

# Measuring Doctoral Student Diversity socio-economic background

*Paul Wakeling*  
*University of York*

A report to Research Councils UK  
December 2016



UNIVERSITY  
*of York*

## EXECUTIVE SUMMARY

This report was commissioned by RCUK as part of efforts to improve diversity within its doctoral student body. Specifically, it is concerned with the conceptualisation and measurement of socio-economic diversity. While other aspects of diversity (e.g. gender, ethnicity) are already measured, research organisations where RCUK funds doctoral students do not currently collect data about socio-economic background. This report suggests a way forward to improve doctoral socio-economic diversity. In essence, this involves a cycle of action: **understanding** and then **monitoring** socio-economic diversity at doctoral level, before **intervening** and then **evaluating** those interventions.

### Socio-economic diversity at doctoral level

Research on the socio-economic background of doctoral students is relatively new and still developing. There are some clear findings however. **Students from lower socio-economic groups are underrepresented at doctoral level**, with the rate of immediate progression for groups from a routine occupational background being less than half that of those from higher managerial and professional occupational backgrounds. Some of these **differences are associated with the differential distribution of graduates** from different socio-economic backgrounds **across subject discipline and institution**. **Attainment at degree level also plays some role**. Nevertheless, there are residual socio-economic inequalities in doctoral participation. This suggests that improving the attainment of students from disadvantaged backgrounds at degree level and their representation among the undergraduate student body at research-intensive universities will flow through into a greater number of doctoral students from these backgrounds. However, it also suggests that **institutions receiving RCUK funding should do more to target and encourage disadvantaged graduates from institutions which have not historically attracted RCUK funding**.

### Understanding and measuring socio-economic diversity

Socio-economic background is a complex and contested concept with substantial variation in definition and measurement. It draws on sociological ideas of social class, economic indicators such as income and wealth and also geographical elements as seen in postcode-based categorisation of higher education participation. There is a core underlying construct which these various measurements all describe in some way.

Two closely-connected challenges for measuring socio-economic diversity at doctoral level are identified. First, graduates' socio-economic position is **mutable**, in that it may change over time. Second, the degree of **independence** of graduates from their parents

will change over time. On both counts, as doctoral students age, the validity of categorisations based on their parents' situation will be reduced in comparison with a typical undergraduate. These issues are more acute when seeking to assist individuals (e.g. with targeted funding), since there is an increased risk of false positives and negatives. When measuring socio-economic diversity at a more aggregate level, as I recommend, then we can expect such errors to mutually offset. Based on these assumptions, a practical means of capturing data about doctoral applicants' and students' socio-economic background is to use their **characteristics at initial entry to undergraduate study** as the reference point.

### **What to collect and how to collect it**

Based on a review of the practical and conceptual advantages and disadvantages of existing measures of socio-economic background within UK higher education, I **recommend two sets of data to be collected**, one for doctoral applicants and the other for enrolled doctoral students. There are no ideal measures of socio-economic background; my recommendations seek a balance between accuracy and cost. Specifically, I recommend that:

- Data about **doctoral applicants** should be collected directly at the point of application and based on self-report. This should comprise their **first-degree institution** (already collected but seldom monitored), **home postcode at the point of entry to first degree** (from which a POLAR3 category can be derived), and **whether or not they have a parent with a higher education qualification**.
- Data about **doctoral students** should be sourced via data linkage across the HESA student record using the procedures employed by HEFCE in its analyses of transition to postgraduate study. This should include **POLAR3, NS-SEC group, parental higher education, first-degree awarding institution** and **type of secondary school attended**. This data should be centrally monitored by RCUK and also provided to individual research councils and institutions.

### **Effective interventions to improve doctoral diversity**

There is a **relatively limited evidence base** on the effectiveness of actions to improve diversity at doctoral level. Principally this is because there is very little actual practice to evaluate. The bulk of practice as well as evaluation is based on attempts to improve racial/ethnic diversity in US graduate schools. While there exist a number of longstanding and well-funded initiatives, systematic evaluations tend to show only that participants on such programmes usually have higher rates of doctoral enrolment. They

do not provide evidence that the interventions in question are pivotal (since their participants may have been likely to enrol anyway); nor is it clear that these initiatives are cost effective in relation to other possible activities.

### **Actions to improve socio-economic diversity at doctoral level**

Progress requires careful planning and co-ordination. Strategic oversight by RCUK will set overall direction and priority for this area and help to avoid basic but well-meaning mistakes by institutions. However, it is also important to empower individual research councils, consortia and institutions to address local issues, based on their own diagnoses of the data collected (as set out above). Drawing on expertise in institutional widening participation offices will also be beneficial and could help to co-ordinate efforts across and between consortia and institutions. The **initial focus should be monitoring** doctoral student diversity, especially at the application stage. Where appropriate, actions should prioritise outreach.

### **Summary of recommendations**

- RCUK should prioritise aggregate over individual measurement of socio-economic background.
- RCUK should explore, with HESA and HEFCE, data linkage possibilities for collecting the following information about its funded doctoral students from their previous HESA record at their point of initial entry to higher education: POLAR3 category; household NS-SEC; parental higher education; secondary school type; first-degree institution.
- Institutions funded by RCUK should collect data about their doctoral applicants to cover POLAR3 category based on home postcode at point of initial entry to higher education; parental higher education; and first-degree institution.
- Relevant data should be shared and monitored across and by RCUK, research councils and institutions.
- Research organisations funded receiving doctoral funding from RCUK should be required, as a condition of funding, to adopt a doctoral diversity and access strategy. Strategies should incorporate plans for systematic evaluation of activities. The quality and success of strategies should inform RCUK future decisions about allocation and renewal of organisations' doctoral funding.
- RCUK should support innovative practice, possibly through seedcorn initiative funding or through a reward-based system (e.g. additional studentships).
- Action should be co-ordinated within and across research councils and research organisations. This should involve existing institutional expertise (e.g. in widening participation offices).

## 1 Background to the report

Research Councils UK (RCUK), through its seven individual research councils,<sup>1</sup> is the principal funding body for doctoral research students in the UK. It is “committed to ensuring that equality and diversity are promoted in all aspects of the recruitment of postgraduate students”.<sup>2</sup> RCUK has published an Equality and Diversity Action Plan which obliges those bodies to which it provides doctoral funding to introduce policies and actions which ensure the most talented candidates are recruited to its doctoral studentships, regardless of background. In this report I contribute to that process by considering the nature and extent of known differences by socio-economic background at doctoral level, the validity and feasibility of possible measures of socio-economic background, and the potential of various actions which might be implemented to secure greater socio-economic diversity among doctoral students. While the available evidence on socio-economic diversity at doctoral level has been relatively slim, there are some useful recent developments which can be applied to RCUK’s operational context.

There is a strong case for increasing diversity across a range of characteristics in the doctoral student body. There are compelling justifications on grounds of the maximisation of talent and potential; of improving the quality of knowledge and the research process itself which derive from diverse viewpoints and experiences; and a moral case for ensuring fair access to doctoral education. However, RCUK has already indicated its commitment to diversity in the doctoral student body and justifying the case for diversity is not in the scope of the report. In what follows the case for diversity is assumed and I concentrate on more tangible matters.

This report is organised so as to move from general principles through to more specific considerations and finally to proposed actions. This arrangement represents a logical progression through key stages for addressing the issue, from understanding existing evidence, through collecting and analysing new data to taking action and monitoring the outcomes. Thus I begin by considering the limited evidence on socio-economic diversity at doctoral level, before reviewing some of the conceptual issues associated with socio-economic diversity for doctoral students. Next, I appraise candidate measures of doctoral students’ socio-economic background and propose a way forward. Finally, I consider the relatively modest literature on the efficacy of specific actions to address doctoral diversity, before concluding with a set of recommendations for institutions which receive RCUK doctoral funding.

In the remainder of the report, I refer to UK-domiciled students only. Conventionally, in considering socio-economic diversity, students ordinarily domiciled elsewhere (including EU students) are excluded because it is not practically feasible to establish a

baseline of socio-economic background for these students against which to compare the doctoral student population. I use the term 'Centres' to refer to any part of an institution or institutions which receives funding from a specific research council. This term covers Centres for Doctoral Training (CDTs), Doctoral Training Centres (DTCs), Doctoral Training Partnerships (DTPs) and the like.

