In contrast, in the other discipline areas, there were three, rather than two, main pathways for full-time doctoral researchers. Comparatively, many more had entered doctoral research directly from an undergraduate degree, ranging from 43% in the physical sciences to 30% in biomedical sciences. The proportion in these disciplines that had studied for a Masters or research-only Masters immediately before their doctoral research ranged from 29% in physical sciences to 24% in biological sciences. Just over a quarter (26%) of engineering/technology and biomedical sciences respondents had been in permanent employment, compared with 18% in biological and 14% in physical sciences, although significant proportions had been in temporary employment in most disciplines. Taking the employment types together, fewer physical sciences respondents (24%) had entered doctoral research from employment, compared to other disciplines, for which it was always at least a third.

The picture was rather different for those studying part-time, of whom more than half overall had been working before they started their research, as shown in Figure 5.2. By discipline, this varied from over 60% in education and biomedical sciences, to less than 40% in arts and humanities and physical sciences. Those who were currently employed while undertaking their doctorate part-time were identified as a separate group within the figure. For almost all disciplines, proportionally fewer had entered research either straight from their undergraduate degree or from studying for a Masters qualification, than their full-time equivalents.

It should be noted that as a full employment history was not collected, some respondents would have been employed before undertaking their Masters degrees and some of those who had been employed immediately prior to their doctorate would have obtained a Masters degree previously. HEFCE data suggests that around 42% of recent postgraduate researchers have undertaken a Masters degree at some point, the majority not immediately prior to their doctoral research[25].

Data from PRES 2011 suggest that around 35% of current doctoral researchers progressed from a prior Masters degree, 18% direct from a first degree, and 37% from employment, but the survey did not break this down by discipline or study mode[26].

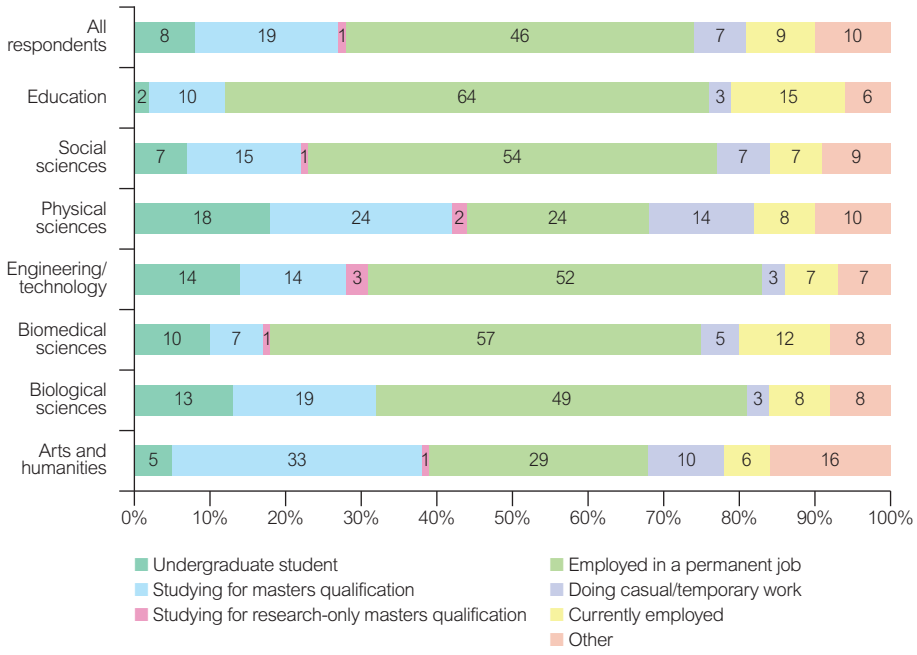

Figure 5.2 Previous activity, by discipline group: all part-time respondents

Table 5.1 Occupational intention by previous activity: all respondents with definite career in mind (%)

	Undergraduate student	Studying for a Masters qualification	Employed in a job that was intended to be permanent	Doing casual/temporary work	All respondents
HE research	13	15	11	14	13
Teaching and lecturing in HE	12	39	32	23	30
Research (not in HE sector)	41	19	16	34	23
Other teaching	9	6	12	5	9
Other common doctoral occupations	17	10	20	15	16
Other occupations	6	5	3	7	5
(N)	233	403	447	134	1361

The occupational intentions of those with a definite career in mind varied depending on their previous activity before starting their doctorate (Table 5.1). Of those who had progressed directly from an undergraduate degree, 41% were thinking about research careers outside the higher education sector and only a quarter about a career in HE (12% of these for a teaching and lecturing role). By contrast higher proportions of those who had previously studied for a Masters degree (39%) or been employed long-term (32%) before commencing doctoral study, aspired to a teaching and lecturing career in HE, while comparatively fewer (19% and 16% respectively) were hoping for a research career outside HE. For many of those who had previously been employed long-term, this could indicate that the choice to undertake doctoral research signalled an intention for a career move into academia rather than facilitating career progression outside the HE sector.

Having understood broadly the main career trajectories undertaken to reach respondents' current doctoral research programmes, we now turn to their experiences during different stages of their higher education pathways.

[25] HEFCE (2009) PhD Study: Trends and Profiles 1996-97 to 2004-05. Bristol: Higher Education Funding Council for England www.hefce.ac.uk/pubs/hefce/2009/09_04/

[26] HEA (2011) Postgraduate Research Experience Survey: 2011 results. Higher Education Academy www.heacademy.ac.uk/assets/documents/postgraduate/PRES_report_2011.pdf

5.2 Higher education: undergraduate and Masters degrees

Half the respondents of UK nationality had undertaken their undergraduate education at a Russell Group university, 20% at a 1994 Group university and 26% at other UK universities. A further 3% of the UK nationals undertook their undergraduate education at a university outside the UK. This shows the strong representation of doctoral researchers with undergraduate degrees from Russell Group institutions, which collectively award around 21% of all UK undergraduate degrees.

