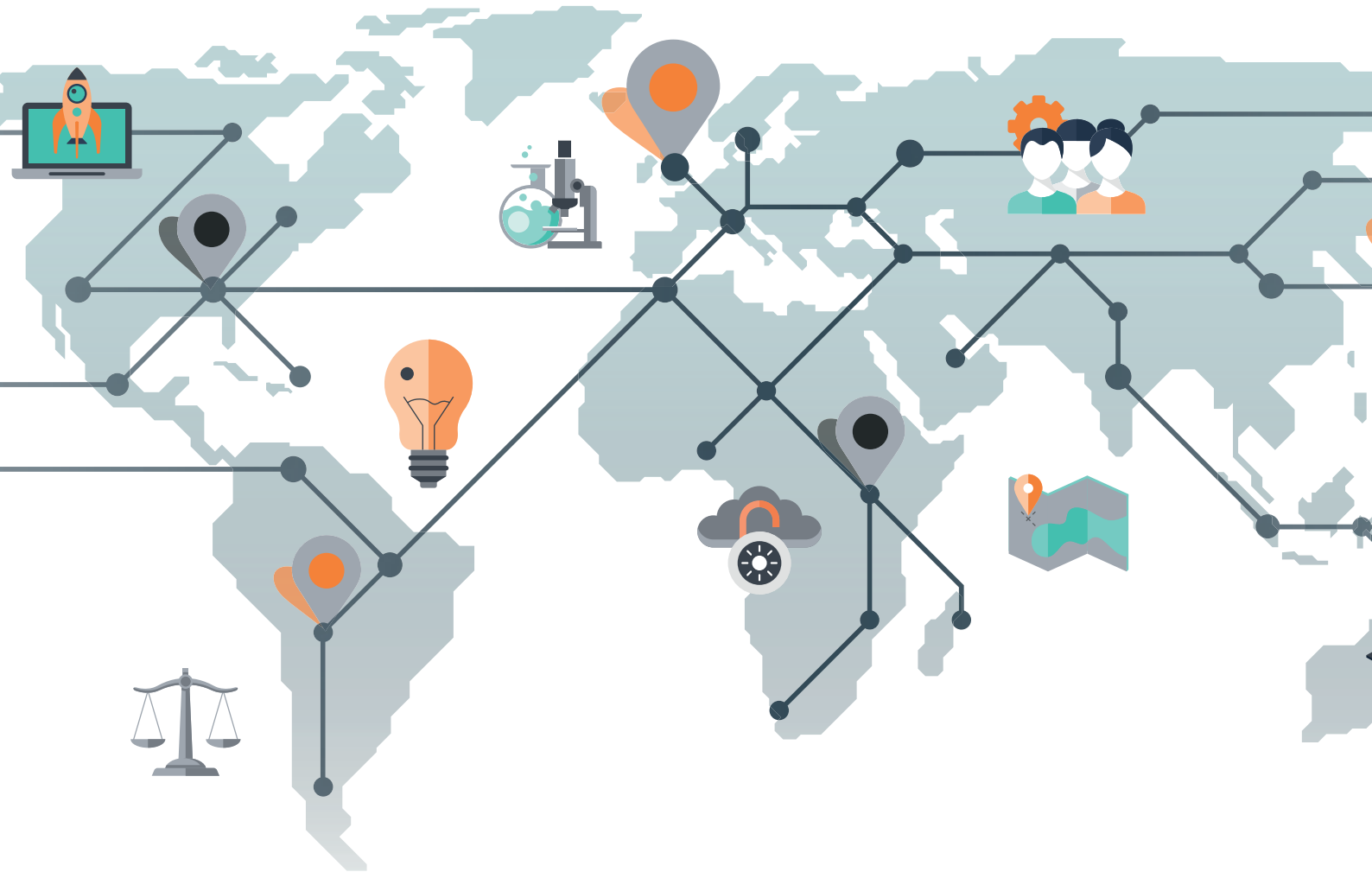




EUROPE



International mobility of researchers

A survey of researchers in the UK

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Sarah Parks and Steven Wooding

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Preface

RAND Europe has been commissioned by the Royal Society to investigate the international mobility of researchers, with a particular focus on the UK. The aim of the work is to better understand the patterns of mobility, its drivers and barriers, and the benefits or disadvantages of the movement of researchers, in academia and industry, across international borders. This work consists of two strands: a review of the existing literature and a survey of researchers currently based in the UK. This report details the findings of the survey. The findings of the literature review can be found in the related report *International mobility of researchers: A review of the literature*.

The report is likely to be of relevance to policy makers, research funders and managers,

professional bodies, and the research community more widely.

RAND Europe is a not-for-profit policy research organisation which aims to improve policy and decision making through research and analysis. For more information on this report or RAND Europe more widely, please contact Dr Susan Guthrie.

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Executive summary

This survey, conducted in March 2017, provides an up-to-date picture of the patterns, drivers, barriers and perceived outcomes of mobility amongst the current UK academic research workforce. It also aims to address some of the gaps in the existing evidence, particularly around the role of personal motivations as well as the interplay of experiences, personal and professional circumstances, motivations and outcomes. The online survey was distributed to researchers in academia at a sample of Higher Education Institutions, Public Sector Research Establishments and Research Institutes, selected to provide a range of levels of research activity, institution size and geographies, and aiming to capture a mix of UK and non-UK nationals and a variety of mobility experiences. We received and analysed 1,285 responses, and identified the following key findings, which reflect on the survey data in the light of our wider literature review (Guthrie et al. 2017).

Most mobility to and from the UK involves a small set of western countries, and the US and Germany in particular

As noted in the literature review, a limited number of countries dominate the circulation of researchers to and from the UK. However, there is a long tail, with 71 nationalities reported among survey respondents.

- Regardless of duration, the US, Germany and France are the three most common destinations for researchers from the UK. Other European countries, Australia, Canada and Japan are also important destinations.
- Around 80 per cent of non-UK nationals in the UK have EU or North American nationality – the most common being German, American, Italian and Spanish.
- Amongst those receiving their highest degree overseas, most did so in EU countries or the US; the most common countries were the US, Germany, Spain and France.

Patterns of mobility differ by gender, discipline, nationality and career stage

The majority of UK researchers obtained their highest degree in the UK, and early career researchers have less (and shorter-term) experience of mobility. Men, as well as researchers in the arts and humanities, were also more likely to have had mobility experiences.

- Respondents reported obtaining their highest degree in a total of 39 different countries, but the majority (62 per cent) had done so in the UK. Some 90 per cent of UK nationals had obtained their first degree in the UK, compared with 33 per cent of non-nationals.
- Male respondents were more likely to have worked as researchers outside the UK – and were more likely to have spent a period of three years or more working outside the UK (39 per cent vs 25 per cent of women).
- Arts and humanities researchers were the most likely to have spent at least a brief period working as researchers outside the UK and be non-UK nationals, and social science researchers the least likely. However, longer-term stays were more common amongst researchers in the physical and life sciences.
- The postdoctoral period is an important time for mobility, with significant increases in the number of researchers having spent time overseas, particularly for longer stays, between the early and mid-career stages.

- Non-UK nationals were more likely to have had longer stays abroad, and UK nationals were more likely to have spent periods of less than three months abroad.

Professional motivations are the main drivers of mobility

Researchers generally move for the same reasons whether they are coming to the UK from overseas, or they are UK nationals spending time in another country. As identified in the literature review (Guthrie et al. 2017), for these individuals, professional motivations, particularly career development but also the development of research networks, are the primary motivations for their mobility.

- Career development is the most commonly cited reason for mobility to the UK and long-term mobility overseas.
- The purpose of shorter-term moves tends to be to work with particular people and/or on particular topics, although these reasons also matter to those moving for longer periods.
- Quality of training is important to early career researchers.
- Professional drivers are more important to men and to early career researchers. Women and more senior researchers are more likely to consider a mix of personal and professional factors, although professional drivers remain important.

Researchers stay in the UK – and return to the UK – for a mix of personal and professional reasons

A mix of personal and professional reasons is the most common overall motivation for both researchers who stay in the UK, and those who return to the UK. However, looking at the specific drivers, the importance of personal considerations becomes clear.

- Family and personal reasons are the top two drivers of non-mobility, followed by career development.

- For those returning to the UK, career development is the most frequently selected driver, followed by family and personal reasons.

Barriers to mobility depend on individual circumstances

Barriers differ by type and length of mobility, career stage and personal factors. The importance of a partner and children in mobility decisions is highlighted in the analysis – particularly the challenge in identifying employment for a partner.

- For short-term mobility, funding and access to accommodation are the main barriers.
- For all other types of mobility, for those with a partner, finding employment for them is a key barrier.
- For those moving to the UK, finding accommodation and maintaining standard of living are barriers, suggesting it is expensive to move here.
- For those staying (or planning to stay) in the UK, personal and family reasons are the main barriers.

Benefits and disadvantages of mobility tend to align with motivations

Regardless of mobility experience, respondents reported more positive effects on outcomes than negative effects, and these tend to align with their decisions and motivations. It is hard to establish whether these represent true differences in outcomes due to mobility, or rather simply the priorities and perceptions of the individuals.

- Those who have moved report more positive effects on their career than those who have stayed in the UK.
- Those who have stayed in the UK report more positive effects on their personal life than those who have moved.
- Mobility experience does not affect respondents' impressions of work-life balance, job security and working hours.

Most researchers feel that there is an expectation that good researchers are internationally mobile

The expectation that good researchers are also internationally mobile has been discussed in the literature (Guthrie et al. 2017), but to date there has been little empirical evidence to back up the assertion. This survey, however, provides a clear finding, with 79 per cent of researchers agreeing that there is an expectation of international mobility in the research community.

- The expectation of international mobility is felt by a majority of respondents across genders, disciplines, types of institution, nationalities and previous mobility experiences.
- This is supported by the wider survey findings, such as the observation that career development is a key driver of mobility.

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1. Introduction

The aim of this survey is to develop a better understanding of patterns, drivers, barriers, benefits and disadvantages of international mobility for researchers moving to and from the UK. Based on our review of the existing literature on this topic, the available evidence is limited (Guthrie et al. 2017).

We have identified a number of important gaps that need to be addressed. There is a notable lack of evidence around the social implications of mobility, with most studies focusing on benefits to the economy, careers or academic output and networks. It seems likely that family and personal circumstances play a role in mobility decisions and may be a barrier in some cases, particularly for women, though this is not well explored. There has also been some discussion of an 'expectation' of mobility for academic researchers, though the evidence is again limited. The effect of immigration rules on migrant researchers' attitudes to and experiences of mobility (particularly in the UK context) is poorly understood. More work is also needed to analyse the diversity of mobility experiences and drivers and their implications for the benefits (and disadvantages) of mobility. A few studies break down the differences in mobility experiences and the benefits that accrue across stakeholders depending on the length of time spent in a different country, career stages, and other factors such as personal circumstances, age and gender. The evidence that is available suggests that these factors do lead to important differences in terms of the benefits and disadvantages of mobility. We designed this survey with the aim of addressing some of these evidence gaps, as well as providing an up-to-date picture of the patterns, drivers and perceived outcomes of mobility

amongst the current UK academic research workforce.

Researchers in industry are less well-defined as a group than researchers in academia, since their roles are less clearly demarcated, and as individuals they are harder to reach. Although they constitute around half of the population of European researchers, data on their mobility patterns and experiences remain an important gap in the evidence. We attempted to collect data on this group through our survey but our experience aligns with that of other studies. Response rates were extremely low and the data gathered are not sufficient to conduct a robust analysis, despite multiple efforts to access contributors through various channels. This chimes with previous experience – for example, the large-scale MORE survey attempted to reach industry researchers but found this very difficult (IDEA Consult 2010). That study also concluded that the data set collected had limited validity, and industry researchers were not included in the subsequent MORE 2 study (Weert 2013). We include in this report some reflections on the challenges of reaching this group, and the ways such challenges might be addressed, but the remainder of the report focuses on the analysis of data on academic researchers – those at Higher Education Institutions (HEIs), Public Sector Research Establishments (PSREs) and Research Institutes (RIs).

1.1. Our approach

The survey was distributed to researchers in academia at a sample of HEIs, PSREs and RIs selected to provide a range of levels of research activity,¹ institution size and geographies, and

1 We used research income as a proxy for the level of research activity at institutions.

aiming to capture a mix of UK and non-UK nationals and a variety of mobility experiences. The results and analyses that follow employ the full survey data set. However, where relevant, the differences in responses from different groups – by institution type and other characteristics (such as those described in Table 1.1) – are presented. We received responses from 1,285 active researchers,² who form our survey population. The sample size differs between questions since not all questions were asked of all respondents, depending on their characteristics (for example, researchers who had not previously spent time abroad were not

asked questions about those experiences). In addition, few questions were compulsory, to encourage respondents to progress through the whole survey. In the analysis, we refer to a number of groups of respondents depending on their characteristics, including their previous mobility experiences. Table 1.1 provides a description of these different groups and how they were identified in the survey data set. In addition, where appropriate, comparisons will be made with the Opinion Leader (2017) survey of National Academy Fellows and grant holders, which included several similar questions to our survey (by design).³

Table 1.1. Explanation of key terms used in this analysis

Term	Definition used in this analysis	How term is operationalized in this analysis
Career stage		
Early career researchers	Researchers with 10 or fewer years' professional experience	Response of '10 years or less' to the question 'How many years have you been a researcher, including postgraduate/PhD study?'
Mid-career researchers	Researchers with 11–20 years' professional experience	Response of '11–20 years' to the question 'How many years have you been a researcher, including postgraduate/PhD study?'
Late career researchers	Researchers with more than 20 years' professional experience	Response of '21–30', '31–40', '41–50' or '51+' years to the question 'How many years have you been a researcher, including postgraduate/PhD study?'
Length of stay		
Short-term mobility	Mobility of less than 1 year in duration	Response of 'For a period of 3 months or less' or 'For a period of 3 months to 1 year' to the question 'Since completing your highest degree, have you worked as a researcher outside the UK...?'
Long-term mobility	Mobility of 1 year or more in duration	Response of 'For a period of 1 to 3 years' or 'For a period of more than 3 years' to the question 'Since completing your highest degree, have you worked as a researcher outside the UK...?'
Mobility experience		
Moving to the UK	Researchers from other countries who have moved to the UK to conduct research. These are defined as non-UK nationals currently based in the UK	We assume all respondents to the survey are currently based in the UK. Non-UK nationals are identified as those who answer 'No' to the question 'Do you have UK nationality?'

2 It is not meaningful to provide a response rate here, since the survey was distributed via central management at individual institutions and we do not know how many individuals received it. In addition, the survey was also made available on Twitter. However, we can say that the figure of 1,285 is around 0.6 per cent of the current UK academic and public sector workforce (HESA 2017).

3 Because of the population surveyed, the Opinion Leader (2017) results have a higher coverage of later career researchers (64 per cent of respondents are professors/chairs and 48 per cent are 60 or over), and correspondingly more male respondents (77 per cent). It is also likely to cover a population of more 'elite' researchers. This survey is likely to be more representative of UK researchers as a whole.

Term	Definition used in this analysis	How term is operationalized in this analysis
Returners	Researchers who have returned to the UK after a period working in another country. These are defined as UK nationals who have spent some time in the past working as a researcher outside the UK	UK nationals are identified as those who answer 'Yes' to the question 'Do you have UK nationality?'. Those who have spent time overseas in the past are identified as those responding 'Yes' to the question 'Since completing your highest degree, have you spent any time working as a researcher outside the UK (even if only for a short period of less than three months)?'
Stayers	Researchers who have only worked as researchers in the UK. These are defined as UK nationals who have never worked abroad	UK nationals are identified as those who answer 'Yes' to the question 'Do you have UK nationality?'. Those who have never spent time working overseas are identified as those responding 'No' to the question 'Since completing your highest degree, have you spent any time working as a researcher outside the UK (even if only for a short period of less than three months)?'
Plan to stay	Researchers currently based in the UK who plan to continue working in the UK in the future (regardless of past mobility experience)	We assume all respondents to the survey are currently based in the UK. Those who plan to stay are identified as those who respond 'No, I plan to continue working as a researcher in the UK' to the question 'Do you plan to work as a researcher outside the UK in the future?'
Plan to move	Researchers currently based in the UK who hope to work overseas in the future (regardless of past mobility experience)	We assume all respondents to the survey are currently based in the UK. Those who plan to stay are identified as those who respond 'Yes' or 'I would like to, but have no concrete plans' to the question 'Do you plan to work as a researcher outside the UK in the future?'
Institution type		
HEIs	Higher Education Institutions	Institution type was identified based on the response to the question 'Which of these institutions is your primary affiliation?'. The list of institutions provided includes a full list of HEIs used by the Higher Education Statistics Agency (HESA 2017), as well as a list of RIs and PSREs based on a classification by the UK Department for Business, Energy & Industrial Strategy
RIs	Research Institutes	
PSREs	Public Sector Research Establishments	
Discipline		
Medicine, health and life sciences	Research disciplines broadly corresponding to the life sciences, based on 'Main Panel A' of REF2014 ⁴	Respondents were asked 'Which of the following best describes your discipline? Please select all those that apply and then the discipline that you mainly associate yourself with.' Analysis was based on the 'main' discipline supplied. The list of disciplines provided corresponded to the panels for the REF2014 assessment, and the responses were grouped by main panel for analysis
Physical sciences, engineering and mathematics	Research disciplines broadly corresponding to the physical sciences, based on 'Main Panel B' of REF2014	
Social sciences	Research disciplines broadly corresponding to the social sciences, based on 'Main Panel C' of REF2014	
Arts and humanities	Research disciplines broadly corresponding to the arts and humanities, based on 'Main Panel D' of REF2014	

4 REF2014 was a national research assessment exercise that took place in the UK. Institutions selected staff for submission and assessment based on research outputs, impact, and also wider environmental factors at the institutional level. The results informed the allocation of core funding to institutions for the following seven years. Submission was through discipline-based categories (termed 'units of assessment'), which were categorised into four 'main panels', A to D, broadly corresponding to the disciplinary areas indicated in the table.

A full description of the survey methodology can be found in Appendix A. More details on the respondent profile and comparison to national-level statistics can be found in Appendix B. The full text of the survey can be found in the

supporting document 'International mobility of researchers: Full survey text'. The results and analysis of the survey are presented in Chapters 2 to 4, and Chapter 5 provides an overall discussion.

Caveats and limitations

This survey provides a snapshot of the perceptions of researchers in the UK around mobility. However, there are a number of important caveats and limitations to the survey and its analysis.

Sample size: The overall sample is fairly large (over 1,200 respondents), but because the survey only asks respondents to answer questions relevant to their own mobility experiences, the subgroup analysis on some questions is limited by sample size. For example, 203 respondents indicated that they have worked outside the UK for less than a year, so subdividing this across the four discipline groups used in our analysis produces very small groups of respondents in each category, so that it is hard to draw meaningful conclusions at this level. However, high-level analysis and many subgroup analyses can be conducted robustly based on the data. Comparisons made in the text are statistically significant ($p < 0.05$)⁵ except where noted.

Representativeness of the sample: The sample was not selected to be completely representative of the UK researcher population; rather it was intended to capture a diversity of perspectives. However, it is useful to reflect on how far our findings can be generalised. This is explored in more detail in Appendix B. The differences in our sample to the general UK researcher population are an over-representation of life sciences researchers, women, EU nationals and white ethnicity, and an under-representation of social sciences researchers, men, UK nationals and black and Asian ethnicities. From a geographical perspective, Wales and particularly Scotland are over-represented, and larger and more research active institutions are over-represented relative to the population. The most notable differences are the over-representation of Scottish respondents and the life sciences and the under-representation of UK nationals. Also, there may be an over-representation of researchers in the sample who have had experience of mobility and who therefore felt more motivated to participate in the survey. This seems likely given the overrepresentation of EU nationals identified, though this may also be partly an artefact of our choice to focus on institutions with the highest proportion of international staff (to allow us to obtain a range of respondent perspectives).

Definition of groups: Another important caveat is the way in which we have defined groups, which makes some assumptions that, while expected to be largely true, will not hold for all respondents. For example, we have assumed that UK nationals who have spent some time working overseas can be considered to have 'returned' to the UK. However, this group may well include individuals who moved to the UK and subsequently became UK nationals after a period of work – they may not have 'returned' after a period overseas as such. Equally, there may be some in this group who have UK nationality, but who moved to another country as children and hence might be considered to have an alternative 'home' country (where they grew up, and/or where their family is based). As such, some of the logic around motivations may not be applicable to these individuals. These problems in defining a point of origin in understanding mobility are common to other studies and have been discussed in the literature (e.g. Weert 2013). Table 1.1 clarifies the way in which different groups are defined for the purposes of our analysis.

Perceptions rather than objective measures: As with all survey data, much of what we report here is the perceptions of researchers around their research experiences. These rely on recall, and are coloured by personal viewpoints and experiences and often may reflect the need for internal self-consistency – people may assign motivations or outcomes to justify actions after they are taken. The findings around motivation and particularly outcomes should be understood in this context. Our data do not provide an objective measure of the benefits and/or disadvantages of different decisions, just the impressions of individuals based on those decisions, and it is likely these will be strongly coloured by some of the factors around self-justification, motivation and personal perceptions described above.

5 This is the standard cut-off point used in statistical testing. It corresponds to a 5 per cent probability of finding the result stated through random variation when there is no underlying difference between the populations compared.

2. Where and how do researchers move? Patterns of mobility of researchers currently based in the UK

This chapter focuses on describing the patterns of mobility of researchers currently based in the UK. This includes both an analysis of the range of nationalities and backgrounds of survey respondents, and a more detailed investigation of the patterns of mobility indicated by the data, considering where and when people move, and how this differs based on personal and professional characteristics.

2.1. The international character of the UK research workforce

Respondents represent 71 different nationalities; half are UK nationals

In terms of researchers' nationalities, about half of the respondents were UK nationals (51 per cent or 571 out of the 1,117 respondents who provided this information) (Figure 2.1). These individuals could have been born in the UK or moved there at an early age, or they could have arrived later in life and become citizens. A further 31 per cent were nationals of other EU/EEA countries⁶; 14 per cent were nationals of other countries (Figure 2.2). The percentage of non-EU researchers is generally in line with EU-

level findings from the MORE2 survey, a large EU-wide study conducted during 2011–13, which found that non-EU nationals make up 6 per cent of all EU researchers, but are concentrated in just a few countries, including the UK (Weert 2013).

The most frequently reported countries of nationality after the UK were Germany (80 respondents), the US (69), Italy (46), Spain (43), Ireland (36) and France (35). With the exception of China, this list is broadly similar to 2005/6 data on academic staff at UK HEIs, which indicated that the most common country of nationality was Germany, followed by Ireland, the US, China and Italy (Universities UK 2007). It is also consistent with data from the GlobSci survey,⁷ conducted across 16 countries in 2011, which indicated that Germany and Italy were the top source countries for the UK (Franzoni, Scellato & Stephan 2012). In contrast to the MORE2 survey finding that China and India were the top two non-EU source countries for researchers EU-wide (Weert 2013), in our results the US, Canada and Australia were the top three source countries for non-EU researchers. Overall, respondents were nationals of 71 different countries.

6 This grouping included countries whose nationals do not require visas to work in the UK (<https://www.gov.uk/eu-eea>): the EU-28 countries, the EEA countries Iceland, Liechtenstein and Norway, and also Switzerland.

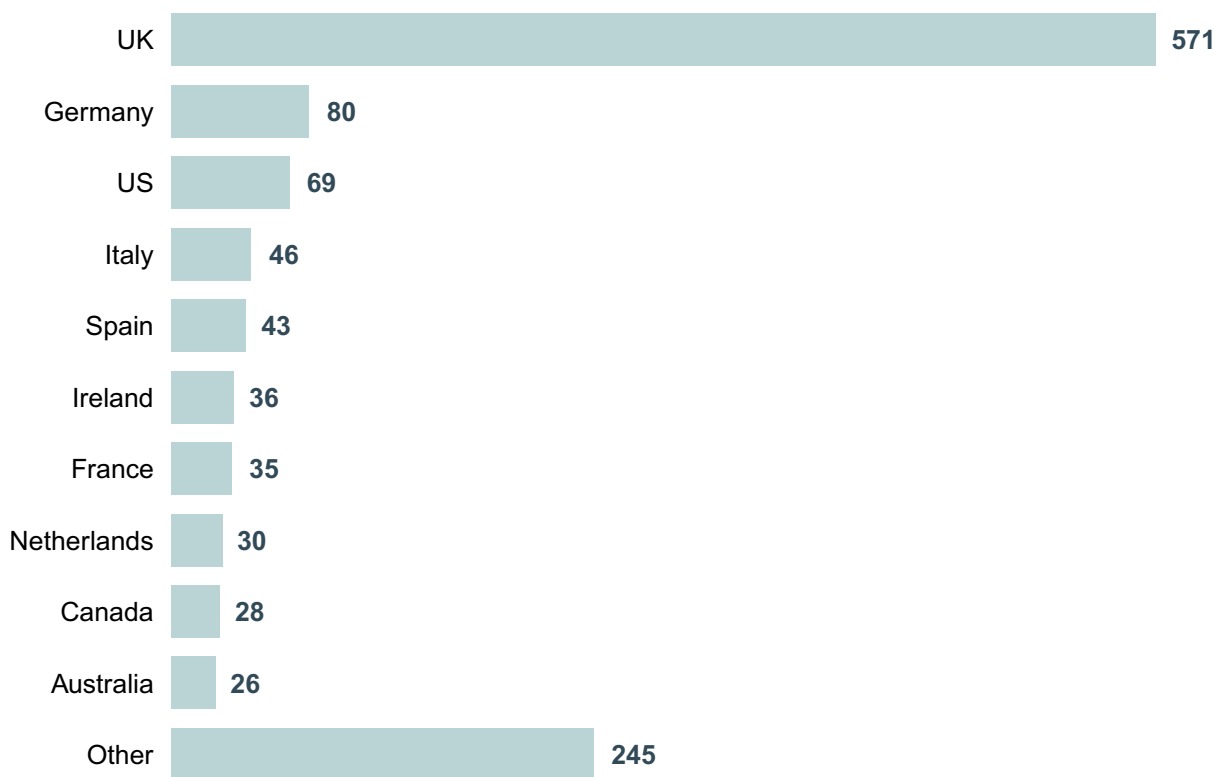
7 Respondents to the GlobSci Survey were corresponding authors of research articles published during 2009 in the fields of biology, chemistry, materials and earth and environmental sciences, and who worked in one of 16 countries: Australia, Belgium, Brazil, Canada, Denmark, France, Germany, India, Italy, Japan, the Netherlands, Spain, Sweden, Switzerland, the UK or the US. The survey had a sample size of 17,182.