## **2 Socio-economic diversity at doctoral level**

There is evidence that students from lower socio-economic groups are less likely to enter doctoral study after completing a first degree. Looking at doctoral study as a 'first destination', approximately one year and three years after completing a first degree, graduates' likelihood of progressing to doctoral study was associated with the occupation of the highest earner in their household. Those from professional/managerial backgrounds were more likely to progress than those from intermediate backgrounds, who were in turn more likely to progress than those from routine/manual occupational backgrounds. While the overall rates of transition are small, in 2010/11 2.8% of graduates from higher managerial/professional occupational backgrounds progressed to a higher degree by research immediately after their first degree. For those from routine occupational groups this fell to just 1.2% (see Appendix 1, Figure A1.1).<sup>3</sup> Similar patterns are noted using other measures of socio-economic background.<sup>4</sup> Rates of transition into doctoral study have varied a little over time, but the difference across groups has remained relatively constant. These findings have been replicated across different time periods and studies and by different researchers.<sup>5</sup>

Some of these apparent inequalities can be accounted for by the distribution of graduates from different backgrounds across institution and subject discipline and by degree-level attainment. For instance, in 2010/11, approximately four out of every ten graduates with a first-class honours degree from a Russell Group university in Physical Sciences progressed immediately to a research degree. Conversely, among Business and Administrative Studies graduates with a lower second class degree who had attended a Million+ university, the equivalent rate was fewer than one in 500. In the former group, more than half of the graduates were from a professional/managerial background, falling to one quarter in the latter group.<sup>6</sup> Variation in rates of entry to doctoral study across discipline and levels of attainment are uncontroversial. There is more funding available for particular disciplines than others, and we can also expect students' intentions to differ considerably, partly in relation to the structure of the graduate labour market for their discipline. Thus it is no surprise that graduates in the life sciences enrol on doctorates at relatively high rates since this is a common career pathway into the life science industry. In contrast, those reading law as undergraduates

are presumably aiming at a legal career, where holding a PhD may confer no particular advantage.

However, this argument does not readily transpose to differences between institutions. While we can expect students of an 'academic' disposition to gravitate towards research-intensive universities as undergraduates, there are also some potentially troubling explanations for how these differences come about. There is a risk that potentially excellent researchers in 'modern' universities are channelled away from research degree study through the 'well-worn paths' created by previous graduate destinations: i.e., research degree study does not appear on their horizon of possibilities, whereas it is an obvious option to undergraduates studying in an environment where there are already many research students. These graduates are not being 'pushed' to doctoral study. Conversely, research-intensive universities, which hold both the majority of research students and the overwhelming concentration of RCUK studentships, may not be 'pulling' talented graduates from outside their sector into doctoral programmes. This could be through the absence of the kind of outreach activities to participation 'coldspots' which are now commonplace in undergraduate widening participation work. But it could also be as a result of research-degree selectors inappropriately using first-degree institution as a proxy for academic ability and attainment.<sup>7</sup> This possibility is particularly concerning because of the clear differences in the socio-economic composition of the undergraduate student body in different kinds of university. There is some evidence to suggest graduates from lower socio-economic groups in Russell Group universities have only a very small disadvantage in rates of progression to doctoral study once other factors (attainment, discipline etc.) are held constant (see Appendix 1, Figure A1.2).<sup>8</sup> The point is that there are relatively few such graduates in the first place. This implies that greater socio-economic diversity at doctoral level would benefit from greater diversity at undergraduate level *and/or* by efforts from research-intensive universities to widen their doctoral recruitment net.

There are some major problems in using the 'first destination' measure to assess inequalities in entry to doctoral study by socio-economic background. Firstly, not all students who enter doctoral study do so immediately after their first degree (see Appendix 1, Figure A1.3). Some go away and do something else first, such as paid employment or travelling. In certain disciplines, particularly the arts, humanities and social sciences, entering doctoral students are typically expected to hold a masters degree. Students who enter doctoral study from a masters degree are missing from the first destination data. There are concerns that the masters requirement constructs a barrier for socio-economically disadvantaged students who, in the absence of state funding for masters-level study, may be priced out and hence excluded by default from doctoral study – the so-called 'broken bridge' problem. There is certainly evidence of

inequalities in access to postgraduate masters degrees (where three-quarters of students are self-funded).<sup>9</sup> HESA's Destination of Leavers from Higher Education Longitudinal Survey looks at graduates three years after graduation, but the sample size is much smaller than the one-year version.

HEFCE has undertaken several studies which get around this issue by using data linkage across multiple years of HESA student records. In this way, they are able to connect the record of a current doctoral student in year  $x$  to years  $x$  minus 1 to  $x$  minus 10. With these data, HEFCE can identify the POLAR quintile<sup>10</sup> of a student at the point they entered undergraduate study with any subsequent doctoral record for the same individual. Using this method, HEFCE has shown that the rate of entry to doctoral study more than doubles across the period from initial graduation to a decade after graduation. They also show a slight increase in the participation gap between those from the highest and lowest POLAR quintiles. To date however, HEFCE has not undertaken multivariate analysis of this data, so it is not clear how much of the difference across POLAR quintiles is accounted for by patterns by discipline, institution and attainment.<sup>11</sup>

From RCUK's perspective, there is a key piece of missing data in previous studies: whether or not a doctoral student was supported by a research council studentship. HESA records data about a student's 'major source of tuition fees' within which separate research councils are identified as the principal sponsor. This means, in principle, that it would be possible to determine the socio-economic background of RCUK-funded students without a separate data collection exercise.<sup>12</sup> However to the best of my knowledge, only one previous study has included consideration of the source of doctoral student funding in relation to socio-economic diversity. This was a single-institution study looking at entry to doctoral programmes at the University of Oxford in 2002.<sup>13</sup> It found that research council studentships were broadly meritocratically allocated, but that having attended a non-Russell Group university was a disadvantage.

In summary then, there are known inequalities in progression to doctoral study by socio-economic background. Some of these are related to the distribution of graduates by socio-economic background across subject discipline and institution, and by differential degree-level attainment. However, inequalities remain when these factors are controlled for. It is not clear how far these inequalities apply to the subset of students funded by RCUK, nor how much they impacted by different 'push' and 'pull' factors. It is clear that there is scope for significantly improving understanding of the socio-economic background of RCUK-funded doctoral students and potentially for instigating actions at council and Centre level to address any identified issues.

### 3 Socio-economic diversity: concepts and measurement principles

#### *Conceiving of socio-economic background*

‘Socio-economic diversity’ is a generic term which captures several underlying concepts. At the most abstract level, socio-economic background refers to those aspects of an individual’s life which are not represented in other prominent measures of their characteristics and experience, which might include gender, race/ethnicity, age, nationality, disability and so on. However, beyond that, there is disagreement among social scientists about precisely what is being referred to. Sociologists tend to talk about social class or stratification, although this may be defined as deriving from material economic differences such as wealth or occupation, from status differences which might be captured by cultural taste and behaviour, or by a combination of both. Economists typically concentrate on income, although more recently there has been an emphasis on the growing prominence of wealth. These are not merely academic distinctions: the way in which socio-economic background is conceptualised implies different manifestations of inequality and difference, as well as varying mechanisms in how that comes about. If we emphasise the ‘economic’ in socio-economic, that leads to particular operationalised measures of diversity. It also suggests selection of certain policies to increase diversity at doctoral level. Foregrounding cultural ideas of socio-economic background would lead to a quite different approach in the practice of increasing doctoral diversity. In considering how doctoral student socio-economic diversity can be enhanced, RCUK will need to take a pragmatic path through these conceptual puzzles. While most of the candidate measures considered below are, in *very* broad terms, getting at a similar latent construct, we also need to recognise that however robust, they can give quite distinct pictures of socio-economic background. Richer measures of socio-economic background, such as that developed by Savage *et al.*<sup>14</sup> from the BBC’s Great British Class Survey, are not an administratively practical solution.

#### *‘Mutability’ and ‘independence’*

In considering the socio-economic background of postgraduates, and in particular doctoral students, we are faced with a problem of ‘mutability’. Some characteristics of individuals are relatively fixed and we can expect their influence over life chances, experiences and so on to be essentially constant over time. Examples might be gender, first language, and ethnicity. We can call these ‘immutable’ characteristics. Other aspects are less fixed – they can and often do change over time. Individuals can be socially mobile, ending up in quite different circumstances to those they were born in. Socio-economic background then is, in some senses, ‘mutable’ in that it is amenable to change and may differ considerably between time points. Someone who is born in

poverty but ends up as a professor will be measured as having quite different socio-economic background depending on the point in their life at which measurement occurs.