Predictably, most respondents from outside the UK had completed their undergraduate education overseas, but a quarter of EU/EEA respondents had undertaken their first degree at a UK university, as had 12% of RoW respondents.

5.2.1 Choice of undergraduate course

In seeking to understand researchers' career intentions, it is worthwhile knowing their motives when they first entered higher education, not least to learn whether they have always intended to pursue research or whether this interest developed during their time at university or later.

Respondents were asked to identify the factors that were most important to them when they chose their undergraduate course (Table 5.2). Five factors were mentioned much more frequently than any others, although this varied by research discipline and to a lesser degree by nationality (the percentages here were of all respondents):

- They had a personal interest/aptitude in this discipline (73%)
- They enjoyed studying this discipline at A-level (or equivalent) (54%)
- They wanted to follow a career in this field (46%)
- The course would keep lots of career options open for them (32%)
- They liked the university/department when they visited it (32%)

Slightly more of the UK respondents mentioned each of these reasons than did non-UK respondents, especially that they enjoyed studying this discipline at A-level (or equivalent) (62% compared with 54% overall).

Having a personal interest/aptitude in the discipline was the most frequently mentioned reason by respondents in every discipline group. Enjoyment of studying the discipline at A-level or equivalent was the second most popular reason for those in all disciplines except for biomedical sciences and engineering/technology, for whom wanting to follow a career in this field was more highly rated. This reason was also mentioned by over half (56%) of those in biological sciences.

The course would keep lots of career options open for me was the factor mentioned more frequently by respondents in engineering/technology (40% overall, and 48% of UK respondents) and physical sciences (43% overall, and 48% of UK) than by those in other disciplines.

Therefore, although personal interest and/or aptitude for a discipline was the dominant reason underlying choice of discipline when choosing their undergraduate course, career-related reasoning was also in the minds of over half of respondents in engineering/technology, biomedical and biological sciences, but fewer than half in the other disciplines.

These results paralleled findings for final-year STEM undergraduates, where (overall) very similar proportions gave these reasons[27], and findings within the longitudinal Futuretrack study[28]. In contrast, more taught postgraduate respondents (67%) in STEM disciplines in that former study had cited a direct career purpose as their motivation for choosing their Masters course[14].

This gives a clear indication that relatively few current doctoral respondents held particular ambitions for a career in research when they first entered university. The desire to pursue research therefore appears largely to develop during or after their first degree.

Table 5.2 Reasons for choice of undergraduate course, by current discipline group: all respondents (%)

	Arts and humanities	Biological sciences	Biomedical sciences	Engineering/ technology	Physical sciences	Social sciences	Education	All respondents
I enjoyed studying this discipline at A-level (or equivalent)	56	65	49	42	67	37	40	54
I had a personal interest/aptitude in this discipline	81	76	71	66	78	61	61	73
I wanted to follow a career in this field	37	56	54	50	45	36	39	46
The course would keep lots of career options open for me	23	26	30	40	43	30	22	32
I wandered into this course after my A-levels (or equivalent)	6	7	7	4	7	8	11	7
I was influenced by my parents/relatives	10	10	13	18	12	15	13	13
I was influenced by other people I know who had studied it	10	6	8	9	6	9	8	8
My teacher at school/college recommended it	14	9	8	10	13	8	7	10
I liked the university/department when I visited it	35	35	28	34	38	23	20	32
It is a required qualification for my chosen career	5	14	16	11	10	6	11	10
Other reason	4	2	3	3	3	4	5	3
Not answered	4	3	3	5	3	6	6	4
(N)	722	620	686	541	997	558	174	4298

[27] CRAC (2011) STEM graduates in non-STEM jobs. London: Department for Business, Innovation & Skills www.bis.gov.uk/assets/biscore/further-education-skills/docs/s/11-771-stem-graduates-in-non-stem-jobs.pdf

[28] HECSU (2008) Stage 1 Future Track report: Applying for university: career choices, (by Elias and Purcell), Warwick: IER for the Higher Education Careers Services Unit www.hecsu.ac.uk/assets/assets/documents/Applying_for_higher_education.pdf

5.2.2 Career plans when first entering university as an undergraduate

Only a minority of respondents had either a definite career in mind (19%) or were considering several alternatives (26%) when they first went to university as undergraduates (Table 5.3). Most (54%) had only a vague idea of possible careers (36%) or no idea at all (18%). Higher proportions of those in education (34%) and biomedical sciences (26%) reported that they had a definite career in mind when they first went to university, and fewer in physical sciences (15%) and social sciences (16%), compared with 19% overall.

Those respondents who had a definite career plan, or who were considering several alternatives when they first went to university were asked what main career they had in mind at that time. Although less than half the respondents had sufficiently well-formed ideas to be asked for this information, only a small proportion (13%) had been consciously considering a career in higher education and a minority of these in higher education research. However, 26% were considering a career in research outside higher education, while over a third (36%) were considering a career in other common doctoral occupations (Table 5.3).

In Table 5.3 the career ideas held at entry to first degree by all respondents with career ideas were compared with the current career aspirations held by respondents overall (reported in section 4.2). Although these samples were not the same, it appears that there were two differences: the much higher proportion now seeking to work within higher education, compared with intentions at first entry to university as an undergraduate, and the similarly high proportion of those seeking to work in non-higher education research. The proportions expecting to work in what we classified as other common doctoral and other occupations were roughly similar.

