

Survey of Physics and Astronomy Doctoral Research Students' Experiences and Career Intentions

A report prepared for the Institute of Physics and Royal Astronomical Society by
Oxford Research and Policy, May 2015

This report was prepared by:

Sean McWhinnie

Oxford Research & Policy

Tel +44 (01380) 871213

E-mail info@oxfordresearchandpolicy.co.uk

Oxford Research & Policy is a consultancy that carries out research and evaluation, and specialises in higher education, science policy, and equality and diversity.

Contents

Acknowledgement	4
Summary	5
1. Introduction and Background	13
1.1 Changes to Doctoral Training Provision: Doctoral Training Centres	13
1.2 The Career Pipeline	13
1.3 Physics and Astronomy Academic Career Pipelines	14
2. Methodology	17
3. The Sample Demographics and Results	18
3.1 General Sample Characteristics	18
3.2 Details of Respondents' Background and Current Study	21
3.3 Reasons for Undertaking a Doctorate	26
3.4 Funding for doctorates	30
3.5 Work Experience before Doctorate	38
3.6 Work Experience during Doctorate	40
3.7 Preparation before Undertaking a Doctorate	41
3.8 Induction, Supervision, Feedback and Support	47
3.9 Life as a Doctoral Researcher	70
3.10 Departmental Culture	73
3.11 Training and Activities	81
3.12 Careers Advice	89
3.13 Application Process	98
3.14 Centres for Doctoral Training	101
3.15 Careers Intentions	103
Appendix A: The Sample Demographics	128
Appendix B: The Questionnaire	138
Appendix C: List of Tables	158
Appendix D: List of Figures	164

Acknowledgement

I would like to thank all the individuals who gave up their time to respond to the Survey of Physics and Astronomy Doctoral Research Students' Experiences and Career Intentions, to those individuals who acted as contacts in participating physics and astronomy departments, and to those doctoral students who helped pilot the questionnaire.

I would also like to thanks those individuals at the Institute of Physics who have worked on the project in particular Maisie Monroe and Claudia Reidegeld.

Sean McWhinnie
May 2015

Summary

A survey was designed to examine the experiences and career intentions of physics and astronomy doctoral students, to find out whether there were differences between those students studying physics and astronomy, between those students studying in a Centre for Doctoral Training (CDT) and those not, and between men and women.

1167 respondents from 45 departments began, and 995 completed, the questionnaire, a completion rate of 85%. Based on a comparison with the 2012/13 Higher Education Statistics Agency (HESA) doctoral researcher population, the respondent population is broadly representative of the population of doctoral researchers in physics and astronomy. Women are over represented, but the proportions of doctoral researchers who are British and other nationalities, the ethnic makeup of the British respondents, the disability status and the age distribution in the sample are broadly representative of the HESA population. The proportion of doctoral students who are part-time is lower than recorded in the 2012/13 HESA data.

Other characteristics of the respondent population are:

- The majority of respondents are spread across the first four years of study; the male respondent population is slightly biased towards the first year of study while there is a more even distribution of female respondents across the first four years of study;
- A relatively small proportion of respondents were members of DTCs, around 10%;
- Male respondents were slightly more likely than female respondents to hold first class degrees although essentially the same proportions of male and female respondents hold first or upper second class degrees;
- Overall, two-thirds of respondents moved institutions for their doctorate with astronomy-based respondents being more likely than physics-based respondents to have moved.

In general the data show that there were relatively few differences between responses of respondents carrying out physics-based and astronomy-based research. There were some differences between the responses of CDT members and non-members, most often relating to issues around the formal organisation of their doctorate and training. The greatest differences between groups of respondents were between the responses of men and women.

Overall the majority of respondents were pleased with their decision to undertake a doctorate, were positive about their experiences as a doctoral student, and envisaged a research-related career, a sizable proportion of whom envisaged that role to be in a university in 6-10 years' time. However, there is a notable minority of doctoral students who are not happy with their progress and who report that their experiences of supervision are not good and that they do not envisage continuing in research. The proportions of students falling into this group rises as year of study increases and, most significantly, women are more likely than men to be in this group.

Reasons for undertaking doctorate

51% of respondents indicated that the main reason they undertook a doctorate is because they loved their subject and wanted to learn more, and another 13% chose this as their secondary reason. Looking in more detail, between 47% and 50% of male and female physics-based research and female astronomy-based respondents chose this as their main reason, but 61% of male astronomy-based respondents chose this reason.

The most popular reason selected for choosing research groups/institutions was, *“It was a group with one of the best reputations in my field of interest,”* but it is notable that this reason was more frequently selected by astronomy-based respondents than physics-based. It is also notable, but not surprising, that those respondents undertaking their doctorates at a different institution from their first degrees were more likely to select this reason than those staying at the same institution.

Funding

Respondents were questioned about their source of funding. 65% of British respondents received their funding solely from research councils, and another 9% reported receiving funding from research councils together with another source. 51% of respondents with research council funding reported receiving funding from the STFC and 46% from the EPSRC.

The majority of doctoral students who are funded reported receiving between £12,000 and £14,000 living expenses. On average members of CDTs reported receiving higher living expenses than non-members. 64% of British respondents who are not members of a CDT reported that they were funded for 3 and a half years. The majority of respondents believed that they would complete their doctorate in 3 and a half years although data suggest that on average females believed they would take longer to complete their doctorates than males.

40% of respondents strongly agreed or agreed that they felt under pressure financially. Females were more inclined to strongly agree or agree than males, 44% and 38%, respectively, and responses of CDT members and non-members were similar with 40% of both groups strongly agreeing or agreeing.

Preparedness for a Doctorate

10% of respondents reported that prior to undertaking their doctorate they had a job in a field related to their doctorate. The majority of these, 7% of all respondents, reported having had jobs before taking their first degree or postgraduate masters. 27% of males and 30% of females, reported that they had undertaken work placement(s) and/or internship(s) related to their doctorate prior to undertaking their doctorate.

Males were more likely than females to strongly agree or agree with the statement *“I felt well prepared from my previous studies and experience to embark on independent research,”* 67% and 60%, respectively, and were less likely than females to disagree or strongly disagree, 14% and 25%, respectively. As might be expected, those respondents who had worked for at least a month before embarking on their doctorate agreed more strongly with the statement than those who had not. There was closer concurrence between males’ and females’ level of agreement with the statement, *“Before embarking on my doctorate, I had already developed the necessary skills to start independent research.”* 49% of males and 46% of females strongly agreed or agreed with the statement and 23% of males and 30% of females disagreed or strongly disagreed. The higher proportions of females than males in particular disagreeing with the two statements is perhaps reflective of females being less confident than males.

23% of males and 26% of females strongly agreed or agreed that, *“there wasn't anything that realistically could have prepared me,”* and 47% of males and 48% of females disagreed or strongly disagreed. There was reasonably close agreement between the responses of CDT members and non-members. So, while about a quarter of respondents believed that nothing could have realistically prepared them for their doctorate almost half the respondents felt that there were ways in which they could have been better prepared. 43% of male and 49% of female respondents who did not possess a

postgraduate masters qualification strongly agreed or agreed that a funded masters course would have helped them prepare for independent research. 41% of males and 48% of females strongly agreed or agreed that a short research taster course would have helped them prepare.

59% of respondents reported that they had a useful departmental induction, and another 24% reported that they felt the induction was neither useful nor informative. Similar proportions of men and women reported that they had an induction, but men were statistically significantly more likely than women to report that they found the induction useful and informative. Notably, 78% of members of CDTs reported that they received an induction that was useful and informative compared to 57% of non-members.

68% of males and 58% of females strongly agreed or agreed with the statement, *“Overall, my experiences during my doctorate are what I expected,”* and 13% of males and 23% of females disagreed or strongly disagreed, which is in line with the finding that women felt less well prepared than men but given that presumably males and females have access to the same information before beginning their doctorates this perhaps also suggests that females have higher expectations than males. The responses of British and other nationals, and those of CDT members and non-members were similar.

86% of men and 83% of women reported that they were pleased with their decision to do a doctorate and 3% of men and 5% of women reported that they were not pleased. Respondents were asked whether they were happy with the way their doctorate was going. Overall 72% of men and 65% of women reported that they were happy with the way their doctorate was going and 10% of men and 14% of women reported that they were unhappy. There was, however, some variation in the responses of women by year of study, whereas the responses of men were essentially invariant. In the first year of study 80% of women reported that they were happy with the way their doctorate was going but this proportion fell to 57% and 66% in the third and fourth year, respectively. 3% of women reported that they were unhappy with the way their doctorate was going in the first year of study, but this figure rose to 20% in the third year and 15% in the fourth year.

Experience of Supervision

The majority of respondents rated their relationship with their main supervisor as excellent or good and only 3% of males and 7% of females rated their relationship with their main supervisor as poor or very poor. Overall male students rated their relationship with their supervisor better than females. Females' rating of the relationship with their main supervisor appeared to drop during the course of their studies: 70% of females in their fourth year rated their relationship as good or excellent compared to 93% in their first year of study. Similar proportions of male and female respondents, 33% and 32%, respectively, reported meeting regularly with their second supervisor. However, a higher proportion of females than males, 54% and 45%, respectively, reported having a second supervisor with whom they rarely or never met. The institutional data did suggest that for a minority of doctoral students, there is a need to clarify arrangements regarding second supervisors.

The median contact time with main supervisors reported is 1-2 hours per week. Men reported more contact time with their main supervisor than women, albeit the difference is not significant, and the average reported contact time drops as the year of study increases so that in the fourth year of study, the median contact reported by both men and women is less than 1 hour per week. 74% of respondents felt that the contact time they have was about right: 22% of men and 28% of women reported that they felt the contact time was “too little” or “far too little.” There is a clear relationship between how highly respondents rated their relationship with their supervisor and how content they were with the contact time they reported having with their supervisor.

57% of men and 49% of women reported having prearranged meetings with their supervisor, and 77% of men and 72% of women reported having casual chats with their supervisor. The proportion of women who reported having prearranged meetings with their supervisor fell from 60% in their first year of study to 42% in their third and fourth the years, while the proportion of men who reported having prearranged meetings varied from year to year but did not fall significantly.

Members of CDTs were more likely to hold prearranged meetings with their main supervisor than non-members, 65% and 54%, respectively, and, members of CDTs were less likely than non-members to have casual chats with their main supervisor, 67% and 76%, respectively. The data suggest that arrangements in CDTs were more formalised than those outside CDT resulting in more frequent prearranged meetings. Data also show that the better respondents rated their relationship with their main supervisor the more likely they were to report having prearranged meetings and/or casual chats with their supervisor.

Approximately 80% of respondents reported that there were postdoctoral researchers, and 80% that there were more experienced doctoral students, that they could consult. 58% of respondents reported that they did regularly consult postdoctoral researchers in their research group, and 60% that they regularly consult more experienced doctoral students.

Overall 77% of men and 70% of women reported that the feedback they received was generally useful. The proportion of women in their first year rating the feedback as not useful was 14% but this proportion rose to 22% in the second year, to 29% in the third year. The proportion of men who reported the feedback as not useful also rose through the course of study but not to the same extent as women.

The data suggest that those respondents who reported having better relationships with their main supervisors were also more likely to report that the amount of contact they had with their main supervisor is about right, that they had prearranged meetings and casual chats with their main supervisor, and that the amount of feedback they received was about right and that it was useful. It does appear that when a doctoral student rated their relationship with their supervisor as poor a number of other indicators such as the amount and quality of contact were also rated as inadequate which might suggest a general breakdown in the student-supervisor relationship. It is therefore a possibility that the key issue in supervision is the quality and appropriateness of the contact time which in turn will depend on the abilities and personalities of both the supervisor and the doctoral student. Nonetheless, the reasons underlying why women were more likely than men to report unsatisfactory supervision experiences are not discernible from the quantitative data alone.

Respondents were asked about their experiences including flexibility, independence and freedom, undertaking exciting and interesting projects, enjoying their research topics, and the general working environment. About 80% or more of respondents responded positively and 10-15% of respondents responded negatively in most areas. 22% of respondents strongly agreed or agreed that they found their research repetitive and frustrating. There were few differences between the responses of men and women or between those of CDT members and non-members.

87% of respondents reported that there are formal assessments that they had to pass (e.g. qualifying masters, submission of yearly reports, etc.) during their doctorate. There was little difference between the responses of those respondents who were members of a CDT and those who were not. All institutions had a majority of respondents reporting that there were formal assessments but in most institutions there was a small minority of respondents who were unclear of the requirements to pass interim assessments.

