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# **Disentangling the Impact of Social Disadvantage on 'Becoming Employable': Evidence from STEM Student University-to-Work Transitions**

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# **Disentangling the Impact of Social Disadvantage on ‘Becoming Employable’: Evidence from STEM Student University-to-Work Transitions**

This article aims to examine alternative explanations of social disadvantage on the university-to-work transition experiences of science, technology, engineering and mathematics (STEM) students. ‘Becoming employable’ during the university-to-work transition is reflected in three ways: students’ cognition/patterns of thinking (i.e., perceived employability); affect/emotion (i.e., anxiety); and career-related behaviour (i.e., job search and networking). To understand how social disadvantage affects ‘becoming employable’, we examine three potential explanations: students’ social background, type of higher education institution attended and individual financial strain. A cross-sectional survey design targeted at final year students in two UK Higher Education Institutions provided 288 survey responses. Findings show support for an institutional explanation to ‘becoming employable’. The study contributes to our understanding of social disadvantage during preparation for labour market entry and the ‘employable graduate’ identity construction process. Practical recommendations focus on alleviating some of the pressures on socially disadvantaged students.

**Keywords:** Employability, graduate identity, STEM, social disadvantage, university-to-work transition

## Introduction

Contemporary accounts of what makes an employable job candidate promote an enterprising and constantly strategizing self (Smith 2010), especially for university graduates (Allen et al. 2013). The notion of an ‘entrepreneurial self’, however, may reproduce and sustain social inequalities, such that students who do not possess the requisite economic, social and cultural capital are disadvantaged in the search for suitable employment (Bathmaker, Ingram, and Waller 2013).

This article considers such potential inequality by examining how social disadvantage may impact students’ development of their ‘entrepreneurial self’ prior to entering the labour market. The specific focus of enquiry is the university-to-work transition (UtWT) experiences of science, technology, engineering and mathematics (STEM) students. Student experiences during the final year of university can be conceptualised in terms of a graduate identity perspective of employability (Holmes 2015) which focuses on individuals’ construction of identity as they prepare for employment. This is reflected in students’ cognition/patterns of thinking (i.e., perceived employability); affect/emotion (i.e., anxiety); and career-related behaviour (i.e., job search and networking). The aim of this article is to examine alternative explanations for how social disadvantage is related to these student experiences of the UtWT.

A considerable body of evidence shows that social disadvantage impacts student experience in higher education (HE) and the graduate labour market (O’Sullivan, Robson, and Winters 2019). We explore three potential explanations for such effects. First, drawing on a Bourdieusian perspective, we propose that first-generation students’ preparation for UtWT will be further from the ‘ideal’ enterprising graduate than continuing-generation students. Second, building on notions of institutionalised social disadvantage in HE, we examine differences in student experiences across two

contrasting universities reflecting the UK's pre-and post-1992 distinction (SFC 2017). Finally, we consider the impact of individual students' perceived financial strain on becoming employable.

The context for the study is STEM HE in the UK. Demand for STEM talent has risen dramatically in the last two decades and is expected to remain strong (Engineering UK 2018), driven by advances in digitalisation, automation and convergence of technologies often known as industry 4.0. Labour market needs are changing to reflect the technological, demographic and socio-economic pace of change. The proportion of STEM graduates entering professional level employment in the UK rose from 67 to 76 per cent between 2008 and 2014, compared to an average of 68 per cent of all graduates (Wakeham 2016). Focusing on a strong labour market context allows us to eliminate some explanations of graduate employment, e.g., visibility of career paths or demand for graduate skills. Nevertheless, there is also evidence that systematic barriers exist in access to STEM education and employment, especially for those from socially disadvantaged backgrounds, as well as women and ethnic minorities (DfE 2018). The present study also addresses challenges for entry into STEM employment.

Our consideration of social disadvantage at the crucial labour market entry preparation stage broadens our understanding of UtWT for students from different backgrounds. The study also informs key policy aims of successive governments to widen participation in HE and enhance social mobility (Allen 2014). Skills policies tend to assume a meritocracy-based approach to employability, where demand is commensurate with the supply of graduate skills and graduates maximize their return on investment in the labour market. Such assumptions are misleading, however, not least due to the declining importance of a degree (Tomlinson 2008) and increasing heterogeneity in graduate attributes impacting employment outcomes, particularly those

which are argued to be gendered, raced and classed (Handley 2018). Our study offers an expanded conceptualisation of graduate employability in examining the potential effects of social disadvantage.

The article begins by introducing the graduate identity perspective on which our notion of employability is based. It then develops hypotheses related to each of the three explanations linking social disadvantage with the indicators of ‘becoming employable’. The methodology section provides a rationale for the selection of two higher education institutions (HEIs) as the focus of the study and details the survey design, measures and analytical strategy for hypothesis testing. The findings suggest support for an institutionalised explanation of social disadvantage in HE. We conclude by discussing implications for the ‘employable graduate’ discourse and policy/practice in HE and STEM disciplines.

### **A graduate identity perspective to ‘becoming employable’**

A graduate identity perspective is concerned with how students invest in their future career and their sense of worthiness to be considered suitable for graduate work (Holmes 2015). Based on the discourse of an enterprising self (Allen et al. 2013), we focus on three indicators of graduate identity relevant for UtWT: students’ (i) pattern of thinking/cognition; (ii) affect toward graduate job search; and (iii) engagement in proactive career preparation.