This possibly indicated one or more of a number of explanations:

- Although these proportions were of those who did have career plans, it may be that those career ideas were not especially well formed prior to university.
- The attractiveness of a career in higher education or in research grows with actual experience of university and research; i.e. respondents knew very little about careers in higher education and/or routes into research careers before entering university.
- It could also be that those considering a career in research may not easily have distinguished higher education research from other research before they entered university.

Table 5.3 Career intentions at point of survey and at entry to university: respondents with a definite career plan or considering several alternatives (%)

	At survey (while in postgraduate study)	At entry (to undergraduate degree)
HE research	17	4
Teaching and lecturing in HE	26	8
Unspecified HE	6	1
Research (not in HE sector)	43	26
Other common doctoral occupations	34	36
Other occupations	14	14
Other teaching	12	9
Occupation not specified	2	1
Not applicable	1	0
(N)	3463	1901

Percentages in 'At survey' column sum to more than 100% as multiple options could be selected

Table 5.4 Career intention at entry to university, by current discipline of research: respondents with a definite career plan or considering several alternatives (%)

	Arts and humanities	Biological sciences	Biomedical sciences	Engineering/ technology	Physical sciences	Social sciences	Education	All
HE research	6	5	1	1	8	3	1	4
Teaching and lecturing in HE	26	4	4	2	4	6	9	8
Unspecified HE	3	1	1	1	1	2	1	1
Research (not in HE sector)	3	52	32	18	43	9	7	26
Other common doctoral occupations	11	26	52	61	29	46	27	36
Other occupations	36	5	4	10	8	27	14	14
Other teaching	14	6	5	6	7	5	40	9
Occupation not specified	2	1	0	0	1	1	1	1
Not applicable	0	0	0	0	1	1	0	0
(N)	316	285	359	251	371	231	88	1901

The distribution of career intentions among this group, who did have early career plans when they first went to university as an undergraduate, differed markedly by research discipline group (see Table 5.4). For example, 35% of arts and humanities respondents were already considering some sort of career within higher education (mostly in higher education teaching) at entry, while 14% were considering a career in other teaching and 36% in other occupations. In contrast, 57% of biological sciences respondents with early career plans were already considering a career in research, but only 5% in higher education research. The picture for physical sciences respondents with career plans was quite similar to that for biological sciences, although with a somewhat higher proportion of them aspiring to enter higher education research.

In a similar manner to the questions reported in section 4.2, those with plans at entry to university were asked to give an illustrative job title. From that information, most of the engineering/technology respondents who had plans (61%) were considering non-research occupations, three quarters of them as engineering specialists within the engineering sector. In a similar way, over half (52%) of biomedical sciences respondents who had plans had been considering careers in other common doctoral occupations, over 80% of them to work in the health sector in either health or social care occupations. Nearly half (46%) of social sciences respondents had been considering other sectors, split between the accountancy and business service sector (20%) and government and public administration (18%), and most were considering job functions such as accountancy and finance, consultancy, and health and social care. Not surprisingly, many education respondents (40%) had already been considering a career in teaching at that time.

5.2.3 Masters degrees

Overall 29% of respondents had been completing a Masters degree immediately before they started their doctoral programme, compared with a figure of 35% which has been reported in PRES (2011)[29]. In reality, a higher proportion than these figures will actually have a Masters degree as some will have completed one at an earlier stage and then been employed, for example, before starting their doctoral research. 80% of those previously studying for a Masters degree did so at a UK university and 16% overseas, while 4% did not give details of where they studied. Just over half (53%) of the respondents who had completed their Masters degree at a UK university had done so at a Russell Group university, 27% at a 1994 Group institution and 20% at another UK university.

5.2.4 Changing institutions

Although details of institutions for all degrees were not obtained, it was possible to track researchers' movements within the higher education system using knowledge of where they completed their undergraduate degree, whether they changed university prior to postgraduate study or doctoral research, and their current institution.

Among those UK respondents who had studied for a Masters degree immediately before their research, two thirds (66%) went on to doctoral research at the same university, with nearly half (46%) of these respondents completing their Masters at the same UK university as their undergraduate degree. From this we can infer that 30% who proceeded directly from a Masters to doctoral research remained in the same university for all three phases of their higher education.

Of those who had not undertaken a Masters degree immediately prior to their doctoral research, 42% of UK respondents were studying for their doctorate at the same university at which they had completed their undergraduate degree. Whether or not any of these respondents had done a Masters at some point prior to postgraduate study was unknown.

5.3 Progression into doctoral research

5.3.1 Reasons for undertaking research

Respondents were asked why they had decided to undertake doctoral research. As shown in Table 5.5, the three reasons most commonly identified, by over half the respondents irrespective of discipline, were:

- They were interested in the discipline (73% overall)
- They wanted to continue studying to a higher level (62%)
- They wanted to develop more specialist knowledge and expertise (58%)

Interest in the discipline was the most frequently cited reason for undertaking postgraduate research regardless of discipline area, while the two other reasons were cited fairly evenly in all disciplines, except for arts and humanities and physical sciences where wanting to continue studying to a higher level was more commonly mentioned.

