorisation (Charmaz, 2006). Data relating to support from mentors, PhD supervisors and networks were arranged in one cluster called individual support. This cluster was revised and, for example, support from line management included, and family support excluded. The categories of formal and informal support and instrumental and emotional support were used in an iterative process typical of qualitative data analysis. Later, relational contexts were identified and mentoring and sponsorship differentiated on the basis of the indicators previously outlined, and the data re-analysed in these terms.

In this article, respondents are identified by a pseudonym, their gender (M/F) and the country in which they are employed (BG Bulgaria, DK, Denmark, IE, Ireland, TR Turkey). Since the number of women in senior positions is very small, in the interests of anonymity, the respondents' position is not indicated in quotations. Since only one HEI from each country was included, and since some of those interviewed were born elsewhere, current location is not used as an explanatory factor, although it is part of the context.

Academic supervisors – particularly PhD supervisors

PhD supervision has traditionally involved a dyadic, privatised and characteristically intense relationship between an academic supervisor and a doctoral student. In the traditional apprenticeship model, the provision of supervisor training is ad-hoc, and supervisory knowledge and skills are generally acquired on-the-job. It leaves open the possibility of gender bias, particularly in male dominated contexts where homosociability is likely to foster interaction between male supervisors and male students. With its emphasis on knowledge transfer, guidance and induction into the academic world, the PhD relationship is in many ways a mentoring relationship, and is critically important in affecting doctoral students' experiences, including their satisfaction, persistence and academic achievement (Sverdlik et al. 2018). In the STEM model of supervision, supervisors are likely to have research grants, to publish and present papers with present or former PhD students (Heath, 2002; Sinclair, 2004), with the status of the supervisor affected by the student's academic success. Previous research has shown male students are likely to receive more support, feedback and encouragement (Lorber-Newsome, 2008) and to have deeper relationships with their PhD supervisors (Husu, 2001).

The respondents in all four universities are from STEM disciplines and had largely completed their PhDs in the apprenticeship model. Men and women in all four universities reported receiving mentoring from their PhD supervisors (who were mainly men). Such mentoring included help in the acquisition of professional skills related to teaching and research. There were slightly different nuances in the kind of mentorship provided: personal reassurance being mostly referred to by women, for example: 'I was the sort of person who would say oh I don't know if I would be able to do that and he says you can, you know you can' (Dana, F, IE): and more directly career related mentorship, including help with job or promotion applications, by men: for example: 'nudging me to consider options... [that I would

not have considered] not quite the high-level universities that I would have applied for if I wasn't encouraged to do so' (Dale, M, IE).

Glaser (2016) found that women mentors were more approachable and excelled at offering personal support, friendship, acceptance and counselling. In this study, as in other studies (Lorber- Newsome, 2008; Husu, 2001), female supervisors, who are in a minority, were supportive of both male and female PhD students. For example, Timothy (M, DK) indicated that he received significant mentoring from women academics: 'Males are still [sexist] I can say in some countries - from my experience, females just look for the gold': i.e. highly talented.

A close personal relationship with a protégé facilitates sponsorship. Many of the men described such relationships with their male PhD supervisor, dating back to their undergraduate project and their invitation to undertake a PhD. Bradley (M, IE) noted that his PhD supervisor (who subsequently became his boss) 'always treated me on sort of a peer to peer basis, even during my final year project'. He suggests that the closeness of the relationship arose because he was his supervisor's first PhD student. Ronald (M, BG) noted that his PhD supervisor was a sponsor who had 'significant influence over my career advancement'. Sponsorship was reflected in references to PhD supervisors getting research contracts, funding and jobs for their students through their own professional networks. Men were more likely than women to refer to such outcomes, although occasionally women did so. Bonnie (F, IE) had worked as a researcher while doing her PhD and got her present job through contacts reflecting her status as a protégé: 'I was not even recruited... The person who brought me in here would have known the professor in the other university'.