The first two indicators reflect the notion that the ‘employable graduate’ displays a positive and optimistic attitude (CBI 2016). Relevant cognitions relate to job search expectations; i.e., the extent to which students expect to secure ‘good’ jobs and perceived barriers to securing ‘good’ jobs. Such expectations are often informed by one’s self-efficacy beliefs and influence the likelihood that one will pursue relevant behaviours (Gbadamosi et al. 2015). Students who display poorer job search

expectations will therefore be less likely to show the ambitions described by the ‘employable graduate’ discourse.

The inclusion of emotions/affect as an indicator acknowledges that job search is an emotionally charged process (Turban et al. 2013). New entrants into the graduate labour market face unprecedented uncertainty in their job search and they often lack the career-related experience to help them negotiate this complex terrain (Boswell, Zimmerman, and Swider 2011). Not surprisingly graduates report considerable levels of anxiety (Matthews 2017). Anxiety sets obstacles for individuals because it conveys and emphasises the belief that one is incapable of accomplishing the task and is associated with avoidance motivation (Spielberger 2010). Students who display higher levels of anxiety, therefore, are less likely to represent the ‘employable graduate’.

Finally, proactive career behaviours, such as obtaining work placements, goal-directed job search and engaging in networking, increase the likelihood of employment success for university graduates. These behaviours have been shown to help position graduates in the competition for high-skilled vacancies and influence recruiters’ decision-making (Jackson and Wilton 2017).

### **Social disadvantage and ‘becoming employable’**

An identity approach suggests that the ‘employable graduate’ identity is socially constructed and negotiated between the individual and gatekeepers of opportunities (Holmes 2015). Systematic differences in access to high-skilled jobs based on ethnicity, disability, and social and educational background (OFS 2019) suggest that social disadvantage plays a significant role in individual-employer negotiations of graduate employability. Students’ academic, social and professional capital influence how they prepare for UtWT from first year onwards (Mullen et al. 2019). To understand how

social disadvantage affects ‘becoming employable’ prior to labour market entry, we examine three potential explanations: students’ social background, the type of HEI attended, and individual financial strain (see Figure 1 for a summary of the conceptual framework).

Insert Figure 1 about here

### ***Students’ social background and development of social capital***

Despite substantial expansion, HE remains a middle-class domain (Wong 2018). Middle-class students’ internalised values and dispositions acquired through socialisation (*habitus*), it is argued, provide a better ‘feel for the game’ in universities than those of working-class students (Edgerton and Roberts 2014). HE, therefore, enables middle-class students to secure employment that reinforces a lifestyle they expect to attain (Tomlinson 2012). Supporting this, first-generation students are less likely to work in elite professions than continuing-generations (Ashley et al. 2015). STEM education and careers tend to be dominated by the middle-class, with only a minority (24%) reported to be from disadvantaged backgrounds (Engineering UK 2018).

Processes of class reproduction operate during university. The discourse of the ‘ideal’ student/graduate ‘pathologises’ those from non-traditional backgrounds for not having appropriate aspirations and attitudes for the future (Moreau and Leathwood 2006). However, graduates have differential access to social capital. For continuing-generation students (i.e., who are not the first in their close family to go to university), the availability and quality of networks through family/social ties may provide access to information about jobs and influence over employers, which are crucial to finding the

first graduate job (Macmillan, Tyler, and Vignoles 2015). Thus, the importance given to the development of social capital through networks, as well as soft skills and competencies through participation in extra-curricular activities and internships places first-generation, and other non-traditional, students at a disadvantage if they do not have access to such opportunities (Bathmaker, Ingram, and Waller 2013).

Particularly for performance and persistence in STEM fields, the crucial role played by role models for encouraging STEM careers and formation of professional identity has been demonstrated (Shin, Levy, and London 2016). First-generation students are unlikely to have such role models, as entry into most STEM careers require a university degree. In contrast, family achievement guilt, referring to the guilt associated with surpassing the educational achievements of close others in family, has been reported among first-generation students (Covarrubias and Fryberg 2015).

While it is likely that university experience may alter and develop ‘graduate identity’, our first set of hypotheses focuses broadly on social background as an obstacle to becoming employable. The hypotheses contrast the experiences of first- and continuing-generation students:

*Hypothesis 1:* First-generation students will report: (a) lower perceived employability; (b) higher anxiety; and (c) lower participation in proactive career behaviours, compared to continuing-generation students.

### ***Institutional context***

The rapid expansion of HE in the UK is argued to have reinforced a ‘two-tier’ university system reflecting varying degrees of university prestige (Boden and Nedeva 2010). Institutions perceived as more prestigious tend to have lower staff/student ratios, higher entry requirements and lower participation rates from less affluent social groups;

this status divide in the UK is reflected in the differentiation between ‘old’ (pre-1992) versus ‘new’ (post-1992) HEIs (Boliver 2016).