The UK was determined to be fairly diverse in the GlobSci Survey, which assessed diversity based on the percentage of a country's foreign scientists coming from its top four source countries. On this basis, the UK ranked fourth with 38 per cent, behind Germany (30 per cent), Sweden (35 per cent) and France (37 per cent) (Franzoni, Scellato & Stephan 2012). Compared with these previous findings, the present survey

suggests a slightly lower level of diversity, with 44 per cent of foreign researchers in the UK coming from the top four source countries.

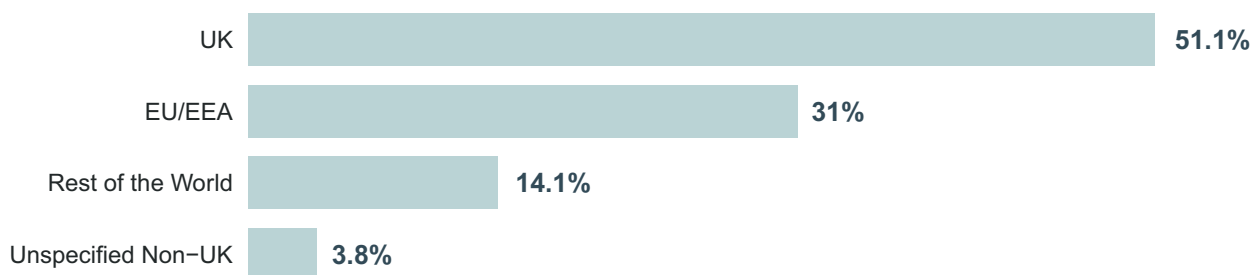
Among the 1,074 respondents who provided additional information on their nationality/ies (some only stated that they did not have UK nationality, but did not provide details), 88 per cent (948 respondents) reported having one nationality

Figure 2.1. Number of respondents by nationality (showing the 10 most frequently named countries, and the rest grouped as 'Other')



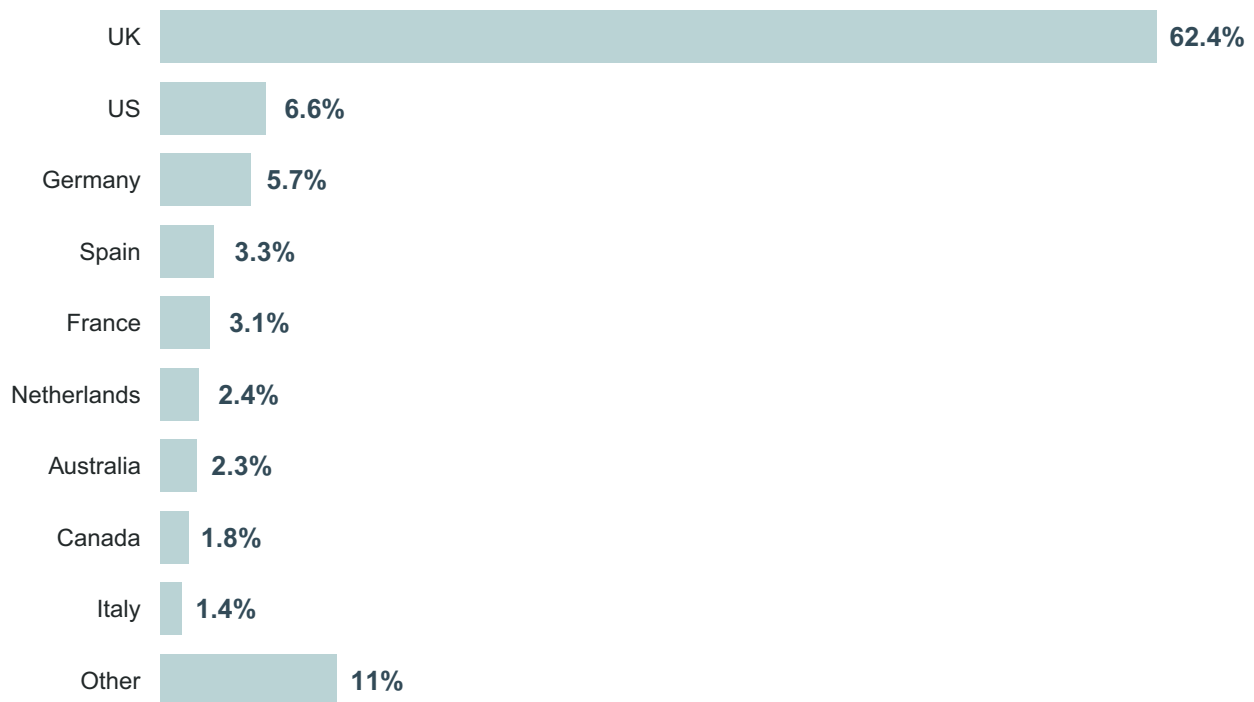
Note: Some respondents listed more than one nationality. Respondents were asked to choose one response from each of up to three lists of countries to answer the question: 'What other nationalities (if any) do you have [besides that of the UK, if indicated]? Please choose the three nationalities with which you identify most strongly.' n = 1,117.

Figure 2.2. Respondent nationalities, grouped by region



Note: The EU/EEA grouping includes Norway and Switzerland. 'Unspecified Non-UK' refers to respondents who said they did not have UK nationality but did not provide more details. n = 1,074.

Figure 2.3. Countries in which highest degree was awarded (showing the nine most frequently named countries, and the rest grouped as 'Other')



Note: Respondents were asked to choose one response from a list of countries to answer the question: 'In which country was your highest degree (e.g. PhD) awarded?' n= 1,106.

and 12 per cent (126) had more than one. Among UK nationals, the proportion of respondents with multiple nationalities was higher, at 17 per cent (96 of 571 respondents). Some 6 per cent (36 of 571 respondents) of UK nationals reported having a second EU/EEA nationality.

A comparison of HEI (n=736) vs PSRE/RI (n=336) respondents indicates that more HEI researchers than PSRE/RI researchers were UK nationals: 54 per cent of HEI researchers were UK nationals, compared with 46 per cent of PSRE/RI researchers. The other nationalities most frequently held by HEI researchers, besides British, were American (7 per cent), German (7 per cent) and Irish (4 per cent). In contrast, PSRE/RI researchers were less likely to be US nationals⁸; the nationalities they most frequently held, besides British, were German (9 per cent), Italian (6 per cent), Spanish (5 per

cent), French (5 per cent) and American (4 per cent).

The majority of UK researchers obtained their highest degree in the UK; those working at HEIs were particularly likely to have done so

To better understand researchers' mobility paths and take into account the fact that individuals may have moved around for various reasons during the course of their lives (and that there are multiple ways to understand where someone 'comes from', such as country of birth, country where university studies were completed, country/ies of nationality), respondents were asked about the country in which they had obtained their highest degree. Respondents reported obtaining their highest degree in a total of 39 different countries and the majority (62 per cent of 1106 responses) had done so in the UK (Figure 2.3).

⁸ The sample size is too small to run statistical significance testing.

The next most frequent responses for all respondents overall were the US (7 per cent), Germany (6 per cent), and Spain and France (each 3 per cent) (Figure 2.3).

Consistent with the observation that HEI researchers were more likely to have a UK nationality than those working at PSREs/RIs, HEI researchers were also more likely to have obtained their highest degree in the UK (67 per cent) than those working in PSREs/RIs (55 per cent). Among PSRE/RI researchers, after the UK the most frequent countries where highest degrees were obtained were Germany (8.7 per cent of respondents), Spain (4.8 per cent), and the US and France (each 4.2 per cent).

UK nationals were nearly three times more likely than non-nationals to have obtained their highest degree in the UK; 90 per cent of UK nationals had done so compared with 33 per cent of non-nationals. The 55 UK nationals who obtained their degrees outside the UK had done so in the US (16 respondents), Australia (9 respondents), and 16 other countries. Among non-UK nationals, the UK was the most frequent country where the highest degree was obtained; next was Germany (11 per cent of respondents), the US (11 per cent), Spain (7 per cent), France (6 per cent) and the Netherlands (5 per cent).

The finding that a large proportion of UK researchers, regardless of their nationality, obtained their highest degree in the UK is unsurprising in light of data (reviewed in Guthrie et al. 2017) which show that the UK is an important destination for research training and that the majority of researchers who obtain UK doctoral degrees remain in the UK for at least the first few years after degree completion. In 2014, the UK had 5 per cent of the total OECD population, but hosted 15 per cent of the students studying at master's and doctoral levels in OECD countries (OECD 2016). Compared with other EU countries, the UK had the highest

net gain of intra-EU PhD candidates in 2005 (in absolute and relative terms) (Mogu rou & Paola Di Pietrogiacommo 2008).⁹ According to a 2008 survey of researchers who obtained a doctoral degree in the UK in 2004/5, 80 per cent remained in the UK three-and-a-half years later (Vitae 2010).

Male respondents have worked for more years in research than female respondents and are more likely to have worked outside the UK

Overall, male respondents had been working in research for more years than female respondents. More than half of female respondents (53 per cent of 563 respondents) had been working in research for 10 years or less, compared with 35 per cent of males (Figure 2.4). Meanwhile, 16 per cent of the 552 male respondents had been working in research for more than 30 years, compared with 6 per cent of females. This corresponds to the evidence in the existing literature that men are over-represented at later career stages in academia – for example, of the 19,975 academic staff employed as professors in 2015/16, only 24 per cent of these were female (HESA 2017).

A large proportion of researchers (37 per cent) had been working in the UK for at least 10 years (Figure 2.5). Consistent with the observation that male respondents had worked for more years in research overall, male respondents had also been working in the UK for longer; 44 per cent had been working in the UK for at least 10 years, compared with 30 per cent of female respondents.

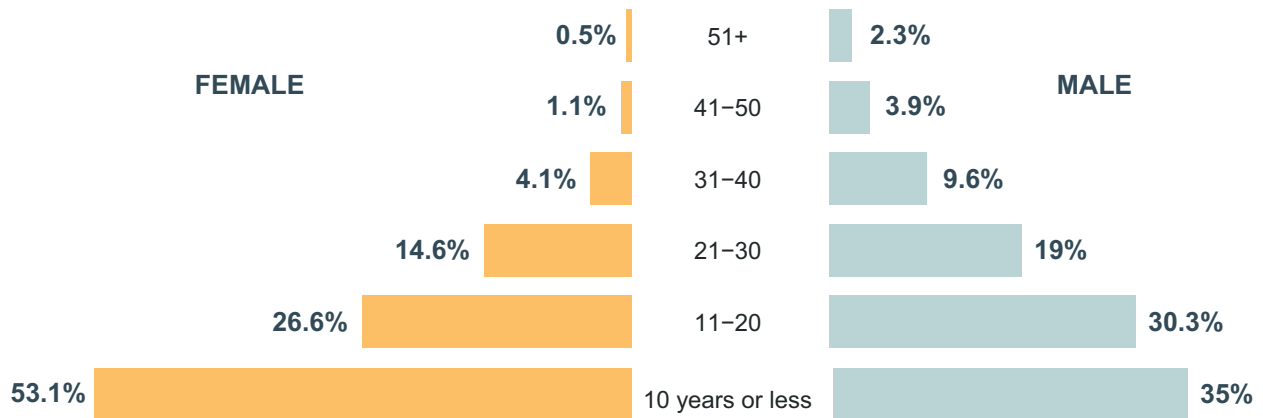
Some 57 per cent of survey respondents had spent time working as a researcher outside the UK since completing their highest degree. This figure is in line with previous estimates of researcher mobility, which have varied from about 42 to 72 per cent due to differences in sample populations and definitions of mobility

9 Other countries with a positive intra-EU net gain were France, Spain, Austria, Sweden, the Czech Republic, Finland and Belgium.

used (Guthrie et al. 2017). Male respondents were also more likely than females to have spent time working as a researcher outside the UK; 65 per cent of males had done so compared

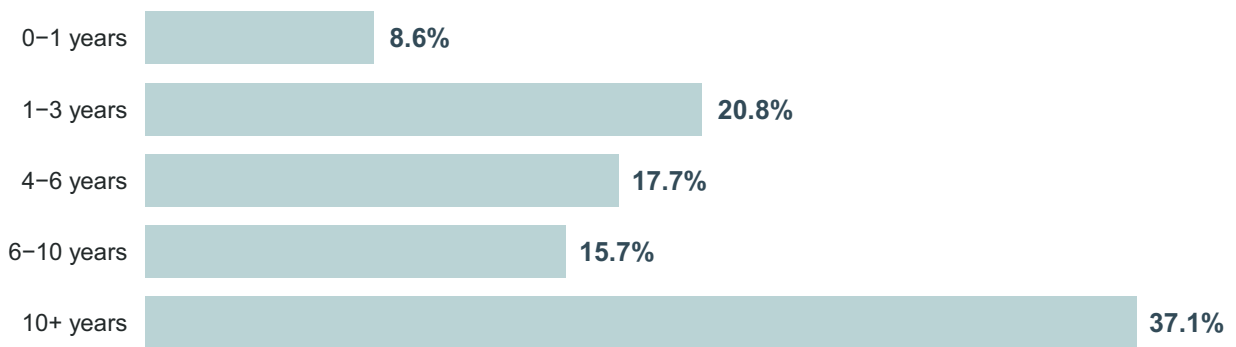
with 50 per cent of females (Figure 2.6). This gender difference is consistent with the MORE2 survey (Weert 2013) and earlier MORE survey (IDEA Consult 2010), which found that male

Figure 2.4. Number of years respondents have been working as researchers (by gender)



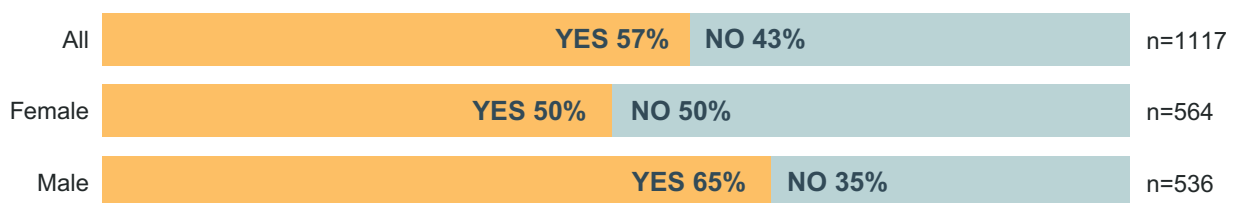
Note: Respondents were asked to select one response from among the options shown to answer the question: 'How many years have you been a researcher, including postgraduate/PhD study?' n= 563 (female) and n= 532 (male).

Figure 2.5. Number of years respondents have been working as researchers in the UK



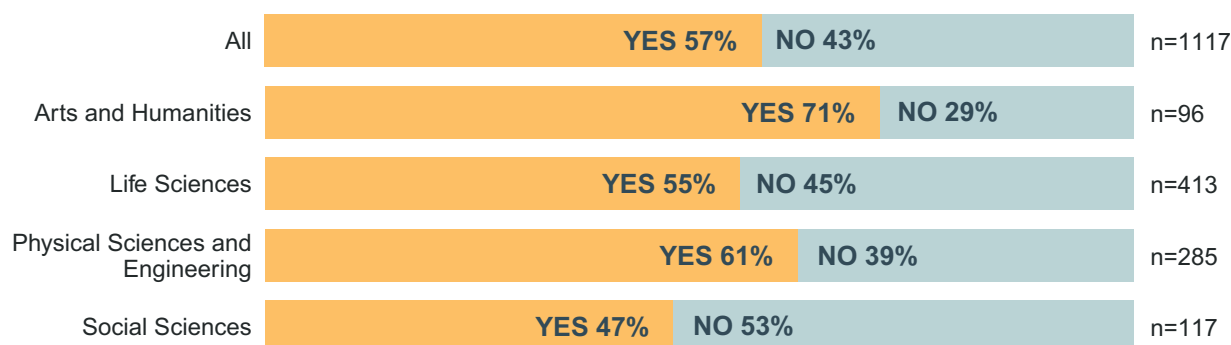
Note: Respondents were asked to select one response from among the options shown to answer the question: 'For how many years have you been working as a researcher in the UK?' n= 1,099.

Figure 2.6. Percentage of researchers who have spent any time working as a researcher outside the UK (by gender)



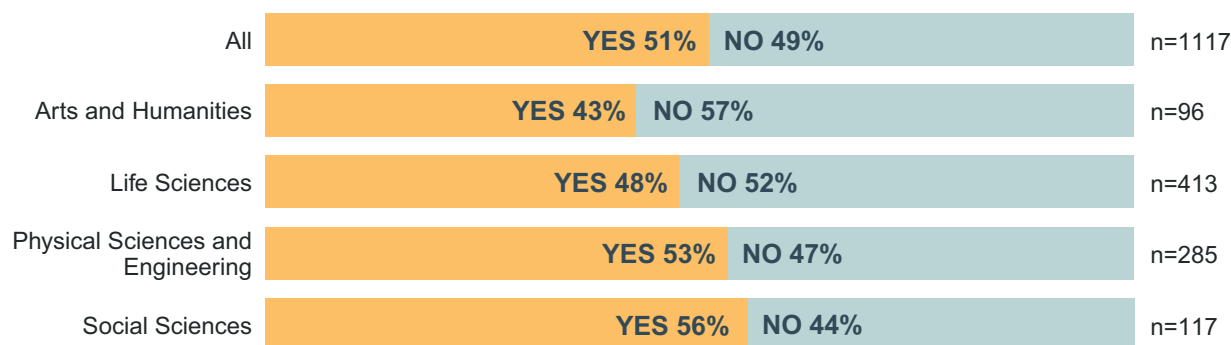
Note: Respondents were asked to respond yes or no to the question: 'Since completing your highest degree, have you spent any time working as a researcher outside the UK (even if only for a short period of less than three months)?'

Figure 2.7. Percentage of researchers who have spent any time working as a researcher outside the UK since completing their highest degree (by field)



Note: Respondents were asked to respond yes or no to the question: 'Since completing your highest degree, have you spent any time working as a researcher outside the UK (even if only for a short period of less than three months)?'

Figure 2.8. Percentage of respondents with UK nationality (by field)



Note: Respondents were asked to respond yes or no to the question: 'Do you have UK nationality?'

researchers had higher rates of mobility than females. Non-UK nationals were also more likely to have worked as researchers abroad: 64 per cent had done so compared with 51 per cent of UK nationals.

Arts and humanities researchers were the most likely group to have worked as researchers outside the UK and be non-UK nationals; social sciences researchers were the least likely

In terms of whether a respondent had worked as a researcher outside the UK, there were notable differences across disciplines, though it should be noted that the sample sizes are considerably smaller when individual discipline groups are focused on (Figure 2.7). Those in

the arts and humanities were most likely to have worked outside the UK; 71 per cent had done so, compared with 61 per cent of physical sciences researchers and 55 per cent of life sciences researchers. Social sciences researchers were least likely to have worked abroad, with 47 per cent having done so.

Previous studies with different sample populations have provided some evidence that humanities researchers are generally more mobile than those in other fields, particularly the medical sciences (Weert 2013), and that social sciences and humanities researchers are the most mobile group (Nedeva et al. 2012). However, studies have also found considerable differences across fields in terms of mobility

Figure 2.9. Duration of time spent working outside the UK

Note: Respondents who reported having worked outside the UK were asked to select all the options that applied from among those shown in answering the question: 'Since completing your highest degree, have you worked as a researcher outside the UK...' n=614.

rates depending on career stage and duration of time spent abroad (Mogu rou & Paola Di Pietrogiacomo 2008), factors which are discussed further below. While some findings related to discipline are consistent with previous data, it is difficult to interpret why differences may arise – they may be due, for instance, to differences in underlying sample populations.

Consistent with this pattern, arts and humanities researchers were also the most likely to be non-UK nationals (57 per cent) and social sciences researchers were the least likely (44 per cent) (Figure 2.8), though the difference was less striking than for the international experience question above. Among life sciences researchers, 52 per cent were non-UK nationals, as were 47 per cent of physical sciences researchers.¹⁰

2.2. Patterns of international mobility among UK researchers

International research mobility experiences of short and long duration are common

Among survey respondents who had spent time abroad since completing their highest degree, the duration of their international experiences was mixed, with two extremes – brief and long-term stays – being the most common (Figure

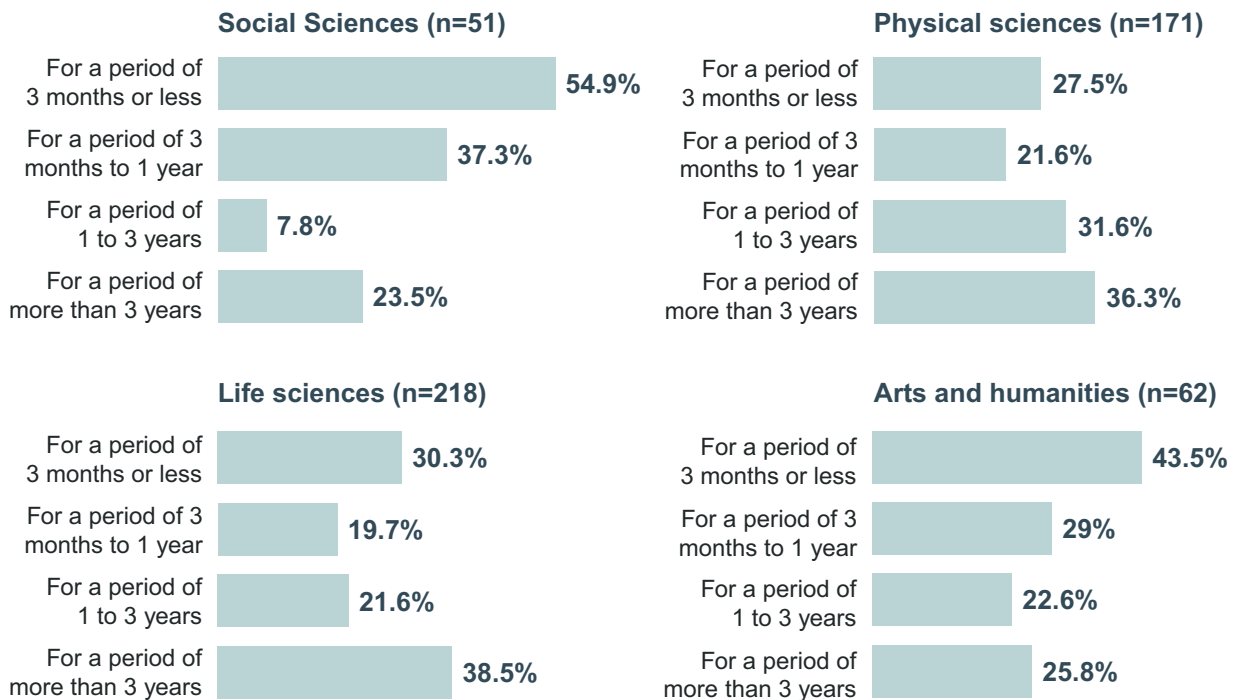
2.9). One third of respondents had worked abroad for three months or less, and one third for more than three years.

The observation that both shorter- and longer-term international mobility is common is consistent with findings from the UK National Academies survey, which also reported that researchers perceive that they are more frequently making short-term international visits (Opinion Leader 2017).

In comparison to National Academy Fellows and grant recipients, survey respondents reported less international mobility experience. About 58 per cent of National Academy Fellows and grant recipients reported having spent at least a year working abroad (Opinion Leader 2017), as compared with 29 per cent of respondents to our survey. Our review of the literature (Guthrie et al. 2017) suggested that high-performing researchers, like National Academy Fellows and grant recipients, have high rates of mobility. Thus, this difference could be explained by the difference in sample populations; respondents to this survey were more representative of UK researchers as a whole.