This poses a conceptual challenge for considering socio-economic diversity among doctoral students. At the point of entry to undergraduate study, for that large group of young people who have just crossed the legal threshold of adulthood, it is self-evidently most appropriate to consider the socio-economic position of their parents as the key measure, since the child's circumstances are so closely tied to those of their parents. At doctoral level though, many students are older and may have established their own household and the link to parental background may be more tenuous.<sup>15</sup> Younger doctoral students are in an even more ambiguous position, particularly in the STEM disciplines where the pattern is for immediate entry to a doctorate following a first degree. Despite being in their early twenties, such students may yet to have established *de facto* independence from their parents. There is not space for a full consideration of these issues in this report. However, it is worth briefly reviewing the challenges they pose to an effective measurement strategy.

Take three hypothetical prospective doctoral students (all with similar first degrees). Graduate 1 has just graduated at 22 years old and has yet to hold a full-time job. Her parents work as the assistant manager of a small shop and a school secretary respectively. Graduate 2 is 26 years old, the son of a single unemployed parent. Since graduating at 22, he has worked as a management consultant and is buying his own flat. Graduate 3 is 32 years old. His parents are both partners in the family legal practice. He graduated at 22 and has had spells of unemployment alongside part-time clerical work. He has been unemployed and living at home for the past two years.

Which would be considered to be the most disadvantaged? That will depend on whose circumstances we take into account. Using parental background, we might consider graduate 2 the most disadvantaged, followed by graduate 1, then graduate 3. Using the graduates' own situation, graduate 3 appears more disadvantaged than graduate 2, and graduate 1 is difficult to assess. In practice, graduate 3 may be able to draw on support from his parents, where graduate 2 may not. However, we might also consider it unfair to expect parents to continue to contribute to their children's education into the child's fourth decade! Conventionally, measurements of students' background characteristics and financial means-tests for student support in the UK have switched from parent to child at age 25 (or in a set of specific circumstances, such as early marriage). In practice however there is much heterogeneity among graduates in this phase of life which means many false positive and false negative identifications of disadvantage are likely.<sup>16</sup>

## *Diversity and aggregate and individual measures: a way forward*

The problems of mutability and independence discussed above are most acute when applied to individuals. Where scholarships are awarded on the basis of defined disadvantage for instance it is critical to ensure they are allocated using criteria which are valid and reliable. Were RCUK to consider ring-fencing a proportion of studentships for students meeting particular socio-economic criteria (e.g. on the basis of financial need), then these issues come into focus.

If instead the intention is to monitor socio-economic diversity among the RCUK-funded student body and to encourage policies and strategies to broaden the applicant pool, then the accuracy of measures at the individual level is of less concern. Taken across a research council or even across a Centre we can assume that measurement errors will broadly cancel each other out, such that measures which may be unreliable at individual level will give a reasonably accurate picture at aggregate level. As will be explained below, different measures may serve better as individual- or aggregate-level indicators.

The model proposed for widening participation to taught postgraduate study in Appendix 2 can be adapted with few changes to doctoral level. RCUK studentships already cover, by definition, the financial costs of doctoral study. This means the stages which precede actual enrolment – intending to apply for doctoral study, actually applying and being made an offer – acquire greater importance as sites for both monitoring socio-economic diversity and intervening to improve it. Since the consequences of measurement error for individuals are much reduced in these stages, the trade-off between cost and accuracy tends to favour simple-to-collect measures which provide reasonable *aggregate* indication of socio-economic diversity. The emphasis on diversification over financial need also considerably reduces the significance of the question of ‘independence’. For monitoring purposes and for targeting non-financial interventions (such as ‘outreach’), adopting a common measurement reference point for all potential doctoral students will simplify practice considerably. It is suggested that the individual’s situation at the point of entry to their first degree is most suitable.<sup>17</sup>

### **4 Selecting measures**

In the previous section, I have recommended that RCUK prioritise measures which are suitable for measuring socio-economic diversity among its doctoral student body as a whole over those which are more valid at the level of the individual doctoral student. This section moves the discussion on by reviewing the advantages and disadvantages

of various candidate measures for characterising socio-economic diversity among doctoral students. There are no ideal measures: all of the potential indicators reviewed below have some flaws. There is also a trade-off between accuracy and cost. In what follows, I try to strike a balance between the validity and reliability of a measure on the one hand; and the practical considerations involved in collecting (and potentially verifying) it on the other.

There exist a large number of candidate measures of socio-economic diversity from which to choose. To focus the discussion, I have eschewed any measures which are not already in common use in the practical and social-scientific measurement of socio-economic background in the higher education setting.<sup>18</sup> Table 1 below briefly summarises potential measures, how they are currently measured and collected and their strengths and weaknesses.

In cutting through the complex pros and cons of different measures, my emphasis is on optimising the validity of measures given the resource constraints which RCUK and Centres will face in collecting and monitoring data. I discuss data collection in more depth in the next section, but here I wish to distinguish between two broad sets of data about doctoral student diversity. First there are those items of data about socio-economic background which are already held about students. Here it would make sense to exploit data linkage between the current doctoral student record and the initial undergraduate record, using the linkage protocols now well-established by HEFCE and HESA. Doing so it should be possible to capture a number of items of data about current doctoral students across all Centres, including **POLAR3 category**, **NS-SEC**, **parental education**, **first-degree institution** and **secondary school type**. None of these categories alone is adequate and each will likely have some missing data. Taken together though, they will provide a comprehensive picture of the RCUK-funded doctoral student body's socio-economic background which can be compared both to that of other doctoral students and to the first-degree population in general. Monitoring these measures for RCUK-funded students as a whole, across councils and across Centres will clearly indicate key areas of concern (and potentially, celebration).<sup>19</sup>

Second, Centres should be required to record a more limited selection of socio-economic background variables for applicants and, where applicable, those who they engage with prior to application. These should then be monitored against application success rates (conversion from application to offer of a place to award of a studentship) *and* to guide Centre strategies for ensuring socio-economic diversity. Here it is recommended that a reduced and relatively simple set of measures are used: **POLAR3** (based on applicant's home postcode at the point of initial entry to higher education); **parental higher education**; and **first-degree institution**.

Table 1: Description and evaluation of candidate measures for assessing doctoral student socio-economic diversity

Measure	Brief description	Current collection	Strengths	Weaknesses
POLAR3 <sup>20</sup>	A classification which allocates UK neighbourhoods to quintiles based on the rate of initial higher education participation by young residents	<p>Measure derived from postcode of student's home address. Simply requires student's postcode, which can then be batch-coded to POLAR3.</p> <p>This measure was developed by HEFCE and is in common use in English HEIs. In Scotland a separate measure is used.<sup>21</sup> However POLAR3 classifies residential UK postcodes in all four home nations.</p>	<ul style="list-style-type: none"> <li>• Very easy to collect</li> <li>• Known relationship between POLAR3 quintile and PG participation</li> <li>• If using postcode of home address at point of HE entry, gives potential for relatively straightforward verification (or data linkage)</li> <li>• Readily comparable across cases</li> <li>• Strong validity <i>at aggregate level</i><sup>22</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Potential for substantial error in classifying individuals (therefore less useful for determining individual need)</li> <li>• Areas change over time</li> <li>• Conceptual basis is relatively weak</li> <li>• Not suitable if collected about student's <i>current</i> home address because of ambiguous meaning: is it parental home, own home, temporary student residence etc</li> </ul>
Household NS-SEC	<p>'Official' socio-economic classification based on occupation of highest earner in the household.</p> <p>Development inspired by influential social class scheme used in international studies.</p>	Not currently collected for postgraduates. Collected for undergraduates who apply via UCAS, but missing in many cases. For proper categorisation, requires accurate job title, size of employing organisation and supervisory level of worker	<ul style="list-style-type: none"> <li>• Strong validity at aggregate level and relatively strong at individual level</li> <li>• Known relationship between NS-SEC category and PG participation</li> <li>• Conceptual basis is strong, especially if using position on initial entry to higher education</li> </ul>	<ul style="list-style-type: none"> <li>• Relatively poor coverage in existing PG data and plans for reduction in coverage in future</li> <li>• Substantial missingness in existing records</li> <li>• Difficult to collect and categorise – potential for substantial measurement error</li> <li>• Verification is difficult</li> </ul>

Table 1: Description and evaluation of candidate measures for assessing doctoral student socio-economic diversity (continued)