HEI environment may shape students’ experiences during UtWT in several ways. First, elite employers tend to focus recruitment resources on a select group of institutions (Ashley et al. 2015). Students in more prestigious HEIs tend to benefit from elite employers’ attention, e.g., in exposure to career opportunities and networking with gatekeepers, than those from other HEIs (Papafilippou and Bathmaker 2018). Second, HEI employability programmes provide students with positional advantage in the graduate labour market. Opportunities to interact with professionals through internships, meeting employers or alumni, and acquiring and practicing skills through volunteer opportunities are examples of such activities (Farenga and Quinlan 2016). These opportunities can raise expectations and reduce anxiety regarding an unknown transition, and allow opportunities for proactive career engagement, e.g., networking.

Finally, the reputation of the university attended can influence students’ perceptions of fit into certain jobs, career expectations (Scholarios, Lockyer, and Johnson 2003) and their perceived barriers to employability (Rothwell, Herbert, and Rothwell 2008). For instance, Boden and Neveda’s (2010) examination of the employability-related information provided on websites of two universities operating within the same geographical area suggest contrasting expectations: the HEI with lower proportions of socially disadvantaged students emphasised creating the employers’ of the future, while the HEI with a greater proportion of socially disadvantaged students focused on producing the “re-trainable flexible workforce with very specific skills” (p. 49).

Such differences in career-related exposure, in turn, shape employability-related expectations. For the purposes of this article, we compare the experience of students

attending pre- and post-1992 HEIs in the UK using this distinction as a proxy for two contrasting institutional employability contexts: the ‘older’, pre-1992 HEI, where students are more likely to be systematically socialised into an enterprising graduate identity compared to students in the ‘newer’, post-1992 HEI. Our second set of hypotheses contrasts graduate identity indicators of becoming employable across HEIs, controlling for the broader effects of social background.

*Hypothesis 2:* Compared to students in a pre-1992 HEI, those in post-1992 HEIs will report: (a) lower perceived employability; (b) higher anxiety; and (c) lower participation in proactive career behaviours.

### ***Student financial strain***

The final aspect of potential disadvantage for ‘becoming employable’ considered in this article is the individual’s perceived financial strain (the degree to which financial resources meet one’s personal needs (Ullah 1990)). Financial pressures, which are reported by a substantial proportion of students (Watson, Barber, and Dziurawiec 2016), can intensify job search and lead to less goal-directed career behaviour, focusing on securing any work available (Hausdorf 2007). Financial strain lowers one’s reservation wage, and graduates experiencing financial strain may lower their job search expectations, irrespective of qualifications match (Furlong 2015).

Students who report experiencing financial difficulties are also more likely to report mental health issues, such as stress and anxiety (Richardson et al. 2017). Moreover, financial strain is a barrier for proactive career behaviour, e.g., extra-curricular activities, engaging in career exploration or networking (Bathmaker, Ingram, and Waller 2013).

Our final set of hypotheses controls for the impact of social background and HEI-type to examine the influence of individual financial strain on becoming employable.

*Hypothesis 3:* The greater a student's perceived financial strain: (a) the lower their perceived employability; (b) the higher their anxiety; and (c) the lower their participation in proactive career behaviours.

## **Method**

The present study was part of a larger (as yet unpublished) research project on UtWT in Scotland. This larger study aimed to examine the role of career agency for securing graduate jobs. First, through snowball sampling, exploratory interviews were conducted with graduates in the first two years of post-graduation careers, focusing on the barriers graduates experienced in transition to work. Findings from interviews were then used to develop a longitudinal survey design which allowed testing conceptual models on the role of agency in UtWT success. The present study uses one of the survey instruments intended for final year students developed as part of the longitudinal design. Heads of schools/departments across subject areas in 10 purposely selected universities (from a total of 19 in Scotland, representing a balance of pre- and post-1992 universities and regional proximity) were invited to help disseminate the survey to final year students. Representatives from seven universities agreed to take part. Department heads/final year coordinators and/or career services in the seven participating universities sent an online survey link to graduating students (May-June 2016). This resulted in an initial sample size of 600 final year students. A follow-up survey was then administered to the 2016 cohort one year after graduation (June 2017).

For the purposes of the present research, we focused only on final year STEM student survey data in two HEIs. The two HEIs were chosen for pragmatic and theoretical reasons: they represented (i) the majority of STEM responses of the participating HEIs, and (ii) pre-and post-1992 UK institutions in the same geographical area, allowing the comparison required for testing Hypotheses 2a, 2b and 2c. Social disadvantage has been argued to be institutionalised in the UK, where there is higher representation of students from socially disadvantaged backgrounds in certain types of HEIs, i.e., post-1992 HEIs (Brown 2004). The pre-1992 HEI reflected higher entry standards, degree completion rates, research intensity and quality, staff-student ratios and proportions of students graduating with a good degree (i.e., 1<sup>st</sup> or upper second-class Honours) (SFC (2017). Although the post-1992 HEI had performed well in recent years with respect to graduate earnings five years after graduation, there are still substantial differences in graduates' outcomes from the two HEIs in this study (Scottish Government 2018). The two HEIs therefore reflect the stratification in the UK graduate labour market (Boden and Nedeva 2010) in terms of graduate employability.