Comparison across disciplines indicates that there is variability in the patterns of mobility duration in different types of research, though again it is important to recall that discipline

¹⁰ Differences in the proportion of UK nationals between disciplines are not statistically significant.

Figure 2.10. Duration of time spent working outside the UK (by field)

Note: Respondents who reported having worked outside the UK were asked to select all the options that applied from among those shown in answering the question: 'Since completing your highest degree, have you worked as a researcher outside the UK...'

group-level sample sizes are small. Among all discipline groups, large proportions of respondents had worked abroad for short periods of three months or less – this experience was most common among social sciences researchers (55 per cent) and least common among physical sciences researchers (28 per cent) (Figure 2.10). In terms of long-term stays abroad of more than three years, these were more common among life sciences researchers (39 per cent) and physical sciences researchers (36 per cent), compared with 26 per cent of arts and humanities researchers and 24 per cent of social sciences researchers.

Among female and male researchers, differences in time spent abroad were most marked for the longest time period: 39 per cent of male researchers reported having worked abroad for a period of more than three years, compared with 25 per cent of female researchers

(Figure 2.11). For each of the three shorter time periods covered in the survey, female researchers were slightly more likely to have spent time abroad.¹¹ This is partially consistent with findings from other surveys. One found that long-term academic circulation is less open to women, though short-term academic circulation is not (Rostan & Höhle 2014), but another (MORE2) found that gender differences became pronounced for mobility lasting longer than three months (Weert 2013).

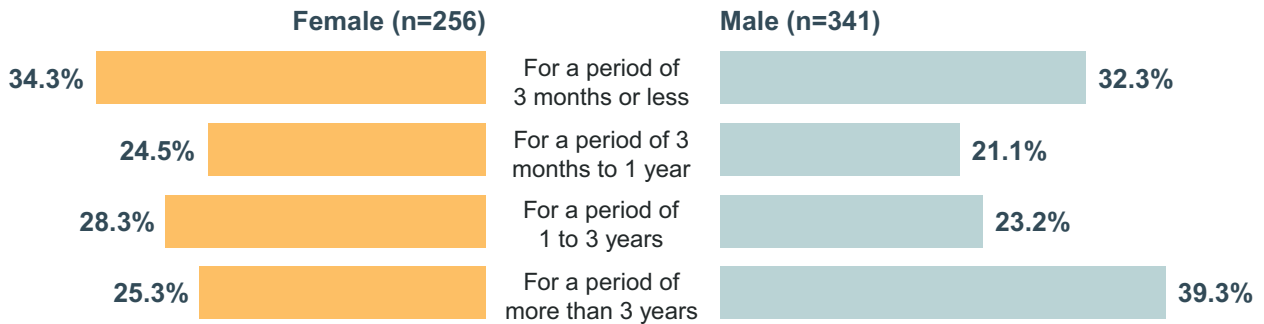
Non-UK nationals were much more likely than UK nationals to have worked outside the UK for a period of more than three years (40 per cent of non-UK nationals had done so, compared with 27 per cent of UK nationals), and this is unsurprising given that they are nationals of other countries (Figure 2.12). The reverse is true for short periods of work abroad lasting three months or less: 42 per cent of UK nationals

11 Differences between genders are not statistically significant for these three shorter time periods.

reported having worked abroad for a period of less than three months, compared with 26 per cent of non-nationals. For intermediate periods of time, patterns across the two groups were roughly similar.

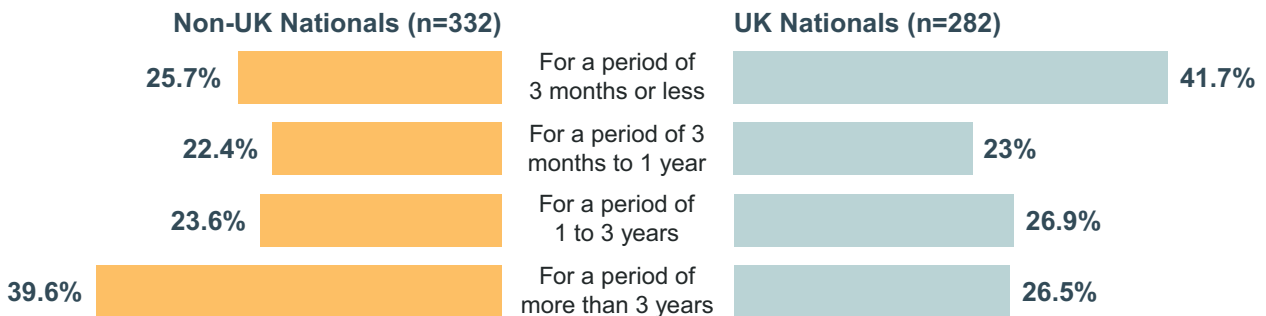
There were also differences according to type of institution: HEI researchers were more likely than PSRE/RI researchers to have undertaken shorter-term periods of international mobility of up to three years (Figure 2.13). However, PSRE/

Figure 2.11. Duration of time spent working outside the UK (by gender)



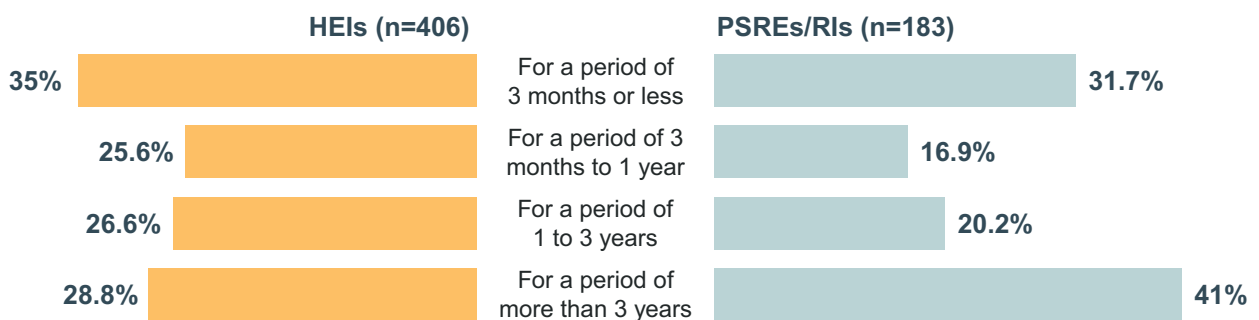
Note: Respondents who reported having worked outside the UK were asked to select all the options that applied from among those shown in answering the question: 'Since completing your highest degree, have you worked as a researcher outside the UK...'

Figure 2.12. Duration of time spent working outside the UK (by UK nationality status)



Note: Respondents who reported having worked outside the UK were asked to select all the options that applied from among those shown in answering the question: 'Since completing your highest degree, have you worked as a researcher outside the UK...'

Figure 2.13. Duration of time spent working outside the UK (by institution type)



Note: Respondents who reported having worked as researchers outside the UK were asked to select all the options that applied from among those shown in answering the question: 'Since completing your highest degree, have you worked as a researcher outside the UK...'

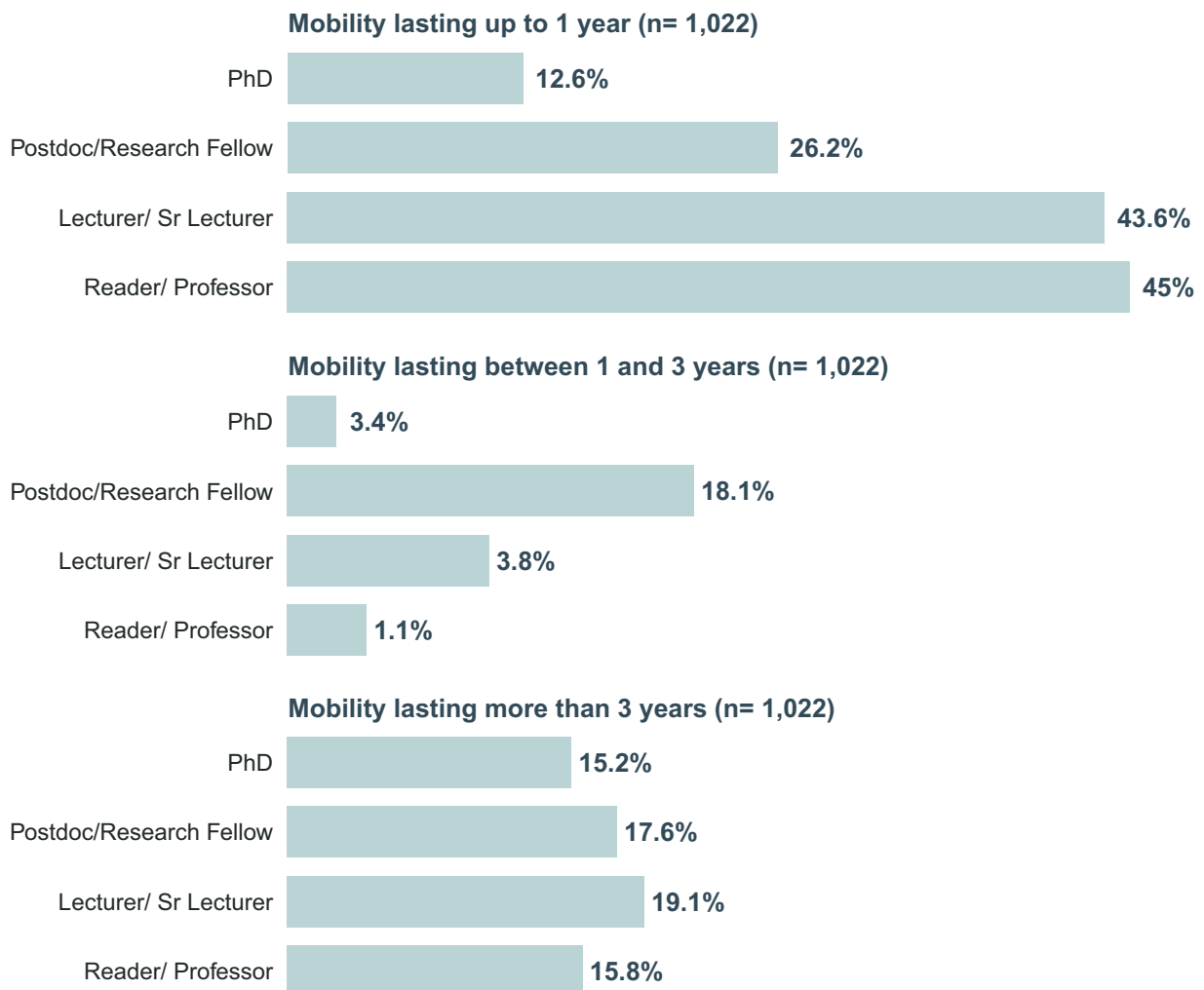
RI researchers were more likely to have worked as researchers abroad for more than three years (41 per cent had done so, compared to 29 per cent of HEI researchers).

The frequency of short-term – but not long-term – mobility varies by career stage

Short periods of work abroad (of one year or less) become more common as researchers' careers advance, according to the survey responses; however long-term mobility (of more than three years) occurs at roughly similar rates across career stages, with 15–20 per cent of

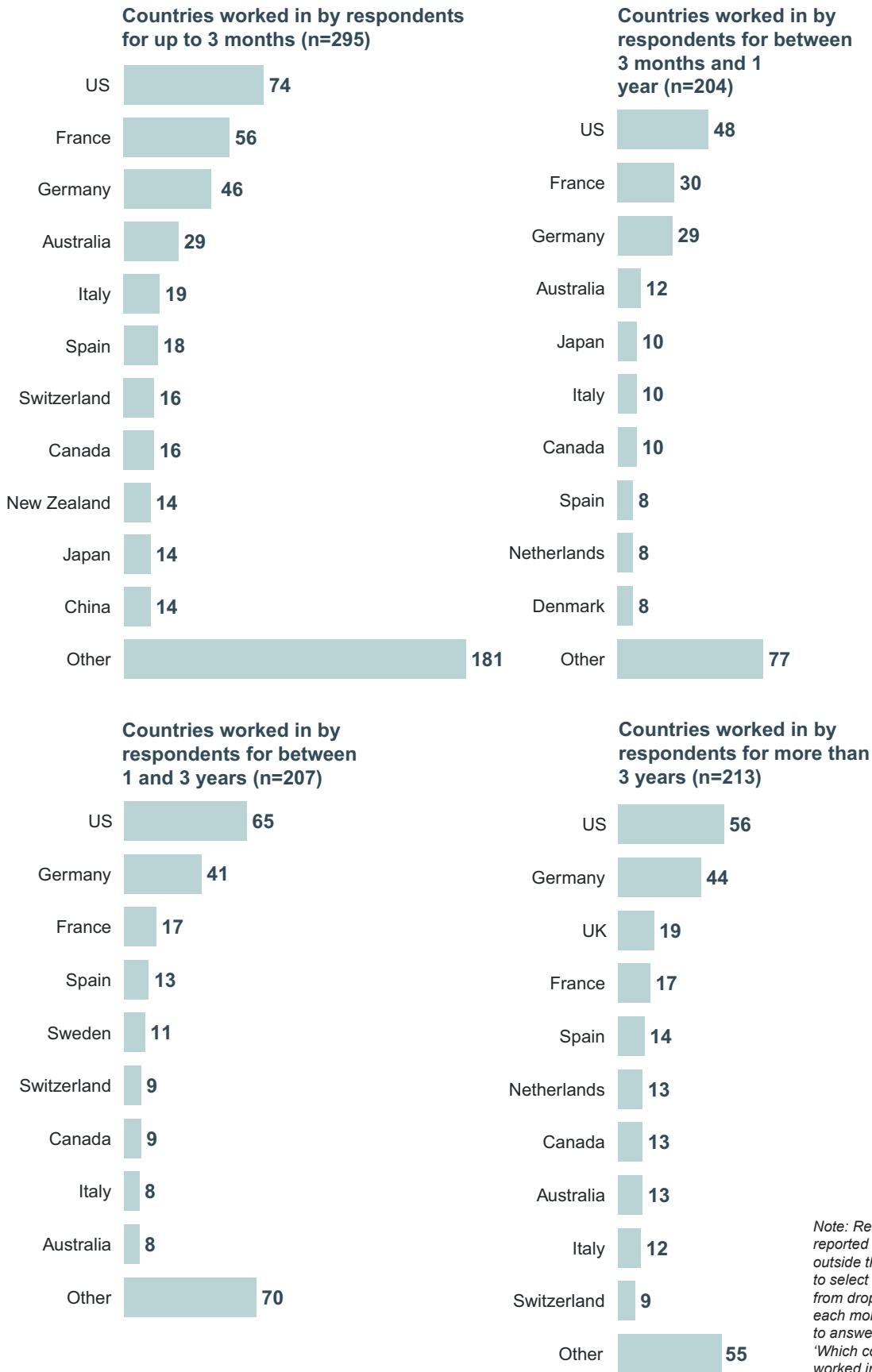
researchers reporting mobility at each stage (Figure 2.14). For mobility of less than one year, 13 per cent of respondents had worked abroad as PhD students, compared with 26 per cent as postdoctoral or research fellows, and 45 per cent as readers or professors. Medium-duration mobility, of one to three years, was most commonly undertaken at postdoctoral/research fellow stage (18 per cent of respondents); in contrast, less than 4 per cent of respondents had experienced medium-duration mobility at other career stages.

Figure 2.14. Percentage of respondents who have been mobile at each career stage (by duration of mobility)



Note: Respondents who reported having worked as researchers outside the UK were asked to select from a matrix of tickboxes to answer the question: 'At which stages of your career have you worked outside the UK? Please select all that apply.' Responses have been normalised by the number of respondents who should have passed through each career stage, based on their current position. Individuals whose current position was 'Other' were excluded, n= 565.

Figure 2.15. Destination countries by mobility duration



The countries most visited are the US, Germany and France

Regardless of the duration of the international mobility or career stage, three countries remain the most common destinations for survey respondents overall: the US, Germany and France (Figure 2.15).¹² Other common destinations include countries in Europe as well as Australia, Canada and Japan. These findings are consistent with those of the survey of National Academy Fellows and grant recipients (Opinion Leader 2017), which found that North America was the most common destination for researchers who had spent time working abroad, followed by Europe.

The postdoctoral period is an important time for mobility

The evidence supports the suggestion from our review of the literature (Guthrie et al. 2017) and from the survey of National Academy Fellows and grant recipients (Opinion Leader 2017)

that the postdoctoral period is important for mobility. Amongst early career researchers, only 38 per cent had spent time working outside the UK, but by the mid-career stage we find that the figure has risen significantly to 67 per cent. There is a further increase (to 77 per cent) amongst late career researchers, but the most dramatic increase is between the early and mid-career stages. This is borne out by the durations of stay noted by each group. In the early career stage, as we might expect, short-term mobility dominates, with only 11.4 per cent of respondents having spent a period of more than three years working outside the UK. However, by the mid-career stage, 41.5 per cent of respondents have spent a period of three years or more working outside the UK, indicating either that more international staff move to the UK in this period (unlikely, since we know that the UK hosts a large number of international PhD students), or that many researchers travel overseas in the early to mid-career stage, taking postdoctoral positions in other countries.

Summary

Most mobility to and from the UK involves a small set of western countries, and the US and Germany in particular:

- Regardless of duration, the US, Germany and France are the three most common destinations for mobility.
- Other European countries, Australia, Canada and Japan are also important destinations.
- Around 80 per cent of non-UK nationals in the UK have EU or North American nationalities - the most common being German, American, Italian and Spanish.
- Amongst those receiving their highest degree overseas, most did so in EU countries or the US; the most common countries were the US, Germany, Spain and France.
- Although a limited number of countries dominate the circulation of researchers into and out of the UK, there is a long tail, with 71 nationalities reported among survey respondents.

The majority of UK researchers obtained their highest degree in the UK:

- Respondents reported obtaining their highest degree in a total of 39 different countries, but the majority (62 per cent) had done so in the UK.

12 Sample sizes too small for statistical significance testing.

- Those working at HEIs and in social science areas were particularly likely to have obtained their highest degree in the UK.
- 90 per cent of UK nationals had obtained their first degree in the UK compared with 33 per cent of non-nationals.

Patterns of mobility differ by gender, discipline and career stage:

- Male respondents have worked for more years in research than female respondents and are more likely to have worked in research outside the UK.
- Men were more likely to have spent a period of three years or more working outside the UK (39 per cent vs 25 per cent of women), though women were slightly more likely to have worked abroad for shorter periods.
- Arts and humanities researchers were the most likely group to have spent at least a brief period working as researchers outside the UK and be non-UK nationals; social science researchers were the least likely.
- The postdoctoral period is an important time for mobility, with significant increases in the number of researchers having spent time overseas, particularly for longer stays, between the early and mid-career stages.

International research mobility experiences of short and long duration are most common:

- Around a third of respondents had worked as researchers outside the UK for less than three months, and a third had worked outside the UK for more than three years.
- Longer-term stays were more common amongst researchers in the physical and life sciences, and amongst men.
- Non-UK nationals were more likely to have had longer stays abroad, and UK nationals were more likely to have spent periods of less than three months abroad.

3. Why do people decide to stay or move? Barriers and drivers influencing mobility decisions

This chapter describes the key motivations, professional or personal, that influence the mobility decisions of researchers currently based in the UK, and the specific barriers and drivers that they consider most important. Surveyed researchers were asked whether different mobility decisions were based primarily on professional reasons, personal reasons, or a mixture of both. They were then asked to identify which drivers, from a pre-defined list,¹³ affected different types of mobility decisions, and similarly which barriers, again from a list,¹⁴ they had experienced. These lists were developed based on evidence from the literature (Guthrie et al. 2017) and drawing on those used in other surveys (notably the MORE/MORE2 surveys (IDEA Consult 2010; Weert 2013). Respondents were also given the option to specify 'other' reasons in a free text box. The evidence around the relative importance of different motivations for different types of mobility and amongst different groups of respondents is described below, focusing primarily on the pre-defined responses. First, we set out the overall findings across the whole survey population regarding the trade-off between professional and personal factors, and the drivers and barriers

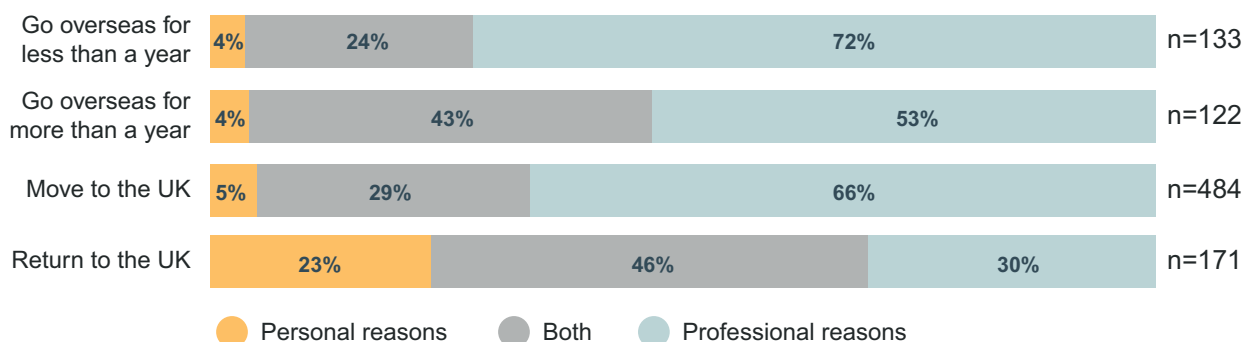
underpinning decisions relating to different mobility experiences. We then explore the differences between different groups, considering gender, career stage, family situation, nationality, previous mobility experience and discipline.

3.1. People move primarily for professional reasons, but they come back to the UK for a mix of personal and professional reasons

People move overseas from the UK primarily for professional reasons, particularly when a shorter stay is involved (67.1 per cent). When they stay for more than a year, nearly half (47.8 per cent) still note professional reasons as being the most important driver, but more than a third (38.2 per cent) note both professional and personal reasons for their mobility. Equally, non-UK researchers move to the UK primarily for professional reasons (62.1 per cent), with another large group (27.2 per cent) moving for both professional and personal motivations. For researchers moving back to the UK, motivations were more mixed. The largest group of respondents (46.1 per cent) note both

13 The drivers included were: To secure a more senior position; To develop my career; Opportunities for more research autonomy; Opportunities to work on a particular research topic; Opportunities to bring your research to market; To work with expert colleagues; Quality of training available; To access research funding; To access facilities and equipment; For an increased salary; Better job security; Better working conditions; To experience another culture*; Personal reasons; Family reasons; Other (please specify). * Note that the driver 'To experience another culture' was not included as a reason to stay in the UK.

14 The barriers included were: Finding a suitable position; Maintaining your standard of living; Obtaining funding for your mobility/research; Transferring your research funding to another country; Maintaining contact with your professional network; Access to facilities and equipment; Quality of training available; Language; Culture; Difficulty obtaining a visa or work permit; Finding adequate accommodation; Finding employment opportunities for your partner or dependents; Other personal/family reasons; Finding suitable care or education for dependents; Transfer of pension/other benefits (e.g. access to healthcare); Other (please specify).

Figure 3.1. Relative importance of professional and personal motivations for different types of mobility

Note: Respondents who reported having worked overseas for less than three months or between three months and a year ('Go overseas for less than a year'), for at least one year ('Go overseas for more than a year'), being non-UK nationals ('Move to UK'), or being UK nationals who had worked overseas ('Return to UK') were asked which one of the three options describes the motivations for their decision.

professional and personal motivations, but there are also significant groups stating either professional (30.5 per cent) or personal (23.4 per cent) reasons as their primary motivation (Figure 3.1).

This is in agreement with our literature review (Guthrie et al. 2017), which found that professional motivations are the primary reason for mobility, but that researchers make tradeoffs between personal and professional factors.