In addition, a number of other reasons were also mentioned by 30-50% of respondents. These included (with overall percentages):

- It is essential for the career they wished to develop (46%)
- They wanted to develop more high level skills (46%)
- It would broaden the range of potential career opportunities (42%)
- It should help them get the sort of job they want in the long term (32%)

Table 5.5 Reasons for undertaking postgraduate research, by discipline of study: all respondents (%)

	Arts and humanities	Biological sciences	Biomedical sciences	Engineering/ technology	Physical sciences	Social sciences	Education	All respondents
I was interested in this discipline	81	73	68	68	77	65	65	73
I wanted to continue studying to a higher level	70	60	56	52	69	55	63	62
I wanted to develop more specialist knowledge and expertise	61	60	58	56	58	57	56	58
It is essential for the career I wish to develop	55	56	51	30	40	46	32	46
I wanted to develop more high-level skills	38	51	51	47	48	41	41	46
It will broaden the range of potential career opportunities	29	48	49	43	44	39	47	42
It should help me get the type of job I want in the long term	31	41	34	28	32	28	23	32
I wanted to change career direction	12	6	12	12	9	16	17	11
It was difficult to get the type of job I wanted at the time	4	7	4	12	8	7	3	7
I was unable to get degree-related work with my first degree	5	6	4	4	4	4	1	4
Other reason	3	2	3	4	2	4	8	3
(N)	722	620	686	541	997	558	174	4298

Note: Column percentages may not sum to 100% as multiple responses were allowed

[29] HEA (2011) Postgraduate Research Experience Survey: 2011 results. Higher Education Academy http://www.heacademy.ac.uk/assets/documents/postgraduate/PRES_report_2011.pdf

Table 5.6 Main reasons for undertaking postgraduate research, by career intention: all respondents with a definite career in mind or considering several alternatives (%)

	HE research	Teaching and lecturing in HE	Other HE	Research (not in HE sector)	Other common doctoral occupations	Other occupations	Other teaching	Occupation not specified	Not answered	All
Interested in this discipline	78	73	73	76	69	74	74	54	54	72
Wanted to continue studying to a higher level	68	67	60	63	52	65	66	43	63	61
Wanted to develop more specialist knowledge and expertise	64	62	60	64	57	61	59	51	50	61
Essential for the career I wish to develop	56	65	51	53	35	38	42	35	42	52
Wanted to develop more high-level skills	47	41	45	53	48	45	49	43	29	47
To broaden range of potential career opportunities	41	36	46	50	49	48	44	34	33	42
To help me get the type of job I want in the long term	36	35	34	40	32	34	32	18	21	34
(N)	574	888	194	1499	1187	495	416	68	24	3463

Note: Column percentages may not sum to 100% as multiple responses were allowed

Some of these reasons were mentioned more or less frequently by respondents in certain disciplines. Essential for the career they wished to develop was indicated as a reason by fewer in engineering/technology (30%, and just 19% of UK respondents) and in education (32%) than other disciplines. Broadening the range of potential career opportunities was highlighted as a reason for undertaking their doctoral research by only 29% of respondents in arts and humanities, but by up to half in some disciplines. On the other hand, 41% of respondents in the biological sciences thought their discipline of study would help them get the sort of job they wanted in the long term, compared with 32% overall.

What this showed was some variance in the reasoning of current doctoral researchers in terms of their decision to undertake research at this level. Although interest in the discipline and a passion to develop high level knowledge and expertise within it were major drivers for almost all, career-oriented reasons were significant for fewer and this varied by discipline. This is similar to results in PRES 2011 where around 40% expressed career-related motivations to undertake a research degree[30]. Career or job-related reasons were cited by relatively few respondents in engineering/technology, perhaps reflecting the perception that a doctorate does not add greatly to career options from that field, but these reasons were mentioned by many more in arts and humanities and biological and biomedical sciences. The relatively high proportion (up to half) in STEM disciplines who considered that a doctorate broadened their career options was presumably indicative of the wide value placed on STEM qualifications within many employment sectors (as demonstrated for STEM undergraduates[31]).

Some of these correlations were demonstrated in Table 5.6, where the main reasons for undertaking doctoral research were analysed by respondents' current career intentions. Although interest in the discipline was high as a motivator for all, there was marked variation in the proportions citing being essential for the career they wished to develop as a reason. As might be expected, almost twice as many of those seeking a higher education teaching career cited this reason as those seeking to work in occupations outside higher education or research.

5.3.2 Would respondents choose the same doctoral research programme again?

Almost three quarters of respondents (74%) would do the same or a similar doctoral programme if they were to start again (Table 5.7). Overall, 15% would do a different doctoral research programme, compared to 24% of final year undergraduates who would do a different degree[32]; only 6% would not do postgraduate research at all, while 6% did not know what they would do if they had their time again. This seems to be a positive endorsement of their choice to undertake doctoral research. There was relatively little difference with discipline studied; the proportion who would do the same programme again varied between 79% of arts and humanities respondents to 72% in biological sciences and engineering/technology. In all discipline groups only 1 in 10 (or fewer) would not do postgraduate research if they were given the chance again.

Although PRES seeks a rating of overall research experience against expectations, results were broadly in line with these figures. In PRES 2011, 64% felt that their experience exceeded their expectations, for 22% it met expectations and 14% reported that their experience was below their expectations.

When analysed by year of their doctoral study, respondents in different years gave slightly different answers to this question. The proportion overall that would do the same doctoral research programme again was 78% of those in years one and two, but only 69% of final year respondents (Table 5.7). The proportion who would do a different doctoral programme was 13% for those in years one and two but 18% amongst final-years. The percentage that would not do postgraduate research again at all was only 4% of early years but 10% of final-year respondents.