### ***Survey sample***

Data was based on a survey instrument administered between May-June 2016. Students responding to the survey represented a broad range of STEM subjects with visible career paths/skills in high demand: Subjects allied to medicine, Biological sciences, Physical sciences, Mathematical sciences, Computer science, Engineering and technology, and Architecture, building and planning. Participants from the post-1992 HEI were more likely to be in Computer science (58%), while those in the pre-1992 HEI were more commonly in Biological sciences (68%). Pre-pilot (N = 5) and pilot (N

= 30) testing was conducted to determine the accuracy, reliability and validity of measures.

A total of 288 volunteered responses from final year STEM students in the two HEIs were received (48% of the responses from the overall 2016 cohort which forms the larger UtWT study). Only data from those students who were engaged in job search at the time of data collection were included in the analysis. The final sample comprised 203 job seekers (Mean age=23, SD=3 years; 46% female; 50% first-generation to attend university; 60% of the sample were from the post-1992 university).

### ***Measures***

The three graduate identity indicators relevant for becoming employable were operationalised as follows.

*Job search expectations:* Seven items were generated through semi-structured interviews, which were conducted as part of the larger UtWT study, with 15 graduates from the 2014 cohort. Participants were asked to indicate which of the seven job-related scenarios they anticipated finding themselves in upon graduation. Principal component analyses showed that these seven items loaded on to two distinct factors. These factors correspond to the employment outcomes generally reported by graduates: accepting any job (e.g., ‘accept the first job that comes my way’) and securing a good/graduate job (e.g., ‘join a graduate trainee scheme with one of the large graduate employers’).

*Perceived internal and external barriers to employment:* Rothwell, Herbert and Rothwell’s (2008)’s self-perceived employability scale was adapted, where participants were asked to indicate whether each item was a barrier to labour market entry (1=yes, 0=no). Sample items for perceived internal (four items,  $\alpha=.74$ ) and external barriers (five items,  $\alpha=.78$ ) are ‘my awareness of opportunities in the graduate labour market’

and ‘the strength of my university’s brand’, respectively. A total sum score was calculated for perceived internal and external barriers to employment.

*Anxiety* was measured using Marteau and Bekker’s (1992) short version of the State Anxiety Inventory. Participants were asked to indicate the extent to which they feel each of the six emotions (calm, tense, upset, relaxed, content and worried) right now, about their job search for a job after graduation (4-point scale; 1=not at all, 4=very much;  $\alpha=.90$ ).

*Proactive career behaviours* were measured in three ways: (1) *Pre-employment activities*: This was an index calculated from the sum of three items asking students if they had engaged in voluntary work, an internship, or part-time work relevant for their degree subject/career intentions (1=yes, 0=no). These items were adapted from Brooks, Cornelius, Greenfield and Josef’s (1995) survey of college students’ career-related work or internship experience. (2) *Job search strategies*: This was measured using the Crossley and Highhouse (2005) scale consisting of strategies which were haphazard (four items, e.g., I use a ‘hit or miss’ approach when gathering information about my future job”,  $\alpha=.78$ ); exploratory (six items, e.g., “I tried to get my resume out to as many organizations as possible”,  $\alpha=.79$ ) and focused (six items, e.g., “I had a clear idea of what qualities I wanted in a job”,  $\alpha=.75$ ). Each item was measured on a 5-point scale (1=strongly disagree, 5=strongly agree) and a mean score calculated for each sub-measure. (3) *Networking*: This was measured using seven items from the Career Strategies Inventory (Gould and Penley 1984; Noe 1996, e.g., “I have a network of contacts for obtaining information about events or activities that are relevant for my career”; 5-point scale, 1=to a little extent, 5=to a great extent;  $\alpha=.84$ ).

*Social background:* Consistent with Clarke and Beech (2018), students were asked to indicate whether any of their parents/carers/guardians had a university degree (1=no (first-generation), 0=yes (continuing-generation)).

*University type:* the two selected universities represented pre- and post-1992 universities, operating within the same geographical area.

*Financial strain* was measured using items from Ullah (1990). Participants were asked to reflect on the past four weeks and indicate (4-point scale; 1=never, 4=very often;  $\alpha=.81$ ) how often they have: (1) had serious financial worries; (2) not been able to do the things they like to do; (3) the things they need to do because of shortages of money; and (4) been able to manage on the money they have.

To account for any common method bias associated with single source measurement of independent and dependent variables, a Karman single factor test was conducted with all 13 study variables, excluding control variables. The unrotated factor solution showed six factors explaining in total 64% of variance, each accounting for less than 20% of variance.

### ***Analytical strategy***

Hierarchical logistic regression analyses were conducted for the two binary job search expectation dependent variables (any job and good job). Hierarchical linear regression analyses were conducted for the remaining dependent variables (perceived internal and external barriers, anxiety and networking). The hierarchical models comprised four steps. Control variables (gender (female=1), nationality (Scottish=1, rest of the UK/rest of the EU/non-EU=0) and expected degree classification (2:1 or first =1)) were included in step 1. Social background, university type and financial strain were included in steps 2, 3 and 4 to test Hypotheses 1-3, respectively. Hypothesis testing was conducted by

examination of the significant standardized Beta coefficients and the change in the variance explained ( $\Delta R^2$ ) at each step.

## Findings

Table 1 provides the descriptive statistics. Validating our choice of universities based on proportion of students from socially disadvantaged backgrounds, first-generation students were more likely to be in the post-1992 rather than in the pre-1992 university ( $r=.16, p<.05$ ). Financial strain was not correlated with either of these measures.