In STEM, PhD students are likely to have funding, to be full-time candidates and to submit within five years. This context is conducive to sponsorship, provided the student completes the research in a timely fashion. Pregnancy, which requires leave of absence, and potentially delays project outcomes inhibits sponsorship. Hande (F, TR) noted that: '[Male] supervisors tend to think that one cannot write a thesis in such circumstances.' She got pregnant during the last year of her PhD and could not tell her male supervisor for a long time: 'I was so afraid of being kicked off' (i.e. that he would terminate her contract). Wayne (M, IE) referring to his own experience of having a project disrupted by pregnancy saw STEM and maternity as incompatible. The strong implicit suggestion is that he will not choose a young woman whom he sees as likely to get pregnant, thereby eliminating any possibility of sponsorship from the start. More long-term tensions involving motherhood reflect the stereotypical monastic concept of the scientist (White, 2014): 'They prefer men rather than mothers with children.' (F, BG).

Female supervisors were seen as more supportive of motherhood: ‘My [female] supervisor ...was a woman who has a child.... I could easily tell her my situation when my child got sick’ (Hande, F, TR). Homosociability facilitates sponsorship: but since men make up the majority of PhD supervisors, women, who are stereotypically perceived to be more concerned with caring, are less likely to be sponsored.

In a minority of cases the PhD experience was described negatively. Arianna (F, DK) for example, said that: ‘I think I have been very alone. There has not been someone who has supported me’. It is possible that she did not receive support, or that women require more, being a member of a marginalised group. Some research suggests that women tend to attribute negative experiences to personal deficiencies, while men tend to attribute them to problems within their department (Almgren et al. 2015) — possibly reflecting a greater sense of entitlement among men (Lewis and Smithson, 2001).

In summary, PhD supervisory relationships were widely seen by men and women as having mentorship elements: with the men being more likely to refer to sponsorship elements.

Line management especially Head of Department

People holding line management positions, particularly the HOD play a key role in shaping the culture of the department, allocating teaching and administration, acting as gatekeepers in the academic hierarchy and as potential sources of mentoring and/or sponsorship (Obers, 2015). It is necessary or at least preferable for a HOD to be a Professor in the Bulgarian and Turkish HEI, while it is not so in the Irish or Danish one. In the STEM faculties where the research was conducted, HODs are predominantly male, although there was some variation (see Table 1).

There was evidence of male and female HODs providing sponsorship to both men and women. Such sponsorship included facilitating their access to jobs, funding and PhD supervision opportunities as well as reducing their teaching loads, particularly at the start of their academic careers. For example, a male HOD was crucial in facilitating Faith’s (F, DK) access to employment: ‘In connection with getting my current position ...I was supported by my Head of Department’. Renee’s (F, IE) female HOD secured permanent employment for her. HODs also facilitated promotions: ‘My [male] Head of Department had a big influence on me being promoted for a position as assistant professor with a tenure track’ (Charles, M, DK);

‘People who helped me? These were all my superiors who credited me with their trust. They promoted me and thus I was able to move upward’ (Bruce, M, BG). In the Irish university, there were numerous references by men to the HOD’s use of power to advance their career. They included bending the rules, for example, allowing them to apply for funding in their own name before they were entitled to do so. The system of ‘paying forward’ was identified with academics doing ‘favours’ (i.e. unpaid work) for line management in the expectation of sponsorship in promotional contexts: ‘when they pick up the phone and ask you to do something you do it. And you do it not just once you might do it fifty times. So, when your application goes in you’d expect them to support you’ (Wayne, M, IE). Sponsorship is being provided at a price and is mutually beneficial: the sponsor delegates their routine work to junior academics who get ‘pay back’ at promotion. Since the majority of HODs are men, this overwhelmingly involved sponsorship by men.

Women did not appear to be aware of this system. Thus, although Catherine (F, IE) thought that her HOD encouraged her and provided money for conference attendance, she saw him as unable to influence career progression: ‘with regard to actual promotion, they have very little influence’. There was also a suggestion that expectations as regards sponsorship were much lower among some of the women (McKay and Monk, 2017). For example, a male HOD was seen as providing ‘huge support’ in that ‘if you want to participate in activities, he’s very happy to let you participate’ (Anne, F, IE). Dana (F, IE) who was older than her contemporaries, was unusual in identifying favouritism to a male colleague at the same level:

it mightn’t even be his choice to do it but he would be given the job. If there’s a conference coming up and you need to give a talk, he would be sent rather than me. He gets favored at some level even though he might not actually want it...They’re just little things but at the same time you know they mount up.

Such ‘little things’ reflected male sponsorships and positioned men for promotion (Valian, 2005).