3.2. Career development is the main driver for mobility

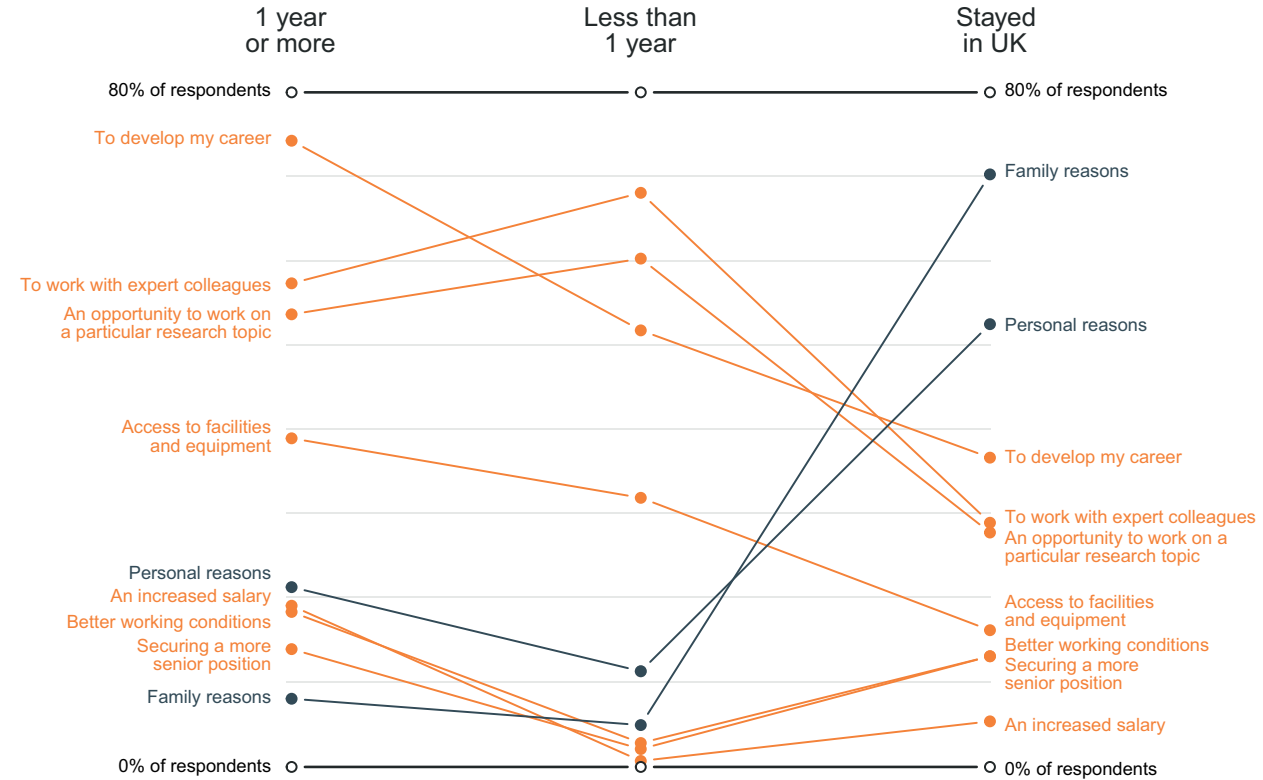
Looking in more detail at the specific drivers of mobility patterns, we see that career development is a key driver of mobility, which largely matches the evidence from the literature (Bauder 2015; Cantwell 2011). Whether moving to or from the UK, or planning to move in the future, the most commonly selected reason for that decision is 'to develop my career'. Other options which are extremely popular are the opportunity to work with expert colleagues, or to work on a specific research topic (see Figure 3.2). For shorter-term mobility (less than one year), there are some slight differences, in that working with expert colleagues and on particular research topics are ranked above career development – perhaps reflecting that

moving for such a short term is unlikely to reflect a promotion into a new position but is more likely to be a placement or short-term collaboration within an existing job. This corresponds to the importance of mobility for building networks seen in the literature (Franzoni, Scellato & Stephan 2012; Guth & Gill 2008; Stephan, Franzoni & Scellato 2013).

Figure 3.2 sets out the comparative importance of different drivers for different mobility options, comparing the decision to work overseas for more than one year, less than one year, or to stay in the UK. In each case, the drivers are plotted vertically by their importance to each type of mobility (according to the proportion of respondents who selected each driver for that mobility decision). The bottom of the graph corresponds to no respondents selecting that driver, the top of the graph would correspond to 100 per cent of respondents selecting that driver. Lines indicate the way drivers change in importance depending on the type of mobility.

There are also some important differences for the group moving back to the UK from overseas. Though career development remains the top driver, the second and third most frequently selected options are family and personal reasons. This is strongly reflected in the drivers of those who have chosen to stay in the UK, with family reasons coming top of the list, followed

Figure 3.2. Comparison of the relative importance of different drivers depending on mobility experience



Note: Respondents who reported having worked abroad for the indicated periods (up to one year, n= 141; more than one year, n= 136) or having never worked outside the UK (n=259) were asked to select all applicable responses from among those in the list shown and 'Other (please specify)' in answering the question: 'When you worked as a researcher overseas for [less/more] than a year, what drove your choice of mobility?' or 'What drove your choice to stay in the UK?' Drivers that are primarily professional are marked in orange; those which are primarily personal are shown in dark blue. The light grey indicates those drivers which do not show much change across the different types of mobility. The vertical axis indicates the percentage of respondents to each question who selected each option.

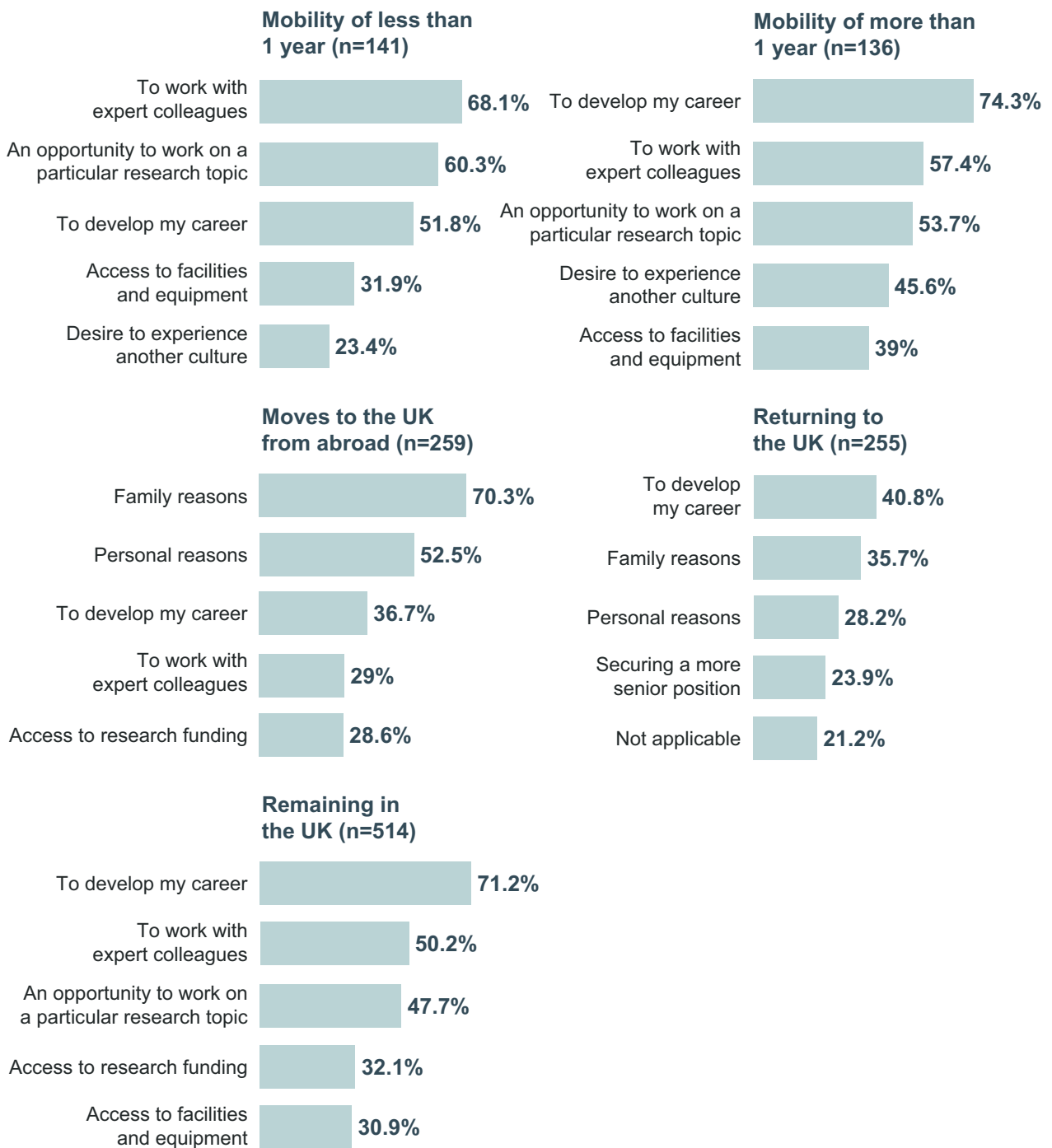
by personal reasons and career development (Figure 3.3).

Generally, across most groups, the key professional drivers were career development, working with expert colleagues, working on particular topics, access to research funding, and the securing of a more senior position. Factors that were of fairly low importance to any of the groups include the opportunity to bring research to market, salary increases and more research autonomy. From a personal perspective, other than family and personal reasons, the opportunity to experience another culture was quite highly cited particularly by researchers moving to the UK, those moving overseas for a longer period, and amongst those considering their future mobility plans in particular (where it was the third most popular choice). The top five drivers

for different types of mobility are shown in Figure 3.3.

These findings are supported by the survey of National Academy Fellows and grant recipients (Opinion Leader 2017), which found that career development was the key driver of international mobility – but that this was focused on developing networks, skills and knowledge, rather than for personal gain in terms of salary increases. The literature also indicates that the primary motivations for mobility are around career development through network building and skills development (Guthrie et al. 2017). Less well explored in the literature are the reasons for deciding not to move, and the evidence here suggests that family and personal reasons are important, but that career development considerations also play a role.

Figure 3.3. The top five drivers of mobility for different types of mobility



Note: Respondents who reported having worked abroad for up to one year; worked abroad for more than one year; moved to the UK from abroad; returned to the UK after a period abroad; or not worked outside the UK were asked to select all applicable responses from among those in the list shown and 'Other (please specify)' in answering the question: 'When you worked as a researcher overseas for [less/more] than a year, what drove your choice of mobility?' or 'What drove your choice to stay in the UK?' The top five responses for each group are shown.

3.3. Barriers to mobility differ between mobile and non-mobile respondents, and depend on the length of mobility

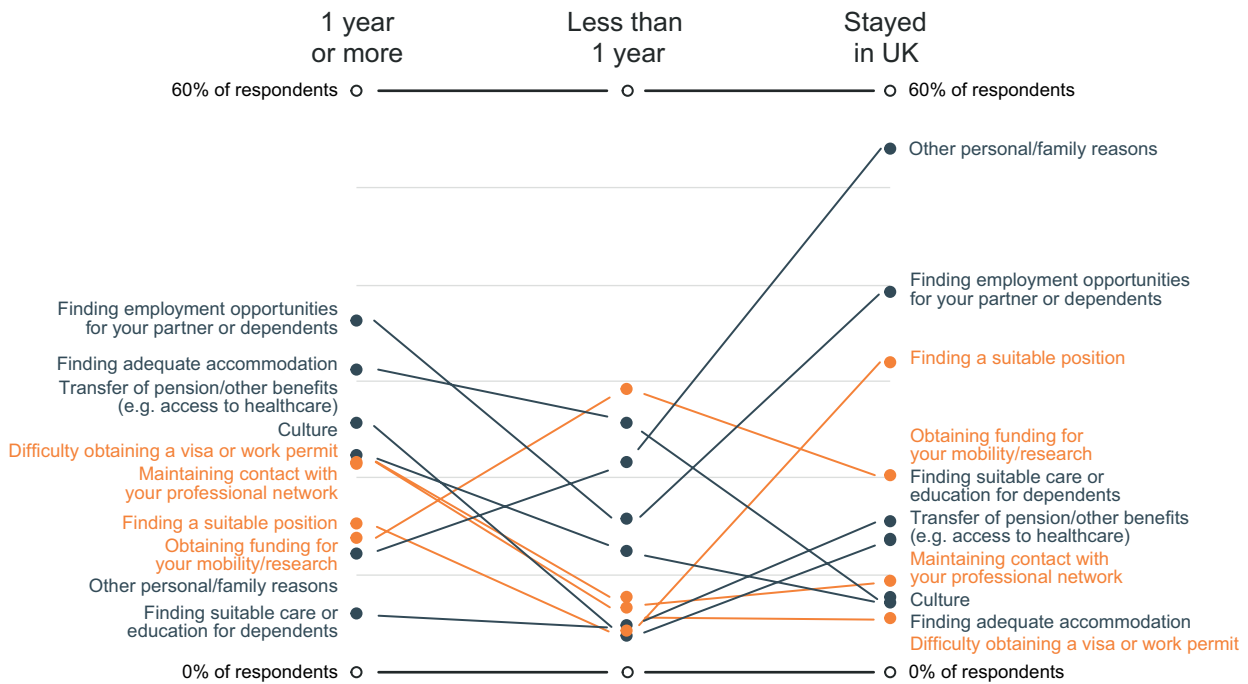
For those moving from the UK to other countries, barriers to mobility depended on the length of time spent overseas. For those spending a shorter period abroad, access to funding and finding adequate accommodation were important barriers, affecting more than a quarter of respondents. For those moving for a longer period, accommodation remained a challenge, but other personal factors were also important, particularly finding employment opportunities for partners/dependents (noted by more than a third of respondents), and transfer of pension/benefits (noted by more than a quarter), reflecting the more permanent nature of the stay in these cases. For both groups, language was an important barrier, noted by more than a third of respondents

in both cases, and as seen in previous studies (Weert 2013; IDEA Consult 2010) (Figure 3.4).

For those moving from another country to the UK, the most important barriers were finding adequate accommodation and maintenance of standard of living, both noted by around 39 per cent of respondents, and perhaps suggesting that the UK is an expensive place to live for researchers coming from other countries, or that it offers other challenges in terms of quality of life (e.g. access to services or infrastructure). Finding employment for a partner/dependents was also important for this group, noted by more than a third of respondents.

For those staying in the UK, and those planning to stay in the UK in the future, personal and family reasons were the key barrier preventing mobility, noted by more than half of respondents in both cases. Finding suitable employment, for the individual as well as partners/dependents, as

Figure 3.4. Comparative importance of barriers across three mobility types



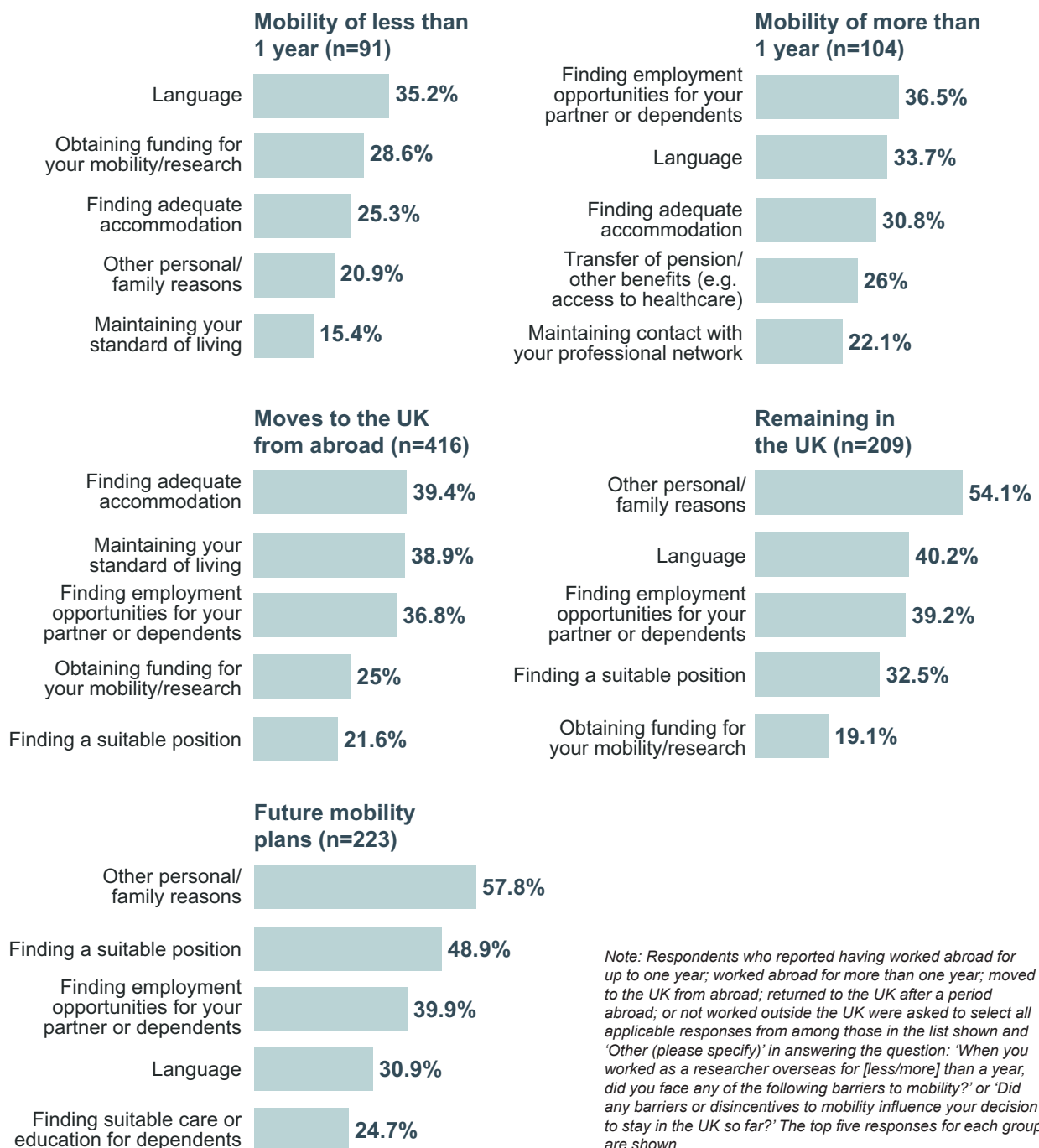
Note: Respondents who reported having worked abroad for the indicated periods or having remained in the UK were asked to select all applicable responses from among those in the list shown and 'Other (please specify)' in answering the question: 'When you worked as a researcher overseas for [less/more] than a year, did you face any of the following barriers to mobility?' or 'Did any barriers or disincentives to mobility influence your decision to stay in the UK so far?' Barriers that are primarily professional are marked in orange; those which are primarily personal are shown in dark blue. The light grey indicates those barriers which do not show much change across the different types of mobility. The vertical axis indicates the percentage of respondents to each question who selected each option.

well as language, are also important barriers for both these groups, all cited by between 30 and 50 per cent of respondents.

Open text responses shed light on reasons that might hinder international mobility, or impact on one's desire to be internationally mobile, the most prominent of which are ties to family. Other barriers to international mobility include care

responsibilities (children or other dependents), being unwilling to place pressure on relationships and partners, or living with a chronic disease/poor health. Although barriers largely depend on personal circumstances, some 'other' reasons include, amongst others, the 23 June 2016 'Brexit' referendum result in favour of the UK leaving the European Union, the financial costs of relocating, and cost of living/quality of life.

Figure 3.5. The top five barriers to mobility for different types of mobility



Factors considered less important as barriers to mobility by most in all groups included quality of training available, access to facilities/equipment, ability to transfer funding across countries, and concerns about obtaining a work permit or visa. This is in contrast to findings from the literature which suggest that immigration rules can inhibit researchers' mobility (Bennion & Locke 2010; Borchgrevink & Scholz 2013; Weert 2013; Cox 2008; Avramov 2015), though this perhaps reflects the fact that the majority (66 per cent) of our non-UK respondents are EU nationals. Maintaining contact with a professional network and finding suitable care or education for dependents were both fairly infrequently cited, but they were each noted by almost a quarter of respondents in one particular group (those leaving the UK for more than one year, and those planning to stay in the UK in the future, respectively). The top five barriers to mobility for each mobility type are shown in Figure 3.5.

3.4 The UK visa and immigration process comes with administrative and financial challenges, but overall impressions of it are mixed

One specific potential barrier to mobility is the visa and immigration process in the UK, and this is not well explored in the literature (Guthrie et al. 2017). Overall, 207 respondents indicated that they had applied for a UK visa/work permit, and, of these, 198 offered overall impressions of that process and 194 provided details of their experience. At a general level, more respondents reported having a positive or a very positive experience of the UK visa/immigration process than not (42.9 per cent vs 37.9 per cent). Almost one-fifth of respondents were neutral. When broken down by institution type, 37 per cent of respondents from HEIs reported a positive or very positive experience with the UK visa/immigration process, while 56 per cent of those in PSREs/RIs reported the same experience. There is also variation in the experiences of individuals when broken

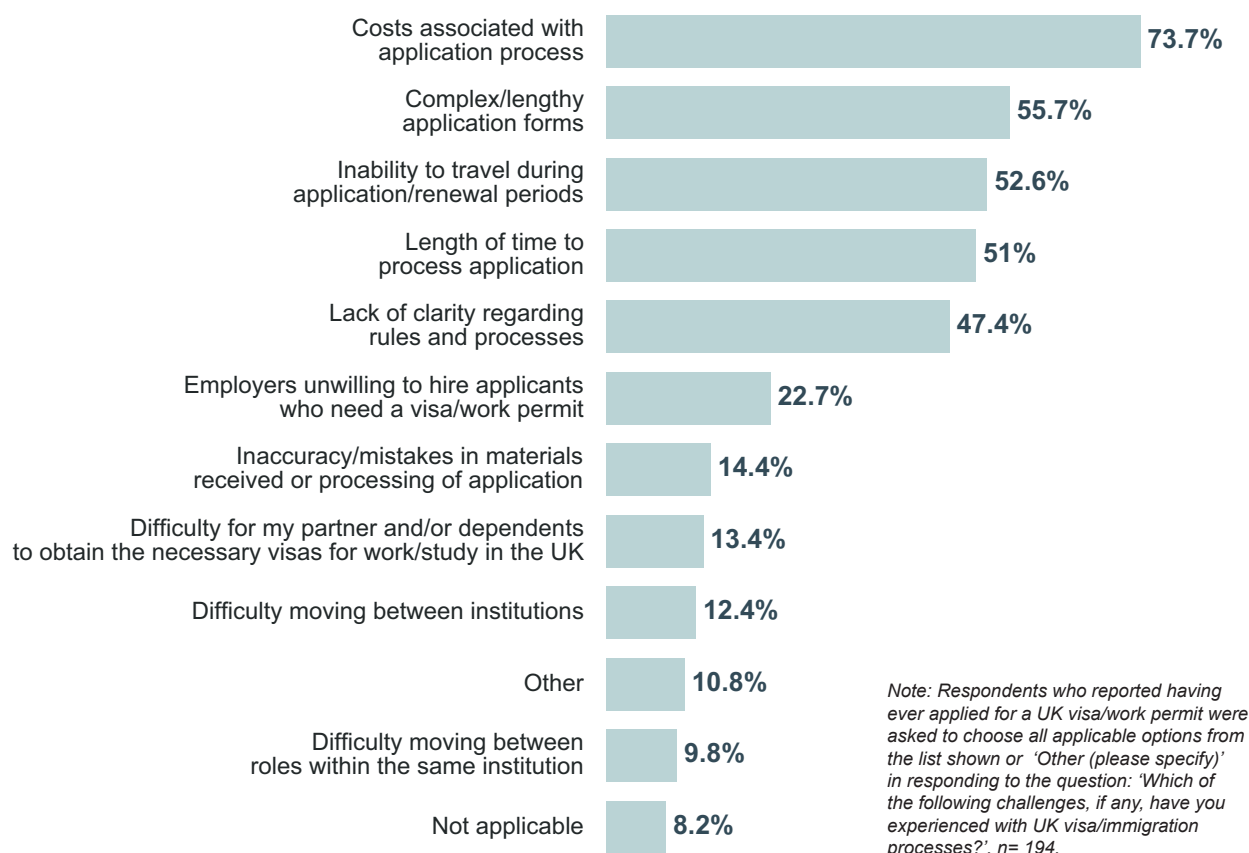
down by researchers' position. For example, PhD candidates, those in senior positions and postdoctoral researchers are more likely to report positive experiences with the visa process (56, 54 and 41.5 per cent, respectively) than negative experiences (37.5, 32 and 34 per cent). In contrast, professors and lecturers were more likely to report a negative experience (41 and 46 per cent, respectively) than a positive one (32 and 35 per cent).

Open text responses highlighted some of the issues respondents had experienced with immigration procedures. Generally, while respondents were positive about participating in and contributing to the UK research environment, they demonstrated negative feelings towards the visa process given the strict rules which can hinder individual progression and opportunities, as well as visa costs.

'Pursuing research in UK has been a positive experience but my decision to move into research support has been driven by stringency of work visa rules that hasn't given me flexibility to pursue research position or apply for fellowship.' (female, researcher transitioning into research support, under 30)

'UK immigration seems designed to alienate people with skills and a genuine interest in contributing to the UK. Constant changes in policies, forms, and procedures, and costs just go up and up.' (female, postdoctoral researcher, 40–49)

'The visa restrictions have proven to be quite a challenge, with a heavy financial burden and limiting the opportunities I have to apply for independent funding. The research environment in the UK is unparalleled and was worth relocating for, but the administration and financial burden of immigration/visa applications will prevent us from staying here longer term.' (female, postdoctoral researcher, 30–39)

Figure 3.6. Challenges identified associated with the UK visa and immigration process

'PhD students coming to the UK under government funded projects should be exempted from paying Visa application fees' (male, PhD student, 30–39)

In order to understand some of the procedural challenges faced by respondents in applying for a visa or undergoing immigration processes, we provided a list of 12 responses,¹⁵ including an option for 'other' and 'not applicable'. Overall, visa application costs (74 per cent), the length of time to complete (56 per cent) and to process the application (51 per cent), the inability to travel while the application was being renewed or processed (53 per cent) and the lack of

clarity around the rules and processes (47 per cent) were the five most cited challenges faced by respondents going through the UK visa/immigration process. While the order in which these reasons were seen as a challenge varied when the results were broken down by position type and research institute, visa application costs remained the number one cited reason by all respondents.