Insert Table 1 about here

Table 2 shows logistic regression analyses predicting likelihood of expecting any job and a good job upon graduation. ‘Any job’ expectations were more likely among first-generation participants ( $\beta=1.73, p<.05$ ) in comparison to continuing-generation participants. However, this effect disappeared with the inclusion of HEI in Step 2 ( $\beta=1.57, p>.05$ ). Students from the post-1992 university were almost four times more likely ( $\beta=3.96, p<.001$ ) to report ‘any job’ expectations in comparison to those from the pre-1992 university ( $\Delta\text{Nagelkerke } R^2=9\%$ ). ‘Good job’ expectations were 85 per cent lower for students from the post-1992 university ( $\beta=0.15, p<.001$ ), in comparison to those from the pre-1992 university ( $\Delta\text{Nagelkerke } R^2=17\%$ ).

Insert Table 2 about here

Results of multiple hierarchical regression analyses are presented in Table 3. In comparison to the pre-1992 university, students from the post-1992 university reported significantly lower levels of pre-employment activities ( $\beta=-.47, p<.001$ ), exploratory ( $\beta=-.30, p<.001$ ) and focused job search ( $\beta=-.18, p<.05$ ), networking ( $\beta=-.28, p<.001$ ),

perceived internal ( $\beta=-.29, p<.001$ ) and external barriers to employability ( $\beta=-.36, p<.001$ ), and higher haphazard job search ( $\beta=.28, p<.001$ ) and job search anxiety ( $\beta=.37, p<.001$ ). University type showed the greatest incremental variance on pre-employment activities ( $\Delta R^2=.16$ ) and job search anxiety ( $\Delta R^2=.13$ ). Moreover, first-generation students reported more exploratory job search ( $\beta=.20, p<.001$ ) and less job search anxiety ( $\beta=-.15, p<.01$ ) in comparison to continuing-generation counterparts. However, this only explained six and one per cent incremental variance, respectively. Financial strain was only associated with job search anxiety ( $\beta=.22, p<.001$ ) and explained five per cent incremental variance.

Insert Table 3 about here

## **Discussion**

The findings provide support for an institutional effect on becoming an ‘employable graduate’. Controlling for students’ own social background, those attending the pre-1992 HEI held more positive expectations, were less anxious, and engaged in more proactive career behaviours than those in the post-1992 HEI (supporting Hypothesis 2). There was weaker support for broader social background (Hypothesis 1) and individual financial strain explanations (Hypothesis 3). These findings allow us to contribute in two distinct ways to understanding the development of student employability during UtWTs.

### ***Understanding social disadvantage during preparation for labour market entry***

We framed the study around three interrelated sources of disadvantage: social background, HEI type and institutional context, and financial strain. The findings indicate that HEI type has the strongest and most substantial effect on indicators of

‘employable graduate’ identity measured in this study. Students in post-1992 HEIs reported poorer job search expectations and lower participation in proactive career behaviours than those in the pre-1992 HEIs. Underlying our hypothesis was an expectation that exposure to opportunities, such as access to elite employers, influential networks, and/or perceived ‘fit’ with such employers and networks, signals expectations for development of enterprising graduate identity. The strong HEI effect over and above social background suggests that students in pre-1992 HEIs, as represented by recent evidence (e.g., Boliver, 2016), may have benefited from these channels in constructing themselves as an ‘employable graduate’, in employability-related cognition, affect and behaviour.

There were also some findings contrary to our expectations. Students in the post-1992 HEI reported fewer barriers to employability. Post-hoc analyses, controlling for social background and financial disadvantage, show that HEI type is indirectly related to perceived internal and external barriers via job search expectations. We can argue, therefore, that students in the post-1992 university may perceive fewer barriers for graduate labour market entry partly because they have lower job search expectations.

We expected that social background would negatively affect becoming employable, based on the incongruence of first-generation students and STEM education/employment habitus and on a lack of social and cultural capital compared to continuing-generation students, especially due to lack of STEM role models. However, social background had a negligible direct effect on most study variables. It showed highest incremental variance ( $\Delta R^2=.02$ ) in explaining expectations of taking ‘any job’ on graduation and exploratory job search and was associated with lower anxiety. We can only speculate on first-generation students’ preferences for exploratory job search. As first-generation university students, it is less likely that they will receive informed

advice and guidance from significant others in access to STEM fields compared to continuing-generation students. Exploratory job search may therefore help compensate for this lack of social capital. We also tested whether job search expectation was an explanatory factor, especially for first-generation students' lower anxiety. These post-hoc analyses did not provide significant results. Research on school-to-university transitions shows that first-generation students have lower expectations of being successful and even of going to university, reflecting their *habitus* (Reay, 2018). These students' lower anxiety may also be associated with feeling less pressure than their continuing-generation counterparts to secure high-skilled, graduate jobs from those around them, e.g., family and even university staff.