This trend of slightly less satisfaction in later years was present at least partly within all discipline groups. The trend was evident in Figure 5.3, based on the proportions of final-year respondents at different stages of study who would do the same or a similar doctoral programme again. Higher proportions of those in years one or two would do the same programme again than final-years, in all disciplines except education. The lowest proportions of final-year respondents who would do the same again were in biological sciences (63%), engineering/technology (64%) and social sciences (65%). Notably, 15% biological sciences would not do postgraduate research at all, almost double the proportion of first or second years in this discipline.

[30] HEA (2011) Postgraduate Research Experience Survey: 2011 results. Higher Education Academy http://www.heacademy.ac.uk/assets/documents/postgraduate/PRES_report_2011.pdf

[31] CRAC (2011) STEM graduates in non-STEM jobs. London: Department for Business, Innovation & Skills www.bis.gov.uk/assets/biscore/further-education-skills/docs/s/11-771-stem-graduates-in-non-stem-jobs.pdf

[32] CRAC (2011) STEM graduates in non-STEM jobs. London: Department for Business, Innovation & Skills www.bis.gov.uk/assets/biscore/further-education-skills/docs/s/11-771-stem-graduates-in-non-stem-jobs.pdf

Table 5.7 Given the chance, whether respondents would choose the same postgraduate programme again, by stage of study: all respondents (%)

	First or second year	Third of four year	Final year	All respondents
Same or similar doctoral research programme	78	73	69	74
Do a different doctoral research programme	13	16	18	15
Not do postgraduate research	4	7	10	6
Delay your entry to higher education	6	6	5	6
Not go to university at all	1	2	1	1
Don't know	6	5	6	6
Other reason	2	3	3	3
(N)	1723	408	1150	3281

Note: Column percentages may not sum to 100% as multiple responses were allowed

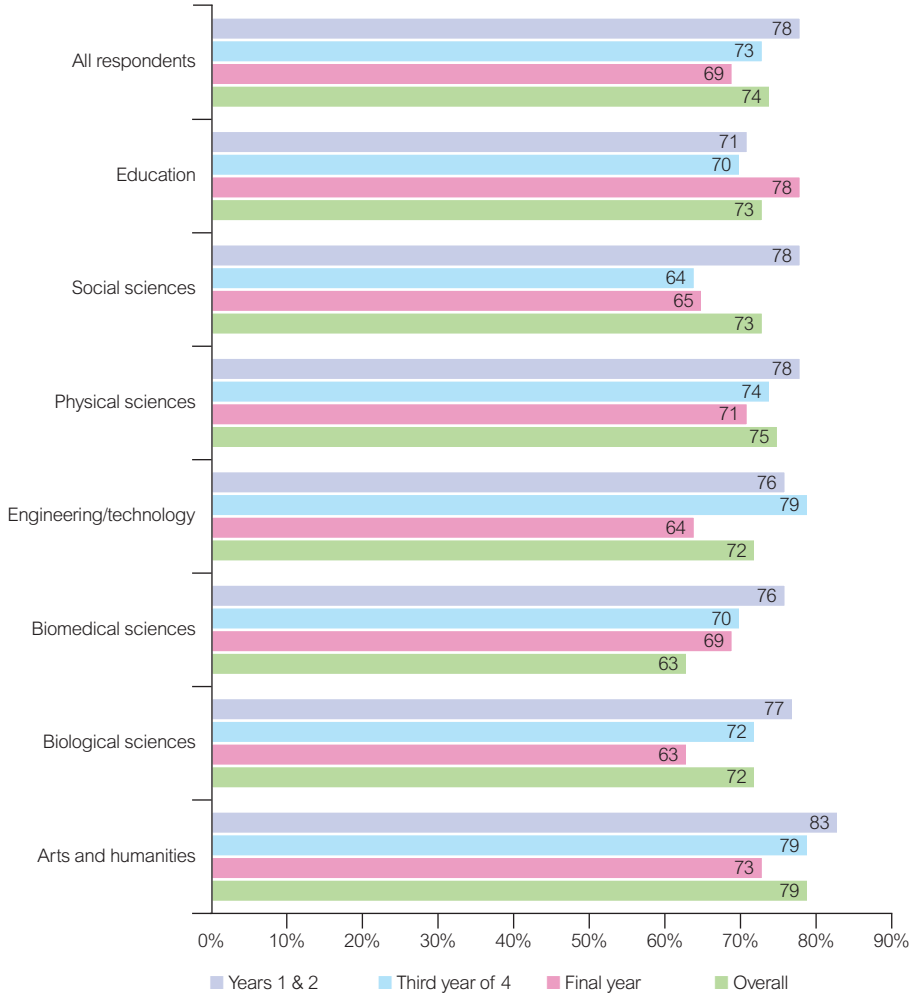

Figure 5.3 Respondents at different stages who would choose the same postgraduate programme again, by discipline of study: all respondents

5.4 Summary

In this section we noted the wide variation in career trajectories that individuals took in progressing to doctoral research. It was important to note how these applied in different disciplines and to different groups, as they may well affect the context for research and also future career aspirations.

The decision to undertake doctoral research was chiefly driven by interest and enjoyment in the discipline and a desire to develop more specialist knowledge and expertise, for all disciplines. Reasons which were more obviously career-related were expressed by lower proportions (30-40%) and this varied somewhat by discipline.

There is a clear indication that the decision to undertake research was taken during or after first degree for most, as very few had been thinking about a research career prior to entering their undergraduate degree.

On the basis of the rather crude measure of whether they would make the same choice again, high proportions appeared to be satisfied that they had undertaken their doctoral research, although with a slight but discernible decrease in this proportion as they progressed through the years of their doctoral study. This overall satisfaction for the majority presumably supported aspirations to continue a career in research in one form or another.