'Other' challenges faced by respondents included the bad attitudes of UK officials, loss or delay of delivery of respondents' visa or passport/official documents, and difficulty in contacting immigration authorities.

15 The possible responses were: Length of time to process application; Complex/lengthy application forms; Lack of clarity regarding rules and processes; Inability to travel during application/renewal periods; Costs associated with application process; Inaccuracy/mistakes in materials received or processing of application; Employers unwilling to hire applicants who need a visa/work permit; Difficulty moving between roles within the same institution; Difficulty moving between institutions; Difficulty for my partner and/or dependents to obtain the necessary visas for work/study in the UK; Not applicable; Other, please state.

3.5. Having a partner and/or children has a significant impact on mobility decisions

Overall, 60 per cent of respondents with a long-term partner indicated that having a partner made them less likely to be internationally mobile. Amongst respondents with dependent children, 79 per cent felt that their children made them less likely to be internationally mobile. There is also a group (13 per cent of respondents) for whom having a partner made them more likely to be mobile – perhaps indicating that their partner is from another country, or that their partner works or is likely to want to work overseas in the future.

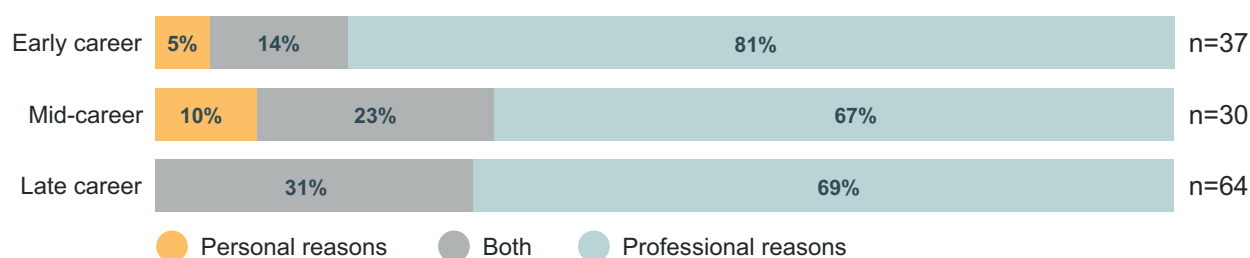
Looking in more detail at the barriers and drivers of mobility for these groups, there is evidence that finding suitable employment for a partner or dependents is a significant consideration for those researchers with a partner when making mobility decisions, as noted in previous studies (Weert 2013). This is a key barrier cited by more than half of respondents who have a partner when choosing to stay in the UK, move to the UK from overseas, and when considering whether to leave the UK in the future. It is the most frequently or second most frequently cited barrier amongst this group for all types of mobility discussed in the survey, except short-term mobility. This group also note family reasons more frequently as a reason for their decision to stay in the UK (78.5 vs 46 per cent), move back to the UK (39.4 vs 25 per cent), and stay in the UK in the future (33.8 vs 16.2 per cent). Taking those with children (largely a subgroup of those with a partner), family reasons are very important, cited as a reason for their choice to stay in the UK by 91.7 per cent of respondents, for their choice to move back to the UK by 42.9 per cent of respondents, and both for plans to move outside the UK in the future (42.2 per cent), and to stay in the UK in the future (65.2 per cent) – likely reflecting

different family situations. Finding suitable care or education for dependents is a barrier to mobility for a significant proportion of those with dependent children, particularly in terms of future mobility plans, where it is noted by more than half of respondents, but also for those who have stayed in the UK so far (40 per cent) and those moving to the UK from overseas (33.6 per cent). Parental or carer responsibilities have been highlighted in a number of previous studies as a potential barrier to mobility (Ackers 2008; Weert 2013; IDEA Consult 2010; Børing et al. 2015).

3.6. Differences between genders are fairly limited, though there is a slightly greater emphasis on professional motivations amongst men, and women are slightly more likely to also consider personal factors

Broadly, we see similar drivers and barriers identified for both men and women across the survey. There are some differences, however, around shorter-term mobility (less than one year) between genders. In particular, professional reasons are the key driver of short-term mobility for more men (75 per cent of men vs 56 per cent of women), which is in contrast to a previous study which found that women are more strongly motivated by professional reasons (Fernández-Zubieta, Marinelli & Pérez 2013). Looking in more detail, though both men and women list working with expert colleagues and the opportunity to work on a particular topic as the top two reasons for their choice of destination, these two options are both more strongly favoured by male respondents. We see a larger proportion of women noting the desire to experience another culture (31 vs 18.5 per cent) and personal reasons (17.2 vs 7.4 per cent) as drivers for their short-term mobility,¹⁶ although overall patterns are otherwise similar.

16 These differences are not statistically significant.

Figure 3.7. Motivations for short-term mobility (by career stage)

Note: Respondents who reported having worked overseas for up to one year were asked to respond to select one responses from the three options indicated in responding to the question: 'When you worked as a researcher overseas for less than a year, what drove your choice of destination?'

In terms of future plans, there is a slightly larger proportion of men who plan, or hope to, work outside the UK in the future (63.4 vs 54.8 per cent). In particular, more men have concrete plans to do so (28.5 vs 19.3 per cent). A similar proportion of both genders plan to stay in the UK, but a larger proportion of women are unsure about their future mobility (18 vs 11.1 per cent). We also see some differences in the reasons why men and women plan to stay in the UK in the future. Though personal and family reasons are the most important barrier for both, these are selected by significantly more women (67 vs 47.2 per cent). Overall, women in this group seem to identify a greater number of barriers to their future mobility, as also seen in previous research (IDEA Consult 2010).

3.7. Motivations for and barriers to mobility vary by career stage

Generally speaking, the differences in response by career stage reflect the findings of previous studies in this area, with an increased focus on professional motivations and on career development amongst early career researchers, and wider criteria around interesting new topics, for example, driving later career researchers (Weert 2013).

Amongst researchers who have moved away from the UK for a short period, professional reasons were the main driver for a majority of

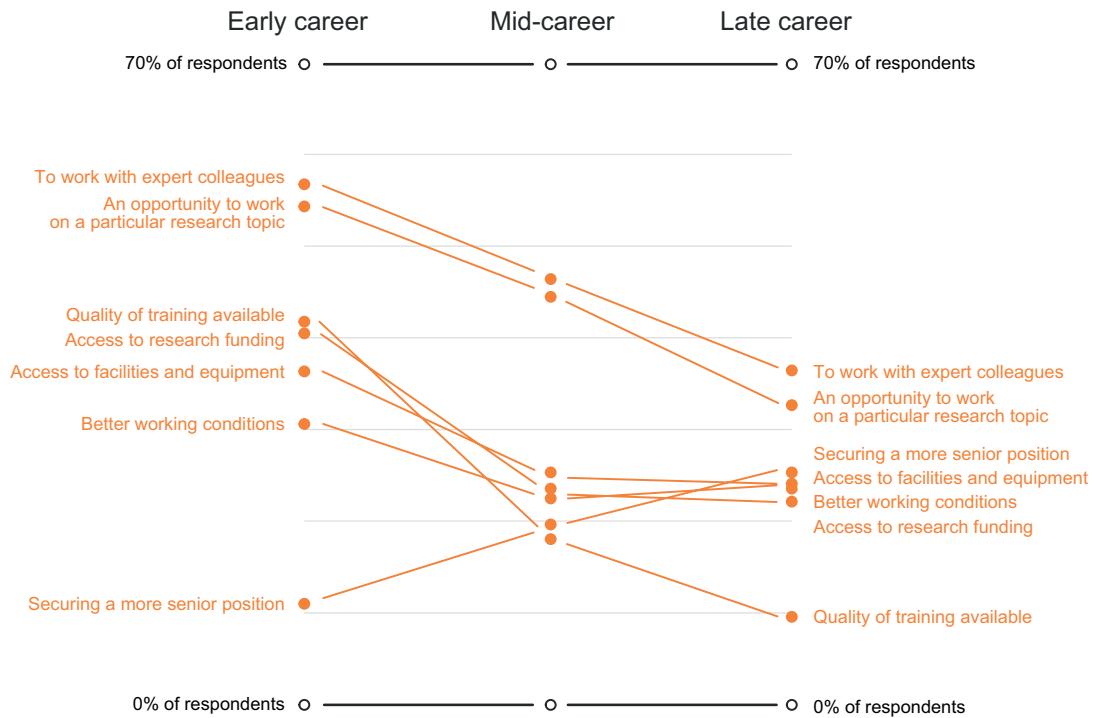
researchers across all groups, but particularly amongst early career researchers (78.9 vs 60.7 (mid) / 60.3 (late) per cent).¹⁷ This is shown in Figure 3.7.

Underlying this general trend, we note that career development is a particularly important driver of mobility for early career researchers (71.1 vs 48.3 (mid) / 44.4 (late) per cent), and desire to experience another culture was a more important driver for late career researchers (27.8 vs 17.2 (mid) / 18.4 (early) per cent). For periods of more than one year, however, career development is more strongly noted for mid- and late career researchers (87.8 and 70.4 per cent respectively, compared to 61.9 per cent of early career researchers), and here the opportunity to work on a specific research topic is the most noted driver for early career researchers – and is also important for mid-career researchers (66.7 (early) vs 63.4 (mid) / 45.1 (late) per cent).

There are also some notable differences in the specific drivers and barriers identified amongst researchers who have moved to the UK. In particular, the quality of training available was a driver to move to the UK for early career researchers (43.4 vs 18.3 (mid) / 9.1 (late) per cent) (see Figure 3.8). In terms of barriers, finding employment for a partner/dependents was more important for early and mid-career researchers (38.1 (early) and 38.7 (mid) vs 29.9 (late) per cent). However, late career researchers

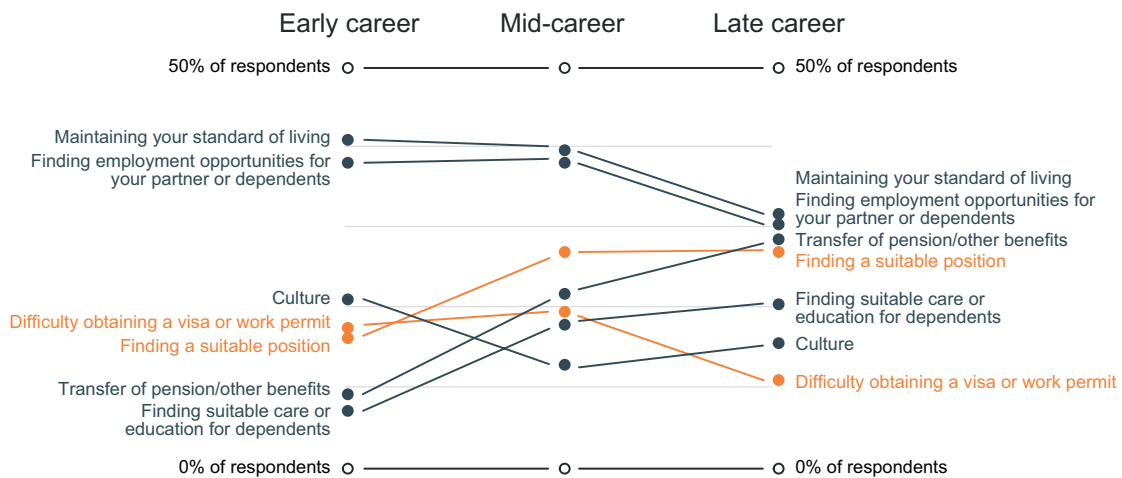
17 This difference is not statistically significant.

Figure 3.8. Comparative importance of drivers when coming to the UK (by career stage)



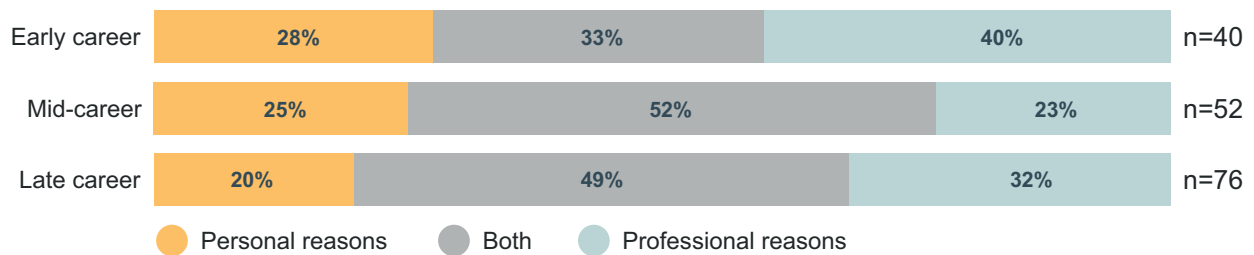
Note: Respondents who reported having non-UK nationality were asked to select all applicable responses from among those in the list shown and 'Other (please specify)' in answering the question: 'What drove your choice of destination?' The light grey indicates those drivers which do not show much change across the different types of mobility. Drivers that are primarily professional are marked in orange; those which are primarily personal are shown in dark blue. The light grey indicates those drivers which do not show much change across career stages. The vertical axis indicates the percentage of respondents to each question who selected each option. For career stage definitions, see Table 1.1. Early career n=251, mid-career n=164, late career n=99.

Figure 3.9. Comparative importance of barriers when coming to the UK (by career stage)



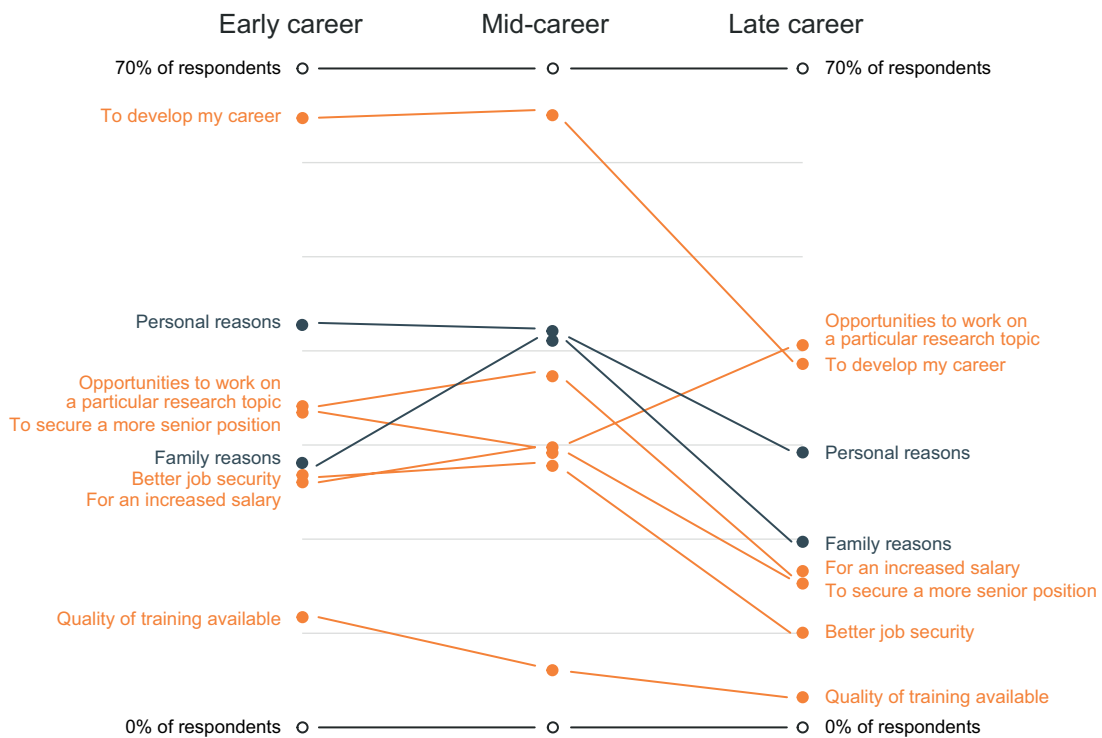
Note: Respondents who reported having non-UK nationality were asked to select all applicable responses from among those in the list shown and 'Other (please specify)' in answering the question: 'Did you face any of the following barriers to mobility?' Barriers that are primarily professional are marked in orange; those which are primarily personal are shown in dark blue. The light grey indicates those barriers which do not show much change across career stages. The vertical axis indicates the percentage of respondents to each question who selected each option. For career stage definitions, see Table 1.1. Early career n=202, mid-career n=137, late career n=77.

Figure 3.10. Relative importance of personal and professional factors when moving back to the UK (by career stage)



Note: Respondents who reported being UK nationals and having worked overseas were asked to choose one option from among the three options or 'Other (please specify)' to answer the question: "Was your decision to move back to the UK motivated by...?" For career stage definitions, see Table 1.1.

Figure 3.11. Comparative importance of drivers for future mobility (by career stage)

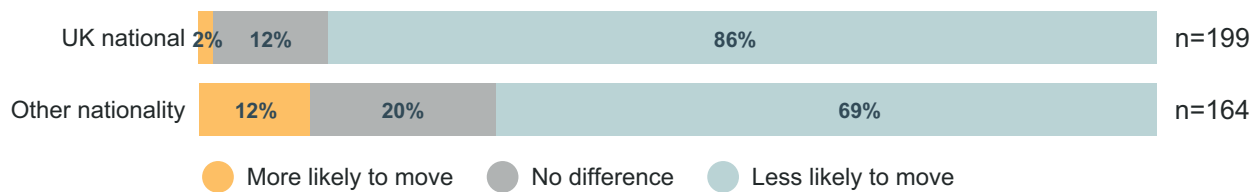


Note: Respondents who reported that they either plan to work as a researcher outside the UK in the future or would like to but have no concrete plans were asked to choose all applicable responses from among the options shown and 'Other (please specify)' to answer the question: 'Why do you hope to work as a researcher outside the UK in the future?' Factors that are primarily professional are marked in orange; those which are primarily personal are shown in dark blue. The light grey indicates those factors which do not show much change across career stages. The vertical axis indicates the percentage of respondents to each question who selected each option. For career stage definitions, see Table 1.1. Early career n=272, mid-career n=163, late career n=168.

were more likely to have faced difficulties with obtaining adequate accommodation (42.9 vs 33.3 (mid) / 37.6 (early) per cent) but less likely to have had difficulty obtaining a visa or work permit (10.4 vs 19.7 (mid) / 17.8 (early) per cent) (Figure 3.9).

Amongst researchers moving back to the UK after a period abroad, professional reasons were the main driver for a larger proportion of early career researchers (27.6 vs 17.9 (mid) / 18.6 (late) per cent). A mix of personal and professional reasons was more common for mid-

Figure 3.12. Comparing the effect of having children on the likelihood of mobility (UK vs non-UK nationals)



Note: Respondents who reported having dependent children were asked to select one option from among the three options shown to answer the question: 'How has having children affected your likelihood of moving between countries?'

career researchers (40.3 vs 22.4 (early) / 28.7 (late) per cent).¹⁸

The overall trend that having a partner makes researchers less likely to move is present for all groups, selected for 65.2 per cent of early career researchers, 53.1 per cent of mid-career researchers, and 59.4 per cent of late career researchers. However, there is a notable difference in the size of the (much smaller) group of researchers who indicate that a partner has made mobility more likely, with significantly more mid-career researchers selecting this response (20.4 vs 10.8 (early) / 9.7 (late) per cent).

Considering future plans for mobility, a similar proportion of each group would like to work outside the UK in the future (around 60 per cent of all respondents), but a larger proportion of late career researchers have concrete plans to do so (30.4 vs 21.6 (mid) / 21.9 (early) per cent). Exploring the reasons why researchers plan to be mobile in the future, late career researchers place less priority than early and mid-career researchers on developing their career (37.5 vs 65.6 (mid) / 64.7 (early) per cent), personal reasons (28.6 vs 42.3 (mid) / 43 (early) per cent), securing a more senior position (14.9 vs 38 (mid) / 33.8 (early) per cent) or increased salary (14.9 vs 30.1 (mid) / 25.7 (early) per cent). However, later career researchers place more priority on the opportunity to work on a particular topic (41.1 vs 29.4 (mid) / 33.8 (early) per cent). Family reasons were an important driver of future

mobility for more mid-career researchers (42.3 vs 26.8 (early) / 18.5 (late) per cent) (Figure 3.11).

3.8. UK nationals are more likely to plan to stay in the UK, and less likely to have concrete plans to move

As might be expected, non-UK nationals are more likely to have concrete plans to work outside the UK in the future (31 vs 17.6 per cent) and less likely to plan to continue working in the UK in future (17.8 vs 27.8 per cent). Motivations around future plans in particular are very different between these groups. For UK nationals, the most important drivers are the opportunity to work with expert colleagues outside the UK (noted by 61.7 per cent of UK nationals vs 29.9 per cent of non-UK nationals), to experience another culture (59.6 vs 25.5 per cent), and to work on a particular research topic (43.9 vs 26.7 per cent), as well as to develop their career, which is important to both groups (noted by 58.5 per cent of UK nationals and 56.3 per cent of non-UK nationals). For non-UK nationals, personal (51.6 vs 24.4 per cent) and family reasons (40.9 vs 15 per cent) are more important, as well as the opportunity to secure a more senior position (36.5 vs 22.3 per cent) and better job security (30.5 vs 12.5 per cent).

The impact of having a partner and/or children also differs between these groups. For non-UK

¹⁸ These differences are not statistically significant.

nationals, a greater proportion suggests that having a partner does not affect their mobility plans (33.4 vs 21.4 per cent) or means they are more likely to move (18.6 vs 8.8 per cent), whilst a greater proportion of UK nationals suggests that having a partner means they are less likely to move (69.8 vs 47.9 per cent). The impact of having children on mobility is also more pronounced among UK nationals, where a higher proportion notes that having children means they are less likely to move (86.4 vs 68.9 per cent).

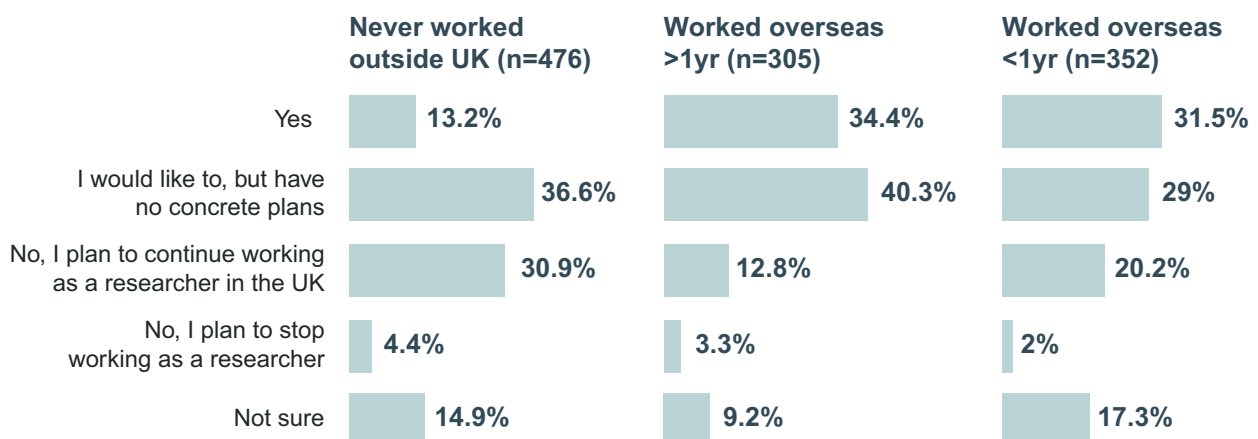
3.9. Those with previous mobility experience are more likely to plan to move in the future

Past experience has a significant influence on future plans. Of those who have never previously worked outside the UK, 30.9 per cent plan to stay in UK in the future (compared to 20.2 per cent of those who have previously worked outside the UK for more than one year, and 12.8 per cent who have worked outside the UK for less than one year). Furthermore, amongst those who have never worked outside the UK, only 13.2 per cent have concrete plans to do so in the future (compared to 34.4 per cent working outside previous for less than one year and 31.5 per cent working overseas for more

than one year). Overall, those with short-term mobility experience are the most likely to want to work overseas in the future (74.7 vs 60.5 per cent (over one year) and 49.8 per cent (never moved)) (Figure 3.13). This corresponds to previous findings that short- and long-term mobility are closely interrelated (Weert 2013).

Having a long-term partner also has a different effect depending on previous mobility experiences. Those who have never moved find that a partner is a greater inhibitor of mobility, with 70.6 per cent of this group saying having a partner makes them less likely to move (19.9 per cent no difference, 9.5 per cent more likely). Those moved for short period think this is still a barrier, with 60.8 per cent of this group less likely to move (25.8 per cent no difference, 13.4 per cent more likely), but among those with long-term mobility experience, only 45.1 per cent think having a partner makes them less likely to move (37.2 per cent no difference, 17.8 per cent more likely). This is also seen (but to a much lesser extent) for children, where amongst those with experience of long-term mobility, 71.5 per cent said having children meant they were less likely to move (compared to 81.4 per cent (less than one year abroad) and 85.2 per cent (never moved)).

Figure 3.13. The effect of previous mobility experiences on future mobility plans



Note: Respondents were asked to choose one option from among those shown to answer the question: 'Do you plan to work as a researcher outside the UK in the future?'