Facilitating international mobility was identified by De Vries and Binns (2018) as a key element in sponsorship. HODs need to deliver on teaching, administration and pastoral care in a context where these are frequently seen as less important for individual career progression (‘academic housekeeping’: Heijstra et al. 2017). The HODs ability to accede to requests for international mobility is potentially affected by a need to maintain departmental morale by sharing such opportunities between academic staff: ‘he told me that since I already had studied abroad before, it’s now another’s turn to go. He did not allow me to go and do my research

abroad, although I had been accepted' (Mehmet, M, TR). Thus, homosociability was in some cases modified by the HODs wider responsibilities.

The women whose current boss had been their PhD supervisor were particularly likely to refer to ongoing mentoring by him: 'in terms of guiding me ...you know how to write funding proposals, how to network, and how important networking is all of that, [how to] chair meetings' (Carolyn, IE). She sees him as sponsoring her: 'within HR, he's fought the corner for me to stay'. However, that sponsorship appears to have trapped her in a career cul-de-sac as a part-time researcher, one that she accepts, albeit reluctantly, since she has 'chosen' this to facilitate her child care responsibilities. Being a scientist is set up in opposition to family responsibilities, with consequences for women: which her HOD and sponsor do not challenge.

There was considerable evidence of sponsorship of both men and women by HODs, with men more likely to benefit from HODs' informal sponsorship related power tactics.

Relationships with other senior academics

There was unanimous agreement from male and female respondents in all four contexts that relationships with other senior academics were significant for career success since they facilitated career related evaluations and the establishment of an international profile 'Networking? Absolutely! Professional contacts are extremely important!' (Matthew, M, BG); 'expanding your network is important, all the time' (Lea, F, DK). Men were much more likely than women to refer to mentoring from senior academics for career success. Carl (M, IE) spoke of the mentorship he received from a professor in his country of origin: 'He certainly was effectively my mentor up to now, pretty much'. Mike (M, BG) also reported receiving mentoring from many senior academics: 'I have had lots of people, more advanced than me, who encouraged me, supported me and gave me a lot by communicating with me'. Baris (M, TR) also notes that: 'There is another professor who I am lucky that I had a chance to work with, he was also extremely helpful... I learned much from him. I can say that he was my mentor'.

Many of the women in the study lacked current mentoring or sponsorship from senior academics (apart from their PhD supervisor or HOD). Wanda (F, IE) is an exception with mentoring provided by three senior male academics in her department: 'they have all been incredibly supportive and they've told me to apply for grants and things like that, and promotion and all that, and helped me and read my applications and all those things'. She noted

that although her first international post doc experience which she got through contacts ('I knew someone') taught her a lot, her career was going nowhere until her second post doc, when she was mentored by a senior academic. He was 'a bit more supportive in terms of what you need to get a job kind of thing —advancing my career'. Describing him as 'very savvy. He said you need more publications....we'll work on this. I think this will be very fruitful and it was.' Wanda was unusual in focusing on career related mentoring by a senior academic. Maria (F, BG) was more typical in referring to emotional support:

I could say that I have had mentors in my research work. Their contribution to my career progression is mainly moral – they helped me with understanding, encouragement ... they made me feel that I have capacities and strengths and need to believe in myself in order to achieve more.

One of the sponsorship practices identified by De Vries and Binns (2018) was providing introductions to key people and facilitating their protégés/ées' inclusion in key networks. Such practices were widely referred to by the men. Some were very strategic about creating such ties: using short trips abroad or attendance at international conferences to access senior academics: 'And those people can give you references, or get you in contact with someone else who can. Just to, just to make introductions' (Bryan, M, IE). Other respondents noted how their relationship with their PhD supervisor could be leveraged to provide access to other senior academics: '[that] is how everything started because of this connection with my professor' (Timothy, M, DK).

Academic women are often excluded from male dominated academic networks (Bagilhole and Goode, 2001; O'Connor et al. 2017) partly because of the impact of family responsibilities but also because of difficulties in penetrating such networks. The 'long hours culture' was seen as causing problems for those with caring responsibilities particularly in the Irish and Danish contexts. It was seen as affecting women's ability to network, attend conferences and out of hours socialising. Women in the Irish and Turkish HEIs, were particularly likely to refer to difficulties in penetrating male dominated networks.