6 Work experience

Structured work experience for higher education students, through placements and internships, is currently receiving much attention for its value in improving the employability skills and potential employment of graduates. We have already noted that many doctoral researchers have mentioned it as a significant influence in their career thinking.

Overall, just over half (52%) of all respondents reported that they had undertaken degree-related work experience while undergraduates, but rather fewer (35%) had undertaken study/research-related work experience while postgraduates. Significant differences emerged amongst different groups of respondents (Figure 6.1). Of UK full-time respondents, only 27% had study-related work experience as postgraduates (half of whom had also undertaken it as an undergraduate), 36% had only undergraduate work experience and 36% had no work experience at all.

A higher proportion of UK part-time respondents had work experience (41%) related to their postgraduate study, which presumably reflects that many were working part-time in areas related to their research. For simplicity, the remainder of this section focuses on full-time respondents.

Significantly more full-time respondents from outside the UK (42%) reported that they had postgraduate study-related work experience, and fewer (26%) none at all, compared to UK full-time respondents (36%).

Interestingly there was no significant difference between the proportion of first and second year respondents who had undertaken study-related work experience as a postgraduate and those in their third or final years. This presumably indicates that most researchers who undertook any work experience related to their research tended to do so early in their doctoral programmes.

There were also differences in the proportions of researchers who had undertaken study-related work experience by discipline area.

For undergraduates:
Less than half of the respondents in arts and humanities (38%), social sciences (46%) or education (47%) had undertaken degree-related work experience while undergraduates, compared with higher proportions in engineering/technology and biomedical sciences (59%) and biological sciences (57%). Recent research with final-year STEM undergraduates[33] gives a broadly similar figure for engineers (c.65%) but a somewhat lower figure for biological scientists (c.45%). Notably this research also showed a strong correlation between those with undergraduate degree-related work experience and those with better formed career ideas.

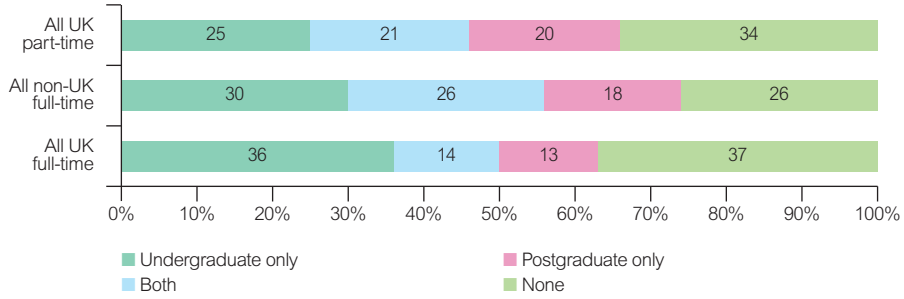

Figure 6.1 Undergraduate and postgraduate study/research related work experience

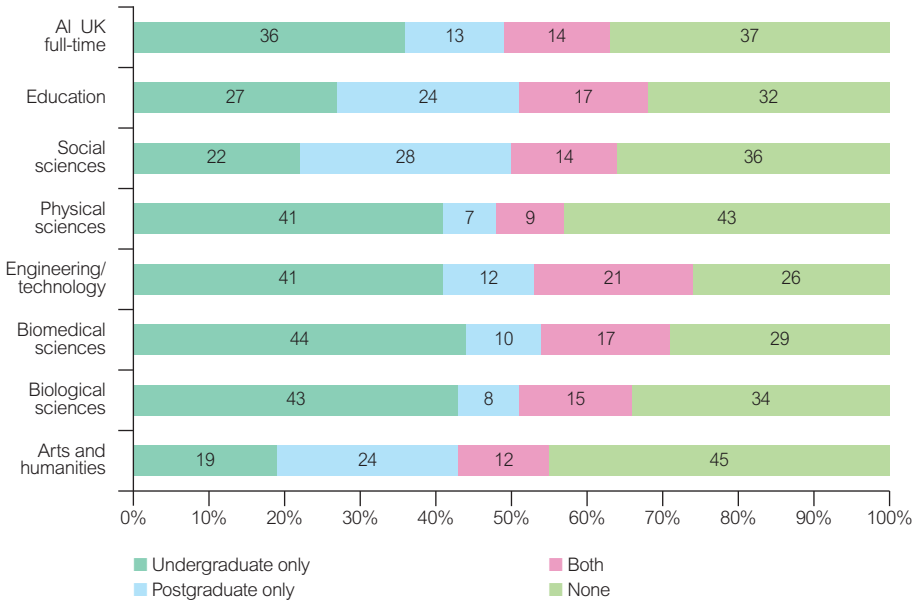

Figure 6.2 Undergraduate and postgraduate work experience: all UK full-time respondents

For postgraduates:
However, this trend by discipline group appeared to be reversed at postgraduate level, with higher proportions of social sciences (52%), education (50%) and arts and humanities (41%) respondents having work experience related to their postgraduate study/research, compared with only 23% in physical sciences and 28% in biological sciences. For both these disciplines, the contrast between the proportions with postgraduate and undergraduate work experience was especially marked.
These variations were seen in Figure 6.2, which is for UK full-time respondents only.

It also showed that the proportion with some kind of work experience was highest amongst those in engineering/technology (75%) and biomedical sciences (72%). At least a quarter of respondents, in all disciplines, and over 40% in some disciplines, had no study-related work experience.