Departmental Culture

Respondents were asked a series of questions relating to the culture of their home department and graduate school. Questions covered topics such as doctoral student representation in meetings, social events and issues relating to diversity including the representation of females among academic staff. Examining the responses by institution showed that the majority of institutions had some respondents who reported that there was representation on the department's equality and diversity committee but it did appear that this was not always widely known. More generally 36% of respondents reported that there was doctoral student representation in important meetings and outcomes were fed back, and 17% reported that there was representation but outcomes were not fed back. However, a large proportion of respondents, 43%, were not clear whether or not there was representation. CDT members were more likely than non-members, and females were more likely than males, to report representation with feedback. Institutional level data suggested that in the majority of departments there was some doctoral student representation but that a large proportion of students were unaware of this.

Training

80% of males and 84% of females strongly agreed or agreed that they were gaining transferable skills. Members of CDTs agreed more strongly than non-members, with 88% of CDT members and 80% of non-members strongly agreeing or agreeing. This is in line with CDTs being tasked to provide additional transferable skills training. 65% of males and 64% of females, and 81% of CDT members and 63% of non-members, strongly agreed or agreed that the quality of the transferable skills training was high. Around 80% of respondents reported that they believed that they possessed, and 5% reported that they believed they did not possess, the majority of general skills for which employers often looked. There were few differences between the responses of men and women. 63% of respondents reported that they had to attend a minimum number of training courses, and around 60% of these respondents, 39% overall, reported that they needed to do this to complete their doctorate. All but two institutions had some respondents reporting that they were required to complete a minimum number of courses to obtain their doctorate.

Careers Advice

Men and women who worked before their doctorate reported greater knowledge of career options outside academia than those who did not. Interestingly, working before the doctorate appeared to make a bigger difference to women's reported knowledge than men's. 33% of men who had worked rated their knowledge as very good or good, and 32% rated their knowledge as poor or very poor compared to 28% who had not worked rating their knowledge as very good or good, and 35% who rated their knowledge as poor or very poor. In contrast, 28% of women who had worked rated their knowledge as very good or good, and 35% rated their knowledge as poor or very poor compared to 22% who had not worked rating their knowledge as very good or good, and 52% who rated their knowledge as poor or very poor.

48% of respondents overall strongly agreed or agreed that undertaking a doctorate has helped them clarify their career plans.

In general women were more likely than men to report using any particular source for careers advice during their doctorate but of those who had used a specific source, women were less likely than men to report that the advice received from that source was useful. There was some variation in the relative

usage of particular sources by gender. In particular, women were more likely than men to use the university careers service.

Applications Process

Respondents were asked whether the application process for their doctorate involved certain specified elements. All departments had some respondents who reported that they completed a general application form. All but one department had respondents who reported that they had a formal interview with their project supervisor, and all but three had respondents who reported that they had a formal interview with a panel of staff. 32 departments had some respondents who reported that they gave a presentation and all but five had some respondents who reported that they met members of their research group.

All but six applicants to CDTs reported filling out some kind of application form and all but 10 reported having a formal and/or an informal interview. It should be noted that a number of respondents were entering brand new CDTs so there were no current students for them to meet and also it is likely that applications processes have changed and improved as CDTs have become better established.

Overall there did not appear to be any typical applications process or experience for those applying for doctorates in physics or astronomy, even within the same department. The majority of respondents reported filling in an application form and having some kind of interview.

Centres for Doctoral Training

CDT members were asked about their reasons for joining their CDT. Almost 90% of CDT members reported being attracted by the multidisciplinary nature of most CDTs. The six months of taught courses was also attractive to about two thirds of CDT members. The choice of CDT was driven by the area of specialism. Less of an issue was the fact that the final choice of research project does not need to be made until towards the end of the first year of study. The least frequently selected reason was the level of funding, although around 40% of CDT members reported being influenced by the funding.

The vast majority of CDT members were pleased with their decision to join a CDT and the majority of CDT members agreed that they have more resources available to them than those doctoral students outside CDTs and that the level of training of they received was better.

Career Intentions

The majority of both men and women believed they will make good research scientists, but women were less confident in their ability than men, and relative to men, women became less confident the more time they spent on a doctorate. After the first year of study, around 1 in 5 female respondents reported that they disagreed or strongly disagreed with the statement that *"I feel confident that I would make a good research scientist."*

A higher proportion of men than women believed that they possessed the technical skills employers look for, but the proportions of men and women who believed that they already had the skills or who believed that they would have by the time they completed their doctorate were essentially the same, 88% and 87%, respectively.

A lower proportion of members of CDTs than non-members believed that they possessed the technical skills employers look for, but as with gender the proportions of members and non-members who believed that they already had the skills or who believed that they would have by the time they completed their doctorate were similar, 92% and 88%, respectively.

The data suggest that the proportions of both men and women who believed they possessed the technical skills employers look for increased with year of study but a lower proportion of women than men believed they possessed those technical skills, in particular in the first and second years of study. So it appears that in the initial stages of doctoral study, women were less confident of their technical skills than men but that women's confidence increases to match men's as doctoral study progresses.

74% of males and 62% of females strongly agreed or agreed that their experiences of studying provided them with good role models to encourage them to pursue a career in scientific research. In contrast, 9% of males and 22% of females disagreed or strongly disagreed that their experiences of studying provided them with good role models. So, although the majority of males and females agreed that their experiences of studying had provided them with good role models, females do not agree as strongly as males and there is a significant minority of females who disagreed. Data also show that there was relatively little difference between the responses of CDT members and non-members.

Respondents were asked what effect their experience as a physics/astronomy student had on their career intentions. Whereas there were few differences between the responses of members and non-members of CDTs or by whether respondents were pursuing physics- or astronomy-based projects there were differences between the responses of men and women, with overall women being more likely than men to report having doubts about, or definitely not wanting to pursue a career in science, 45% and 34%, respectively. As length of study increased the proportions of both men and women with doubts, or definitely not wanting to pursue a career in science increased, but the proportion of women increased more than the proportion of men such that by the third and fourth years of study 57% of women had doubts or did not want to pursue a career in science compared to 38% of men in the third year and 47% in the fourth year.

The proportions of respondents who reported having fully planned their careers rose from 5% in the first year of study to 16% in the third year and 35% in the fourth year. The proportion of respondents who reported not planning their careers at all fell from 51% in the first year to 24% in the third year and 13% in the fourth. There were few differences between the responses of men and women.

Respondents were asked to select the one or two roles they thought they were most likely to be undertaking in the short and longer-term. Overall the patterns of the roles men and women envisaged they may undertake in 3-5 years' time were similar. 68% of men and 61% of women thought that they might be postdoctoral research associates and 30% of men and 26% of women thought that they might be scientists in industry. Another 16% of men and 12% of women thought that they might be academics. The proportion of men indicating that they feel they were likely to be a postdoctoral research assistant falls from 76% in the first year of study to 69% and 61% in the third and fourth years, respectively. For women the proportion falls from 82% in the first year to 63% and 48% in the third and fourth years, respectively.

Considering those individuals who envisaged in the short-term that they might have a role in a university either as an academic and/or a postdoctoral researcher, in the first year 78% of men feel this is likely compared to 71% in the third year of study and 65% in the fourth year of study. In contrast, 82% of women in their first year feel that they are likely to have a university role in 3-5 years' time and this falls to 63% in the third year and 48% in the fourth year.

Turning to the data for the roles respondents envisaged they would be undertaking in 6-10 years' time, overall 46% of men and 37% of women envisaged that they were likely to be academics, 29% of men and 28% of women envisaged that they were likely to be scientists in industry, and 21% of men and

16% of women felt that they were likely to be postdoctoral researchers. Examining the data by year of study showed that the proportion of men who felt they were likely to be academics was between 48% and 45% in years one to four. In contrast the proportion of women fell from 47% in the first year to 36% in the second and third years and 33% in the fourth year. The proportion of men who envisaged being a scientist in industry remained at between 27% and 30%, while that for women varied more but was around 26%. By the third and fourth years of study around 1 in 5 men envisaged being a postdoctoral researcher in 6-10 years' time compared to only around 1 in 10 women.

Considering those individuals who envisaged that they might have a role in a university either as an academic or a postdoctoral researcher in 6-10 years' time, in the first year 63% of men felt this is likely compared to 56% in the third year of study and 54% in the fourth year of study. In contrast, 51% of women in their first year felt that they were likely to have a university role and this fell to 42% in the third year and 36% in the fourth year.

The indications are that towards the end of their doctoral studies, in the short- and longer-term women were less likely than men to see themselves in university-based roles, but were as likely as men to see themselves in scientific roles in industry. In the longer-term women were more likely than men to see themselves in roles other than academics or postdoctoral researchers or as scientists in the private or public sectors.

There were few differences between the career expectations of those studying physics-based and astronomy-based doctorates. It appears that those respondents carrying out astronomy-based projects were more likely than those who carried out physics-based projects to see their longer-term careers in universities, and less likely to see their careers based in industry.

1. Introduction and Background

The Institute of Physics (IOP) and the Royal Astronomical Society (RAS) commissioned this study to explore two main aspects of doctoral training in physics and astronomy:

- i) The experiences and career intentions of doctoral students and how these differ for men and women;
- ii) The quality of training provided in Doctoral Training Centres as compared to other routes to doctorates.

This report presents the results of a survey which addressed those two main questions. A separate summary report specifically focusses on the differing experiences of male and female physics and astronomy doctoral students in the UK and makes a number of recommendations on how departments, funders and professional bodies can close this experiential gap between male and female students.¹

1.1 Changes to Doctoral Training Provision: Doctoral Training Centres

Doctoral Training Centres (DTCs) were originally used by the research councils as a strategic mechanism for increasing capacity in interdisciplinary research activities such as the life sciences interface and complexity science. By 2009 the Engineering and Physical Sciences Research Council (EPSRC) had widened its focus, announcing funding for 50 new DTCs spanning its entire remit. Each DTC involves a university (or a small number of universities) in delivering a four-year doctoral training programme which includes technical and transferrable skills training, as well as a research element, to a number of students organised into cohorts. Each DTC targets a specific area of research. Many Centres leverage additional studentships from other sources (e.g. EPSRC DTA funding, EU funding, industrial funding, private funding etc.). The EPSRC spends almost half its current studentship funding on DTCs.

1.2 The Career Pipeline

Experiences during doctoral study play a part in determining whether or not individuals continue into a research/technical career in academia or in the commercial world, or decide to pursue a non-technical career, albeit in all likelihood one that requires a scientific background. Previous surveys in chemistry, and molecular bioscience, and a small scale survey in physics, suggest that while all three subjects retain women in research careers less than men, there are differences in the retention rates suggesting that there are differences in the cultures of different subjects and the effect that those cultures have on men and women.^{2,3,4}

¹ *Gazing at the future: the experiences of male and female physics and astronomy students in the UK*, Institute of Physics and Royal Astronomical Society, London, 2015.

² *Factors affecting the career choices of graduate chemists*, Royal Society of Chemistry, London, 1999; *Recruitment and Retention of Women in Academic Chemistry*, Royal Society of Chemistry, London, 2003; *Change of Heart - Career intentions and the chemistry PhD*, Royal Society of Chemistry, London, 2008; *The Career Intentions & First Employment Destinations of Chemistry PhD Students: A Gender-Based Quantitative Analysis*, Royal Society of Chemistry, London, 2008.

³ *The Molecular Bioscience PhD and Women's Retention: A Survey and Comparison with Chemistry*, Biochemical Society, London, 2008.

⁴ A survey was conducted in the summer of 2010 which looked at the PhD experience and career intentions of physics doctoral students. The survey was distributed to three of the largest physics departments in the UK and was completed by 115 students. Of the 115 respondents, 33% were female and 67% were male. (*The career intentions and careers advice received by physics PhD students*, S Dickinson, report prepared for Institute of Physics Diversity and Inclusion Committee, 2011.)

A survey of chemistry and physics postdoctoral researchers⁵ examined their experiences of postdoctoral work and their career intentions. The data suggest that there is relatively little difference between the career intentions of male and female postdoctoral physicists, although female chemists were less inclined towards research careers than male chemists. In respect of experiences, male physicists report the most positive experiences, the reported experiences of male chemists and female physicists were similar, and female chemists reported the least positive experiences.

1.3 Physics and Astronomy Academic Career Pipelines

Table 1 presents the proportion of UK domiciled students who are female studying physics or astronomy at various degree levels and table 2 shows the proportions of all students who are female studying physics or astronomy at various degree levels. The data for the proportion of UK domiciled students who are female in 2013/14 are plotted in the chart.