Measure	Brief description	Current collection	Strengths	Weaknesses
Type of secondary school attended	Classifies secondary school attended into state or independent	Not currently collected for postgraduates. Collected for undergraduates who apply via UCAS, relatively good coverage. Uses look-up file of all UK schools (via UCAS)	<ul style="list-style-type: none"> <li>• Simple measure which nevertheless does a reasonably good job of capturing social/educational advantage</li> <li>• Straightforward to verify</li> <li>• Known relationship between attending independent school and PG participation</li> </ul>	<ul style="list-style-type: none"> <li>• Relatively weak conceptual basis – state schools cover very wide socio-economic spectrum</li> <li>• Classifying based on ‘last school attended’ (as with UCAS) does a poor job of capturing trajectory of secondary educational career (many move from independent to state sector at 16)</li> <li>• Data not routinely captured for doctoral students at present</li> </ul>
Eligible for Free School Meals as a pupil	Indicates whether individual was eligible for Free School Meals (indicating household of low economic means) during secondary school	Not currently collected via UCAS or HESA. Potential for data linkage via National Pupil Database, but this is currently untried	<ul style="list-style-type: none"> <li>• Simple, well-known and easy to understand measure</li> <li>• Clear relationship between FSM status and educational disadvantage</li> <li>• Known to identify the most socio-economically disadvantaged students</li> </ul>	<ul style="list-style-type: none"> <li>• Can be a temporary status, so there is measurement error depending on when data captured</li> <li>• Very difficult to verify retrospectively</li> <li>• Blunt discriminator: many socio-economically disadvantaged individuals are nonetheless above the FSM threshold</li> <li>• Will be difficult to collect</li> </ul>

Table 1: Description and evaluation of candidate measures for assessing doctoral student socio-economic diversity (continued)

Measure	Brief description	Current collection	Strengths	Weaknesses
First-degree institution	Institution where student completed their first degree (potentially classified using mission group or other appropriate scheme such as HEFCE's 'tariff' grouping)	Currently collected for postgraduates as part of application process, but data not routinely transferred into enrolment records and not reported to HESA	<ul style="list-style-type: none"> <li>• Easy to collect and verify</li> <li>• Clear relationship between first-degree institution and PG participation</li> <li>• Known clustering of students by socio-economic background in different institutions</li> </ul>	<ul style="list-style-type: none"> <li>• Weak justification for use as a socio-economic measure: will generate false negatives and positives</li> <li>• Potentially controversial</li> </ul>
Household Residual Income	This is a measure of the financial means of a household based on the means-test assessments undertaken by Student Finance England and its national equivalents. It is used to allocate bursaries and (previously) maintenance grants for lower income students.	Undergraduate students' households are assessed by their relevant student finance agency and data disclosed only to the institution at which they are studying. Information is not collected by HESA, but can be linked to HESA records (e.g. by HEFCE)	<ul style="list-style-type: none"> <li>• Direct link to affordability and material disadvantage</li> <li>• Relatively rigorous verification process and common standard</li> </ul>	<ul style="list-style-type: none"> <li>• Substantial gaps in data where students have not been assessed or have the ambiguous result of HRI=zero.</li> <li>• Information rapidly dates</li> <li>• Cost of undertaking financial assessments likely to be prohibitive for institutions, especially for the applicant pool</li> <li>• Known issues with separated parents etc.</li> </ul>
Parental education	Whether or not one (or both) parents has a higher education qualification	Currently collected by self-report for entrants through UCAS. Not collected for postgraduates	<ul style="list-style-type: none"> <li>• Clear relationship between parental education and PG participation</li> <li>• Simple to understand and easy to collect measure</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to verify so open to abuse and genuine mis-reporting too</li> <li>• Very blunt measure of socio-economic background (with little emphasis on material issues)</li> </ul>

## 5 Collecting data

Establishing a data link between doctoral and first-degree HESA student records is critical to providing extensive socio-economic background data for RCUK-funded students. HESA records, via its MSTUFEE field, the 'major source of tuition fee' for all students. RCUK-funded students can be identified using this field (there are separate categories for each of the research councils). Through the use of now well-established probability-based record-matching algorithms developed by HEFCE, it is possible to link back from a current record to previous records. In this way, relevant socio-economic background data for current RCUK-funded (and other) doctoral students can be obtained from previous records without a need to collect the data anew. This not only substantially reduces the cost of data collection; it also tends to increase data quality as it avoids reporting error by students who misremember information from some time ago.

Data linkage is not without some issues however. The quality of data obtained is reliant on the quality and coverage of earlier records. Some categories of student may have greater likelihood of missing data, such as those who studied part-time as an undergraduate (or others who did not apply via UCAS). Mature students with a very long gap between their first degree and doctoral study may also be missing data and a few students may not have undertaken a first degree in the UK (or at all) and hence will have no previous record. In the majority of cases however it will be possible to make a link and obtain at least some socio-economic background data. Coverage issues are also likely to decline over time.

Still, on balance there are significant benefits to be achieved for RCUK and Centres in data linkage. This would enable centralised provision of socio-economic (and other) diversity data at aggregate, council and Centre level for strategic monitoring purposes. Providing data in this way would allow RCUK to take an overview of doctoral socio-economic diversity for the purpose of prioritising specific areas or initiatives. It would also facilitate councils and Centres to take ownership of their own diversity context, but in a way which is not atomised or contradictory to RCUK priorities. It is recommended that RCUK explore concrete data linkage options with HESA (and HEFCE as appropriate). This should focus on the socio-economic measures suggested in the previous section. The anticipated outcome is a dataset which identifies a range of background characteristics of RCUK-funded doctoral students which will allow RCUK and councils to take an overview of their students, comparing them with non-funded doctoral students and with first-degree graduates as a whole. It will also allow Centres to understand their doctoral student body and benchmark their diversity position against other Centres.

Data linkage will only provide information about current students. Referring to the model of access to doctoral study set out in Appendix 2, this provides information only about those who have made the phase 1b to phase 2 transition. To understand the association of socio-economic background characteristics with transition to doctoral study it is necessary to collect data about *applicants* to doctoral study, as well as noting who is successful in their application. Since it is not thought to be feasible to link applicant records to past student records,<sup>23, 24</sup> Centres will be obliged to collect data themselves for monitoring purposes. It is recommended that RCUK require Centres to record *and monitor* the three items of data suggested in the previous section for *all* their UK-domiciled doctoral applicants (not just those applying for a RCUK-funded place). The anticipated outcome is a Centre-level dataset which gives an overview of the socio-economic (and other) characteristics of both the pool of doctoral applicants as a whole as well as those successful in securing an offer of a RCUK-funded place.

Using this data to monitor socio-economic diversity among the doctoral student body will help to create a more detailed and fuller evidence base and a foundation for action. Actually addressing diversity issues will need to move beyond monitoring however to incorporate specific actions. In the next section I review the limited international evidence base on initiatives to improve doctoral student diversity, before briefly considering how Centres might be tasked with approaching diversity in the final section.

## **6 Research evidence on improving doctoral socio-economic diversity**

Within the British context, there is very little direct evidence concerning how socio-economic diversity can be increased at doctoral level. I know of no UK-based study which addresses this issue. Moreover, a recent Higher Education Academy-funded project in which I was involved concluded that there was an absence of previous research on this topic for taught postgraduate programmes *and* an apparent absence of frontline practice, even where institutions were more successful in recruiting students from disadvantaged backgrounds to taught postgraduate programmes. Institutions were unable to identify specific practices which might have generated greater socio-economic diversity.<sup>25</sup> There *is* a more substantial literature on other forms of diversity, most notably gender, although this tends to be focused on STEM subjects. There is also some literature on persistence within doctoral programmes, although evidence suggests that funded students tend to have very good completion rates (and indeed this is closely monitored by the research councils).<sup>26</sup>

During 2014/15, HEFCE funded the Postgraduate Support Scheme (PSS), a £25 million initiative to, among other things, investigate ways to widen participation to

postgraduate study. While the scheme was limited to *taught* postgraduate programmes, some lessons can be drawn from it which could be applied to doctoral level. I have drawn on the knowledge and experience I acquired as the scheme's programme analyst<sup>27</sup> in preparing this report, especially in the review of the conceptual and practical aspects of various measurements of socio-economic background. The scheme also provides some evidence of more and less successful approaches to widening postgraduate participation. A key difference between PSS and any future RCUK initiative is that the former involved targeting of scholarship funding on the basis of socio-economic (and other) background characteristics in a circumstance where there were very few alternative public sources of finance. Studentships already exist for doctoral study and the key challenge is instead to ensure that the applicant pool is socio-economically diverse and that other potentially unfair barriers to progression are removed.