[33] CRAC (2011) STEM graduates in non-STEM jobs. London: Department for Business, Innovation & Skills
www.bis.gov.uk/assets/biscore/further-education-skills/docs/s/11-771-stem-graduates-in-non-stem-jobs.pdf

Given the significant differences in the profile of researchers in the different discipline groups, it was worthwhile analysing the data further. In Figure 6.3, the percentage with postgraduate study-related work experience was shown for respondents in different discipline groups, according to their previous activity. This showed that the trend in levels of work experience was not an artefact of higher proportions having been employed prior to research, which would also be related to differing age profiles, but subsisted across all career trajectories. Why the contrasts exist, and how they relate to differential rates of opportunity to undertake degree-related work experience or different cultures within doctoral research programmes, is worthy of further study.

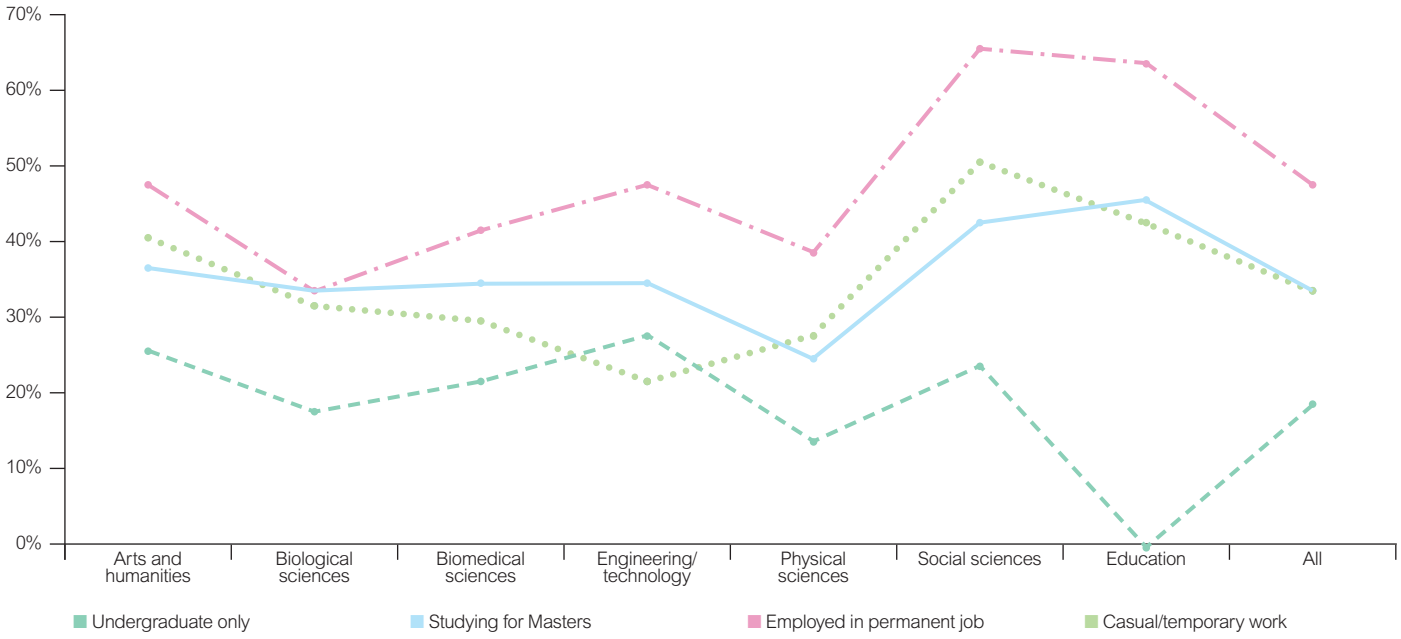

Figure 6.3 Percentage of researchers with postgraduate work experience by prior activity: all full-time respondents

6.1 Impact of degree-related work experience as an undergraduate

The vast majority of respondents who had degree-related work experience as an undergraduate described it as having been positive, either very helpful (47%) or quite helpful (32%), towards completion of their first degree/course. Slightly more of them described the experience as very (53%) or quite (30%) helpful to their career and work choices. Almost half (48%) described it as very and 21% as quite helpful in their decision to undertake postgraduate study/research.

Slightly higher than overall proportions of respondents in biological sciences (63%), biomedical sciences (56%) and physical sciences (56%) said their undergraduate work experience was very helpful in their decision to undertake postgraduate study/research, although this could partly relate to their relatively younger age profile and more direct route into research.

Respondents were also asked how their work experience influenced their career choices. The most significant impact, mentioned by 42% of those who had undertaken degree-related undergraduate work experience, was that they decided this was the sort of occupation that they wanted to pursue. Half the respondents in biological sciences and biomedical sciences with undergraduate work experience cited this as a main reason for their career intention. Overall, a quarter mentioned that it was through their undergraduate work experience that they realised that they needed a postgraduate qualification/further training to get work in this field, although this proportion varied considerably by discipline area, being highest (38%) in the biological sciences.

6.2 Impact of work experience related to postgraduate study/research

Most respondents who had undertaken study-related work experience as postgraduates (35% overall) evaluated it very positively, even more helpful than their undergraduate work experience. As many as 58% overall described it as very helpful to their postgraduate study/research. This varied relatively little by discipline, although a somewhat higher proportion of respondents in education (69%) rated it as very helpful.

In much the same way, 60% of respondents overall rated their postgraduate study-related work experience as very helpful to their career and work choices; this too varied little by discipline but was highest (65%) amongst those in biological sciences. Fewer than one in ten in any discipline described their postgraduate work experience as not very or not at all helpful to their career choices.