Table 1: Proportions* of UK domiciled students who are female in physics and astronomy

Subject	Degree level	Year			
		2010/11	2011/12	2012/13	2013/14
Physics	First Degree	22.5%	21.3%	21.2%	20.7%
	Enhanced First Degree	20.4%	20.2%	20.1%	20.2%
	Undergraduates	21.7%	20.9%	20.7%	20.5%
	Post Graduate Taught	28.5%	27.0%	24.0%	27.3%
	Post Graduate Research	22.9%	21.6%	22.0%	22.8%
Astronomy	First Degree	23.5%	23.9%	25.3%	24.8%
	Enhanced First Degree	26.9%	29.4%	28.7%	31.8%
	Undergraduates	23.9%	25.9%	26.6%	26.8%
	Post Graduate Taught**				
	Post Graduate Research	30.9%	30.2%	26.7%	26.9%

* Proportions are calculated based on a head count of students who are registered as studying the subject in question for half their time or more.

** The numbers of post graduate taught students were too few to calculate the proportion of students who are female.

⁵ *Mapping the Future: Physics and Chemistry Postdoctoral Researchers' Experiences and Career Intentions*, Institute of Physics, London, 2011

Table 2: Proportions* of all students who are female in physics and astronomy

Subject	Degree level	Year			
		2010/11	2011/12	2012/13	2013/14
Physics	First Degree	21.5%	20.3%	20.0%	19.5%
	Enhanced First Degree	19.8%	19.7%	19.4%	19.5%
	Undergraduates	20.9%	20.1%	19.7%	19.5%
	Post Graduate Taught	26.5%	26.7%	22.9%	26.4%
	Post Graduate Research	20.1%	18.9%	19.0%	19.4%
Astronomy	First Degree	23.2%	23.5%	24.0%	24.1%
	Enhanced First Degree	25.5%	27.0%	27.2%	30.6%
	Undergraduates	23.7%	25.1%	25.7%	26.0%
	Post Graduate Taught				
	Post Graduate Research	28.8%	26.3%	22.4%	22.2%

* Proportions are calculated based on a head count of students who are registered as studying the subject in question for half their time or more.

** The numbers of post graduate taught students were too few to calculate the proportion of students who are female.

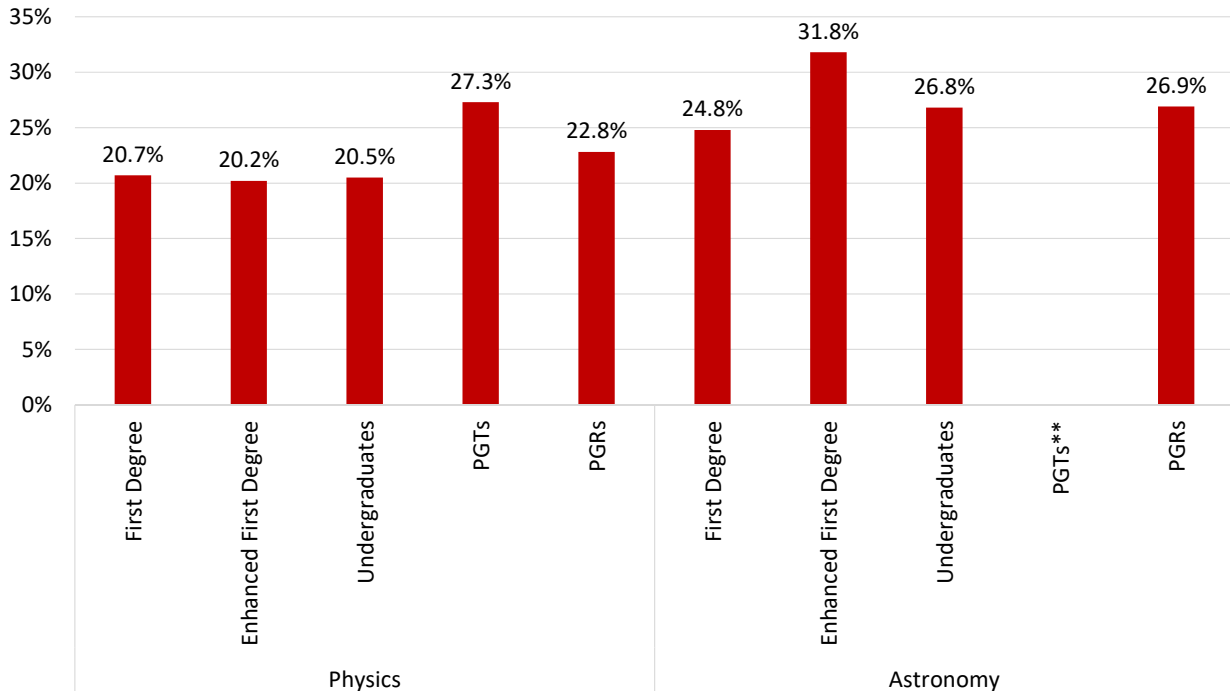


Figure 1: Proportions* of UK domiciled students who are female in physics and astronomy in 2011/12

* Proportions are calculated based on a head count of students who are registered as studying the subject in question for half their time or more.

** The numbers of post graduate taught students were too few to calculate the proportion of students who are female.

The data illustrate a number of points. Among UK domiciled students in physics, the proportion of students who are female falls slightly between undergraduate level and postgraduate research level. However, a higher proportion of post graduate taught students (PGT) are female. The proportion of UK domiciled students who are female in astronomy is higher than that in physics, and the proportion of students who are female increases slightly between undergraduate level and postgraduate research level. In physics and astronomy men and women appear to move from undergraduate to postgraduate research levels in similar proportions.

The question in respect of the physics career pipeline is, are there are differences in the likelihood of men and women remaining in physics/astronomy-related careers after they complete their research degrees. Data in table 3 suggest that among UK nationals women are less likely than men to go on to researcher positions in UK Higher Education Institutes. However, women are better represented in lecturer than researcher positions which may suggest that that women are more successful than men in gaining academic positions but may also suggest that women spend more time than men in lecturer roles before promotion.

Table 3: Proportions* of UK national academic staff who are female in the physics cost centre (teaching and research, and, research-only employment functions)

Academic Grade	Proportion of staff who are female*			
	2008/09	2009/10	2010/11	2011/12
Professors	5.7%	6.6%	7.7%	8.6%
Senior Lecturers/ Lecturers**	14.3%	15.9%	16.4%	15.5%
Senior Lecturers			11.9%	12.6%
Lecturers			19.5%	18.2%
Academic Staff	10.3%	11.3%	13.0%	12.5%
Researchers	16.6%	16.2%	15.0%	15.0%
Total FTEs	13.4%	13.7%	13.7%	13.5%

* Proportions are calculated using staff FTEs

** In 2010/11 and 2011/12 senior lecturers/lecturers were identified as academic staff with a research and teaching or teaching-only role not marked as a professor. Researchers were identified as staff with a research-only role and not marked as a professor. In 2012/13 and 2013/14 HESA used a different way of recording staff grades. Staff in specific grades have been identified using a mapping using the HESA level of contract field and researchers have been identified using the HESA research assistant marker. The change has led to some discontinuities, in particular for researchers.

2. Methodology

A questionnaire was developed for doctoral students in physics, designed to collect information on their academic history, their experiences during their doctorate including provision of training and support, and their plans for the future. The questionnaire was based on a questionnaire used in the 2006 study of chemistry PhD students which has been the basis for several other surveys looking at student experiences.

The questionnaire was hosted on SurveyMonkey. The majority of questions were obligatory but appropriate options were provided for respondents who did not want to give personal details.

A draft version of the questionnaire was piloted by a group of doctoral students from Imperial College. A group of doctoral students were invited to attend a lunch time session where they tested the questionnaire on line. Participants were timed so that a reasonably accurate estimate of the time taken to complete the questionnaire could be obtained. Once participants had completed the questionnaire a discussion was held during which the questionnaire was reviewed and suggestions for improvements were collected, a number of which were subsequently incorporated into a revised version of the questionnaire.

A paper version of the final questionnaire is given in Appendix B.

Institute of Physics departmental contacts in the UK were contacted, along with the named administrative contacts at all CDTs which were likely to have physics students, to ask whether they would be willing to make the link to the survey available to doctoral research students. It was suggested that the contacts might provide the name of someone else who would send out the survey. It was also made clear that the expectation was that it would be necessary to send out one, two and possibly three reminders as well as the original link.

45 physics departments agreed to participate (see Appendix A) and distributed the link. Response rates were monitored and departments with zero response rates were followed up on the assumption that they had not distributed the link. A series of reminders were sent to departments once initial response rates had fallen – in most cases after an initial spurt of responses immediately after the link was sent out by departments, the rate of response dropped to zero in two or three days. Reminders were not sent to all participating departments simultaneously, but were sent once response rates had fallen.

The survey was open from 20 March 2014 to 5 May 2014. It was made clear that the link should also be sent to students who were part of Centres for Doctoral Training. It was also suggested that contacts could add some words at the beginning of the email encouraging doctoral students to participate.

The survey gave those who participated the opportunity to enter a prize draw with Amazon vouchers offered as prizes. Participants were also invited to provide contact details in case any follow up was needed.

In total 1169 individuals started the survey and 995 individuals completed the full survey. Of those respondents who did not complete the survey, a number did fill in a portion and their responses were usable.

The raw data were copied to an Excel worksheet and were cleaned up. The vast majority of responses were used in the analyses. Processed data were analysed in Excel, for the most part using Pivot Tables.

3. The Sample Demographics and Results

3.1 General Sample Characteristics

The following chapters describe the results of the Survey of Physics and Astronomy Doctoral Research Students' Experiences and Career Intentions. For the most part the analysis is concentrated on comparisons between students based within and outside CDTs, and between men and women. Occasionally other factors have been examined, such as respondents' year of study and respondents' nationality.

Respondents were invited to make general comments in the last section of the questionnaire. Many did so, but the analysis of those qualitative data is not presented in this report.

As with all surveys of populations across a number of Higher Education Institutions (HEIs), one important issue to consider is that the size of the doctoral student population varies greatly from one institution to another. Clearly, the views of doctoral students in the larger departments may well dominate the responses. Where appropriate, responses have been considered by institution in order to check whether particular institutional patterns are obvious. In many areas students at the same institution reported contradictory policies, indicating a lack of awareness of departmental or institutional policies. For example, some respondents report that second supervisors are not appointed even though their institution's policy is that all doctoral students should have second supervisors.

A fuller description of the sample demographics is provided in Appendix A.

Once the data had been cleaned 1167 respondents from 45 departments began the survey and 995 completed the questionnaire, a completion rate of 85%. HESA data⁶ indicate that in 2012/13, 3905 individuals were registered for doctorates in physics or astronomy: in 2012/13, 3800 students in the departments that distributed the link were registered for doctorates in physics and astronomy. This suggests that the overall response rate was around 30% and around 26% for those completing the survey, assuming that the numbers of doctoral students had changed little between 2012/13 and the time the survey was run. A breakdown of the respondents by institution is provided in Appendix A. The response rate by institution varied greatly.

Women are over represented in the respondent population in comparison with the HESA data for 2012/13. 29.7% of those respondents who gave their gender were female compared to 23% of the astronomy and physics HESA doctoral student population in 2012/13.

Of the 1033 respondents that specified their doctoral research topics, 281 specified *astronomy, astrophysics, cosmology and space science* as their sole research topic or as one of two. This represents 27.2% of those respondents that specified research topics. For the purposes of the analyses that follow, any student that specified *astronomy, astrophysics, cosmology and space science* as their single research topic or as one of two will be treated as *astronomy* students and the remaining students will be treated as *physics* students. It should be noted that students studying as part of a CDT do not generally have to finalise their research topic until the end of their first year and consequently first year CDT students will not be classified as physics or astronomy students.

Table 4 shows the breakdown of all respondents by doctoral subject, nationality and gender. Women are over represented among physicists and astronomers.

⁶ HESA require that numerical data are rounded to the nearest 5.

Table 4: Survey respondents who began the survey by doctoral subject, nationality and gender

Doctoral Subject	Nationality (HESA: Domicile)	Gender			Totals	Proportion of students who are female in HESA Data 2012/13*
		Male	Female	Do not wish to say		
Astronomy	British	66%	32%	1%	191	21.8%
	Other	62%	38%	0%	85	35.8%
	Overall	65%	34%	1%	276	25.7%
Physics	British	74%	25%	1%	477	19.1%
	Other	69%	30%	1%	279	28.0%
	Overall	72%	27%	1%	756	22.4%
Unknown/ Undecided	British	66%	29%	5%	65	
	Other	70%	30%	0%	70	
	Overall	68%	30%	2%	135	
Total respondents		817	339	11	1167	3669

* Doctoral students are counted as studying astronomy or physics if they are recorded as 0.5 FTE or more.