One explanation for the negligible overall incremental effect of social background on becoming employable could be that this effect is indirect (Blasko et al. 2002). In other words, first-generation students fare worse than continuing-generation counterparts because they are more likely to attend post-1992 HEIs (where their *habitus* is more closely aligned with the HEI than in a pre-1992 HEI) and/or experience more financial strain. It is difficult to observe such indirect causality effects within the confines of our small-size and cross-sectional dataset. In fact, our post-hoc analyses where we tested indirect and interaction effects between social background and HEI type as predictors of becoming employable, did not yield meaningful results. This remains an issue for further research.

Financial strain was not related to other measures of social disadvantage in this study. This might be due to the widespread experience of financial difficulties across the student population (Watson, Barber & Dziurawiec, 2016) and so may not be a meaningful indicator to differentiate social disadvantage among students. There was limited support for a direct effect of financial strain on cognitive and behavioural

aspects of UtWTs, with the only significant association being between financial strain and higher anxiety, findings consistent with existing research (Richardson et al. 2017).

### ***Understanding the ‘employable graduate’ identity construction process***

The study’s second theoretical contribution is to broaden the concept of graduate employability beyond the likelihood of securing and maintaining a job (McQuaid and Lindsay 2005) and/or individual attributes associated with securing a graduate job (e.g., human capital, career behaviour) (Bridgstock 2009). The neoliberal discourse of graduate employability assumes that the experience of becoming an ‘ideal graduate’ is uniformly positive (Allen et al. 2013). Yet, the realities of the UtWT are varied and complex.

Student cognitions and affective states are rarely included in discussions of graduate employability. Our findings show that social disadvantage explained the greatest incremental variance on students’ job search expectations, perceived barriers to employability and job search-related anxiety, i.e., in their cognition and affect toward UtWT, in comparison to its effects on proactive career behaviours. There is already considerable research on perceived employability and proactive career behaviours among the student population. Our study contributes to this research by showing that each of the indicators of potential disadvantage considered (social background, HEI-type and financial strain) significantly explained levels of anxiety felt by students related to UtWT. The study, therefore, highlights a need for a broader approach to understanding student experience of ‘becoming employable’, to include not only proactive career behaviours but also students’ cognition and affect.

### ***Practical implications***

Findings suggest a key role for HEIs, employers and policymakers in the development of an employable graduate identity for STEM subjects. First, HEI staff and employers contribute to students' employability-related expectations. Alumni can provide exemplars of the opportunities available to students and help reflect the students' potential – especially when their own journey reflects a similar pattern to the students. Particularly for entry into STEM careers, availability of non-stereotypical role models is important (Shin et al 2016); for example, first-generation students or those from similar HEIs. STEM employers are encouraged to be more nuanced in their recruitment activities and make selection decisions based on subject strength rather than long-standing perceptions or university rankings. This could be achieved by adopting local HEIs and thereby forming deeper relationships to help shape the curricula and build trust in the quality of the graduates (Allison et al. 2018).

Our second set of practice recommendations focuses on improving student experience and wellbeing beyond the degree programme. A key finding from this study concerns student wellbeing, as reflected in anxiety. Financial anxieties may be detrimental for academic and labour-market performance. Adopting the University Mental Health Charter, universities can proactively encourage student wellbeing throughout the university.

Our third set of practical recommendations is for supporting more effective STEM career behaviours. Universities' enhanced employment events could be better tailored to provide an understanding of career routes, develop a deeper awareness of the labour market and to overcome the challenges of accessing the market. For instance, entrepreneurship education has been suggested as a way of facilitating graduate identity development (Berglund 2013).

### ***Study limitations***

We recognise that the study captures graduate identity at a particular stage of the UtWT and that graduate career identities evolve as they interact with the labour market (Holmes, 2013). Few studies, however, have attempted to apply a graduate identity perspective during the UtWT and specifically explore social disadvantage at this critical phase. The study, therefore, represents an original perspective on the construction of graduate employability.

Our focus on STEM students was intended to narrow the labour markets being compared across HEI type, and hence potential explanatory variables impacting employability. However, there still exist subject-specific paths into employment for different STEM subjects which may impact graduates' construction of employability. We were not able to differentiate between subjects at this level. Moreover, future research could study social disadvantage at the intersection of gender-based disadvantage, which remains an important issue for entry into STEM education and careers.

The cross-sectional survey design drawing from a single source (students) limits causal inferences regarding the relationships between study variables. Given also the relatively small sample size, our findings raise questions about which we can only speculate in this article.

Finally, it should also be recognised that the tuition-free Scottish HEI context is unique. Elsewhere, the existence of tuition fees and associated student debt may serve as an additional source of disadvantage for some students, with even greater implications for indicators of becoming employable, especially mental wellbeing (Richardson et al., 2017).

## Conclusions

This article examined graduate employability from a graduate identity perspective, reflected not only in proactive career behaviours but also in students' cognitions and affect related to UtWT. The findings show a substantial institutional effect on becoming employable, particularly on employability expectations and job search-related anxiety. Our findings are consistent with arguments that institution-type provides varying access to channels enabling more successful UtWTs, such as: elite employers, influential networks, and/or perceived 'fit' with such employers and networks. We attribute this to HEIs' and employers' expectations which shape students' goals and behaviour in the labour market. In the present study, students in the post-1992 university may have felt less pressure to engage in entrepreneurial activities to improve employability.