3.10. There is little evidence of important differences in the drivers and barriers for mobility between disciplines and research environments

There are few important differences in findings by subject area, particularly when possible confounders, such as the gender profile in different fields, are taken into account. One notable exception is that obtaining funding is a particular barrier to mobility in the arts and humanities, noted by 37.2 per cent of those coming to the UK from overseas (compared to 26.2 per cent for the social sciences, 28.2 per cent for the physical sciences and 18.9 per cent for the life sciences), as well as by 41.2 per cent of respondents planning not to move outside the UK in the future (compared to 22.2 per cent for the social sciences, 25.4 per cent in the physical sciences and 19.8 per cent in the life sciences).

Comparing HEIs with PSREs and RIs, the overall priority placed on different barriers and drivers of mobility are broadly similar, though there are some specific differences depending on the direction and duration of travel. However, two notable variations are around the importance of working with expert colleagues, and language. The opportunity to work with expert colleagues is a more important driver of mobility for researchers working in HEIs when coming to the UK (51.9 vs 45.9 per cent), moving back to the UK (21.8 vs 15.7 per cent) or planning to move overseas in the future (49.2 vs 36.2 per cent). However, for short-term mobility outside the UK this was actually more important for PSRE/HEI staff (72.2 vs 66.3 per cent) – though it was the top reason for both groups in this case. Language appears to be a greater barrier for HEI researchers in most cases – when spending a short period outside the UK (39.1 vs 19 per cent), a longer period (38.6 vs 27.6 per cent), or in future plans (34.5 vs 25.7 per cent) – though for those who have stayed in the UK in the past, this is more prevalent as a barrier among PSRE/RI respondents (47.5 vs 38.5 per cent).

The evidence also suggests that there may be particularly good facilities for PSREs/RIs in the UK, as this was a more important driver for this group amongst those choosing to stay in the UK (30.6 vs 10.1 per cent) and those coming to the UK (40.1 vs 25.5 per cent).

We also see fairly limited evidence of important differences between small and large institutions, and between institutions with higher and lower levels of research funding. There is some evidence that language barriers are more important to researchers based at more research-intensive institutions (noted by 40.9 per cent of respondents when spending less than a year overseas, compared to 28.3 per cent at lower research intensity institutions; and 39.3 per cent of respondents when spending more than a year overseas, compared to 30.2 per cent at lower research intensity institutions.). However, most research intensive institutions are HEIs, which also have a high number of respondents citing language barriers (as above). For those moving (whether to the UK or overseas for an extended period), though career development is a major driver across all groups, it is particularly important to those at smaller institutions (79.2 vs 69 per cent when going overseas for more than a year; 75.5 vs 66.7 per cent when coming to the UK), and when coming to the UK, for those at lower research intensity institutions (75 vs 69.2 per cent). For those leaving the UK, the opportunity to work with expert colleagues is more frequently cited by those based at lower intensity research institutions, whether that overseas travel is for a short (72.9 vs 62.9 per cent) or longer (61.4 vs 54.8 per cent) period.

3.11. The UK's decision to leave the EU may prove to be a barrier to settling in the UK and a driver for some to leave

Although the survey did not ask directly about the UK's decision to leave the EU, 'Brexit' emerged as an important concern for researchers. We asked respondents if they had additional

comments to make at the end of the survey. We examined and cleaned the data, controlling for comments such as no, none, thank you, n/a, etc., and were left with 209 responses. Respondents used this as an opportunity to clarify some of their thinking in previous responses, to comment on the survey, or to share their experiences and insights on a range of issues. The predominant theme extracted from the comments related to the referendum on the UK's decision to leave the European Union on 23 June 2016. In total one quarter of the responses (53 out of 209) related to Brexit and the future of EU mobility.

Brexit has led respondents to consider their position in the UK in both a personal and professional capacity, with some speculating that it will pose a barrier to mobility. Generally, respondents who discussed Brexit demonstrated their uncertainty about the future, their feeling unwelcome in the UK, and their doubts about financial security and the future of research.

Non-UK national respondents reported the personal impacts of the Brexit vote, perceived xenophobia, and the uncertainty around the rights of EU nationals to remain in the UK, with some feeling unwelcome, or 'existentially anxious'.

'I am absolutely shattered that after more than 10 years in the UK our ability to remain, to retire, to draw a pension, of our children to settle in the UK permanently, are now in question.' (female, professor/chair, 50–59)

'Brexit has had a significant effect on my willingness to remain long term' (male, professor/chair, 50–59)

As a result of Brexit some researchers are thinking of leaving the UK to return to their home countries, rather than build their careers in the UK, or to follow their EU national partners abroad should they be required or choose to leave the UK. Some respondents worry about the implications of Brexit on research funding (e.g. access to European funding, or believing that UK funding streams are insufficient to support

research groups), the uncertainty around EU nationals' right to remain in the UK, or that both may impact on UK research.

'Brexit and xenophobic politics from the British government and population will plague UK science for decades.' (male, PhD student, under 30)

'Brexit changes everything for researchers. From a framework where mobility was encouraged to one where we don't know if we'll be able to stay in the place where our family and friends now live. It makes opportunities in Europe [...] very appealing.' (female, PhD student, 30–39)

Beyond being an 'existential threat', Brexit casts doubt over the future of international research collaboration, mobility and scientific advancement. One respondent felt that the UK needs to make European 'researchers feel welcome and maintain the excellence of its research institutions and networks' but also to create new positions and shift thinking to address the lack of opportunities for postdoctoral researchers.

'UK-based researcher mobility is likely to be reduced when the UK leaves the EU.' (male, senior researcher/lecturer/research fellow, 40–49)

'The future of research in the UK following the split from the EU is a huge concern. Access to funding is critical, as is international reputation and ease of mobility. It is unclear what (if anything) will be possible.' (female, researcher/lecturer/research fellow, 30–39)

'Although I am UK-based, all of my lab members are non-UK nationals. A ban on EU migration would be disastrous for my research.' (female, senior/principal lecturer/reader/principal research fellow, 30–39)

'One thing that was not mentioned in the survey is the effect of how non-UK researchers feel about not being welcomed from the general public in deciding to move

to somewhere outside the UK. (female, postdoctoral researcher, 30–39)

Nonetheless, while the majority of comments on the Brexit vote demonstrated pessimism for the future, one respondent was less certain that Brexit would be detrimental to research mobility:

'We don't need to be in the EU to work abroad. Switzerland shows that.' (male, senior researcher/lecturer/research fellow, 40–49)

Others question their decision to come or to return to the UK, stating that they would have considered their decision differently if Brexit had been a prospect at the time of their move.

Finally, one respondent noted that the decreased value of sterling in the wake of the referendum has translated into reduced spending power. They also questioned the UK's ability to attract world-class scientists as salaries 'are no longer competitive' (male, professor/chair, 40–49). Building on this point, another respondent noted that scientists already face barriers to living in the UK on their salaries coupled with the high cost of living in some 'major centres' (male, deputy director, 40–49). Independent of their feelings on Brexit, respondents felt that research facilities and standards of living for academics are 'poorer' than those in other European countries, even though the UK has 'excellent researchers' (female, researcher/lecturer/research fellow, 30–39). This corresponds to the evidence described above that standard of living is a key barrier for those moving to the UK. One academic stated that moving to another European country (Sweden) provided an opportunity to engage in a welcoming environment for young professional families (e.g. tax support, childcare, etc.), compared to their experience in the UK.

3.12 Respondents perceive that good researchers are expected to be internationally mobile

A key driver of mobility across groups may be expectation – there is a clear perception across survey respondents that good researchers are expected to be internationally mobile. We asked whether respondents believe that the research community expects good researchers to be internationally mobile. Overall, approximately 79 per cent of respondents believed that there is an expectation for good researchers to be internationally mobile, while 13 per cent were unsure and roughly 9 per cent did not believe that this expectation exists. The findings remained consistent across gender lines and the length of time spent as a researcher. Generally, PhD candidates were less likely to state that good researchers are expected to be internationally mobile compared with other professional positions, while a higher proportion of professors and postdoctoral researchers (82 and 80 per cent, respectively) stated that there is an expectation that good researchers should be internationally mobile.

Although the majority of respondents across disciplines agree that there is an expectation for good researchers to be internationally mobile, this expectation is more pronounced in some fields than others. Respondents from the life sciences, physical sciences and arts and humanities (84, 81 and 72 per cent, respectively) believed that there is an expectation that good researchers should be internationally mobile. Social sciences researchers, however, are proportionally the least likely of the disciplines to accept that their research community expects good researchers to be internationally mobile (68 per cent). This is consistent with our findings detailed in Chapter 2, that social sciences researchers in the UK are more likely to be UK nationals than not and have spent less time working overseas than those from other disciplines.

Summary

Professional motivations are the main drivers of mobility:

- People move primarily for professional reasons, particularly where that movement is for a shorter period, but they come back for a mix of personal and professional reasons.
- Professional drivers are more important to men, and to early career researchers, whereas for women and more senior researchers, although they remain the most commonly selected motivation for mobility, they are more likely to consider a mix of personal and professional factors.

In terms of drivers, career development is the main reason people move:

- Shorter-term moves are to work with particular people and/or on particular topics, and these also matter to movers for longer periods.
- People stay in the UK for personal and family reasons, and these are also important to those returning to the UK (alongside career development).
- Quality of training is important to early career researchers.

Barriers depend on personal circumstances:

- Having a partner and/or children is a barrier to mobility.
- For short-term mobility, funding and access to accommodation are the main barriers.
- For all other types of mobility, for those with a partner, finding employment for them is a key barrier.
- For those moving to the UK, finding accommodation and maintenance of standard of living are barriers, suggesting it is expensive to move here.
- For those staying (or planning to stay) in the UK, personal and family reasons are the main barriers.
- Access to funding is a more significant barrier in the arts and humanities.

Future plans are strongly influenced by nationality and previous mobility experience:

- Non-UK nationals, and those with previous mobility experience, are more likely to have concrete plans to leave the UK, and less likely to plan to stay.
- The drivers for future mobility also differ, with non-UK nationals focused on personal and family reasons as well as increased job security and opportunities for a more senior position.
- Having a partner is also seen as less of a barrier to mobility amongst non-UK nationals and those with mobility experience (particularly long-term mobility experience).
- The 23 June 2016 'Brexit' referendum result in favour of the UK leaving the European Union has created uncertainty amongst non-UK nationals in terms of their right to remain and availability of and access to research funding.

Researchers perceive an expectation that good researchers are internationally mobile:

- This is true for a majority of respondents across subgroups, and is supported by evidence that career development is the top driver of mobility.

4. What impact does mobility have on researchers' lives?

Perceived outcomes of mobility at a professional and personal level

We asked respondents about the impact of their mobility experience on a number of personal and professional outcomes.¹⁹ Those with non-UK nationality, who therefore must have chosen at some point to move to the UK, were asked how pursuing research in the UK has affected them; researchers with UK nationality who had been abroad for research at least once were asked about the effects of pursuing research overseas; and researchers with UK nationality who have never been abroad for research were asked about the impacts of pursuing research only in the UK. We therefore had three groups of researchers: two that had moved, either to the UK or away from the UK, and one who had always stayed in the UK (see Table 1.1 in Chapter 1 for more information on how these populations are defined). For each outcome, respondents were asked whether the effect of mobility had been very positive, positive, neutral, negative or very negative.

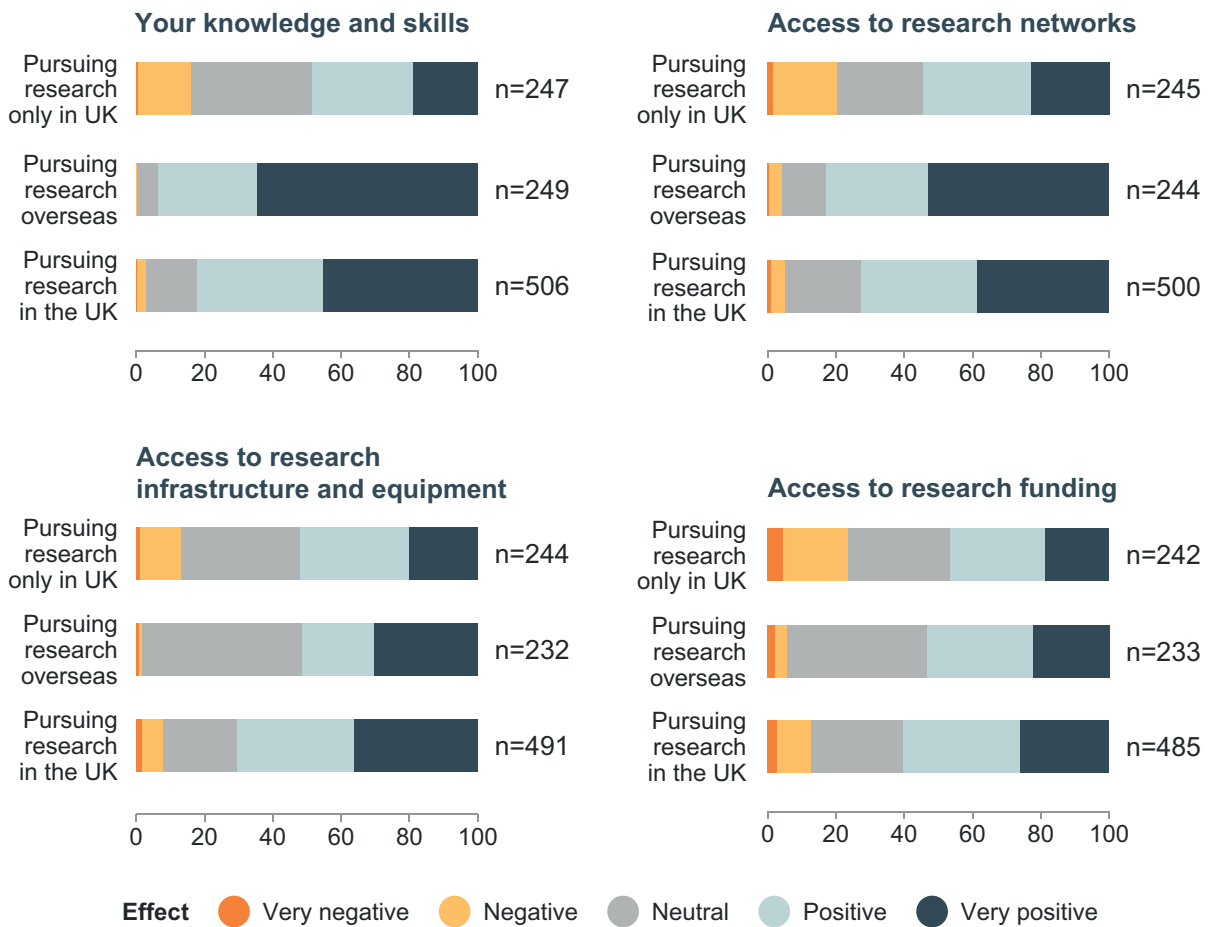
4.1 Regardless of mobility experience, respondents reported more positive effects than negative effects

In general respondents from all groups reported more positive than negative effects. Over

50 per cent of respondents from each group thought that there had been a positive effect on their personal knowledge and skills, access to research networks, access to research infrastructure and equipment, and access to research funding (Figure 4.1). Respondents who have experienced mobility, either moving from or to the UK, had the highest percentage reporting a positive effect on knowledge and skills (82.0 per cent of those moving to the UK and 93.6 per cent of those spending time overseas, compared to 48.6 per cent of those staying in the UK), and access to research networks (72.6 per cent of those moving to the UK and 82.8 per cent of those spending time overseas, compared to 54.3 per cent of those staying in the UK); in both these cases the percentages for those moving from the UK to overseas was slightly higher. Respondents with non-UK nationality but pursuing research in the UK had the highest percentage reporting a positive effect on access to research infrastructure and equipment (70.5 per cent compared to 51.3 per cent of UK nationals spending time overseas and 52.0 per cent of those staying in the UK) and access to research funding (60.4 per cent compared to 53.2 per cent of those spending time overseas and 46.7 per cent of those staying in the UK). Respondents who have stayed in

¹⁹ The outcomes included were: Volume of academic output (journal articles, books etc); Quality of academic output (journal articles, books etc); Access to networks; Access to research infrastructure and equipment; Access to funding; Knowledge and skills; Career prospects; Your partner's career prospects; Your child(ren)'s education; Contact with wider family/friends; Social life; Overall work-life balance; Working conditions (hours, salary etc); Job security

Figure 4.1. Effects of different types of mobility experiences on knowledge and access to research networks, infrastructure and funding



Note: Respondents who reported being UK nationals with no experience working overseas ('Pursuing research only in the UK'), UK nationals with experience working overseas ('Pursuing research overseas') or non-UK nationals ('Pursuing research in the UK') were asked to indicate on a scale how their experiences had impacted different various professional and personal areas, including those shown here.

the UK had the lowest percentage reporting a positive effect on all four of these outcomes, except for access to research infrastructure and equipment (although in all cases more than 50 per cent of respondents thought the effect was positive); they also had the highest percentage reporting a negative effect, with 20.4 per cent saying that pursuing research only in the UK had had a negative effect on their access to research networks (compared to 5.2 per cent of those coming to the UK and 4.1 per cent of those going overseas) and 23.6 per cent reporting a negative impact on their access to research funding (compared to 12.8 per cent of those coming to the UK and 5.6 per cent of those going overseas).

These findings match well with the MORE2 survey, in which 80 per cent of respondents felt their research skills had increased as a result of mobility (11 per cent unchanged and 9 per cent decreased) (Weert 2013), as well as other survey-based studies which found that a high proportion of researchers report improved access to networks (Bennion & Locke 2010; Ecorys 2012; IDEA Consult 2010; Economisti Associati, GhK, Fraunhofer ISI 2014; Rostan & Höhle 2014; Weert 2013). While the results for mobile researchers match well, these surveys did not consider the impact of not moving, and it is interesting to note that 50 per cent of the respondents in our survey who didn't move also thought that not moving had had a positive effect on their knowledge and skills, and their access to networks.

The same percentage of researchers who stayed in the UK as moved overseas reported positive effects on access to research infrastructure and equipment; an even higher percentage of those who moved to the UK reported positive effects. This also matches findings from other studies, which show that while access to research equipment and infrastructure can be a benefit of international mobility, this may depend on the country to which researchers move as well as the discipline of the researcher (Fresco 2015; Economisti Associati, GhK, Fraunhofer ISI 2014; Nedeva et al. 2012).

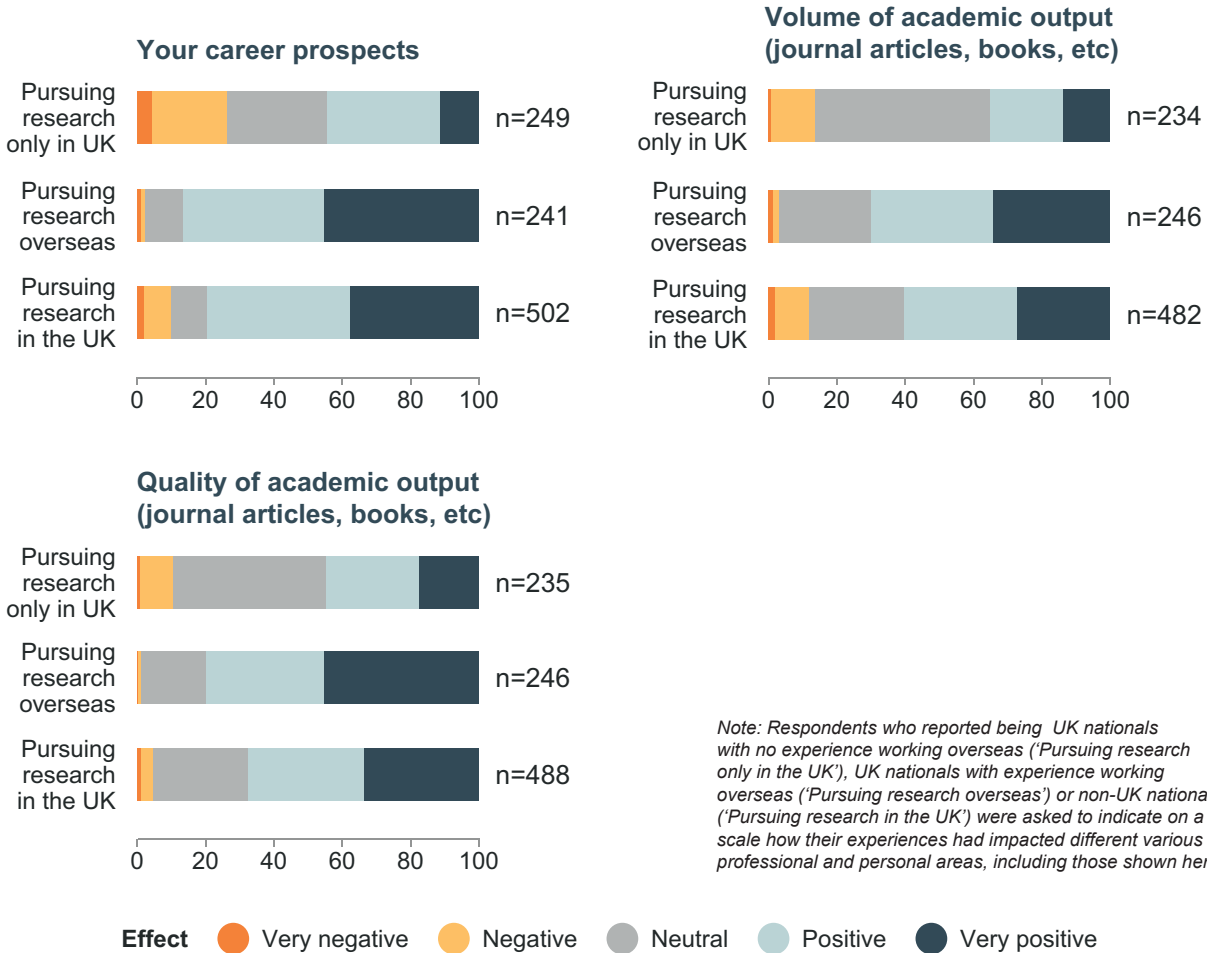
Weert's (2013) analysis of the MORE2 survey data suggests that the same share of mobile researchers felt that their ability to obtain international research funding had decreased as felt it had increased (39–40 per cent). We find that 50 per cent of researchers from all groups of

mobility experience reported a positive effect on access to research funding, with the proportion slightly higher for researchers who have moved.

4.2 Those who have moved report more positive effects on their academic output and their career than those who have stayed in the UK

More than 60 per cent of those who have moved, either from or to the UK, thought that mobility had had a positive effect on their career prospects and the quality and volume of their academic output. In terms of career prospects, more than three quarters of those who had moved reported a positive effect on their career (79.3 per cent of those who moved to the UK and 86.3 per cent

Figure 4.2. Effects of different types of mobility experience on careers



Note: Respondents who reported being UK nationals with no experience working overseas ('Pursuing research only in the UK'), UK nationals with experience working overseas ('Pursuing research overseas') or non-UK nationals ('Pursuing research in the UK') were asked to indicate on a scale how their experiences had impacted different various professional and personal areas, including those shown here.