63.2% of respondents who specified their nationality were British, 63.1% of physicists and 69.2% of astronomers in line with the 2012/13 HESA data that indicates 63.3% of physicists and 72.3% of astronomers are British domiciled. Female respondents are over represented in all subject-nationality groups.

Around 93.4% of the British respondents who provided the information classified their ethnicity as White: among British national respondents 93.9% of physicists and 94.5% of astronomers are White. This is in line with 2012/13 HESA data which indicate that 93.7% of physicists and 90.1% of astronomers are White. The numbers of those British nationals who classify themselves as belonging to BME groups are too low to analyse the data in respect of ethnicity. **It is noteworthy that there are no British national doctoral researchers in the sample who classify themselves as Black or Black British.**

1.2% of respondents who specified their mode of study reported that they are studying part-time, 1.1% of astronomers and 1.3% of physicists. In the 2012/13 HESA data 4.4% of astronomers and 3.8% of physicists are recorded as studying part-time. The number of part-time respondents is not high enough to allow any useful analyses.

3.7% of the sample disclosed that they have a disability and 3.2% did not wish to say: there was no significant difference between men and women. The 2012/13 HESA data suggest that among physics and astronomy doctoral students 6.7% physicists and 5.6% of astronomers have a known disability. The numbers of respondents with a declared disability is too small to analyse the data in respect of declared disability status.

The age distribution of the respondents is shown in figure 2. Comparison with the 2012/13 HESA data suggests that the sample is a little older but this is almost certainly because the census date for the HESA

data is 31 August, that is some six months before the survey was run. Adjusting the HESA population ages for the six month discrepancy shows that the age distribution of the respondents is similar to that of the 2012/13 HESA population.

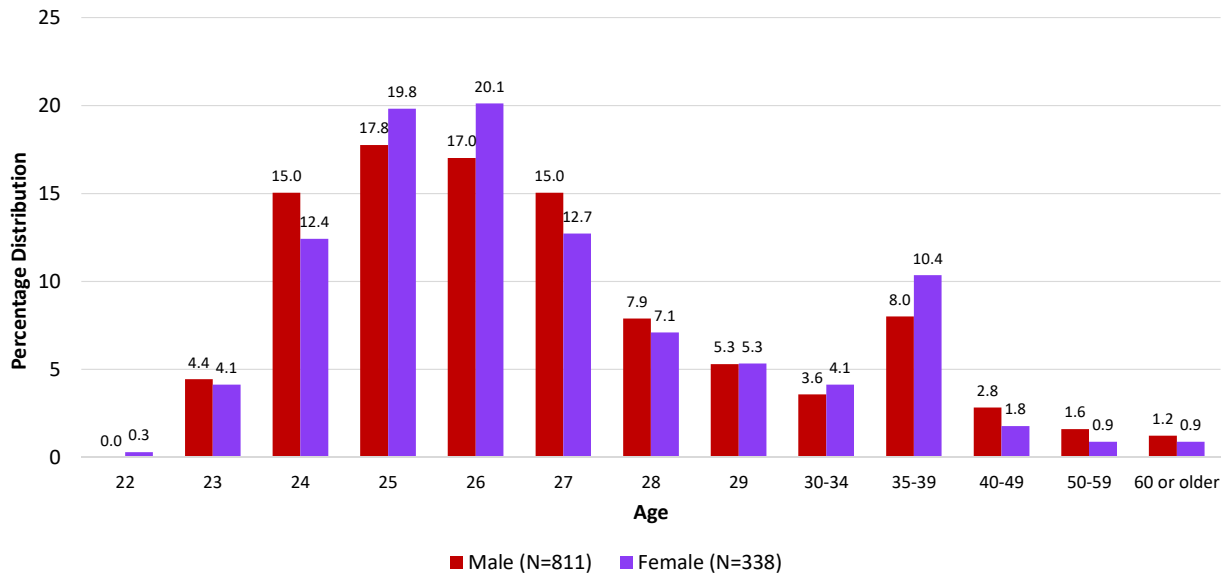


Figure 2: Age of respondents who began the survey by gender

So, overall, based on a comparison with the 2012/13 HESA doctoral researcher population, the sample is broadly representative of the population of doctoral researchers in physics and astronomy. Women are over represented, but the proportions of doctoral researchers who are British and other nationalities, the ethnic makeup of the British respondents, the disability status and the age distribution in the sample are broadly representative of the proportions in the HESA population. The proportion of doctoral students who are part-time is lower than recorded in the 2012/13 HESA data.

3.2 Details of Respondents' Background and Current Study

Of the 1163 respondents who specified, 110 indicated that they were members of a Centre for Doctoral Studies (CDT) (see table 5). A few respondents indicated that they were not sure whether they were a member of a CDT: in the rest of the report these respondents are classified as not being members of CDTs as it is assumed that respondents who are members of CDTs will know that for sure.

Table 5: Whether or not respondents reported that they were members of Centres for Doctoral Training

Gender	Member of CDT						Total	
	Yes		No		Not sure			
Male	80	73%	565	69%	169	71%	814	70%
Female	28	25%	243	30%	67	28%	338	29%
Do not want to say	2	2%	6	1%	3	1%	11	1%
Total Respondents	110		814		239		1163	

As shown in table 6, the majority of respondents are spread across the first four years of study; male respondents are slightly biased towards the first year of study while there is a more even distribution of female respondents across the first four years of study. There are relatively few respondents in their fifth year of study and above: for the most part analyses by year of study are restricted to respondents in their first four years of study.

Table 6: Respondents' reported year of study

Year of study*	Gender					Total	
	Male		Female		Did not wish to say		
	Number	Distribution	Number	Distribution	Number	Number	Distribution
1st year	260	33%	85	26%	5	350	31%
2nd Year	196	25%	86	26%	1	283	25%
3rd Year	179	23%	82	25%	3	264	23%
4th Year	129	16%	69	21%	1	199	18%
5+ Year	24	3%	11	3%	10	35	3%
Total respondents	788		333		10	1131	

* Only those students who specified their year of study are included.

As shown in table 7, the majority of respondents had studied physics and/or astronomy for their first degree. 65% of respondents reported that they had studied physics for their first degree, 10% had studied physics and astronomy/astrophysics, 6% physics and mathematics and 4% astronomy/astrophysics. The distributions of male and female respondents between first degree subjects are similar.

Table 7: Respondents' reported first degree subjects

First Degree Subject	Gender					Total	
	Male		Female		Do not wish to say		
	Number	Distribution	Number	Distribution	Number	Number	Distribution
Physics	503	66%	204	63%	9	716	65%
Physics and Astronomy/Astrophysics	75	10%	36	11%	0	111	10%
Physics and Mathematics	47	6%	18	6%	0	65	6%
Astronomy/Astrophysics	33	4%	13	4%	0	46	4%
Chemistry	31	4%	12	4%	0	43	4%
Electronics/Electrical Engineering	25	3%	3	1%	0	28	3%
Materials	11	1%	3	1%	0	14	1%
Mathematics	10	1%	5	2%	0	15	1%
Physics/Astrophysics and another Subject	9	1%	7	2%	0	16	1%
Astronomy/Astrophysics and another Subject	3	0%	1	0%	0	4	0%
Other SET subject	20	3%	23	7%	0	43	4%
Other non-SET subject	0	0%	1	0%	0	1	0%
Total respondents	767	100%	326	100%	9	1102	100%

Table 8 shows the first degree classifications of respondents who studied in the UK. 65% of respondents held first class degrees and 27% held upper second class degrees. **Male respondents were slightly more likely than female respondents to hold first class degrees although essentially the same proportions hold first or upper second class degrees.** The differences between the distributions of degree classification between males and females are not statistically significant. The preponderance of first and upper second class degrees is to be expected as obtaining state funding for a doctorate normally requires a first or upper second class degree.

Table 8: Respondents' reported first degree classifications from UK Institutions

First Degree Classification	Gender					Total	
	Male		Female		Do not wish to say		
	Number	Distribution	Number	Distribution	Number	Number	Distribution
First (1)	370	66%	138	62%	6	514	65%
Upper second (2.1)	147	26%	65	29%	1	213	27%
Lower Second (2.2)	35	6%	13	6%	0	48	6%
Third (3)	5	1%	3	1%	0	8	1%
Not applicable	3	1%	2	1%	0	5	1%
Other	1	0%	0	0%	0	1	0%
Total respondents	561	100%	221	100%	7	789	100%

The qualifications obtained by those respondents who studied in the UK are shown in table 9. Overall 75% hold MPhys/MSci qualifications and 18% hold BSc qualifications. There are no significant differences between the distribution of qualifications between males and females. Generally, an MPhys/MSci qualification is regarded as a prerequisite for undertaking a doctorate. Table 10 shows that 47% of respondents with a BSc qualification also hold a postgraduate masters, compared to just 4% of those who hold a MPhys/MSci qualification. In other words, just 9% of respondents with first degree qualification from the UK, hold only a BSc qualification without a postgraduate masters.

Table 9: Respondents' reported first degree qualifications from UK Institutions

First degree qualification	Male		Female		Overall	
	Number	Distribution	Number	Distribution	Number	Distribution
MPhys/MSci	423	75%	164	74%	593	75%
BSc	98	17%	45	20%	144	18%
Other	40	7%	12	5%	52	7%
Total respondents	561	100%	221	100%	789	100%

Table 10: Respondents' reported first degree qualifications from UK Institutions and whether or not they reported holding a postgraduate masters qualification

First degree qualification	Possess a postgraduate master			Total respondents
	Yes, from the UK	Yes, from outside the UK	No	
MPhys/MSci	4%	0%	96%	593
BSc	47%	1%	52%	144
Other	29%	0%	71%	52
Overall	14%	0%	86%	789

Table 11 presents data on whether respondents possess a postgraduate masters degree by gender and nationality. British respondents are significantly less likely to possess a postgraduate masters degree than non-British respondents. Only 13% of British respondents hold a postgraduate masters degree compared to 65% of non-British respondents. Overall 42% of those British respondents with postgraduate masters degrees stayed at the same institution for their doctorate. There were no significant differences between males and females.

Table 11: Whether respondents reported possessing a postgraduate masters degree by nationality and gender

Nationality	Gender	Possess a postgraduate masters degree			Total respondents	Proportion possessing postgraduate masters
		Yes, in the UK	Yes, outside the UK	No		
British	Male	60	2	437	499	12%
	Female	28		164	192	15%
	Total	88	2	608	698	13%
Other nationalities	Male	40	131	93	264	65%
	Female	29	57	46	132	65%
	Total	69	188	141	398	65%

Table 12 shows the proportion of respondents who are studying in the same institution as they studied for their first degree and table 13 shows the same data but restricted only to British nationals. Clearly non-British nationals are more likely to have moved institution to study for their doctorate, and this is underlined in the data.

Table 12: Whether respondents reported that were studying in the same institution as they studied for their first degree by whether respondents’ research was physics-based or astronomy-based and gender

Institution	Physics-based research		Astronomy-based research		Overall
	Male	Female	Male	Female	
Same institution as first degree	41%	35%	32%	19%	34%
Different institution as first degree	59%	65%	68%	81%	66%
Total respondents	545	205	180	94	1167

Overall, astronomy-based respondents are more likely than physics-based respondents to move institution. Also, British physics-based male and female respondents show similar patterns but, although numbers are small, female astronomy-based respondents are more likely than male astronomy-based respondents to have moved institutions. It is difficult to know why this behaviour is observed. There are no clear patterns in examining the data at institutional level, mainly because the number of female respondents in any one institutional are not great enough to draw firm conclusions.

Table 13: Whether British respondents reported that they were studying in the same institution as they studied for their first degree by whether respondents' research was physics- or astronomy-based and gender

Institution	Physics-based research		Astronomy-based research		Overall
	Male	Female	Male	Female	
Same institution as first degree	56%	53%	43%	26%	47%
Different institution as first degree	44%	48%	57%	74%	53%
Total respondents	353	120	127	62	733

3.3 Reasons for Undertaking a Doctorate

Respondents were asked to indicate the main reason they decided to do a doctorate and, if they wanted, to indicate a secondary reason. Respondents were given a list of possible reasons but could specify another reason if they wished. The reasons chosen are shown in table 14 broken down by whether respondents' research is physics- or astronomy-based and gender.