... you need to have somebody with you [at a conference] as most of the networking is done in a social environment ...If I was at a conference on my own and I didn't know anybody, then I'd be very reluctant to go into the bar and network on my own. It shouldn't be any harder [for women] but it does seem to be. (Carolyn, F, IE)

Similar comments were made by women in the Turkish HEI: 'networks are crucial for better relations in academia and getting socialised is easier for men compared to women' (Farah, F,

TR). There were also occasional references suggesting that male dominated networks are not equally attractive or available to all men. Male colleagues appeared occasionally to be aware of women's exclusion from such networks. Victor (M, IE) referring to a female colleague noted that: 'I see her struggling big-time because she doesn't have those relationships... she's been excluded....I don't know if it's gender or if it's just personal to her... For her, I see it as being a really significant issue'. He does not feel any responsibility to change the situation and was in any event marginalized himself.

Men were more likely than women to refer to mentoring and particularly to sponsorship by senior academics. Many women appeared to lack such relationships (other than with their PhD supervisor or HOD) and, especially in Ireland and Turkey, to see difficulties in accessing them.

Discussion and Conclusion

This article looks at the extent to which men's invisible advantage in STEM reflects the provision of particular kinds of career related support. It differentiates between mentoring (advising, listening to the mentee) and sponsorship (leveraging power to advance the protégé's career) and looks at both aspects in four HEIs: one each in Bulgaria, Denmark, Ireland and Turkey. The research questions include: are men or women most likely to be mentored? Is possible to distinguish between mentoring and sponsorship? Is there gender variation in either or both of these depending on the source? (i.e. academic supervisor, line manager or other senior academic).

The general pattern was one of overarching similarities in terms of mentoring and sponsorship in these STEM environments across the four universities. Both men and women received mentoring from their PhD supervisors, although this was more likely to be career related for men, whereas it was more likely to involve reassurance in the case of women. Men were more likely than women to get sponsorship from their PhD supervisor. HODs in all four HEIs provided sponsorship to both men and women, with homophily possibly reduced by the HODs wider responsibilities. Men were much more aware of the informal power tactics involved in getting and using sponsorship, whether from line managers or from other senior academics. There was unanimous agreement by male and female respondents that establishing relationships with senior academics was crucial for a successful academic career. Men were more likely than women to have mentoring and sponsorship relationships with them. Women's

access to them seemed to be limited by domestic responsibilities and difficulty in penetrating such networks, particularly in Ireland and Turkey. Female sponsors (apart from supervisors or HODs) were almost entirely absent, perhaps reflecting women's underrepresentation at senior level or their lack of leverage as women in the male dominated STEM context.

It was striking that in some contexts women's expectations even of their HOD were low- possibly reflecting a low sense of entitlement. Women disliked what they saw as the political aspect of career advancement and preferred to focus on 'honest' work (O'Connor et al. 2017). Such attitudes reflect an assumption that career progression is unaffected by relationships: an assumption that reinforces the myth of individual merit and so effectively perpetuates the ignoring of patriarchal support systems and men's invisible advantage in STEM (Bagilhole and Goode, 2001).

This article argues that the importance of sponsorship has been obscured by failing to differentiate between it and mentoring. The promotion of sponsorship for women institutionalises gender inequality, and effectively promotes cronyism (O'Connor, 2018). The purpose of the article is not to identify a model for the promotion of gender equality, but to explore the ways in which gender inequality is maintained. It does this through highlighting the greater availability of sponsorship to men.

The focus of this study was on the STEM context in academia. Further work needs to be done on non-STEM environments, looking at the extent to which similar patterns emerge there (Van Den Brink and Benschop, 2012b). Only one institution was selected in each country, reflecting the links of those involved in the EU funded project. The universities included in this study had relatively low rankings (see Table1). Hence further work, including quantitative work is needed on the extent to which these patterns are replicated on a wider scale in HEIs and in more highly ranked universities. Studies including intersectional dimensions such as race, ethnicity, age or sexuality should also be undertaken.

Individual men supported women within the dominant masculinist culture in STEM, suggesting that hierarchical bureaucracies such as universities are not inevitably unhelpful to women. Such career related support for women was mainly through mentoring by the PhD supervisor and the HOD. With the exception of the HOD relationship, sponsorship was most likely to be directed at men. Women for the most part lacked the career accelerator provided by sponsors leveraging power to advance their protégés/ées' careers. By distinguishing

between mentoring and sponsorship, this article contributes to our understanding of the way the culture in STEM perpetuates male dominance.