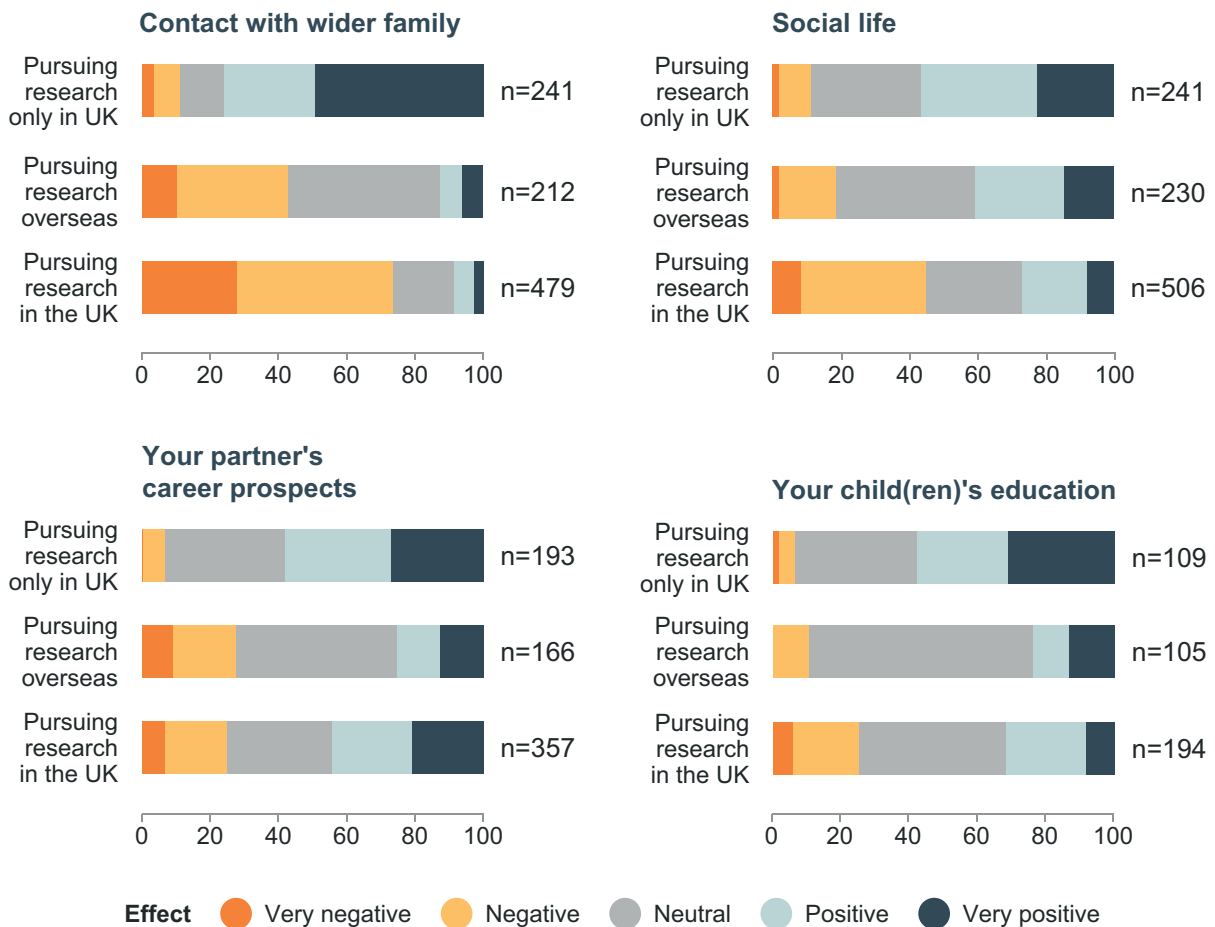
of those who moved from the UK overseas, compared to 44.2 per cent of those who stayed in the UK). Again, those who moved from the UK overseas were more positive than those who moved to the UK. Fewer than 50 per cent of those who stayed in the UK thought that staying had positively affected their career prospects and quality of academic output (44.7 per cent compared to 67.4 per cent who moved to the UK and 79.7 per cent of those who spent time overseas) or volume of academic output (35.0 per cent compared to 60.2 per cent of those who moved to the UK and 69.9 per cent of those who moved from the UK overseas); although in all cases more respondents reported a positive effect than a negative effect. These findings match those in the literature: in the MORE

survey, for example, respondents reported that their mobility has led to improved academic output (IDEA Consult 2010) (Figure 4.2).

4.3 Those who have stayed in the UK report more positive effects on their personal life than those who have moved

More than half of researchers who have stayed in the UK thought this had had a positive effect on their contact with wider family (75.9 per cent), social life (56.4 per cent), partner's career prospects (58.0 per cent) and children's education (57.8 per cent). Those who have moved, either from or to the UK, were in general

Figure 4.3. Effects of different mobility experiences on personal outcomes



Note: Respondents who reported being UK nationals with no experience working overseas ('Pursuing research only in the UK'), UK nationals with experience working overseas ('Pursuing research overseas') or non-UK nationals ('Pursuing research in the UK') were asked to indicate on a scale how their experiences had impacted different various professional and personal areas, including those shown here.

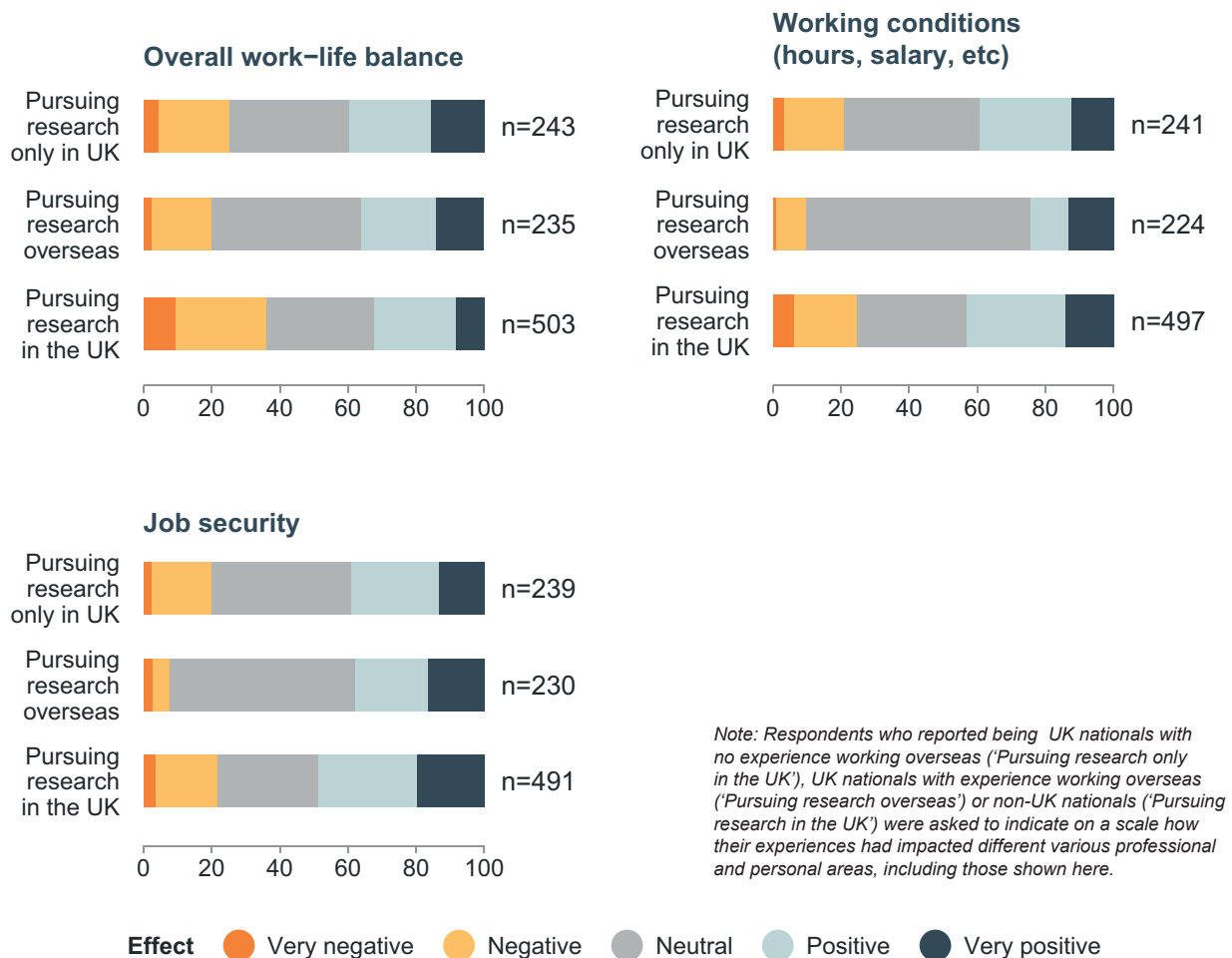
more negative about these outcomes: 73.7 per cent and 42.9 per cent respectively of those who have moved to or from the UK said that doing so had had a negative or very negative effect on their contact with wider family (compared to 11.2 per cent of those who stayed in the UK). This particularly affects those who have moved overseas from the UK for more than a year, where 55 per cent reported a negative effect. For both those moving to the UK and those moving away, more respondents reported a negative effect than a positive effect. Social life is also negatively affected by mobility, in particular moving to the UK (noted as negative or very negative by 45.3 per cent of respondents, compared to 18.7 per cent of those moving from the UK overseas and 11.6 per cent of those staying in the UK), as are partner's career prospects (noted as negative or very negative by 24.9 per cent of respondents coming to the UK and 27.7 per cent of those from the UK spending time overseas, compared to 6.7 per cent of those staying in the UK) and child(ren)'s education (negative or very negative for 25.3 per cent of respondents coming to the UK, compared to 10.5 per cent of those from the UK spending time overseas and 6.4 per cent of those staying in the UK). Negative effects on partner's career prospects were reported more by those who had been overseas for longer, and also more by mobile men than by mobile women (Figure 4.3).

These findings fit with those of previous studies, which have shown that mobility can lead to possible trade-offs on a personal level, such as the loss of social ties (Heining, Jergler & Lingens 2007) and the challenges associated with mobility for those with a partner and children (Nedeva et al. 2012).

4.4 Mobility experience does not affect people's impression of work-life balance, job security and working hours

For all respondent types, at least 20 per cent of people thought that their mobility pattern had had a negative effect on their work-life balance (36.2 per cent of those coming to the UK, 20.0 per cent of those from the UK spending time overseas and 25.1 per cent of those staying in the UK). For those moving to the UK, more respondents reported a negative effect than a positive effect (36.2 per cent vs 32.2 per cent), whereas for the other groups more respondents reported a positive effect (36.2 per cent vs 20.0 per cent for those spending time overseas and 39.5 per cent vs 52.1 per cent for those staying in the UK). Work-life balance received a relatively high proportion of negative responses across all respondent groups (receiving the second or third highest proportion of negative responses amongst all the different outcomes investigated for each respondent group). All researcher groups have a higher percentage of reports of positive than negative effects on working conditions (43.3 per cent positive vs 24.8 per cent negative for those moving to the UK; 24.6 per cent vs 9.8 per cent for those moving overseas; 39.4 per cent vs 20.7 per cent for those staying in the UK) and job security (48.5 per cent positive vs 21.8 per cent negative for those moving to the UK; 37.8 per cent vs 7.8 per cent for those moving overseas; 38.9 per cent vs 20.1 per cent for those staying in the UK), but the differences are not large. Comparing the number of positive and negative responses from each group there are few differences, indicating that mobility experience does not affect people's impression of work-life balance, job security and working hours (Figure 4.4).

Figure 4.4. Effects of different types of mobility experience on working conditions, job security and work-life balance



Summary

Regardless of mobility experience, respondents reported more positive effects than negative effects:

- More than 50 per cent of both those who stayed and those who moved thought that their mobility experience had had a positive effect on knowledge and skills, as well as access to research networks, research funding, and infrastructure and equipment.
- However, particularly with respect to their knowledge and skills and access to research funding, more of those who moved thought it had had a positive effect, compared to those who stayed.

Those who moved report more positive effects on their career than those who stayed in the UK:

- More than 80 per cent of those who moved think this has had a positive effect on their careers.
- 20 per cent of those who stayed think that this has had a negative effect on their careers.
- In terms of positive effects on careers and quality and volume of output, those who moved overseas from the UK were more positive than those who moved to the UK.

Those who stayed in the UK report more positive effects on their personal life than those who moved:

- More than 50 per cent of researchers who stayed in the UK thought this had had a positive effect on their contact with wider family, social life, partner's career prospects and children's education.
- More than 70 per cent and 40 per cent respectively of those who moved to or from the UK said that this had had a negative or very negative effect on their contact with wider family.

Mobility experience does not affect people's impression of work-life balance, job security and working hours:

- For all respondent types at least 20 per cent of people thought that their mobility pattern had had a negative effect on their work-life balance. The highest percentage of negative responses was from those who moved to the UK.
- There are few differences between groups, indicating that mobility experience does not affect people's impression of work-life balance, job security and working hours.

5. Discussion

The evidence from this survey of over 1,200 researchers in the UK supports the broader findings from the literature (Guthrie et al. 2017) that international mobility in research is a broad, multifaceted topic which can be explored and understood in a range of different ways. Mobility encompasses a variety of different experiences based on different motivations, and resulting in different outcomes depending on personal and professional circumstances. Our aim was to explore how different types of mobility and their drivers, barriers and outcomes can be characterised, in order to shed some light on these different mobility pathways and experiences. Though there are many details and nuances, we are able to identify some key messages and trends that build on and advance the existing knowledge base revealed in the literature.

Looking at the patterns of mobility to and from the UK, it is clear that the majority of mobility consists of an exchange of researchers with other major western research systems, notably the US and Germany (partly because these are larger countries) but also other EU countries. Regardless of duration, and whether for PhD studies or subsequent research, these countries dominate mobility to and from the UK. There is a long tail, however, with 71 nationalities reported among survey respondents. This corresponds to previous evidence from the literature, that the larger and stronger research systems dominate overall mobility patterns (Mogu rou & Paola Di Pietrogiacomo 2008; Weert 2013; Moed, Aisati & Plume 2012).

Generally, researchers move for the same reasons whether they are coming to the UK from overseas, or are UK nationals leaving to spend time in another country. As identified

in the literature, for these mobile individuals, professional motivations, particularly career development but also the development of research networks, are the primary motivations for mobility (Bauder 2015; Cantwell 2011; Franzoni, Scellato & Stephan 2012; Guth & Gill 2008; Stephan, Franzoni & Scellato 2013). Barriers are typically of a practical nature, with finding accommodation common to most. For those moving to the UK, maintenance of standard of living is also a common challenge, perhaps reflecting the fact that the UK is an expensive place to live for researchers. For UK nationals, language was commonly listed as a barrier.

Less well explored in the literature are ‘stayers’ – researchers based in the UK who have never worked in another county. Typically, most analyses focus on the experiences of and reasons for active mobility. In this survey, we also asked individuals who had not moved what factors had informed their decision not to be mobile. The results are interesting, with individuals typically staying in the UK for an overall mix of personal and professional reasons rather than solely one or the other. However, when identifying specific barriers and drivers, personal and family factors were the most commonly noted for this group, illustrating the importance of personal reasons in this decision. This also reflects previous findings from EU survey data that personal and family reasons are important to non-mobile researchers (IDEA Consult 2010; Weert 2013).

Another set of motivations that we were able to explore here, and which are not as widely discussed in the literature, are the reasons people return – when UK nationals spend time overseas, what motivates their decision to come

back to the UK? Though this is a type of mobility, we find here that actually their motivations are closer to those of the 'stayers', with a mix of personal and professional reasons together being the most common overall motivation for their decision to return – particularly a combination of personal and family reasons with career development. The same also applies to those from other countries currently working in the UK – when asked about future plans for mobility, personal and family issues were more important reasons to want to move for this group compared to UK nationals (where these were primarily reasons to stay).

Trends around gender and career stage largely bear out previous findings in the literature (IDEA Consult 2010; Weert 2013; Scellato, Franzoni & Stephan 2014; Gibson & McKenzie 2010; Rostan & Höhle 2014). Men are more likely to move than women, and women place more emphasis on a combination of professional and personal reasons than professional reasons alone. However, the differences in motivations and outcomes we found between genders are fairly small and broadly both males and females have similar experiences of mobility. Trends around mobility experiences by career stage are more distinct, with career and skills development being a clear priority for early career researchers, and the postdoctoral period noted as an important period for mobility (particularly longer-term mobility).

Another factor that has been noted previously in the literature (Ackers 2008; Weert 2013; IDEA Consult 2010; Børing et al. 2015) but that is particularly strongly demonstrated by this analysis, is the importance of partners and children in mobility decisions. Respondents indicated that both were barriers to mobility (particularly children, with over 90 per cent of respondents with children indicating that family reasons were important in their decision to stay in the UK). Both groups were more likely to factor personal reasons into their mobility decisions. Previous studies have suggested that children are a particular barrier to women (IDEA Consult

2010; Fernández-Zubieta, Marinelli & Pérez 2013; Sang, Al-Dajani & Özbilgin 2013), but our data suggest this is equally true for both men and women. Especially notable is the challenge of finding suitable employment for a partner. Amongst those with a current long-term partner, this is the primary barrier to mobility in most circumstances (with short-term mobility being the main exception). By analysing just those for whom this problem is relevant, we were better able to demonstrate the significance of these factors than previous studies.

When reflecting on the outcomes of their mobility decisions, people are generally positive, regardless of whether they decided to move or not. We also note that their perceptions align with their motivations – those who have moved, where professional reasons were the major driver, are more positive about the career outcomes of those decisions. Those who decided not to move, typically for a mix of professional and personal reasons, are more positive about the outcomes from a personal perspective. Because of this, and because this analysis is based on perceived outcomes, it is hard to distinguish the extent to which these findings reflect true differences in outcomes based on mobility experience. Instead, they may simply reflect the priorities of those individuals – or indeed may be perceptions that people hold to justify (to themselves and to others) the decisions they have taken. More objective measures of outcomes would be helpful to provide some clarity, but these are difficult to come by. There is evidence from the literature that mobile researchers have better academic outputs and build better networks (Dubois, Rochet & Schlenker 2014; Franzoni, Scellato & Stephan 2014; Halevi, Moed & Bar-Ilan 2016; Scellato, Franzoni & Stephan 2012; Science Europe & Elsevier 2013), but causality is hard to establish (Hunter, Oswald & Charlton 2009; Veugelers & Van Bouwel 2015; Franzoni, Scellato & Stephan 2014). Measuring personal outcomes is even more difficult and would suffer from the same problems around causality.

The findings of this analysis also suggest that previous mobility experiences have an important impact on future plans as well as on the perceptions around barriers to mobility. People who have moved before are more likely to plan to move in the future, and also less likely to perceive some of the barriers to mobility than those who have not moved. Amongst those who have previous experience of mobility (whether to or from the UK), challenges around moving with a partner and children are less strongly emphasised, for example. In particular, those who have previously moved for a short period are very likely to plan to move again in the future.

Finally, a key finding of this analysis, and one which has not been empirically demonstrated in many previous studies, is that most researchers feel that there is an expectation that good researchers are internationally mobile. This feeling persists for a majority of respondents across all subgroups analysed in the survey and is supported by the wider survey findings, such as the observation that career development is a key driver of mobility. This concept has been previously suggested in the literature (Robertson 2010; Cantwell 2011; Ackers 2008; Bauder 2015) but our findings provide clear evidence to support the concept that for academic researchers in the UK, there is an expectation to move in order to have a successful career in academia.

Appendix A: Methods

We conducted two online surveys, one focusing on academic researchers, and another focusing on industry researchers. As noted in the introduction, the analysis presented in Chapters 2–5 focuses on the results of the academic survey. However, we set out methods for both surveys here as it is informative to reflect on the challenges of accessing the population of industry researchers. The approaches taken to sampling, survey design and analysis are set out in turn below.

Sampling

Survey of academic researchers

For the survey of academic researchers, we wanted to capture both researchers in Higher Education Institutions (HEIs) and those at Public Sector Research Establishments (PSREs) and Research Institutes (RIs). In each case, our approach was to select a sample of institutions and identify a central contact point (e.g. Centre Director, Pro-Vice Chancellor for Research). We then approached that individual and asked if they would be willing to distribute the survey to their research staff. In addition, we shared a survey link through the RAND Europe and Royal Society Twitter accounts. This produced a very limited number of responses, the majority being received via the more targeted approach. The method by which institutions were identified and selected is set out below.

For HEIs, we generated a sample of institutions based on data from the Higher Education Statistics Agency (HESA). We identified six geographical regions: London and the South East; the North; the South West and the Midlands; Scotland; Wales; and Northern

Ireland. In addition, we stratified the institutions in terms of their research income, as a proxy for research activity/quality at each institution, and in terms of their size, based on number of FTE staff. For research income, institutions were grouped into two categories: high research income, of over £100 million (accounting for more than 72 per cent of funding, but less than 14 per cent of institutions); and low research income. For institution size we used two groups: large institutions (3,400 FTE staff or more), and small institutions. The division is such that the FTEs in the sector are split evenly between the two groups (we considered using a similar approach for funding – with half the funding in each category – but this would have left only 10 institutions in the high research income category). Then, within each group, we selected the institution with the highest proportion of international staff (excluding specialist subject institutions, to ensure a diversity of research areas is covered in the final sample). Note that because of the alignment between size and research income, there were no institutions in some groupings (e.g. there were no smaller institutions in Northern Ireland with a high level of research income). A final sample of 15 institutions was thus selected. Where institutions were unable to participate, or we could not contact an appropriate individual to share the survey, we substituted the institution with the next highest proportion of international staff. Overall, we contacted 17 HEIs, of which 11 were willing to distribute the survey to their staff. The final sample included institutions from all six regions, six large institutions, five small institutions, four institutions with a high level of research income, and seven institutions with a lower level of research income.

We selected a sample of PSREs and RIs based on the typology provided in Smith (2015). We categorised the list of organisations identified in that report as PSREs, RIs, cultural organisations or private sector research institutes, and excluded the latter two groupings. From the PSREs and RIs, we selected a random sample of around 20 per cent of each type of organisation, producing a sample of 15 of each. Of the 15 PSREs contacted, six were willing to participate; of the 15 RIs contacted, eight were willing to participate.

Survey of industry researchers

Our approach to the survey of industry researchers was to capture information at the company level. This was because of the experience noted from previous such studies, where it was found that approaching individual researchers directly was challenging. The survey was designed to be completed by a member of HR staff or other central person within an organisation. Also, to maximize the relevance of the responses received, we aimed to target the survey at R&D-intensive organisations. To do this, we selected a sample based on the UK-based companies listed in the EU top 1000 companies ranked by R&D intensity. We stratified this sample into three groups by size, selecting 40 small companies (here defined as 100 employees or less), 40 medium-sized enterprises (101–10,000 employees) and 40 large companies (more than 10,000 employees). Within each of those groups, we selected the companies with the highest level of R&D intensity. We didn't stratify by sector, because of the wide variety of sectors listed, but the selection process nevertheless resulted in a diverse mix of sectors. To approach selected companies, we used three routes. Firstly, we approached a range of sector-level bodies where the Royal Society or RAND Europe had existing contacts, and asked them to share the survey with any of the companies listed within their membership. Next, we used any direct contacts we had at these organisations and asked them to pass the survey on to the relevant member

of staff. Finally, we searched online for contact details and approached individuals by email or telephone.

In addition to this sample of R&D-intensive companies, we hoped to reach a number of start-up companies. To do this, we approached a sample of accelerators and incubators selected randomly from Nesta's database of UK accelerators and incubators (Nesta 2016), and asked them whether they would be willing to circulate the survey to the companies they support.

This initial strategy was broadened on the basis of low response rates, and we asked sector-level bodies to circulate the survey to their wider membership where they were willing and able to do so, and we also circulated the survey through any networks we were members of (e.g. the Cambridge Network) and to a wider group of companies where we had existing contacts. Despite these efforts, and considerable willingness amongst sector-level bodies and networks to circulate this survey to their members, we still received very few responses. Of the 120 companies targeted, four responded. In addition, a further two companies reached through wider networks responded, giving a total of six responses, covering around 68,000 UK research staff.

One challenge was that since our widest distribution network was indirect (through the sector-level bodies), we were unable to coordinate follow up to non-respondents centrally, since we did not have the direct contact details for the companies ourselves. However, even where we were able to contact companies directly, the level of response was poor. Reflecting on our experience and those of others attempting to contact industry respondents for this type of survey, we can identify several potential barriers that need to be overcome in order to gather data on this important population. The first is lack of engagement. International mobility is a topical issue for academic researchers, who have considerable concerns

around their ability to move and the implications for their research. This is perhaps less the case amongst industry researchers. Industry researchers may also be less inclined to move, and spending time abroad may be less crucial to career advancement. Targeting HR staff may also be ineffective, as for them mobility is not a pressing issue – though this approach was taken because of the difficulties in identifying and contacting research staff directly. We think it is unlikely that companies would have been willing to distribute an individual-level survey to their staff in the way that academic institutions were willing to. However, this approach could be explored. Finally, the name of the Royal Society might also carry less weight amongst the industry research sector compared to academia, where it is very well known and respected.

Survey design

Survey of academic researchers

We designed the academic survey with the aim of capturing information on the mobility patterns, drivers and outcomes amongst this group, with a particular focus on addressing some of the evidence gaps identified through the literature review:

- UK immigration rules and visa processes
- Impact of personal circumstances on mobility decisions (particularly partner and/or children)
- Differences in motivations/barriers depending on length of stay
- Differences in motivations/outcomes depending on direction of travel
- Whether there is an 'expectation' of mobility in academia.

Additionally, we aimed to make the survey as low burden as possible, taking no more than 10–15 minutes for each individual to complete. To achieve this, we used branching logic, so that respondents only saw questions relevant

to them. For example, UK nationals would not see questions about applying for a UK visa, and those without any children would not see questions asking about the impact of children on propensity to move. We drew extensively on the existing literature; for example, the lists of barriers and drivers as well as the potential outcomes of mobility were developed in light of the findings of our literature review. Also, where possible, we have reflected the language used in other surveys, in order to aid comparability. Most notably, there is correspondence between a number of questions in this survey and the survey of National Academy Fellows and grant recipients (Opinion Leader 2017) which looks at mobility as part of a wider survey on the international nature of research (also covering collaboration, for example). The full question set for this survey was shared with the project team and has been used as a basis for a number of questions.

The survey questions were implemented in SurveyMonkey, using branching logic so that researchers only see the questions relevant to their circumstances. This approach ensured the survey was quick to complete (10–15 minutes). The survey was piloted with five individuals, resulting in some minor changes, such as clarification to the wording on some of the options around the barriers and drivers of mobility. No major changes were made. The survey was shared with senior respondents at a range of institutions, as described in the sampling approach above. Where institutions were willing to participate, the survey was then distributed by email to researchers at those institutions. Information at the start of the survey detailed the confidentiality arrangements (see supplementary document 'International mobility of researchers: Full survey text').