Overall 51% of respondents indicated that the main reason they undertake a doctorate is, *"Because I love my subject and wanted to learn more."* The second most common main reason was, *"I have an aptitude for science/physics/astronomy,"* which 12.9% of respondents selected, followed by, *"A doctorate is a pre-requisite for the career I want,"* which 12.7% of respondents chose. 6.8% of respondents selected *"I "wandered" into a doctorate after my first degree."* No other reasons were selected by more than 5% of respondents overall.

Between 47% and 50% of male and female physics-based and female astronomy-based respondents chose *"Because I love my subject and wanted to learn more"* as their main reason for undertaking a doctorate, but 61% of male astronomy-based respondents chose this reason. There are gender and research field differences in the proportions of respondents selecting other main reasons but in all cases under consideration *"I have an aptitude for science/physics/astronomy,"* and, *"A doctorate is a pre-requisite for the career I want,"* are the next most popular choices.

89% of respondents chose a secondary reason for undertaking a doctorate. Overall the most popular choice was, *"I have an aptitude for science/physics/astronomy"* chosen by 21% of respondents followed by *"A doctorate is a pre-requisite for the career I want,"* chosen by 17% of respondents. 13% of respondents chose *"Because I love my subject and wanted to learn more."* Again, there are some gender and research field differences in respondents' choices of secondary reasons. For males the most popular choice is *"I have an aptitude for science/physics/astronomy,"* followed by *"A doctorate is a pre-requisite for the career I want,"* while for females the order is reversed. It is notable that, as with the main reasons, male astronomy-based researchers are out of line with the other groups in that 29% chose, *"I have an aptitude for science/physics/astronomy,"* compared with 21% of male physics-based researchers.

Considering both the main and secondary reasons for choosing to undertake a doctorate, 64% of respondents chose, *"Because I love my subject and wanted to learn more."* This is in line with reasons most commonly given by students for choosing to study subjects at all levels.

Table 14: Main and secondary reasons given by respondents for undertaking their doctorates by whether respondents' research was physics or astronomy-based and gender

Reasons for undertaking doctorate	Physics-based research				Astronomy-based research				Main reason: overall	Secondary reason: overall
	Main reason		Secondary reason		Main reason		Secondary reason			
	Male	Female	Male	Female	Male	Female	Male	Female		
Because I love my subject and wanted to learn more	49.1%	49.5%	12.8%	10.6%	60.8%	47.3%	13.5%	17.6%	51.1%	12.6%
I have an aptitude for science/physics/astronomy	15.7%	8.1%	20.8%	13.1%	8.8%	17.6%	28.7%	19.8%	12.9%	21.2%
A doctorate is a pre-requisite for the career I want	13.0%	14.6%	16.1%	16.2%	11.7%	9.9%	18.7%	20.9%	12.7%	16.9%
I "wandered" into a doctorate after my first degree	5.9%	6.6%	9.4%	6.1%	6.4%	8.8%	4.7%	4.4%	6.3%	7.1%
To improve my employability	5.2%	6.6%	8.2%	15.7%	2.3%	3.3%	7.6%	4.4%	4.8%	9.4%
I was inspired/encouraged by a tutor/staff member	3.8%	5.6%	7.1%	10.6%	5.3%	6.6%	7.0%	7.7%	4.5%	7.9%
To enhance my earning potential	2.3%	3.0%	6.3%	5.1%	1.2%	1.1%	2.9%	3.3%	2.3%	4.9%
I was inspired/encouraged by a family member/friend	1.1%	3.5%	3.8%	6.1%	1.2%	1.1%	1.2%	3.3%	1.9%	3.8%
I realised that others I knew were applying for doctorates	0.2%	0.5%	1.9%	2.0%	0.0%	0.0%	1.2%	0.0%	0.2%	1.6%
Other	2.9%	1.0%	0.8%	1.0%	0.6%	0.0%	0.6%	0.0%	1.8%	0.8%
Don't know why	0.8%	1.0%	3.6%	4.0%	1.8%	4.4%	1.2%	3.3%	1.5%	3.2%
No second reason chosen			9.2%	9.6%			12.9%	15.4%		11.3%
Total respondents	523	198	523	198	171	91	171	91	1076	1076

Respondents were also asked what their main reasons were for choosing their research group/institution. Respondents were allowed to select up to two choices from a list, or provide an alternative reason as one of their choices. The proportions of respondents selecting different reasons are presented in table 15, broken down by gender and whether respondents are undertaking physics-based or astronomy-based research and by whether or not respondents are studying at the same institution as their first degree.

Table 15: Main reasons given by respondents for choosing their research group/institution by gender and whether respondents' research was physics-based or astronomy-based or whether or not respondents were studying in the same institution as their first degree

Reasons for choosing research group/institution	Research				Institution			
	Physics-based		Astronomy-based		Same as first degree		Different as first degree	
	Male	Female	Male	Female	Male	Female	Male	Female
It was a group with one of the best reputations in my field of interest	40.7%	35.9%	52.6%	58.2%	38.7%	39.4%	46.7%	44.7%
I was offered a place by my undergraduate/masters department	23.9%	24.7%	14.0%	11.0%	49.5%	54.3%	3.0%	6.2%
I had heard that it was a great team with a supportive atmosphere	22.8%	22.7%	33.3%	26.4%	26.8%	18.1%	23.5%	26.1%
I was attracted by the location/city	19.5%	18.2%	14.6%	19.8%	13.9%	9.6%	22.0%	21.2%
I wanted to get a doctorate from a prestigious institution	25.4%	20.2%	17.0%	19.8%	12.2%	9.6%	32.0%	25.7%
It was one of the few groups/institutions that I could get funding to work in	12.0%	8.1%	12.3%	9.9%	4.5%	0.0%	16.3%	11.5%
To be near my partner's work/study institution	5.4%	10.6%	7.6%	6.6%	7.3%	8.5%	4.8%	9.3%
The doctorate had a higher level of funding than others	4.0%	5.1%	2.9%	5.5%	1.7%	2.1%	4.8%	6.2%
Other	11.1%	14.1%	9.9%	8.8%	6.3%	10.6%	6.5%	5.8%
Total respondents	523	198	171	91	287	94	460	226

The most popular reason selected was, *"It was a group with one of the best reputations in my field of interest"*, but it is notable that this reason was more frequently selected by astronomy-based respondents than physics based. It is also notable, but not surprising, that those respondents undertaking their doctorates at a different institution from their first degrees were more likely to select this reason than those staying at the same institution.

Looking in more detail at the differences between physics- and astronomy-based, as well as noting that astronomy-based respondents are more likely to choose, *"It was a group with one of the best reputations in my field of interest"*, they are less likely to choose, *"I was offered a place by my undergraduate/masters department"* and more likely to choose, *"I had heard that it was a great team with a supportive atmosphere."* It was noted earlier that astronomy-based respondents are more likely

to move institution than physics-based respondents so it is to be expected that astronomy-based respondents will be less likely to select *“I was offered a place by my undergraduate/masters department”* than physics-based respondents and, since they are more likely to be moving, they would be more likely to move to join a group with a good reputation. In other words, the differences between astronomy-based and physics-based respondents are linked to the difference in behaviours when it comes to moving institution for their doctorates.

The differences are supported by the comparison between the responses of those who have and have not moved institutions. Those who have moved institutions are more likely than those who have not to select, *“It was a group with one of the best reputations in my field of interest”*, *“I was attracted by the location/city,”* *“I wanted to get a doctorate from a prestigious institution,”* or *“It was one of the few groups/institutions that I could get funding to work in”* as the main reasons for selecting their research group/institution. It is worth noting that around 40% of those who have not moved selected *“It was a group with one of the best reputations in my field of interest”* and 24% selected *“I had heard that it was a great team with a supportive atmosphere”* illustrating that the offer of a doctoral place at the institution where the respondents were already studying was made more attractive by good research reputations and good atmospheres.

3.4 Funding for doctorates

Respondents were asked to indicate whether they received funding for their doctorate or whether they funded their doctorate themselves. The responses are presented in table 16. 97% of British respondents received funding compared to 90% of other nationality respondents.

Table 16: Whether respondents who were not members of a CDT reported receiving funding for their doctorate by nationality and gender

Nationality	Funding for doctorate	Gender		Overall
		Male	Female	
British	Receive funding	98%	96%	97%
	Fund doctorate themselves	2%	4%	3%
	Total Respondents	455	177	639
Other nationalities	Receive funding	92%	87%	90%
	Fund doctorate themselves	8%	13%	10%
	Total Respondents	260	130	391

Respondents were questioned about the source of their funding. The results are shown in table 17 and table 18. 65% of British respondents received their funding solely from research councils, and another 9% reported receiving funding from research councils together with another source. As shown in table 19, 51% of these respondents reported receiving funding from STFC and 46% from the EPSRC. Females were more likely than men to report receiving funding from research councils, either solely or together with other funding, 76% and 73%, respectively. However, around three quarters of both male and female British nationals reported receiving funding from the research councils. Respondents not receiving funding from research councils site a variety of other sources: interestingly no females reported receiving solely industrial funding compared to 18 males.

Relatively small numbers of respondents reported being on research council CASE funding: 3 funded by STFC and 17 funded by the EPSRC.

Among non-British nationals there is a much more even spread of funding sources which is understandable as only a relatively small proportion will be eligible of research council funding. Nonetheless 35% of males and 18% of females reported receiving research council funding either solely or in combination with another source. The gender difference is likely to be related to the different mix of nationalities by gender which effects eligibility. The mix of research council funding is different for the British and non-British nationals. 32% of the non-British national receiving research councils funding were funded by the STFC and 68% by the EPSRC, as shown in table 19.

The variation in funding sources by gender does suggest that perhaps departments ought to monitor the funding sources of their doctoral students by gender to ensure that in particular females avail themselves of industrial funding and university scholarships.

Table 17: Funding sources reported by British respondents who were not members of a CDT by gender

Source of funding	Gender		Overall
	Male	Female	
UK Research Council (including CASE awards)	66.0%	61.8%	65.0%
University scholarship	7.4%	4.1%	6.5%
Departmental funding	2.5%	2.4%	2.4%
European Union funding	1.6%	4.7%	2.4%
Industrial Funding	4.1%	0.0%	2.9%
DELNI	2.3%	1.2%	1.9%
UK Research Council (including CASE awards) combined with another source	7.4%	14.1%	9.4%
Departmental funding combined with another source	1.8%	4.1%	2.4%
Other sources	5.6%	6.5%	5.8%
Don't know	1.4%	0.6%	1.1%
Total respondents	444	170	620

Table 18: Funding sources for their doctorate reported by non-British national respondents who were not members of a CDT by gender

Source of funding	Gender		Overall
	Male	Female	
UK Research Council (including CASE awards)	26.3%	13.4%	22.1%
University scholarship	13.6%	17.9%	14.9%
Government funding from (non-UK) home country	11.4%	14.3%	12.3%
European Union funding	10.6%	8.9%	10.0%
Departmental funding	5.5%	7.1%	6.3%
UK Research Council (including CASE awards) combined with another source	8.9%	5.4%	7.7%
Departmental funding combined with another source	6.4%	6.3%	6.6%
University scholarship combined with another source	5.1%	9.8%	6.6%
Other sources	12.3%	17.0%	13.8%
Total respondents	236	112	349

Table 19: Research councils reported as providing funding for respondents who were not members of a CDT by nationality and gender

Nationality	Source of funding	Gender		Overall
		Male	Female	
British	STFC	50%	53%	51%
	EPSRC	47%	43%	46%
	Other research councils	3%	3%	3%
	Total respondents	326	129	461
Other nationalities	STFC	33%	29%	32%
	EPSRC	67%	71%	68%
	Total respondents	84	21	105

Table 20: Level of annual living expenses reported received by respondents by gender and whether respondents were members of CDTs

Level of Funding	CDT Members		CDT non-members		Overall
	Male	Female	Male	Female	
Less than £10,000	4%	0%	3%	2%	3%
£10,000-£12,000	5%	0%	10%	11%	10%
£12,000-£14,000	51%	58%	64%	65%	63%
£14,000-£16,000	27%	38%	16%	14%	17%
£16,000-£18,000	7%	4%	2%	3%	3%
More than £18,000	5%	0%	5%	5%	5%
Total respondents	73	26	674	281	1063

As shown in table 20, the majority of doctoral students who received funding reported receiving between £12,000 and £14,000 living expenses. 64% of respondents who are not members of CDTs reported receiving this amount, and 54% of respondents who are members of CDTs. 72% of British nationals who are not members of CDTs reported receiving between £12,000 and £14,000. **On average members of CDTs report receiving higher levels of living expenses than non-members.**

Respondents were asked how strongly they agreed with the statement, “*I feel under pressure financially.*” The responses are shown in figure 3. Overall 40% of respondents strongly agreed or agreed that they feel under pressure financially. Females were more inclined to strongly agree or agree than males, 44% and 38%, respectively, and responses of CDT members and non-members were similar with 40% of both groups strongly agreeing or agreeing.