Acknowledgements:

The work was supported by the European Commission (Grant number 287526)

References

- Acker, J. (1990). Hierarchies, jobs, bodies: A theory of gendered organizations. *Gender and Society*, 4 (2), 139-158.
- Acker, J. (2006). Inequality regimes: Gender, class and race in organizations. *Gender and Society*, 20 (4), 441-64.
- Adamo, S. A. (2013). Attrition of women in the biological sciences: Workload, motherhood, and other explanations revisited. *BioScience*, 63 (1): 43-48.
- Adcroft, A. & Taylor, D. (2013). Support for new career academics: An integrated model for research intensive university business and management schools. *Studies in Higher Education*, 38(6), 827-840.
- Almgren, N., Salminen-Karlsson, M., Molin, F., Topuzova, I., Apolstolov, G., Baisner, L. & Myers, E. (2015) *Improving meeting culture*. <http://www.festa-europa.eu/sites/festa-europa.eu/files/6.1.1.%20Report%20Meeting%20Structures.pdf>
- Bagilhole, B. & Goode, J. (2001). The contradiction of the myth of individual merit and the reality of a patriarchal support system in academic careers: A feminist investigation. *European Journal of Women's Studies*, 8 (2), 161-180.
- Ceci, S. & Williams, W.M. (2011). Understanding current causes of women's under-representation in science. *PNAS*, February 22, 108 (8).
- Charmaz, K. (2006). *Constructing grounded theory*. London: Sage.
- Denzin, N. K. & Lincoln, Y. S. (2013). Introduction: The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Landscape of Qualitative Research* (4th ed.) (pp. 1-42). California: Sage.
- De Vries, J. A. & van den Brink, M. (2016). Transformative gender interventions: Linking theory and practice using the 'bifocal' approach. *Equality, Diversity & Inclusion: An International Journal*, 35 (7/8), 429-448.
-

De Vries, J., & Binns, J. (2018). *Sponsorship: Creating career opportunities for women in higher education*. Universities Australia Executive Women (UAEW), Canberra, Australia: <https://www.universitiesaustralia.edu.au/UAEW/SponsorGuide>.

Ely, R. & Meyerson, D. (2000). Advancing gender equity in organizations: The challenge and importance of maintaining a gender narrative. *Organization*, 7, 589-608.

Fox, M. F. (2010) Women and men faculty in academic science and engineering: Social-organizational indicators and implications. *American Behavioral Scientist*, 53 (7), 997– 1012.

Foust-Cummings, H., Dinolfo, S., & Kohler, J. (2011). *Sponsoring women to success*. New York: Catalyst.

Gardiner, M. Tiggermann, M. Kearns, H. & Marshall, K. (2007). Show me the money! An empirical analysis of mentoring outcomes for women in academia. *Higher Education Research & Development*, 26 (4), 425-442.

Glaser, C. (2016). Male vs female: Which mentor is best? <http://www.divinecaroline.com/life-etc/career-money/male-vs-female-which-mentor-best>.

Grummell, B., Lynch, K. & Devine, D. (2009). Appointing senior managers in education: Homosociability, local logics and authenticity in the selection process. *Educational Management, Administration and Leadership*, 37(3), 329–49.

Hartmann, H (1981). The unhappy marriage of marxism and feminism: Towards a more progressive union. In L.Sargent (Ed), *Women and Revolution* (pp.1-41). Boston: South End Press

Heath, T. (2002). A quantitative analysis of PhD students' views of supervision. *Higher Education Research & Development*, 21 (1), 41-53.

Heijstra, T.M, Einarsdóttir, Þ., Pétursdóttir, G.M. & Steinþórsdóttir, F.S. (2017). Testing the concept of academic housework in a European setting: Part of academic career-making or gendered barrier to the top? *European Educational Research Journal*, 16 (2-3), 200-214.

Hewett, S. A. (2013). *Forget a mentor, find a sponsor: The new way to fast-track your career*. Harvard: Harvard Business School Publishing.

Holton, J. A. (2007). The coding process and its challenges. In A. Bryant & K. Charmaz (Eds.), *The sage handbook of grounded theory*. (pp. 265-289). Thousand Oaks, CA: Sage.

Husu, L. (2001). *Sexism, support and survival in academia. Academic women and hidden discrimination in Finland*. Helsinki: University of Helsinki.