The PSS programme analysis found that, apart from scholarships, several factors contributed to successful attempts to widen taught postgraduate participation. Successful PSS projects typically involved carefully planned 'inreach' and 'outreach' schemes to target graduates from groups underrepresented on taught postgraduate programmes. Where institutions were able to collaborate in this activity there appeared to be even greater success. Projects which adopted simple, institution- or consortium-wide measures and priorities proved more effective than those which attempted more nuanced and multiple interventions across different priorities. PSS also highlighted the future importance of systematic data collection about postgraduate students and applicants for the purposes of monitoring and reporting on access, diversity and equality. That experience has guided my recommendations in this report about monitoring and reporting on socio-economic diversity among doctoral students.

Initiatives to improve the diversity specifically of *doctoral* programmes have a longer pedigree in the USA. There are a number of long-running initiatives aimed at diversity in American universities focussed on race/ethnicity, and sometimes on students from low-income backgrounds. These range in scale and type, but typically involve a structured package aimed at encouraging promising undergraduates to consider doctoral study and/or to prepare them for the process of applying for a place. This may involve some form of internship, often during the summer vacation, where the student assists faculty with their research. A brief description of some of the major programmes of this type is given in Appendix 3.

There are a number of published evaluations of the effectiveness of these programmes on doctoral diversity. It is tricky to provide a definitive summary of their findings because they focus on programmes of different scale and type. Some programmes are

based in a single department in one university; others are limited to a specific discipline; whereas others are multi-institutional or even federal in scope and cover a range of disciplines. Across a range of studies, there is clear evidence that students who attend some form of summer institute or participate in research as an undergraduate are more likely to enrol in a doctoral programme.<sup>28</sup> This finding is replicated in large and small studies and in several disciplines (including STEM and economics). Researchers have also identified a range of characteristics of such programmes which increase their effectiveness, although few of these generate many surprises.<sup>29</sup> Nor do the identified actions of successful summer programme research mentors. The major drawback with almost all of the studies reviewed is the lack of a control group. Most fundamentally, it is not clear what additional effect summer institutes and their ilk have on student behaviour. It is reasonable to assume that students who sign up to such initiatives are already predisposed towards doctoral study. The programmes are certainly not allocated as a 'randomised treatment' An evaluation of the Mellon Mays Undergraduate Fellowship Program suggested that it did not have any statistically significant effect on PhD completion because the participants were already highly selected.<sup>30</sup>

## **7 Centre actions to improve doctoral socio-economic diversity**

What lessons can be drawn from this body of mainly American research for the British case? What else might comprise effective action by Centres to address socio-economic diversity at doctoral level?

It is possible that summer institutes and similar programmes might be effective in increasing socio-economic (and other forms of) diversity at doctoral level. On the other hand, these are expensive activities and therefore it would pay to be cautious about their introduction in the absence of more preliminary analyses of the precise nature of the issues in relation to socio-economic diversity. Regarding the model of postgraduate decision-making presented in Appendix 2, the actions discussed in section 6 above are addressed at stages 1a and 1b: encouraging graduates from underrepresented groups to consider and apply for doctoral study and supporting them in constructing an application to maximise their chances of securing a funded place. Since we currently lack data about this phase of the doctoral admission process in respect of socio-economic diversity (or indeed actual admissions practice),<sup>31</sup> it is premature to propose specific actions. More diagnostic investigation is required to identify where the 'pinch points' lie in the process. It may indeed be the case that students from underrepresented backgrounds are not applying or even considering applying for doctoral study. Conversely, they may be applying but are less likely to be successful.

A balance is required here between efficiencies of scale and strategic oversight of funded doctoral provision by RCUK; and the need for local engagement with and ownership of the issue by Centres. An entirely devolved approach, which delegates all action to Centres would empower them to act and could encourage innovation. It would also recognise the structuring of diversity by subject discipline, with some areas facing greater challenges than others or needing to place more emphasis on ethnicity or gender than socio-economic background. However, it also risks atomisation, commission of basic but well-meaning mistakes and an absence of scale and statistical power for drawing firm conclusions. Evidence from undergraduate level suggests that simple, national schemes tend to have a greater impact on applicant/student behaviour than more nuanced local schemes (e.g. in the award of undergraduate bursaries).

A particular challenge for RCUK relates to the overlap of Centres across institutions. Many Centres involve several institutions, but many institutions have two or more Centres. This means either Centres having to deal with different institutional approaches or institutions having to deal with different Centre approaches across research councils. Ultimately, my judgement is that the tension between central and local strategies is unresolvable. Consequently, a clear policy position is needed about where emphasis should be placed. Is RCUK's concern principally the overall socio-economic diversity of its funded student body as whole? If so, a one-size-fits-all strategy is preferable, recognising that this may not be ideal for each research councils. Or, does RCUK wish to address specific issues in specific disciplines? Doing so empowers local actors, but may be less cost-effective, with lower overall impact.

There are clearly difficult issues to grapple with. But there are compelling reasons to act. RCUK, as the flagship funder of doctoral students in the UK, has substantial leverage and influence to drive institutional behaviour. There is also a promising opportunity to co-ordinate actions with other funders such as the Wellcome Trust to present a united strategy in this area.

It is recommended that RCUK adopt a two-stage approach to investigating and addressing doctoral student diversity in its body of funded students. First, it is recommended that Centres be required to collect data on socio-economic background at three points in the doctoral application cycle, using the measures proposed in section 5. Data should be collected **at the point of application** to determine the socio-economic background of the applicant pool and to determine the background of **applicants who are offered funding**. This data should be reported to RCUK in a standard form. Additionally, Centres should collect data on the socio-economic background of RCUK-funded students who **enrol on a doctoral programme**. This information should be reported to HESA through the existing fields in the HESA Student Record.<sup>32</sup> RCUK will then be able to obtain data on registered students via the statutory reporting

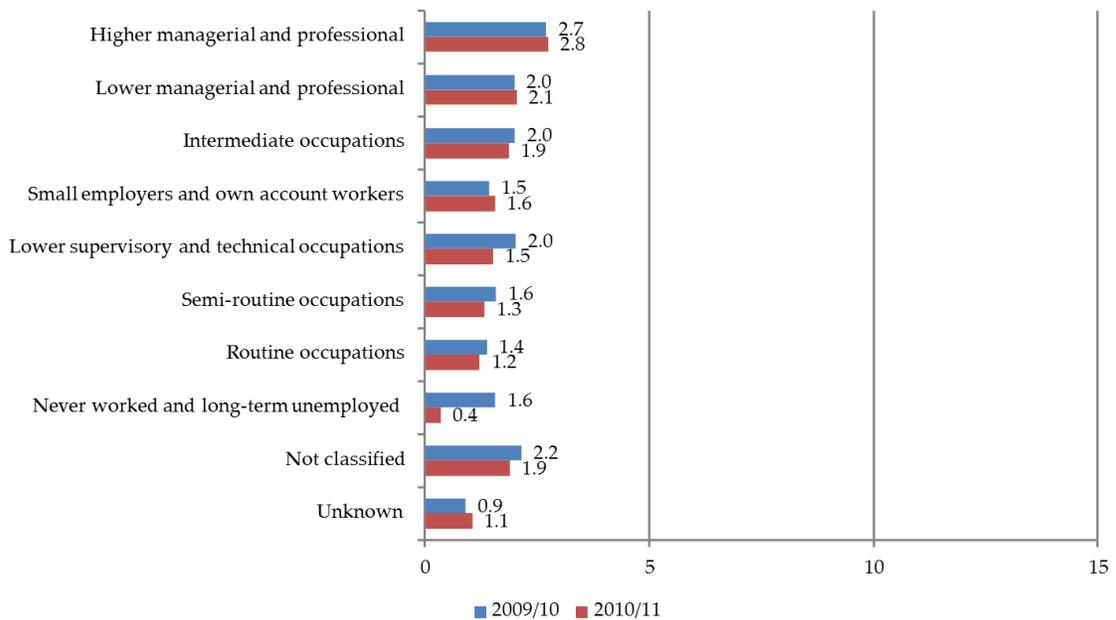
relationship with HESA, although it should be noted that this will mean a delay of approximately 18 months before enrolment data is available (based on typical autumn enrolment of new RCUK-funded doctoral students). It is further recommended that **RCUK explore data linkage options with HESA** to replicate, albeit on a smaller scale, the work done by HEFCE to investigate the background of postgraduates in England using information from their undergraduate record. This would provide much richer detail and a validation check on data collected by Centres. Such a data linkage would not, however, be a feasible means of obtaining data on doctoral applicants, where primary data collection by Centres is necessary.