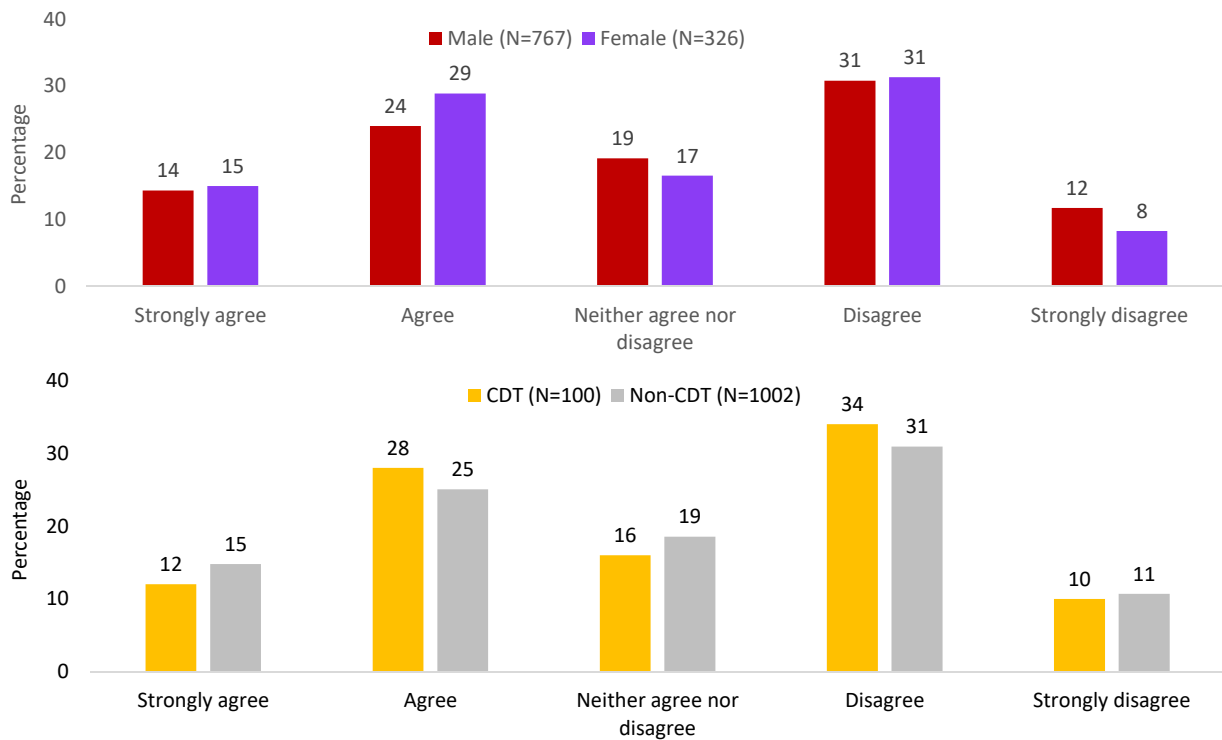


Figure 3: How strongly respondents agreed with the statement, "I feel under pressure financially," by gender and whether respondents were members of a CDT*

* Respondents confined to just those institutions with CDT members responding to the survey.

Table 21 presents data on how strongly respondents agreed with the statement, "I feel under pressure financially," broken down by the level of grant funding that respondents receive. The data show, as would be expected, that the proportion of respondents strongly agreeing or agreeing falls, and the proportion disagreeing or strongly disagreeing increases, as respondents' funding level increases. However, even at the higher levels of funding, sizable proportions of respondents report that they are under pressure financially.

Table 21: How strongly respondents agreed with the statement, “I feel under pressure financially,” by level of annual living expenses received by respondents

Level of funding	I feel under pressure financially					Total respondents
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	
Less than £10,000	32%	32%	21%	4%	11%	28
£10,000-£12,000	17%	25%	21%	30%	6%	99
£12,000-£14,000	11%	25%	19%	32%	11%	664
£14,000-£16,000	14%	28%	15%	34%	10%	178
£16,000-£18,000	0%	24%	21%	41%	14%	29
More than £18,000	14%	12%	10%	46%	18%	50
Overall	15%	25%	18%	31%	11%	1102

Table 22: Length of time which respondents who were not members of a CDT reported their doctorate was funded for by nationality and gender

Length of time of funding	British		Other nationalities		Overall
	Male	Female	Male	Female	
3 years	23%	23%	47%	40%	31%
3.5 years	63%	67%	38%	38%	55%
4 year	13%	10%	14%	20%	13%
More than 4 years	1%	0%	1%	2%	1%
Total respondents	435	166	229	110	947

As shown in table 22, 64% of British respondents who are not members of a CDT reported that they are funded for 3 and a half years, which correlates with the fact that the majority received funding from research councils. The majority of non-British nationals reported being funded for 3 years. Only 1% of respondents reported being funded for more than 4 years.

Table 23: Length of time respondents who were not members of a CDT believed they would take to complete their doctorate by current year of study and gender

Gender	Length of time respondents think they will take to complete their doctorate	Current year of Study					Total respondents
		1st	2nd	3rd	4th	4+	
Male	3 years	22%	15%	12%	1%	0%	96
	3.5 years	63%	64%	69%	41%	0%	412
	4-5 years	14%	20%	18%	54%	73%	169
	More than 5 years	0%	1%	1%	3%	27%	14
	Not sure	0%	1%	1%	1%	0%	4
	Total respondents	229	171	158	116	15	695
Female	3 years	18%	8%	15%	3%	0%	33
	3.5 years	59%	73%	53%	30%	0%	158
	4-5 years	22%	18%	31%	64%	86%	100
	More than 5 years	0%	0%	1%	2%	14%	4
	Not sure	1%	1%	0%	2%	0%	5
	Total respondents	74	74	78	64	7	300

Respondents were questioned about how long they believed they would take to complete their doctorates. The results for those respondents who are not members of a CDT are shown in table 23. The majority of respondents believed that they would complete their doctorate in 3 and a half years, which is the time for which the majority of respondents were funded, but on average females were more likely than males to believe that they would take more than 3 and a half years. There is some variation by year of study. For males in their first year of study, 22% believed they would complete in 3 years, 63% believed they would complete in 3 and a half years, and 14% believed they would take 4 to 5 years. By the third year of study, 12% of males believed they would complete in 3 years, 69% believed they would complete in 3 and a half years, and 18% believed they would complete in 4 to 5 years. It is interesting to note that although numbers of respondents in their fourth year of study was lower than in the earlier years, and those who had completed in 3 years would have already left, the proportion of respondents believing that they would take 4 to 5 years to complete had jumped to 54%. There is similar variation for females but since the number of female respondents is lower than male respondents the year to year variation on the proportions is greater. **However, the data do suggest that on average females believed they would take longer to complete their doctorates than males.** In the third year of study, 53% of females believed that they would complete their doctorates in 3 and a half years and 31% believed that they would complete in 4 to 5 years, and in the fourth year of study, 41% believed they would complete in 3 and a half years and 54% believed they would take 4 to 5 years.

Table 24: Length of time respondents who were not members of a CDT believed they would take to complete their doctorate by length of time for which doctorate was funded and gender

Gender	Length of time respondents think they will take to complete their doctorate	Length of time for which doctorate is funded				Total respondents
		3 years	3.5 years	4 years	More than 4 years	
Male	3 years	34%	6%	1%	0%	91
	3.5 years	54%	70%	42%	0%	402
	4-5 years	11%	24%	54%	43%	160
	More than 5 years	1%	0%	3%	57%	4
	Total respondents	208	360	89	7	664
Female	3 years	29%	2%	0%	0%	27
	3.5 years	49%	63%	34%	0%	150
	4 years	18%	35%	61%	100%	93
	More than 4 years	4%	1%	5%	0%	1
	Total respondents	83	153	38	2	276

Table 24 shows the same data as those in table 23 but this time broken down by length of time respondents are funded for rather than by year of study. Although it should be borne in mind that, as shown above, there is a relationship between year of study and how long respondents believed they would take to complete their doctorate, the data suggest that there is also a relationship between how long respondents are funded for and the length of time they believe they will take to complete. Of course, it may well be the case that those funded for 3 years are more determined to finish in 3 years, and that those funded for four years feel that they are under less pressure to finish in under 4 years.

Examining the data for all respondents funded for 3 years by year of study show that in the first year of study, 47% believed they would finish in 3 years, but in the second year this proportion drops to 27%. The proportion is 32% in the third year of study. Interestingly there is less year to year variation in the populations of those respondents funded for 3.5 and 4 years, which does suggest that it is those students funded for shorter times, and in the earlier years of study, that have the most unrealistic expectations of the time they will take to complete. However, it should be noted that 47% of those funded for 3 years and in their first year of study believed that they would actually take 3 and a half years to complete.

3.5 Work Experience before Doctorate

10% of respondents reported that prior to undertaking their doctorate they had a job in a field related to their doctorate. As shown in table 25, the majority of these, 7% of all respondents, reporting having had jobs before taking their first degree or postgraduate masters. A small number, 2% of all respondents, held jobs before their doctorate but after their first degree/postgraduate masters, and a similar number both had jobs before taking their first degree or postgraduate masters and before their doctorate but after their first degree/postgraduate masters.

Table 25: When respondents reported having had jobs before undertaking doctorate by gender

When job was held	Gender		Overall
	Male	Female	
A job before starting doctorate	9	7	16
A job before starting first degree/postgraduate masters	52	26	78
Both a job before starting doctorate and a job before starting first degree/postgraduate masters	14	4	18
Total respondents	75	37	112

Data in table 26 show the distribution of time spent working before respondents' doctorates for males, females and overall. Similar patterns of distribution are displayed by male and female respondents.

Table 26: Distribution of respondents' reported time spent working before doctorate by gender

Time working	Gender		Overall
	Male	Female	
1-3 months	16%	14%	15%
4-6 months	19%	16%	18%
7-12 months	17%	30%	21%
Between 1 and 2 years	13%	19%	15%
Between 2 and 3 years	8%	3%	6%
Between 3 and 4 years	11%	8%	10%
Between 4 and 5 years	4%	11%	6%
More than 5 years	12%	0%	8%
Total respondents	75	37	112

27% of respondents, 27% of males and 30% of females, reported that they had undertaken work placement(s) and/or internship(s) related to their doctorate prior to undertaking their doctorate. The numbers and distributions of those respondents are shown in table 27. There is a statistically significant difference in the distributions of work placements and internships for males and females ($P < 0.05$). Females are more likely than males to report undertaking an internship: males are more likely than females to report undertaking a work placement as part of a previous degree. Work placements are likely to increase the length of a degree course so perhaps females are less keen on this option than males. Females do seem to show a greater tendency than males to opt for the shorter BSc courses rather than MPhys/MSci courses and perhaps opting not to take work placement options may be related

to this observation. Internships on the other hand are likely to be undertaken in the summer vacation and have to be actively sought – perhaps females are more proactive than males in applying for and, in consequence, getting internships.

Table 27: Reported nature of work experience before undertaking doctorate by gender

Work placement and/or internship	Gender				Overall	
	Male		Female		Number	Distri- bution
	Number	Distri- bution	Number	Distri- bution		
Work placement(s) as part of a previous degree	65	33%	16	17%	81	27%
Internship(s)	118	59%	68	72%	189	63%
Both work placement(s) and internship(s)	17	9%	11	12%	28	9%
Total respondents	200		95		298	

Data in table 28 shows the distribution of time spent on work placements and/or internships before respondents' doctorates by gender. Similar distribution patterns are displayed by male and female respondents: the differences are not statistically significant.

Table 28: Distribution of respondents' reported time spent on work placements and/or internships before doctorate by gender

Time working	Gender		Overall
	Male	Female	
1-3 months	49%	55%	50%
4-6 months	25%	23%	25%
7-12 months	16%	11%	14%
Between 1 and 2 years	5%	6%	5%
Between 2 and 3 years	2%	1%	1%
Between 3 and 4 years	2%	1%	2%
Between 4 and 5 years	1%	2%	1%
More than 5 years	2%	1%	1%
Total respondents	200	95	298

Examining the patterns of work for members and non-members of CDTs show no clear differences although in part this is because of the small numbers involved. Similarly, no clear differences are obvious between those studying astronomy or physics.