Ibarra, H., Carter, M. & Silva, C (2010). Why men still get more promotions than women' *Harvard Business Review*. September 2010. <https://hbr.org/2010/09/why-men-still-get-more-promotions-than-women>

Kossek, E.E., Pichler, S., Bodner, T. & Hammer, L.B. (2012). Workplace social support and work–family conflict. *Personnel Psychology*, 289–313.

Lewis, S. & Smithson, J. (2001). Sense of entitlement to support for the reconciliation of employment and family life. *Human Relations*, 55 (11), 1455-1481

Lorber-Newsome (2008). *The chemistry PhD: the impact on women's retention*. London: UK Resource Centre for Women in SET and the Royal Society of Chemistry.

McKay, L. & Monk, S. (2017). Early career academics learning the game in whackacademia. *Higher Education Research & Development*, 36 (6), 1251-1263.

Morley, L (2008). *The micropolitics of professionalism: Power and collective identities in higher education*. In B. Cunningham (Ed.) *Exploring professionalism*. Bedford Way Papers, London.

Moss-Racusin, C. A., Dovidio, J. F., Brescoll, V. L., Graham, M. J. & Handelsman, J. (2012). Science faculty's subtle gender biases favor male students. *PNAS*, 109 (41), 16474–79.

Nielsen, W.M. (2016). Limits to meritocracy? Gender in academic recruitment and promotion processes. *Science and Public Policy*, 43 (3): 386-399.

Obers, N. (2015). Influential structures: understanding the role of the head of department in relation to women's academic careers. *Higher Education Research & Development*, 34 (6), 1220-1232.

O'Connor, P. (2011). Where do women fit in University senior management? An analytical typology of cross-national organisational cultures. In B. Bagilhole & K. White (Eds) *Gender, power and management: A cross cultural analysis of higher education* (pp168-191). UK: Palgrave.

O'Connor, P. & O'Hagan, C. (2016). Excellence in university academic staff evaluation: A problematic reality? *Studies in Higher Education* 41(11), 1943–1957.

O'Connor, P., Montez López, E., O' Hagan, C. Wolffram, A., et al. (2017). Micro-political practices in higher education: A challenge to excellence as a rationalising myth? *Critical Studies in Education* DOI: 10.1080/17508487.2017.1381629.

O'Connor, P. (2018). Gender imbalance in senior positions: what is the problem? What can be done? *Policy Reviews in Higher Education*, 3 (1): 28-50.

QS. (2017). World university rankings 2016-17 //www.topuniversities.com/university-rankings/world-university-rankings/2016

Rhodes, J. E. (2002). *Stand by me: The risks and rewards of mentoring today's youth*. Cambridge, MA: Harvard University Press.

Salminen-Karlsson, M. (2017). *FESTA Handbook of organisational change*. <http://www.festa-europa.eu/sites/festa-europa.eu/files/The%20FESTA%20handbook%20of%20organizational%20change.pdf>

Sinclair, M. (2004). *The pedagogy of 'good' PhD supervision: A national cross-disciplinary investigation of PhD supervision*. Canberra: Australian Government.

Sverdlik, A., Hall, N.C., McAlpine, L., & Hubbard, K. (2018). The Ph.D experience: A review of the factors influencing doctoral student's completion, achievement, and well-being. *International Journal of Doctoral Studies*, 13, 361-388.

Trower, C. (2012). *Success on the tenure track*. Boston: John Hopkins University Press.

Valian, V. (2005). Beyond gender schemas: Improving the advancement of women in academia. *Hypatia* 20, 3, 198-213.

Van den Brink, M. & Benshop, Y. (2012a). Gender practices in the construction of academic excellence: Sheep with five legs. *Organization*, 19 (4), 507–24.

Van den Brink, M. & Benshop, Y. (2012b). Slaying the seven headed dragon: The quest for gender change in academia. *Gender Work and Organisation*, 19 (1): 71-92.

Weber, R.P. (1990). *Basic content analysis*. 2nd ed. CA: Newbury Park.

Weber, M. (1947). *The theory of social and economic organisation*. New York: Free Press.

Wenneras, C. & Wold, A. (1997). Nepotism and sexism in peer review. *Nature*, 387 (6631): 341–3. www.sciencethatmatters.com/wp,content/uploads/2007/04/wenneras97nepotism.pdf.

White, K. (2014). *Keeping women in science*. Melbourne: Melbourne University Press.