Having established the patterns of application and entry according to socio-economic background characteristics, the second stage is to **determine targeted actions** to address any identified issues. It is suggested that this could employ both top-down and bottom-up approaches. **Centres could be required to adopt diversity strategies** based on their analysis of where their particular issues lie. These should be holistic diversity strategies in that they should consider other kinds of diversity alongside the socio-economic (e.g. gender, ethnicity, disability). In developing their strategies, Centres should be encouraged to engage with staff within member institutions with responsibility for diversity and widening participation. Alongside Centre action, RCUK should set the framework for diversity strategies by, for instance, emphasising particular priorities. It may be considered more appropriate for co-ordination to be at individual research council level rather than at RCUK level, although some top-level oversight is likely to be necessary. **Approved diversity strategies should be a condition of Centre funding.** Into the future, successful delivery against diversity plans should form a meaningful element in the periodic re-approval of Centres. Diversity strategies should be expected to draw on the analysis of data collected for the purpose, as already described. They should also refer to existing research evidence on effective practice, where available. However given the relative paucity of evidence in this area, **RCUK should encourage and support innovative practice by Centres** to address identified issues. At least initially, this might include some provision of modest priming funding directed at such activity.

Finally, the success of strategies and initiatives should be subject to **systematic evaluation**. Previous initiatives to widen participation and increase diversity have suffered from lack of such evaluation meaning it has been difficult to determine whether they have been effective and/or good value for money. Building in evaluation plans to the design of intervention strategies helps to mitigate this risk. It also implies a long-term commitment to improving socio-economic (and other forms of) diversity.

## Appendix 1 – selected charts showing characteristics of UK-domiciled graduates progressing to research degree study<sup>33</sup>

Figure A1.1 Percentage of first degree qualifiers by progression to research degree by socio-economic classification category: 2009/10 & 2010/11 combined.



Source: HESA Student Record and Destinations of Leavers from Higher Education survey 2009/10 - 2010/11

Figure A1.2 Rate of progression to research degrees by UK-domiciled graduates of UK higher education institutions, 2001/02 – 2004/05 by social class and type of institution attended for first degree

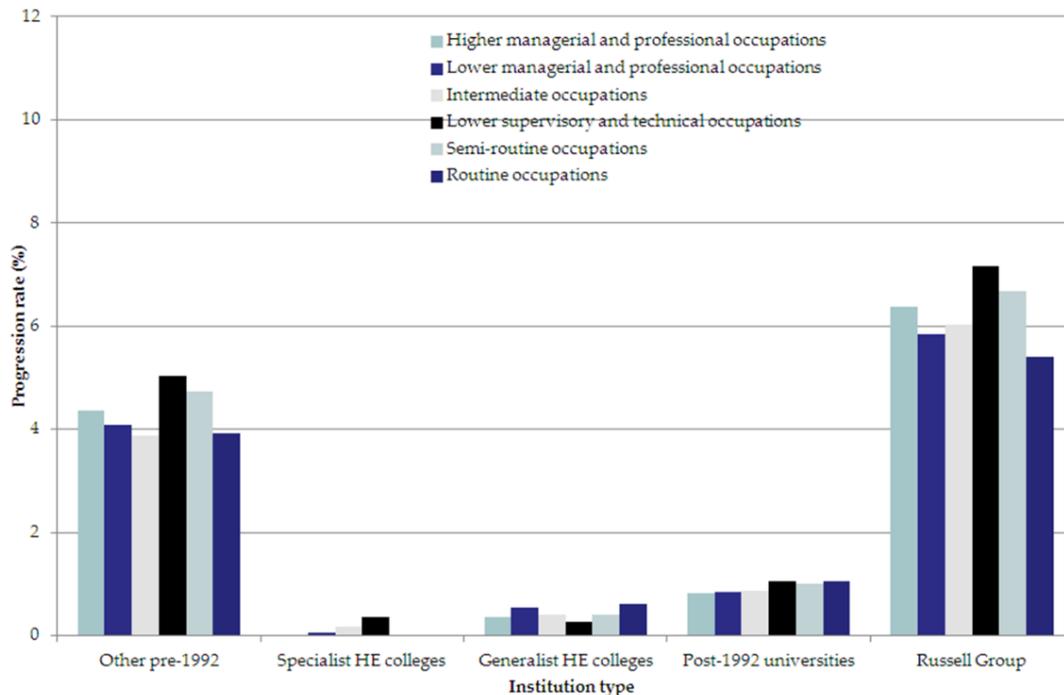
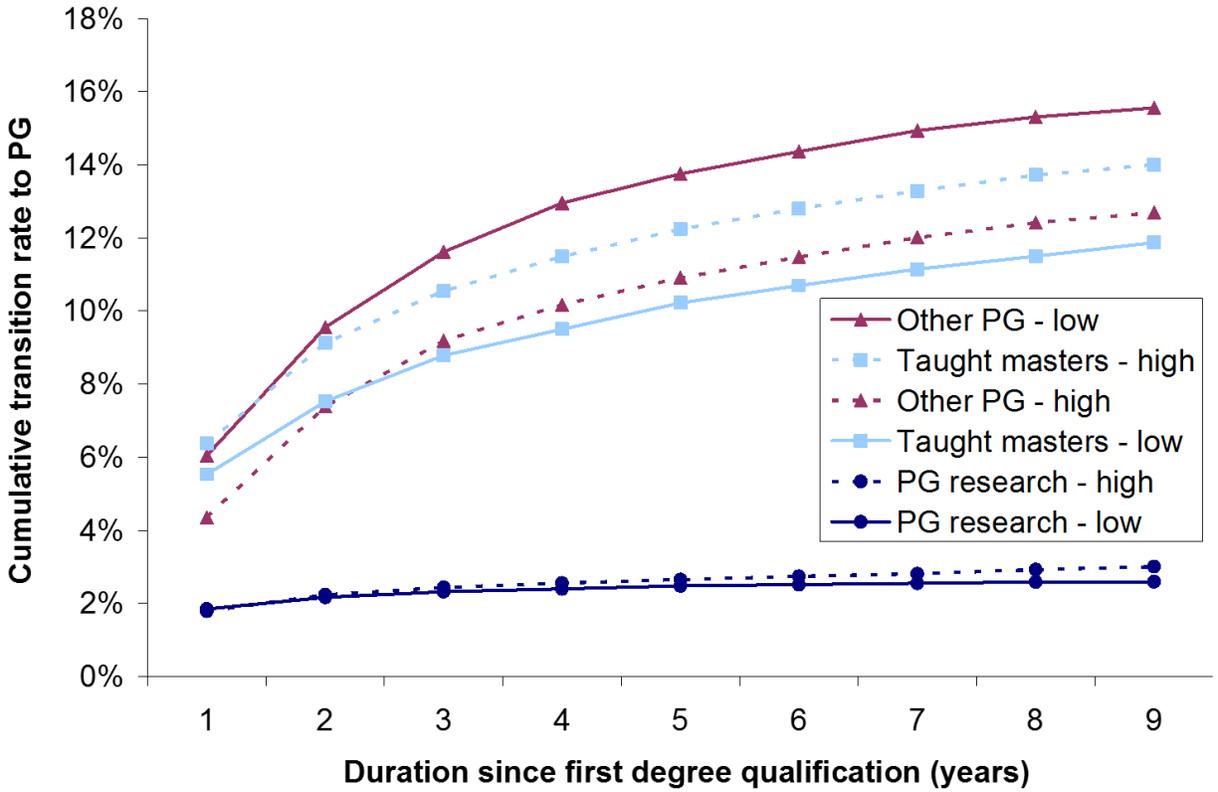
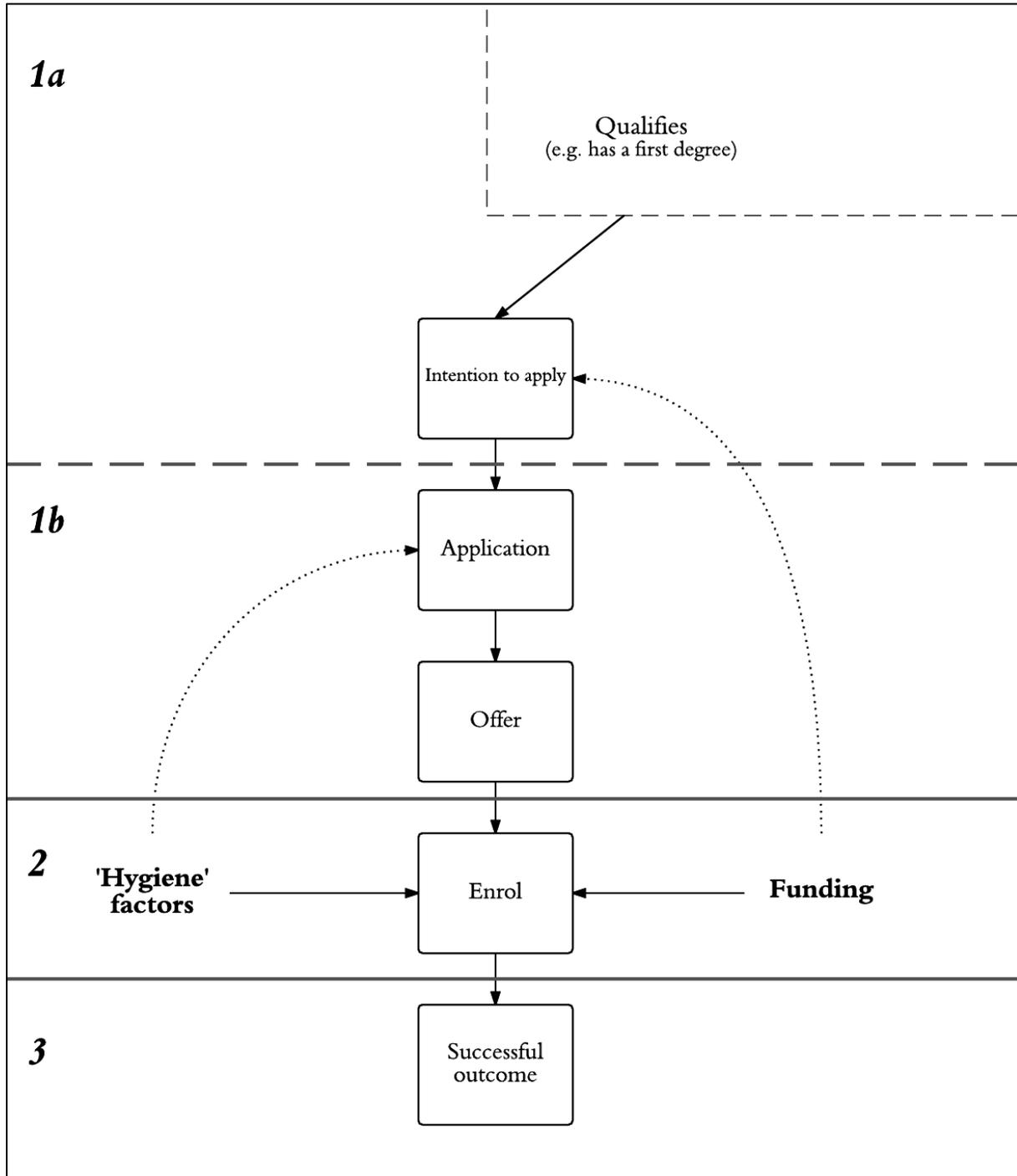