Finally, around 50 respondents highlighted the fact that they had carried out short research projects most often over a summer in addition to project work included in their previous degree programmes. This project work has not been included in the figures above.

3.6 Work Experience during Doctorate

160 male and 57 female respondents reported spending one month or more in total on placement working in industry or at another institution/research institute during their doctorate. Looking at the data by year of study shows that the proportion reported working peaks during the third year (see table 29). Overall around 30% of those in their 3rd and 4th year of study reported having worked outside their home department and the vast majority of those reported having worked in another institution or research institute. However, comparing the numbers of males and females in their 3rd and 4th year of study who have and have not worked for one month or more show that females are significantly less likely than males to have worked outside their department ($P < 0.05$). It is not obvious why this is the case.

Of those who have worked outside their department, 20% reported working for up to 1 month, 25% between 2 and 3 months, 17% between 3 and 6 months and 37% for more than 6 months.

Table 29: Distribution of types of work undertaken by respondents before doctorate by current year of study

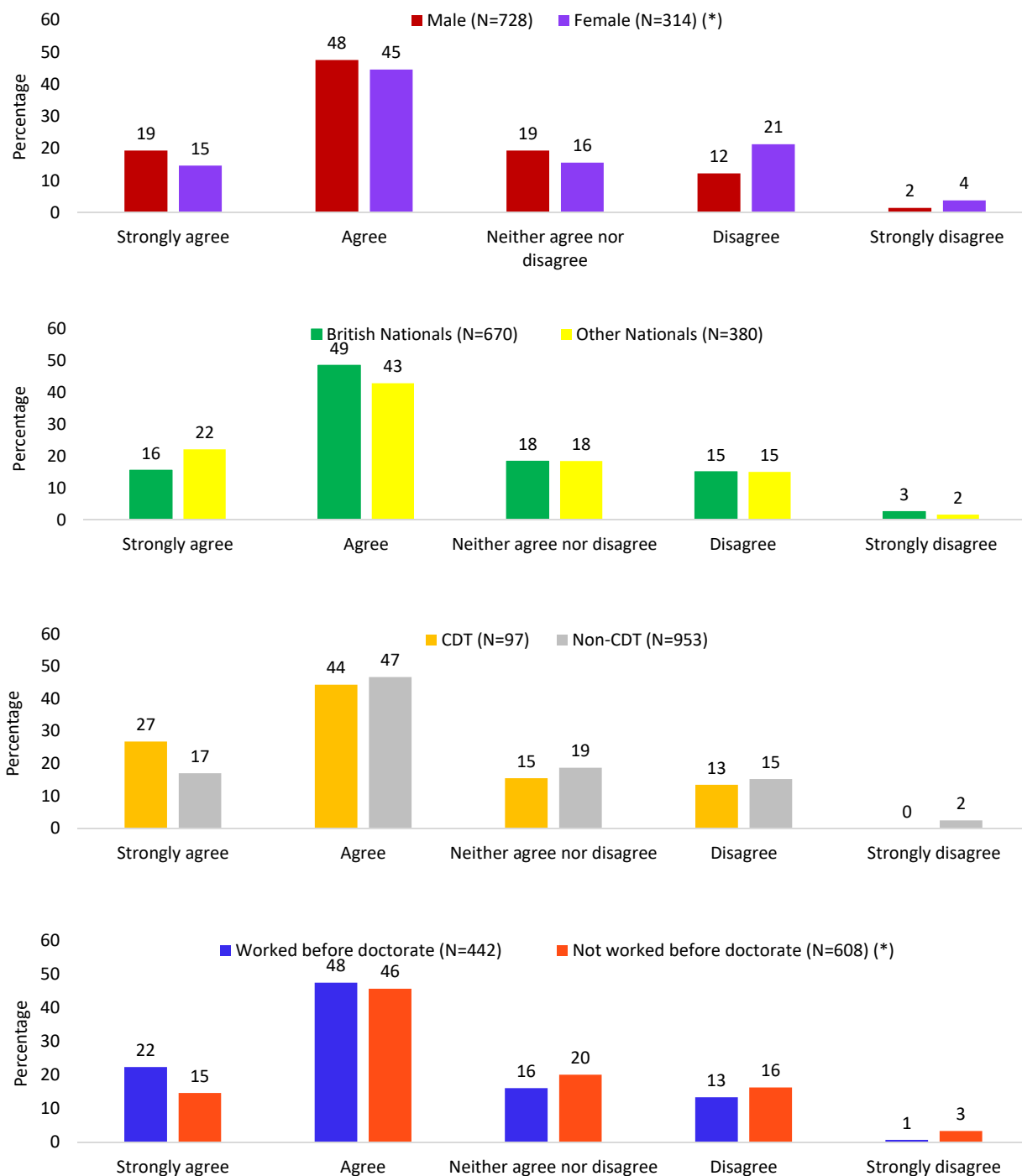
Working for at least a month during doctorate	Current year of study							
	1st		2nd		3rd		4th	
	Male	Female	Male	Female	Male	Female	Male	Female
In industry	1%	1%	2%	1%	1%	1%	2%	2%
In another institution/ research institute	8%	4%	11%	23%	29%	22%	32%	14%
In industry and in another institution/research institute	1%	0%	4%	1%	1%	2%	2%	0%
Not worked	90%	95%	83%	75%	69%	74%	63%	85%
Total respondents	242	79	186	84	174	81	122	65

The majority of those who had worked outside their department, 53%, reported that the experience had made them more intent on pursuing a career in science. 7% of respondents reported that their experiences had made them less intent on pursuing a career in science. **There was no significant difference between the responses of males and females, but, as females are less likely than males to have worked outside the department, females are less likely than males to experience this reinforcement in respect of research careers.**

3.7 Preparation before Undertaking a Doctorate

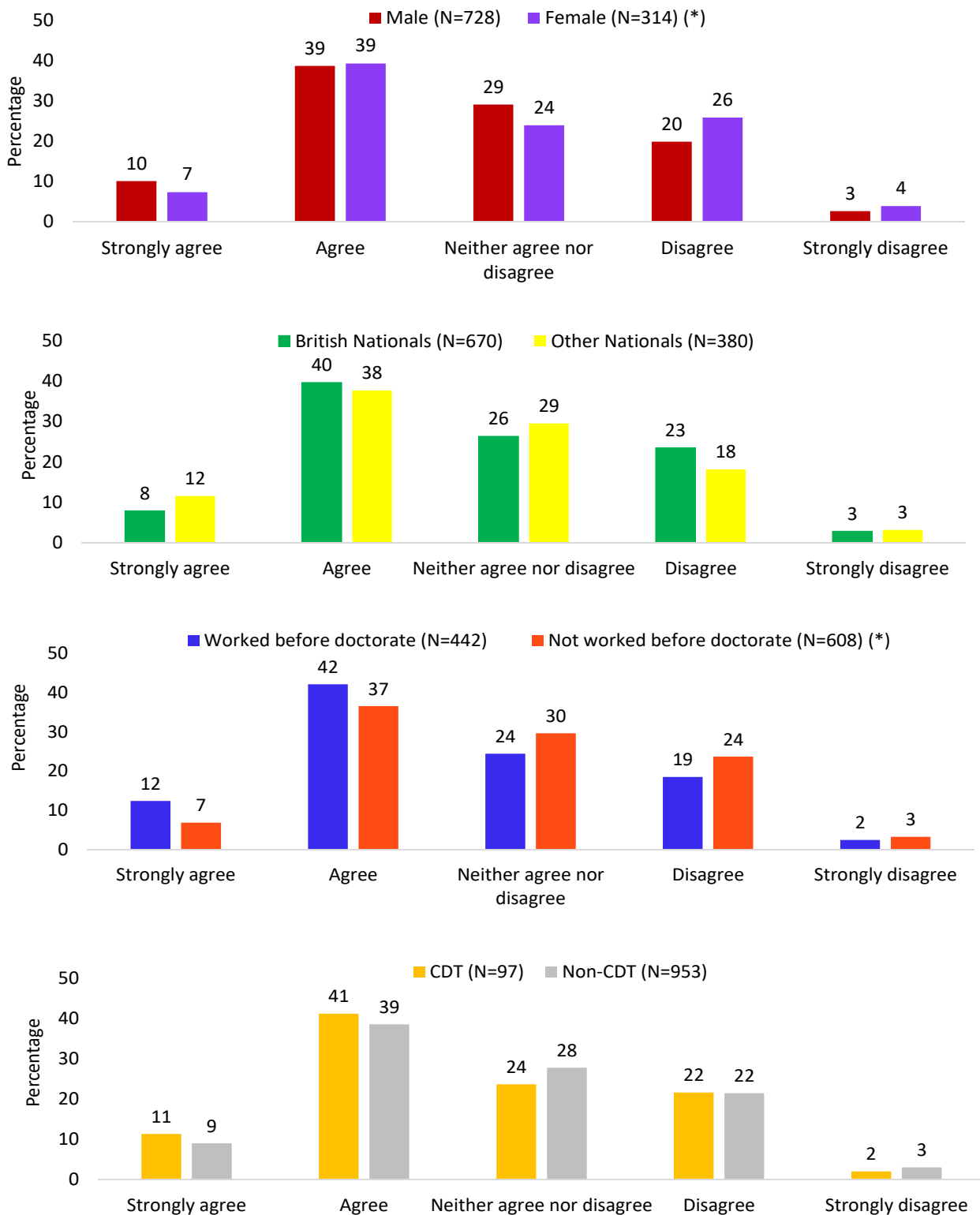
Respondents were asked how strongly they agreed with the statement “*I felt well prepared from my previous studies and experience to embark on independent research.*” The responses, broken down by various qualities are shown in figure 4. Males were more likely to strongly agree or agree than females, 67% and 60%, respectively and males were less likely than females to disagree or strongly disagree, 14% and 25%, respectively. The differences between the responses of males and females are statistically significant ($P < 0.05$). The gender difference is perhaps unexpected as males and female are likely to have had similar experiences before their doctorates and may reflect a difference in confidence between males and females.

There is relatively little difference in the responses of British respondents and respondents of other nationalities, but members of CDTs were more likely to strongly agree or agree than non-members. As might be expected, those respondents who had worked for at least a month before embarking of their doctorate agreed more strongly with the statement than those who had not. The differences here are statistically significant ($P < 0.05$).



* Statistically significant difference between the populations ($P < 0.05$). To measure significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.

Figure 4: How strongly respondents agreed with the statement, “I felt well prepared from my previous studies and experience to embark on independent research,” by gender, nationality, whether respondents were members of a CDT, and whether respondents had worked before undertaking their doctorate



* Statistically significant difference between the populations ($P < 0.05$). To measure significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.

Figure 5: How strongly respondents agreed with the statement, “Before embarking on my doctorate, I had already developed the necessary skills to start independent research” by gender, nationality, whether respondents were members of a CDT and whether respondents had worked before undertaking their doctorate

As illustrated in figure 5, although the differences are still statistically significant ($P < 0.05$), there is closer agreement between males' and females' level of agreement with the statement, "Before embarking on my doctorate, I had already developed the necessary skills to start independent research." Nonetheless, smaller proportions of men and women strongly agreed or agreed with the statement than strongly agreed or agreed with the statement, "I felt well prepared from my previous studies and experience to embark on independent research," 49% and 46%, respectively. 23% of males and 30% of females disagreed or strongly disagreed. The higher proportions of females than males in particular disagreeing with the two statements is perhaps reflective of females being less confident than males.

There are few differences in the responses of British and other nationals or between CDT members and non-members. As might be expected, those respondents who have worked before their doctorate agreed more strongly than those who have not.

It is perhaps surprising that about half the respondents strongly agreed or agreed that "Before embarking on my doctorate, I had already developed the necessary skills to start independent research." Examining the responses by year of study shows little variation in responses which suggests that respondents were not reinterpreting their preparedness as their studies progressed.

Data in table 30 concerns ways in which respondents could have prepared for their doctorate presented in the form of statements and an indication of how strongly respondents agreed with that statement broken down by gender. Data in table 31 show the same information but broken down by nationality and table 32 shows the data broken down by whether or not respondents are members of CDTs.