The study also expands understanding of how disadvantage affects STEM UtWTs. Employability in STEM subjects has primarily examined gender or ethnicity as the focus of disadvantage (Smith and White 2019). Here, we focused on different facets of social disadvantage: social background, HEI type and financial strain. The findings have practical implications for universities, employers and policymakers in alleviating some of these pressures on disadvantaged students. Our recommendations focus on managing expectations, enabling students to gain the exposure and experiences required for successful UtWT, and reducing their anxiety and perceived barriers to achieving such transitions.

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Table 1 Means, standard deviations and bivariate correlations (N=203)

|    |                             |       |      | 1      | 2      | 3     | 4      | 5     | 6      | 7      |
|----|-----------------------------|-------|------|--------|--------|-------|--------|-------|--------|--------|
| 1  | Age                         | 23.22 | 4.72 | —      |        |       |        |       |        |        |
| 2  | Female                      | 0.46  | 0.50 | 0.01   | —      |       |        |       |        |        |
| 3  | Scottish                    | 0.79  | 0.41 | -0.08  | -0.09  | —     |        |       |        |        |
| 4  | 2:1/higher                  | 1.88  | 0.63 | -.18*  | 0.07   | .15*  | —      |       |        |        |
| 5  | First-generation            | 0.50  | 0.50 | 0.06   | 0.06   | .20** | -0.01  | —     |        |        |
| 6  | Post-1992 HEI               | 0.60  | 0.49 | .21**  | -.38** | .23** | 0.07   | .16*  | —      |        |
| 7  | Financial strain            | 2.12  | 0.90 | .15*   | .16*   | 0.02  | 0.07   | 0.06  | 0.12   | —      |
| 8  | Any job expectation         | 0.41  | 0.49 | 0.09   | 0.03   | 0.08  | 0.04   | 0.14  | .34**  | 0.11   |
| 9  | Good job expectation        | 0.42  | 0.50 | -.15*  | 0.07   | -0.05 | -0.04  | -0.10 | -.36** | -.19** |
| 10 | Perceived internal barriers | 2.37  | 1.46 | -.19** | -0.03  | 0.00  | .17*   | -0.02 | -.24** | -0.13  |
| 11 | Perceived external barriers | 2.19  | 1.78 | -0.12  | 0.09   | -.16* | 0.07   | -0.01 | -.32** | -0.12  |
| 12 | Anxiety                     | 2.04  | 0.82 | 0.04   | .18*   | 0.09  | 0.06   | 0.01  | .33**  | .32**  |
| 13 | Pre-employment work         | 1.38  | 1.01 | 0.00   | .26**  | -0.10 | -.20** | -0.05 | -.52** | -0.06  |
| 14 | Haphazard job search        | 2.44  | 0.93 | -0.06  | -.16*  | -0.13 | -0.02  | -0.02 | .26**  | 0.11   |
| 15 | Exploratory job search      | 3.45  | 0.72 | -0.02  | 0.07   | 0.02  | -.16*  | .16*  | -.18*  | 0.00   |
| 16 | Focused job search          | 3.45  | 0.67 | 0.11   | 0.09   | 0.01  | -0.01  | -0.09 | -.19** | 0.06   |
| 17 | Networking                  | 3.28  | 0.76 | -0.05  | -0.03  | 0.02  | -.26** | -0.05 | -0.13  | 0.07   |

Table 1 continued...

|    |                             | 8      | 9      | 10     | 11     | 12      | 13     | 14     | 15    | 16    | 17 |
|----|-----------------------------|--------|--------|--------|--------|---------|--------|--------|-------|-------|----|
| 9  | Good job expectation        | -.32** | —      |        |        |         |        |        |       |       |    |
| 10 | Perceived internal barriers | -.20** | .19**  | —      |        |         |        |        |       |       |    |
| 11 | Perceived external barriers | -.20** | 0.11   | .57**  | —      |         |        |        |       |       |    |
| 12 | Anxiety                     | .35**  | -.21** | -.19** | -.21** | —       |        |        |       |       |    |
| 13 | Pre-employment work         | -.25** | .27**  | 0.10   | .15*   | -.358** | —      |        |       |       |    |
| 14 | Haphazard job search        | .34**  | -.29** | -.17*  | -.20** | .32**   | -.31** | —      |       |       |    |
| 15 | Exploratory job search      | -.20** | .18*   | .22**  | .17*   | -0.11   | 0.13   | -.24** | —     |       |    |
| 16 | Focused job search          | -.21** | 0.03   | 0.07   | 0.09   | -0.12   | .21**  | -0.10  | 0.06  | —     |    |
| 17 | Networking                  | -.16*  | .28**  | .21**  | 0.14   | -0.09   | .27**  | -.24** | .22** | .19** | —  |

Note. \* p<.05, \*\* p<.01, \*\*\*p<.001, Cronbach's alpha reliability coefficient presented in parentheses where relevant.