Figure A1.3 Rate of progression to research degrees by UK-domiciled graduates of UK higher education institutions, 2001/02 – 2004/05 by social class and type of institution attended for first degree



## Appendix 2 – a model of postgraduate decision-making



(Taken from Wakeling, P. (2015) *Programme Analysis of HEFCE's Postgraduate Support Scheme: Final Report to ESRC and HEFCE*. Bristol: HEFCE, Figure 4.1, p. 34)

### **Appendix 3: brief summary of selected US programmes to address diversity at doctoral level**

#### *Mellon Mays Undergraduate Fellowship program*

The [scheme](#), supported by the Andrew W. Mellon Foundation, was begun in 1988 to address the underrepresentation of minority groups among higher education faculty in the US. It involves a large number of colleges and universities across the USA and is targeted at aspiring doctoral students in the social sciences and humanities. While the details of programme vary, they typically target sophomore students from underrepresented minority groups who have the desire and academic ability to undertake doctoral study. A package of mentoring, summer research opportunities, and seminars is provided together with some repayment of undergraduate debt. According to the MMUF website, as of 2016 some 5000 fellows have been supported. Over 500 have obtained a PhD, with over 100 being tenured faculty. One evaluation of the effectiveness of the scheme, using its own data linked to the National Science Foundation's Survey of Earned Doctorates found "no statistically significant increase in the numbers of PhDs completed by underrepresented minority students", suggesting that many of the participants would have completed a PhD anyway.<sup>34</sup>

#### *Ronald E. McNair Post-baccalaureate Achievement Program*

Named in honour of the first African American astronaut, a research physicist who died in the *Challenger* Space Shuttle disaster, the [scheme](#) is intended to prepare undergraduates from minority groups and first-generation low-income students for doctoral study. Running at 151 institutions in the US and Puerto Rico, this federal scheme involves a set of summer research activities, conferences and advice.

#### *Big Ten Academic Alliance Summer Research Opportunities Program*

The Big Ten is a set of large, public, research-based universities located in the north east of the USA. There are actually 14 members in total. Originally an association for intercollegiate athletics (similar to the Ivy League), it has developed into an academic collaboration. The [Summer Research Opportunities Program](#) involves placement of undergraduates from minority backgrounds who aspire to doctoral study with a faculty mentor in order to conduct research. A set of associated preparation and support activities are also run. While the program is well-respected, personal communication with a member of faculty responsible for the scheme in a member institution suggested that there has not been a rigorous evaluation of effectiveness or value-for-money, and that there are concerns that students sometimes use the scheme as a means of enhancing

their CV (e.g. in preparation for law school), rather than from a genuine desire to undertake doctoral study.

#### *Other institutional or subject-specific schemes*

Other schemes were identified. A number of such schemes were identified; however this list is intended to be indicative, not exhaustive.

- [Meyerhoff Scholars Program](#). A large program, similar in aims and scope to those outlined above, running at the University of Maryland, Baltimore County. An evaluation of the scheme suggested positive effects, with some variation in outcome according to the extent of experiences offered to students.<sup>35</sup>
- [American Economics Association Summer Program](#). Similar to the previous schemes, but intended for economics students only. More intensive mathematical and technical training is also provided. Participants are found to be more likely to enrol on doctoral programmes and the scheme is thought to account for around one-fifth of all economics PhD awards in the USA over the past two decades.<sup>36</sup> However it is not clear how much of an additional difference the scheme has made.
- [Opportunities in Genomics Research](#). A scheme operated by The McDonnell Genome Institute at Washington University St. Louis. Part of the Diversity Action Plan by the National Human Genome Research Institute, its aim is to increase participation at PhD level in the field by those from minority ethnic groups and, more recently first-generation, low-income and disabled students. Students undertake an eight-week research placement within the Institute during the summer vacation.

## Notes

---

<sup>1</sup> Biotechnology and Biological Sciences Research Council (BBSRC), Natural Environment Research Council (NERC), Economic and Social Research Council (ESRC), Engineering and Physical Sciences Research Council (EPSRC), Medical Research Council (MRC), Arts and Humanities Research Council (AHRC), Science and Technology Facilities Council (STFC). At the time of writing, plans to transfer the councils to a single umbrella organisation – UK Research and Innovation (UKRI) – are progressing through Parliament.

<sup>2</sup> As stated in the consultancy brief for this report, April 2016.

<sup>3</sup> Wakeling, P. and Hampden-Thompson, G. (2013) *Transition to higher degrees across the UK: an analysis of national, institutional and individual differences*. York: Higher Education Academy, p. 50.

<sup>4</sup> See for instance HEFCE (2016) *Transitions into Postgraduate Study: Trends for one, three and five year transition periods for 2002-03 to 2013-14 qualifiers*. Bristol: HEFCE. Evidence suggests the socio-economic gap widens for delayed transitions to research degree study.

<sup>5</sup> For example: Lindley, J. and Machin, S. (2013) *The Postgraduate Premium: Revisiting Trends in Social Mobility and Educational Inequalities in Britain and America*. London: The Sutton Trust; Wakeling, P., Hampden-Thompson, G. and Hancock, S. (2015) *Widening Access to Postgraduate Study and the Professions: Understanding the Student - Consortium Strand Report*. Sheffield: University of Sheffield. For a fuller summary of evidence on socio-economic inequalities at doctoral level, see Wakeling and Kyriacou (2010).