Survey of industry researchers

Here too burden was a key consideration, so the industry survey was designed to be short enough to complete in 10 minutes. We also tried to ensure that all the information requested would

be readily available to a member of a company's HR team, and to be clear where approximate answers were sufficient rather than precise data. The survey focused on capturing information on the international make-up of the company's workforce, patterns of movement, overseas recruitment strategies, and the importance and contribution of international staff to the company (as well as the benefits/motivations for those staff). Necessarily, this approach required one individual to reflect on the overall experiences across their company, which may be diverse. The approach is therefore limited in terms of what it can say about individual-level motivations – the results will rather be a reflection of the motivations that are communicated to colleagues centrally.

However, the approach does allow company-level information to be collected, and, theoretically, could offer useful wider information on patterns, giving overall impressions of the movement of the research workforce. Low response rates, however, have limited its utility for this purpose. The web-based survey (implemented in SurveyMonkey) was piloted with three individuals and a number of more detailed questions were removed on the basis that relevant data would not be readily available to respondents. We discussed confidentiality concerns, but pilot respondents indicated that the information requested was unlikely to be sensitive for most organisations. Nonetheless, we made it clear in the survey introduction and invitation materials that all data would be handled in a confidential manner.

Analysis

Survey of academic researchers

Responses to the academic survey were analysed using R, an open-access programming language and software environment. Initially, the population of respondents was analysed by demographic and professional characteristics and the results were compared to information

readily available from the Higher Education Statistics Agency (HESA 2017), in order to assess the extent to which the survey sample was reflective of the wider researcher population in the UK. Less information of this type regarding the wider population is available for PSRE or RI staff, so we have assumed that these groups have a similar demographic make up to the researcher population at HEIs. This is probably a reasonable assumption for RI staff, but might be a limitation for PSRE staff, who we expect are more likely to have come from other less traditional academic routes. The representativeness of the sample was analysed and reflections were made on the likely implications of this for the outcomes of the survey and the potential caveats of our findings (see Appendix B).

Descriptive statistics were then produced, setting out the basic results for each question, first for the sample as a whole, then broken down for the different institution types, and for other characteristics (e.g. UK vs non-UK nationality, career stage, gender). Cross question analysis was conducted to allow us to start to bring together patterns, and look at the relationships across areas – for example, how do drivers and barriers depend on career stage, length of mobility, and personal factors such as relationship status? Or how do motivations for moving correspond to the outcomes experienced? This type of cross question analysis was conducted where there was a sufficient number of responses to particular questions, and subject to statistical significance testing using a chi-squared test (where feasible given the number of respondents, and using a standard cut-off of $p < 0.05$). The outcomes of the initial quantitative analysis were discussed at a project team workshop where themes, patterns and observations were identified and findings grouped for the purposes of reporting. Based on this initial team workshop, further analyses were conducted as required to support the emerging themes and issues, then discussed again at the team level to generate the results and conclusions presented in Chapters 3 and

4. By systematically analyzing each question at an individual level, and discussing the full data set at the team level, we aimed to avoid any systematic biases (which may result from personal perceptions and experience). At the workshop, we also reflected on our findings in the context of the wider literature reviewed by the team for the accompanying literature review (Guthrie et al. 2017). This allowed us to set the work in context, and identify any novel or unexpected findings for further investigation and testing. As noted above, a number of the questions used in the survey replicated those in a survey of National Academy Fellows and grant recipients (Opinion Leader 2017). For

those questions, we have reflected on any interesting differences or commonalities between the responses received from this group of 'elite' researchers and our own wider survey of UK researchers.

Survey of industry researchers

Because of the small number of responses, the industry survey data was not formally analysed in a quantitative manner. The results were reviewed by two researchers, and possible reasons for low response levels were identified on a qualitative level.

Appendix B: Respondent profile and characteristics

This appendix sets out details regarding the size and profile of the response to the academia survey. Comparisons are also made, where feasible, to national-level data sets to allow us to assess the extent to which our sample is representative of the population as a whole. The sampling approach was not intended to provide a completely representative sample of the UK researcher population – instead we aimed to capture a range of viewpoints in order to explore mobility from different perspectives. However, it is still useful to know how well the survey respondents are characteristic of the wider population and hence how far the findings can be translated to the wider context.

Number of responses

The survey received a total of 1,374 responses, of which 1,285 (94 per cent) were from respondents who identified themselves as active researchers in the first question and were thus eligible to complete the remainder of the survey. In this appendix, the term ‘respondents’ refers to this group of 1,285 active researchers (or the subset of them who answered a given question). It is not meaningful to provide a response rate, since the survey was distributed via central management at individual institutions and we do not know how many individuals received it. In addition, the survey was made available on Twitter. However, we can say that the figure of 1,285 is around 0.6 per cent of the current UK academic and public sector workforce (HESA 2017).

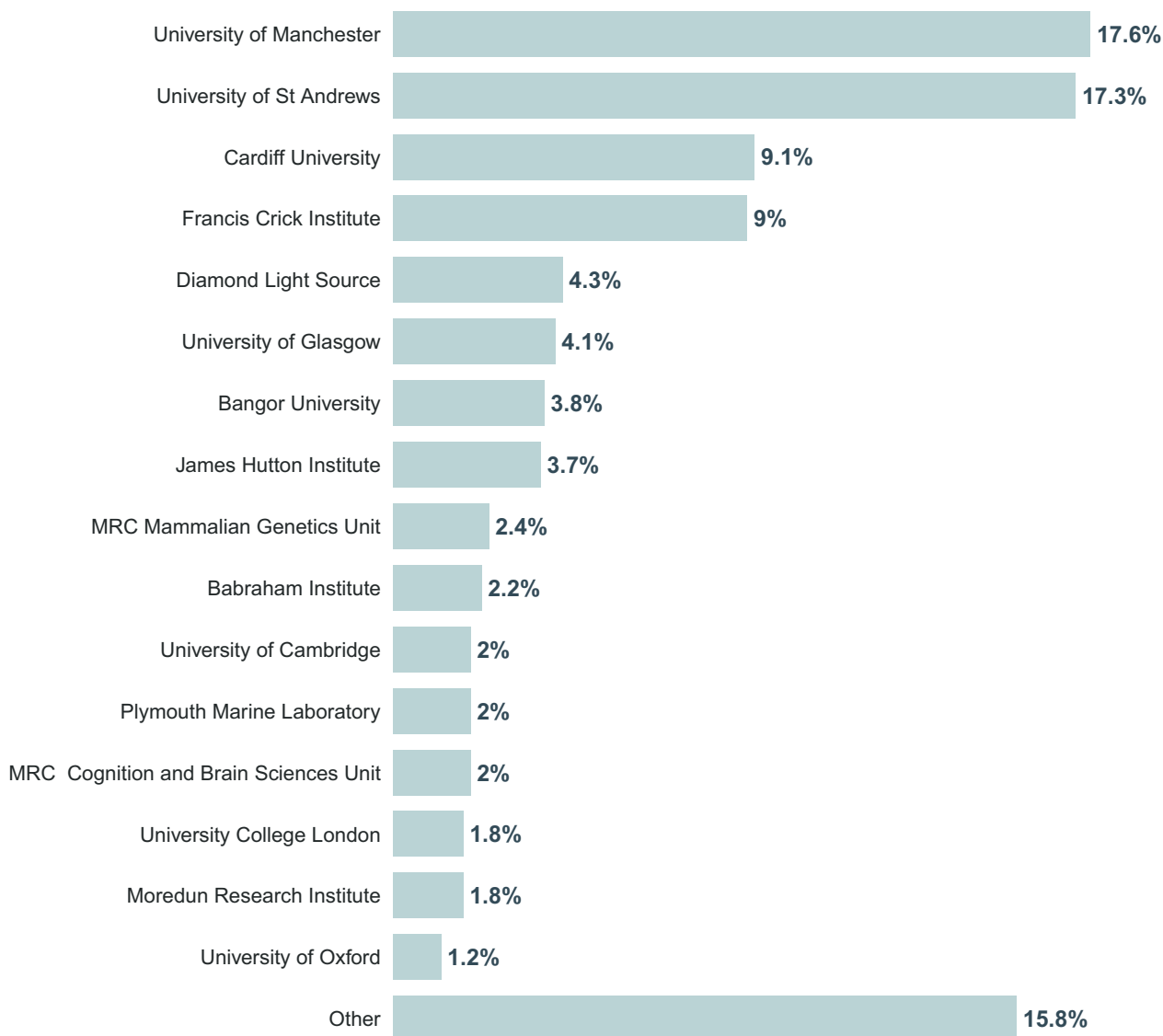
Institutions

Respondents were asked to name one institution as their main affiliation, and they identified a total of 78 institutions (Figure A.1). Overall, 736 respondents (57 per cent) were affiliated with an HEI, while 336 (26 per cent) were affiliated with a PSRE/RI (213 respondents or 17 per cent did not provide an institutional affiliation). The top three most frequently identified HEIs were the University of Manchester (189 respondents), the University of St Andrews (185) and Cardiff University (98). The top three most frequently identified PSREs/RIs were the Francis Crick Institute (96 respondents), the Diamond Light Source (46) and the James Hutton Institute (40).

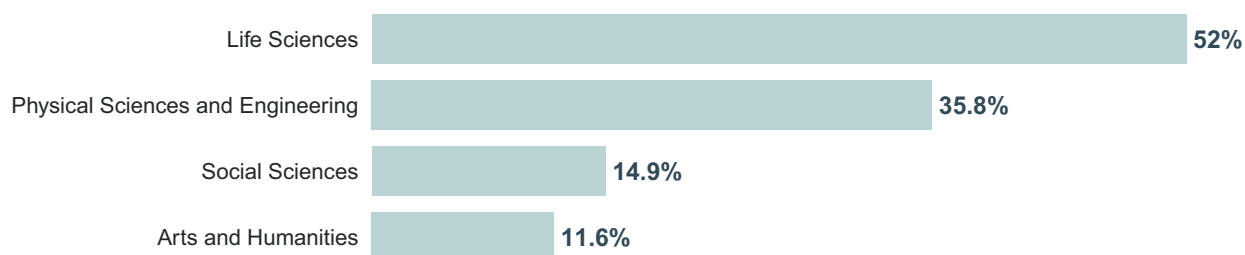
Looking at Table A.1, our sample over-represents Scotland and Wales, and under-represents some of the English regions, notably the South West and the Midlands. We also have an over-representation of researchers from institutions with a high level of research income, as well as an over-representation of larger institutions. Note that the comparison of research income and institution size only includes HEIs, and it is likely that most of the PSREs/RIs fall into the smaller income and institution size bracket.

Disciplines

Respondents were asked to identify their main research discipline from a list of 36 options and 911 respondents did so. For ease of analysis, the disciplines were grouped into four broad categories, as shown in Figure A.2. The largest group of respondents (52 per cent) identified an area of life sciences as their main research discipline.

Figure A.1. Respondents' institutional affiliations

Note: Respondents were asked to choose one option from a drop-down list of all UK HEIs, PSREs and RIs to answer the question: 'Which of these institutions is your primary affiliation?' The figure shows all institutions with at least 13 respondents (1 per cent of all respondents) individually, with the remaining 62 institutions grouped as 'Other'.

Figure A.2. Respondents' main field of research

Note: Respondents were asked to tick applicable options from a set of 36 options to answer the question: 'Which of the following best describes your discipline? Please select all those that apply and then the discipline that you mainly associate yourself with.' Responses for the main discipline part of the question are shown here and they have been grouped as described in Table 1.1.

Table A.1. Comparison of institutional characteristics between the survey sample and the UK researcher population (showing the proportion of researchers from institutions with the given characteristics)

Characteristic	Grouping	Survey sample (%)	Population (%)
Region*	London and the South East	24	32
	North of England	20	24
	South West of England and the Midlands	13	28
	Wales	13	4.7
	Northern Ireland	0.7	1.7
	Scotland	29	10
Research income**	Below £100m	40	58
	Above £100m	60	42
Institution size**	Large (>3400 FTEs)	61	50
	Small (<3400 FTEs)	39	50

Source: HESA Finance, student & staff data 2014/15 (HESA 2017). Population-level data is for HEIs only.

* Region data for the survey sample includes HEIs and PSREs/Ris.

** Research income and institution size data based on HEIs only.

Table A.2. Comparison of disciplines between the survey sample and UK researcher population

Discipline	Survey sample (%)	Population (%)
Life Sciences	52	32.7
Physical Sciences and Engineering	25.8	21.2
Social Sciences	14.9	27.2
Arts and Humanities	11.6	18.9

Source: HESA Academic staff by cost centre 2015/16 (HESA 2017). Cost centres reclassified against REF main panels for comparison purposes. Population-level data covers those who return data to HESA only (HEIs and some RIs).

Compared to the overall UK researcher population, we have an over-representation of respondents from the life sciences in our sample, and an under-representation of the social sciences in particular.

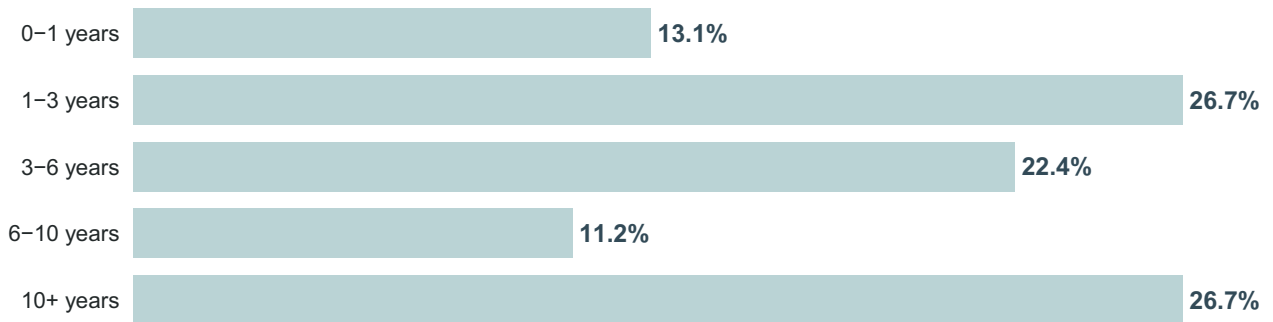
Career stage

The majority of respondents (60 per cent) had been at their institution of primary affiliation for at least three years. Just over one quarter (27 per cent) had been there for more than 10 years, while the same proportion had been there for between one and three years (Figure A.3).

In terms of current position, the largest group of respondents was postdoctoral researchers (23 per cent), followed by lecturers and research fellows (21 per cent) and PhD students (17 per cent) (Figure A.4). Professors and emeritus professors made up 13 per cent of the respondents.

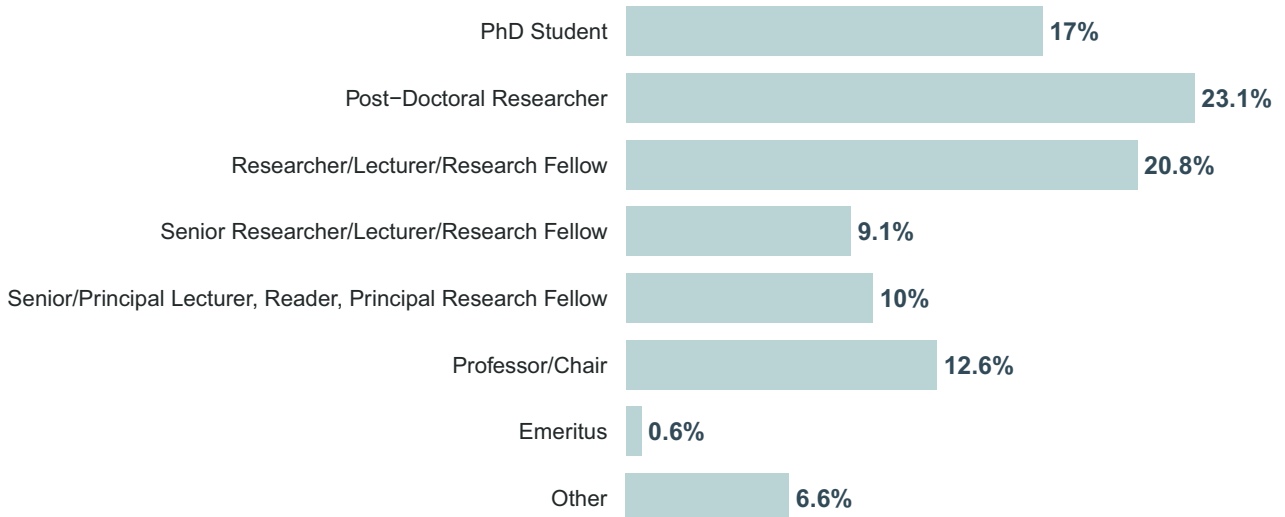
The majority of respondents (73 per cent) had been working as researchers for 20 years or less, including their postgraduate and/or PhD studies (Figure A.5). A large proportion (44 per cent) had been working as researchers for 10 years or less.

Figure A.3. Number of years respondents have spent at their current institution



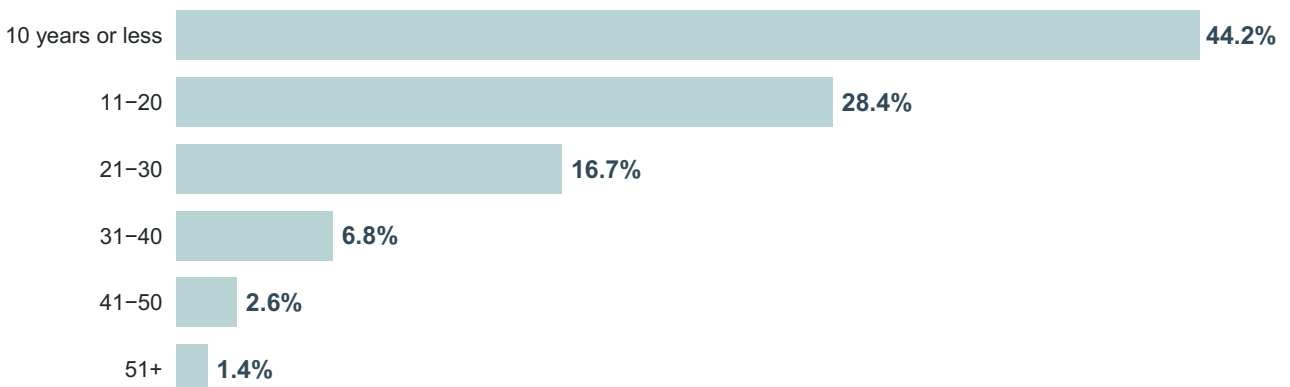
Note: Respondents were asked to select one response from among the options shown to answer the question: 'How many years have you been at this institution?'

Figure A.4. Respondents' current positions



Note: Respondents were asked to select one response from among the options shown to answer the question: 'What is your current position?'

Figure A.5. Number of years respondents have been working as researchers



Note: Respondents were asked to select one response from among the options shown to answer the question: 'How many years have you been research active, including postgraduate/PhD study?'

Personal demographics

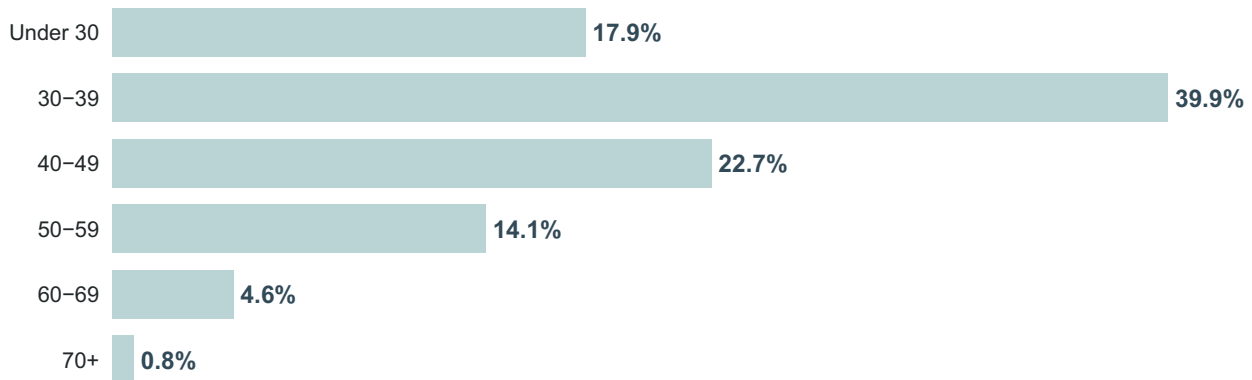
Just over half of the respondents (51 per cent) identified as female; 48 per cent identified as male and 1 per cent preferred not to provide this information.²⁰ At HEIs in the UK, approximately 55 per cent of academic staff are male and 45 per cent female, suggesting the latter may be over-represented in our sample.²¹ The majority of respondents (58 per cent) were below age 40, with 40 per cent in their 30s (Figure A.6). Our sample is fairly representative of the general UK researcher population, which at HEIs is 13 per cent aged 30 and under, 32 per cent aged 31–40, 28 per cent aged 41–50, 22 per cent aged 51–60, and 5 per cent aged 61+.

The majority of respondents (70 per cent) identified their relationship status as ‘cohabiting/married/civil partnership’, while 24 per cent were

single.²² The other respondents who chose to answer this question were divorced/separated, widowed, or else preferred not to provide the information. A total of 35 per cent of respondents stated that they have dependent children.²³

Just over half of respondents (51 per cent) said they have UK nationality (Figure A.7). A breakdown by nationality is provided in Table A.3. The survey sample has an over-representation of EU respondents, and an under-representation of UK respondents compared to the general UK researcher population, perhaps reflecting our choice to focus on institutions with a higher proportion of international staff (so that we could access a wider range of views on mobility). Responses were analysed for UK and non-UK respondents both separately and collectively, in order to ensure any discrepancies were taken into account.

Figure A.6. Age of respondents



Note: Respondents were asked to select one response from among the options shown to answer the question: ‘What was your age on your last birthday?’

Figure A.7. Proportion of respondents with UK nationality



Note: Respondents were asked to answer yes or no to the question: ‘Do you have UK nationality?’

- 20 There were 1,112 responses to the question about gender.
 21 HESA, proportion of total staff on academic contract 2014/15 (HESA 2017).
 22 There were 1,113 responses to the question about relationship status.
 23 There were 1,109 responses to the question about dependent children.

Table A.3. Comparison of nationality in the survey sample and UK researcher population

Nationality	Survey sample (%)	Population (%)
UK	53.0	70.6
Other EU	31.1	17
Other Europe	1.7	1.2
Africa	0.6	1
Asia	3.3	4.9
Australasia	1.7	0.9
Middle East	0.8	0.8
North America	6.4	3
South America	1.3	0.4
Total non-EU	15.8	12.4

Source: HESA Staff by geographic region of nationality 2015/16 (HESA 2017). Population-level data is for HEIs only.

The vast majority of respondents (88 per cent) identified their ethnicity as white.²⁴ The second largest group of respondents (5 per cent) identified as Asian/Asian British and the remainder were mixed (2 per cent), black/black British (0.5 per cent), or other/preferred not to

say (4.6 per cent). In comparison to national-level data for HEIs, in our sample those of white ethnicity are over-represented and those of black and Asian ethnicity are under-represented.

Table A.4. Comparison of ethnicity in the survey sample and UK researcher population

Ethnicity	Survey sample (%)	Population (%)
Black	0.5	2.3
Asian	5	11.9
Other including mixed	3.8	4.9
White	88	80.9

Source: HESA Staff by geographic region of nationality 2015/16 (HESA 2017). Population-level data is for HEIs only.

Summary

The table below provides a summary of the characteristics of our survey sample compared to the corresponding population-level data, where available.

24 There were 1,102 responses to the question about ethnicity.

Table A.5. Overall comparison of survey sample and UK researcher population characteristics

Characteristic	Grouping	Survey sample (%)	Population (%)
Geography	London and the South East	24	32
	North of England	20	24
	South West of England and the Midlands	13	28
	Wales	13	4.7
	Northern Ireland	0.7	1.7
	Scotland	29	10
Research income**	Below £100M	40	58
	Above £100M	60	42
Institution size**	Large (>3400 FTEs)	61	50
	Small (<3400 FTEs)	39	50
Gender	Male	48	55
	Female	51	45
Age	30 and under	18	13
	31–40	40	32
	41–50	23	28
	51–60	14	22
	61+	5	5
Ethnicity	Black	0.5	2.3
	Asian	5	12
	Other including mixed	4	5
	White	88	81
Primary nationality*	UK	53	71
	Other EU	31	17
	Other Europe	1.7	1.2
	Africa	0.6	1
	Asia	3	5
	Australasia	1.7	0.9
	Middle East	0.8	0.8
	North America	6	3
	South America	1.3	0.4
	Total non-EU	16	12
Discipline*	Life sciences	52	33
	Physical sciences	26	21
	Social sciences	15	27
	Arts and humanities	12	19

Source: HESA data 2014/15 (except where marked * = 2015/16) (HESA 2017). Population-level data is for HEIs only, whilst survey data includes PSREs/RIs (except where marked **). Age groupings are slightly different between the survey and HESA data: bandings given are for the HESA data, and survey data is one year displaced (under 30, 30–39, 40–49, 50–59, 60+).

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