Table 2 Binary logistic regression analyses predicting likelihood of expecting ‘any job’ and a ‘good job’ upon graduation (N=203)

|                      | Any job |         |         | Good job |         |         |
|----------------------|---------|---------|---------|----------|---------|---------|
|                      | Exp(B)  | Exp(B)  | Exp(B)  | Exp(B)   | Exp(B)  | Exp(B)  |
| Female               | 0.87    | 1.39    | 1.31    | 1.38     | 0.66    | 0.73    |
| Scottish             | 1.37    | 1.26    | 1.26    | 1.22     | 1.49    | 1.48    |
| Degree class 2:1/1st | 0.93    | 0.79    | 0.79    | 0.89     | 1.17    | 1.19    |
| First-generation     | 1.73*   | 1.57    | 1.57    | 0.77     | 0.93    | 0.93    |
| Post-1992 HEI        |         | 4.13*** | 3.96*** |          | 0.14*** | 0.15*** |
| Financial strain     |         |         | 1.18    |          |         | 0.74    |
| -2LL                 | 365.82  | 345.78  | 344.5   | 356.62   | 315.67  | 312.09  |
| Nagelkerke $R^2$     | 0.05    | 0.14    | 0.14    | 0.07     | 0.24    | 0.26    |

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\* $p < .001$ .

Table 3 Hierarchical regression analyses predicting perceived barriers, anxiety and career management behaviours (N=203)

|                      | Perceived internal barriers |          |         | Perceived external barriers |          |         | Anxiety |          | Networking |         |         |         |
|----------------------|-----------------------------|----------|---------|-----------------------------|----------|---------|---------|----------|------------|---------|---------|---------|
|                      | $\beta$                     | $\beta$  | $\beta$ | $\beta$                     | $\beta$  | $\beta$ | $\beta$ | $\beta$  | $\beta$    | $\beta$ | $\beta$ | $\beta$ |
| Female               | -0.01                       | -0.15    | -0.14   | 0.12                        | -0.05    | -0.04   | .16*    | .35***   | 0.29       | 0       | -0.12   | -0.15   |
| Scottish             | -0.02                       | 0.01     | 0.01    | -0.07                       | -0.04    | -0.03   | 0.12    | 0.08     | 0.08       | 0.05    | 0.07    | 0.07    |
| Degree class 2:1/1st | -0.06                       | -0.04    | -0.04   | -.17*                       | -.14*    | -.14*   | .16*    | 0.13     | 0.12       | 0.08    | 0.1     | 0.09    |
| First-generation     | 0.05                        | 0.1      | 0.1     | 0.05                        | 0.11     | 0.11    | -0.09   | -.16**   | -.15**     | -0.08   | -0.04   | -0.04   |
| Post-1992 HEI        |                             | -.30***  | -.29*** |                             | -.37***  | -.36*** |         | .41***   | .37***     |         | -.26**  | -.28*** |
| Financial strain     |                             |          | -0.04   |                             |          | -0.04   |         |          | .22***     |         |         | 0.11    |
| $\Delta R^2$         | 0                           | 0.07     | 0       | 0                           | 0.1      | 0       | 0.01    | 0.13     | 0.05       | 0.01    | 0.05    | 0.01    |
| $\Delta F$           | 0.45                        | 13.51*** | 0.35    | 0.5                         | 21.91*** | 0.37    | 1.7     | 29.13*** | 11.55**    | 1.32    | 1.11*** | 2.39    |

Table 3 continued...

|                      | Pre-employment activities |          |         | Haphazard job search |          |         | Exploratory job search |          |         | Focused job search |         |         |
|----------------------|---------------------------|----------|---------|----------------------|----------|---------|------------------------|----------|---------|--------------------|---------|---------|
|                      | $\beta$                   | $\beta$  | $\beta$ | $\beta$              | $\beta$  | $\beta$ | $\beta$                | $\beta$  | $\beta$ | $\beta$            | $\beta$ | $\beta$ |
| Female               | .25**                     | 0.04     | 0.04    | -.19**               | -0.06    | -0.08   | 0.04                   | -0.09    | -0.12   | 0.06               | -0.02   | -0.03   |
| Scottish             | 0                         | 0.04     | 0.04    | -.17**               | -.20**   | -.20**  | -0.01                  | 0.02     | 0.01    | -0.02              | 0       | 0       |
| Degree class 2:1/1st | -0.12                     | -0.08    | -0.08   | -0.01                | -0.03    | -0.03   | -0.02                  | 0        | 0       | -0.13              | -0.11   | -0.12   |
| First-generation     | -0.06                     | 0.02     | 0.02    | 0.03                 | -0.02    | -0.01   | .15*                   | .20**    | .20**   | -0.14              | -0.11   | -0.11   |
| Post-1992 HEI        |                           | -.47***  | -.47*** |                      | .29***   | .28***  |                        | -.28***  | -.30*** |                    | -.17*   | -.18*   |
| Financial strain     |                           |          | .00     |                      |          | 0.06    |                        |          | 0.11    |                    |         | 0.04    |
| $\Delta R^2$         | .00                       | 0.16     | .00     | 0                    | 0.06     | 0       | 0.02                   | 0.06     | 0.01    | 0.02               | 0.02    | 0       |
| $\Delta F$           | 0.66                      | 39.40*** | .00     | 0.17                 | 13.42*** | 0.66    | 4.28*                  | 12.14*** | 2.19    | 3.64               | 4.11*   | 0.36    |

Note. \* p<.05, \*\* p<.01, \*\*\*p<.001.

Figure 1 Conceptual framework for examining sources of social disadvantage on 'becoming employable' in the graduate labour market