Among these respondents, as a result of their postgraduate work experience slightly under half (46%) decided this was the sort of work they wanted to do, although 20% realised that they needed further qualifications/training to obtain it (Table 6.1). One in five (19%) had been offered a job by their work experience employer. The experience put very few respondents off working in that field, either because of the kind of work (5%) or for other reasons (3%).

As Table 6.1 shows, there is some variation in the impact of work experience by discipline area. Those in the biological sciences were the most likely to have decided this was the sort of work they wanted to do (53%), and also the most likely to have realised that they needed further training to enter this employment sector (26%). Nearly a quarter (24%) of engineering/technology respondents had been offered a job by their work experience employer, compared to 19% overall (and a much lower proportion in the arts and humanities, 13%).

Overall, only 19% of respondents with work experience related to their postgraduate study reported that it had no effect on their career plans (varying from 26% of arts and humanities and education researchers, to 15-16% in biological, biomedical and social sciences). By implication, this indicated that for 80% overall (and over three quarters in any discipline) postgraduate work experience did have a significant effect on their career thinking.

From these data, it seemed conclusive that undertaking work experience related to postgraduate study/research had a positive impact on both research study and career thinking. For full-time respondents at least, there was some evidence that physical, biological and biomedical sciences researchers, in particular, were less able to take advantage of such work experience opportunities as postgraduates, compared with opportunities at undergraduate level, and compared with those in other disciplines. The picture for part-time respondents may be different and is more likely to reflect the part-time employment simultaneously undertaken during their doctoral programme.

Table 6.1 Impact of study-related postgraduate work experience, by discipline group (%)

	Arts and humanities	Biological sciences	Biomedical sciences	Engineering/ technology	Physical sciences	Social sciences	Education	All respondents
I was offered a job by this employer	13	18	19	24	20	21	15	19
I decided that I did not want to work for this employer	5	12	11	11	12	9	1	9
I decided that this was the sort of work I want to do	47	53	44	43	48	43	40	46
I was put off seeking a career in this field because of the kind of work	3	5	3	7	8	5	2	5
I was put off seeking a career in this field for other reasons	3	7	2	5	2	3	4	3
I realised that I needed further qualifications/ training to get work in this field	19	26	21	20	19	18	15	20
It had no effect on my career plans	26	15	16	19	18	16	26	19
Other outcome	1	1	2	3	1	3	1	2
Not answered	8	5	12	7	9	11	8	9
(N)	286	171	229	188	224	280	84	1462

Note: Column percentages may not sum to 100% as multiple responses were allowed

7 Careers advice and guidance

Formal careers advice and guidance were not overtly mentioned by many respondents as amongst the top influences on their career choices. However, it is important in the context of this study to consider the role that access to formal careers advice and guidance may have played on researchers' choices at different points in their progression. Not least, we wished to consider whether such support had been sought or used by researchers, and/or whether there were times when they would have benefited from additional support of this kind.

7.1 Use of the university careers service

Overall, a quarter of respondents had used their university careers service during their doctoral programme. Unsurprisingly this was higher (32%) amongst those in their final year or third year of four, than of first or second year respondents (19%). Figure 7.1, for final-year respondents, showed that slightly fewer of the UK respondents (28%) had used their higher education careers service than equivalent researchers from the EU/EEA (41%) or RoW (36%). On the other hand, markedly more UK final-year respondents had used their university careers while an undergraduate (46%) than had other nationalities. This may reflect on the lower levels of provision for careers advice in many countries' higher education systems, compared with the UK.

When analysed by their current career intention, somewhat fewer of those seeking a long-term career in higher education teaching had used their careers service compared with those with other career aspirations. Otherwise there was no significant evidence to suggest that those seeking careers outside research had used their careers services more than others, or vice versa.

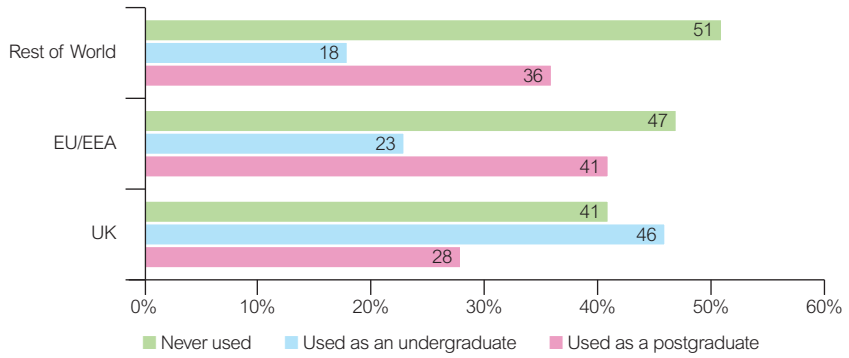

Figure 7.1 Use of university careers service, by nationality: final-year researchers only

7.2 Helpfulness of the university careers service

Respondents who had used their university careers service either as an undergraduate or as a postgraduate were asked to rate how helpful they had found the service.

Among UK respondents who had used their university careers service as an undergraduate, 60% rated that experience as very helpful (14%) or quite helpful (46%). Those who had used it while a postgraduate were slightly more satisfied than at undergraduate level. Just over three quarters (76%) of all such respondents in this group rated their university careers service as very helpful (25%) or quite helpful (51%). There were only small differences by discipline group, other than a larger proportion of those in arts and humanities seemed to be somewhat dissatisfied with their experience of their university careers service as postgraduates (30% rating it as not very or not at all helpful, compared with 23% overall). Fewest respondents in engineering/technology were dissatisfied (only 15%).

The small number of part-time respondents who had used their university careers service as a postgraduate rated it just as helpful as those who were studying full-time.