<sup>6</sup> Source: my calculations from HESA student record and Destination of Leavers from Higher Education Survey 2010/11.

<sup>7</sup> There is no empirical evidence on this question of which I am aware within the UK context. However Julie Posselt's study in the USA finds some evidence of this (Posselt, J. (2016) *Inside Graduate Admissions: Merit, Diversity and Faculty Gatekeeping* Cambridge, MA: Harvard University Press).

<sup>8</sup> Wakeling, P. (forthcoming, 2017) A glass half full? Social class and access to postgraduate study. In R. Waller, N. Ingram and M. Ward (eds.) *Higher Education and Social Inequalities: Getting in, Getting on and Getting out*. Routledge and British Sociological Association: London.

<sup>9</sup> BIS (Department for Business, Innovation and Skills) (2015). *Consultation on Support for Postgraduate Study*. London: BIS.

<sup>10</sup> This term is explained more fully in section 4 below.

<sup>11</sup> HEFCE (2013) *Trends in Transition from First Degree to Postgraduate Study Qualifiers Between 2002-03 and 2010-11*. Bristol: HEFCE.

<sup>12</sup> This is discussed in more detail below in the section on data linkage.

<sup>13</sup> Zimdars, A. (2007) Testing the spill-over hypothesis: meritocracy in enrolment in postgraduate education. *Higher Education*, 54 (1): 1 – 19.

<sup>14</sup> Savage, M., Devine, F., Cunningham, N., Taylor, M., Li, Y., Hjellbrekke, J., Le Roux, B., Friedman, S. and Miles, A. (2013) A new model of social class? Findings from the BBC's Great British Class Survey experiment. *Sociology*, 47 (2): 219 – 250.

<sup>15</sup> There is abundant sociological evidence that, although background effects decline with successive educational transitions, they do not disappear. There has also been a suggestion that background effects can return after postgraduate or postdoctoral level (e.g. Torche, F. (2011) Is a College Degree Still the Great Equalizer? Intergenerational Mobility across Levels of Schooling in the United States. *American Journal of Sociology*, 117 (3): 763 – 807).

<sup>16</sup> For a more detailed discussion, see Wakeling, P., Berrington, A. and Duta, A. (2015) *Investigating an age threshold for independence at postgraduate level*. Bristol: HEFCE.

<sup>17</sup> For students with more than one first degree, this would be their most recent one. If a threshold age were to be adopted, before and after which measurement switches from parent(s) to child, then Wakeling

---

*et al.* (2015, *op. cit.*) suggest 28 years of age to be optimal. For simplicity's sake it might be more acceptable to use 30. However adopting a threshold means some students' data could not be collected through data linkage (see below).

<sup>18</sup> Some such measures were used in HEFCE's Postgraduate Support Scheme 2014/15, including receipt of an undergraduate bursary, being a benefits claimant or having a high level of undergraduate debt. See Wakeling (2015) *Programme Analysis of HEFCE's Postgraduate Support Scheme: Final Report to ESRC and HEFCE*. Bristol: HEFCE, p. 36ff for further details.

<sup>19</sup> Such data sharing would need to take into account factors such as degree-level attainment and known disciplinary structuring of doctoral participation.

<sup>20</sup> HEFCE is developing a geographical measure of postgraduate participation to complement existing undergraduate measures. This is currently in development, with no release date indicated, although initial signs are reported to be positive (personal communication from HEFCE).

<sup>21</sup> The Scottish Funding Council does not use POLAR3, on the grounds that participation in undergraduate study in Scotland includes substantial provision in Further Education colleges and an overall higher participation rate which may therefore lead to underestimates of disadvantage. SFC have developed a separate indicator which measures area-based differences in deprivation and the proportion of young people from households classified as NS-SEC 4 – 7.

<sup>22</sup> See the discussion in HEFCE (2014) *Further Information on POLAR3: an analysis of geography, disadvantage and entrants to higher education*. Bristol: HEFCE

<sup>23</sup> Except where the applicant happens to have undertaken a first degree in the same institution to which they have applied for doctoral study. The incidence of this varies across discipline and institution. HEFCE (2013, *op. cit.*) estimates that, on average 60% of doctoral students were previously undergraduates in the same institution.

<sup>24</sup> One idea discussed with RCUK officers would be to provide a 'look-up' service whereby institutions would be able to use an online facility to securely access the background characteristics of a given applicant at the point of their entry to undergraduate study. This would utilise the probability matching techniques developed by HEFCE for linking HESA records. Having discussed this idea with HEFCE, my conclusion is that, while possible in principle, the regulatory and technical barriers to realising such a system would take some time and significant cost to address. My judgement is that this would outweigh the likely benefits of such a system. This judgement is based on the likely scale of activity for collecting RCUK doctoral applicants' data. It may become more attractive were there to be other uses for such data linkage (e.g. across the whole UK-domiciled student body or even for graduate employers' utilisation).

<sup>25</sup> Mellors-Bourne, R., Mountford-Zimdars, A., Wakeling, P., Rattray, J. and Land, R. (2016) *Postgraduate Transitions: Exploring Disciplinary Practice*. York: Higher Education Academy.

<sup>26</sup> E.g. HEFCE (2012) *Rates of qualification from postgraduate research degrees: projected study outcomes of full-time students starting postgraduate research degrees in 2008-09 and 2009-10*. Bristol: HEFCE.

<sup>27</sup> See Wakeling (2015, *op. cit.*). Together with Sally Hancock and Alex Ewart, I am evaluating the subsequent 2015/16 scheme for HEFCE.

<sup>28</sup> E.g. Eagan Jr., M. K., Hurtado, S., Chang, M. J., Garcia, G. A. Herrera, F. A. and Garibay, J. C. (2013) Making a difference in science education: the impact of undergraduate research programs. *American Educational Research Journal*, 50 (4): 683 – 713.

<sup>29</sup> Tsui, L. (2007) Effective strategies to increase diversity in STEM fields: a review of the research literature. *Journal of Negro Education*, 76 (4): 555 – 581.

<sup>30</sup> Prenovitz, S. J., Cohen, G. R., Ehrenberg, R. G. and Jakubson, G. H. (2016) An evaluation of the Mellon Mays Undergraduate Fellowship's effect on PhD production and non-UNCF institutions. *Economics of Education Review*, 53: 284 – 295

<sup>31</sup> Perhaps the sole British exception is CRAC's study for HEFCE: Mellors-Bourne, R., Metcalfe, J., Pearce, E. and Hooley, T. (2014) *Understanding the recruitment and selection of postgraduate researchers by English*

---

*higher education institutions*. Cambridge: CRAC. Posselt's (2016, *op. cit.*) study of admissions practices on elite US doctoral programmes shows that narrowly conceived definitions of academic merit typically supersede diversity considerations, except among applications at final selection stages (at which point most of the applicants from underrepresented groups have already been excluded).

<sup>32</sup> Specifically, these are: POSTCODE (which would need to be converted into POLAR3 categories or an alternative measure such as that under development by HEFCE for categorising postgraduate participation); PARED; and PREVINST. In respect of the latter field, some discussion with HESA may be necessary to ensure that the *first-degree institution* can be recorded here; this will not necessarily be the most recent institution the student has attended (e.g. if they completed a stand-alone taught postgraduate masters degree after a first degree).

<sup>33</sup> Sources: Figure A1.1 – Wakeling and Hampden-Thompson (2013, *op. cit.*, p. 50); Figure A1.2 – HESA Student Record 2001/02, First Destinations Survey 2001/02 and Destination of Leavers from Higher Education Survey 2002/03 – 2004/05; Figure A1.3 – HEFCE (2013, *op. cit.*, p. 36).

<sup>34</sup> Prenovitz *et al.* (2016, *op. cit.*)

<sup>35</sup> Pender, M., Marcotte, D. E., Domingo, M. R. S. and Maton, K. I. (2010) The STEM pipeline: the role of summer research experience in minority students' PhD aspirations. *Education Policy Analysis Archives*, 18 (30): 1 – 36; Tsui (2007, *op. cit.*).

<sup>36</sup> Becker, C. M., Rouse, C. E. and Chen, M. (2016) Can a summer make a difference? The impact of the American Economic Association Summer Program on minority student outcomes. *Economics of Education Review*, 53: 46 – 71.