Table 30: Proportions of respondents who agreed or disagreed with statements about their experiences as a doctoral student by gender

Statement	Gender	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total respondents
<i>....there wasn't anything that realistically could have prepared me.</i>	Male	4%	19%	31%	38%	9%	728
	Female	3%	23%	26%	40%	8%	314
<i>....an additional one-year funded research masters course would have helped me prepare for independent research⁺ *</i>	Male	13%	30%	25%	27%	5%	512
	Female	20%	29%	25%	21%	4%	205
<i>....a funded short research taster course would have helped me prepare.</i>	Male	8%	33%	30%	24%	5%	728
	Female	15%	33%	26%	21%	5%	314

+ Responses restricted to those who do not possess a postgraduate masters qualification.

* Statistically significant difference between the populations ($P < 0.05$). To measure significance the "strongly agree" and "agree", and "disagree" and "strongly disagree" categories were combined and a χ^2 test used.

23% of males and 26% of females strongly agreed or agreed that, "there wasn't anything that realistically could have prepared me," and 47% of males and 48% of females disagreed or strongly disagreed. There is reasonably close agreement between the responses of British and other nationals although British nationals were slightly less likely to disagree or strongly agree than respondents of other nationalities, and between the responses of CDT members and non-members. So, while about a quarter of respondents believed that nothing could have realistically prepared them for their doctorate – which

does not necessarily mean that they felt well prepared - almost half the respondents felt that there were ways in which they could have been better prepared.

43% of male and 49% of female respondents who did not possess a postgraduate masters qualification strongly agreed or agreed that a funded masters course would have helped them prepare for independent research, and 41% of males and 48% of females strongly agreed or agreed that a short research taster course would have helped them prepare. Also, 45% of British and 47% of other nationals who do not possess a postgraduate masters qualification strongly agreed or agreed that a funded masters course would have helped them prepare for independent research, and 47% of British and 36% of other nationals strongly agreed or agreed that a short research taster course would have helped them prepare. Comparing CDT members and non-members shows that 37% of CDT members and 45% of CDT non-members who did not possess a postgraduate masters qualification strongly agreed or agreed that a funded masters course would have helped them prepare for independent research, and 35% of all CDT members and 44% of all CDT non-members strongly agreed or agreed that a short research taster course would have helped them prepare. In the case of males and females and CDT members and non-members, there are statistically significant differences between the responses of different groups in respect of the potential usefulness of a postgraduate masters ($P < 0.05$), and in the case of British and other nationals there are significant differences between the responses of the two groups in respect of the usefulness of a short taster course ($P < 0.05$).

The most interesting findings are that British nationals were more likely than other nationals to indicate that a short taster course would have helped them prepare for their doctorate, and that that around half of respondents without a postgraduate masters qualification felt that undertaking a masters would have helped them prepare. The data also show that females were more likely than males to indicate that a short taster course would have helped.

It will be interesting to explore further why respondents feel a masters course would have helped them prepare given that masters courses are generally classroom-based, albeit courses generally include a substantial project.

The relatively large proportion of particularly British respondents suggesting that a taster course would have helped is interesting. The majority of students, especially those who studied in UK institutions for their first degrees, would have had some experience of project work and it is likely that the majority of these projects would have been carried out as part of a research group in a research laboratory. Consequently, a large proportion of graduates probably have had direct experience of research. It will be interesting to learn what respondents would expect to experience during a short taster course.

Table 31: Proportions of respondents who agreed or disagreed with statements about their experiences as a doctoral student by nationality

Statement	Nationality	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total respondents
<i>....there wasn't anything that realistically could have prepared me.</i>	British	3%	20%	30%	40%	8%	670
	Other	5%	20%	30%	36%	9%	380
<i>....an additional one-year funded research masters course would have helped me prepare for independent research⁺</i>	British	13%	32%	25%	26%	4%	587
	Other	25%	22%	24%	21%	9%	138
<i>....a funded short research taster course would have helped me prepare.*</i>	British	10%	37%	26%	25%	3%	670
	Other	11%	25%	34%	21%	9%	380

+ Responses restricted to those who do not possess a postgraduate masters qualification.

* Statistically significant difference between the populations ($P < 0.05$). To measure significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.

Table 32: Proportions of respondents who agreed or disagreed with statements about their experiences as a doctoral student by whether respondents were members of a CDT

Statement	CDT Membership	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total respondents
<i>....there wasn't anything that realistically could have prepared me.</i>	Member	5%	25%	29%	31%	10%	97
	Non-member	4%	19%	30%	39%	8%	953
<i>....an additional one-year funded research masters course would have helped me prepare for independent research⁺*</i>	Member	14%	23%	18%	35%	10%	78
	Non-member	15%	30%	26%	24%	4%	647
<i>....a funded short research taster course would have helped me prepare.</i>	Member	7%	28%	28%	33%	4%	97
	Non-member	11%	33%	29%	23%	5%	953

+ Responses restricted to those who do not possess a postgraduate masters qualification.

* Statistically significant difference between the populations ($P < 0.05$). To measure significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.

3.8 Induction, Supervision, Feedback and Support

Respondents were asked whether they had an induction into their department and, if they did, whether they felt it was informative. Alternatively if they did not have an induction respondents were asked whether they felt an induction would have been useful. As shown in table 33, 59% of respondents reported that they had a useful induction, and another 24% reported that they felt the induction was neither useful nor informative. Similar proportions of men and women reported that they had an induction, but men were statistically significantly more likely ($P < 0.05$) than women to report that they found the induction useful and informative. 78% of members of CDTs reported that they received an induction that was useful and informative compared to 57% of non-members and 17% reported that they had an induction which was neither useful nor informative compared to 24% of non-members. The differences are statistically significant ($P < 0.05$). Overall 10% of respondents reported that they had not had an induction and felt that they did not need one. It is interesting that their results were very similar whether or not respondents had studied at the same institution for their first degree. All institutions had some respondents reporting that they had a departmental/CDT induction. It does appear that the inductions that take place within CDTs are better thought of by respondents. Perhaps lessons can be drawn from practice within CDTs.

Table 33: The nature of any departmental/CDT induction that respondents reported undergoing by gender, by whether respondents were members of a CDT, or by whether respondents were at the same institution as for their first degree

Nature of departmental/CDT induction	Gender		Member of CDT		Same institution as first degree		Overall
	Male	Female	Yes	No	Yes	No	
Formal departmental/CDT induction which was useful and informative	61%	55%	78%	57%	58%	60%	59%
Departmental/CDT induction which, overall, was neither useful nor informative	22%	27%	17%	24%	24%	23%	24%
No formal departmental/CDT induction and feel that having a formal induction would have been useful	6%	8%	3%	7%	6%	7%	7%
Not given a formal departmental/CDT induction and felt that they did not need one	11%	9%	2%	11%	11%	9%	10%
Total Respondents	695	303	96	910	359	647	1006

Respondents were also asked whether they had a university induction and if they had what they thought about it: the results are shown in table 34. 35% of respondents reported that they had a useful and informative university induction and 32% reported that the university induction was neither useful nor informative. 24% of respondents reported that they did not have a university induction and felt that they did not need one. There is relatively little difference between the responses of men and women, but CDT members are more likely to report having had a university induction than CDT non-members. Respondents who changed institutions since their first degree and had a university induction were more likely to report that the induction was useful and informative than those who stayed at the same

institution. Those respondents who had moved institution and not had a university induction were more to report that they would have found one useful than those who had stayed in the same institution. Considering those respondents who had a university induction, the differences between the groups considered are not significant. Like the results for departmental/CDT induction, at institutional level, all institutions had some respondents who reported having had a university induction.

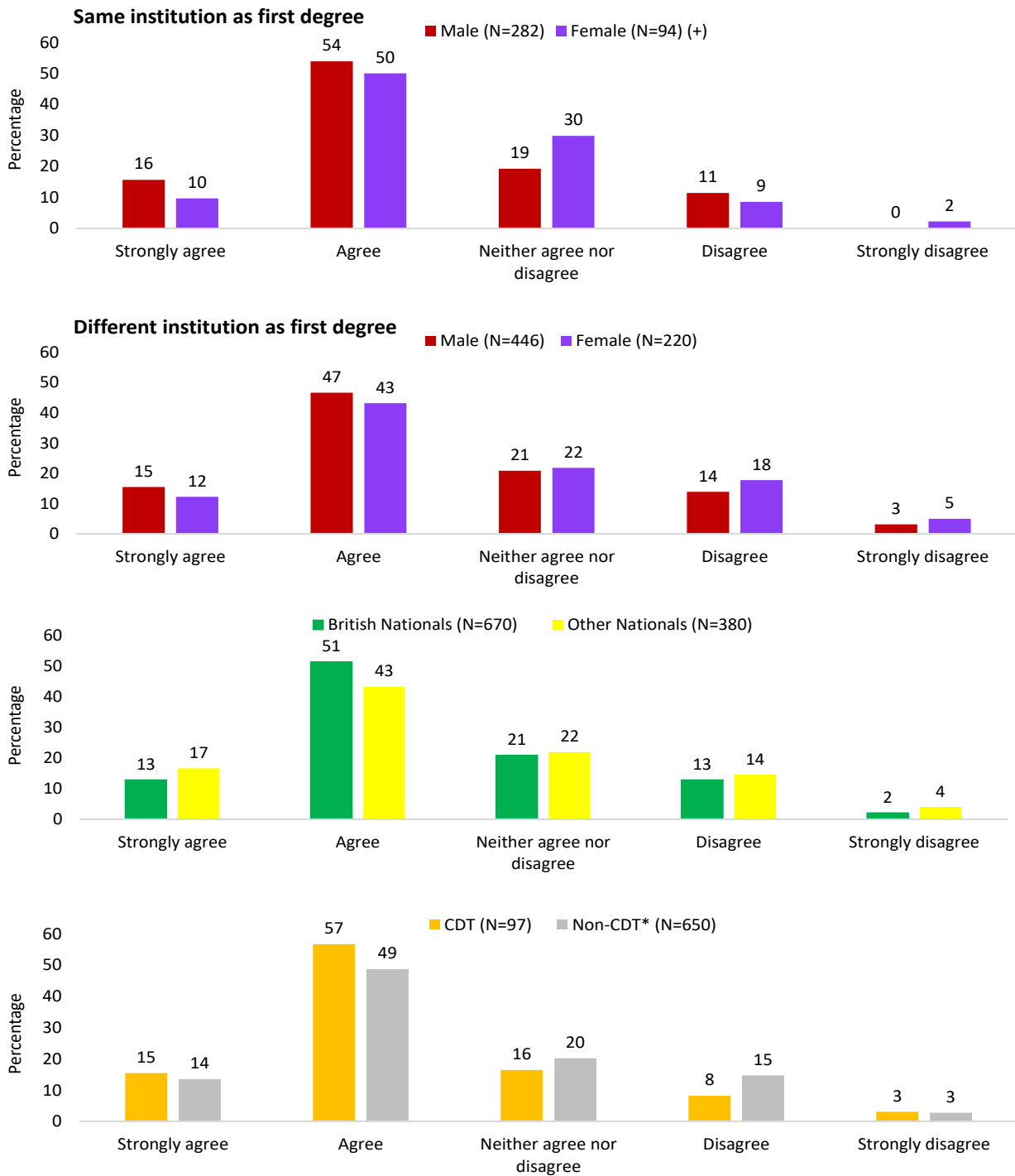
Table 34: The nature of any university induction that respondents underwent by gender or by whether respondents were members of a CDT

Nature of university induction	Gender		Member of CDT*		Same institution as first degree		Overall
	Male	Female	Yes	No	Yes	No	
Formal university induction which was useful and informative	36%	33%	41%	35%	32%	37%	35%
University induction which, overall, was neither useful nor informative	32%	31%	41%	28%	34%	30%	32%
No formal university induction and feel that having a formal induction would have been useful	7%	12%	5%	9%	3%	12%	9%
Not given a formal university induction and felt that they did not need one	24%	24%	14%	27%	31%	21%	24%
Total Respondents	695	303	96	617	359	647	1006

* Respondents confined to just those institutions with CDT members responding to the survey.

Respondents were asked how strongly they agreed with the statement that, *“I received adequate information about my doctorate during the application and interview process, so I had a good idea of what to expect from the department.”* The responses are shown in figure 6. Males were more likely to strongly agree or agree than females (differences are statistically significant ($P < 0.1$)), and those studying in a different institution to their first degree were less likely to strongly agree or agree than those studying in the same institution. Overall 67% of respondents studying in the same institution as their first degree strongly agreed or agreed with the statement, and 60% of those studying in a different institution. In both cases females were less likely to strongly agree or agree than males but it is not clear why there is a difference in responses by gender.

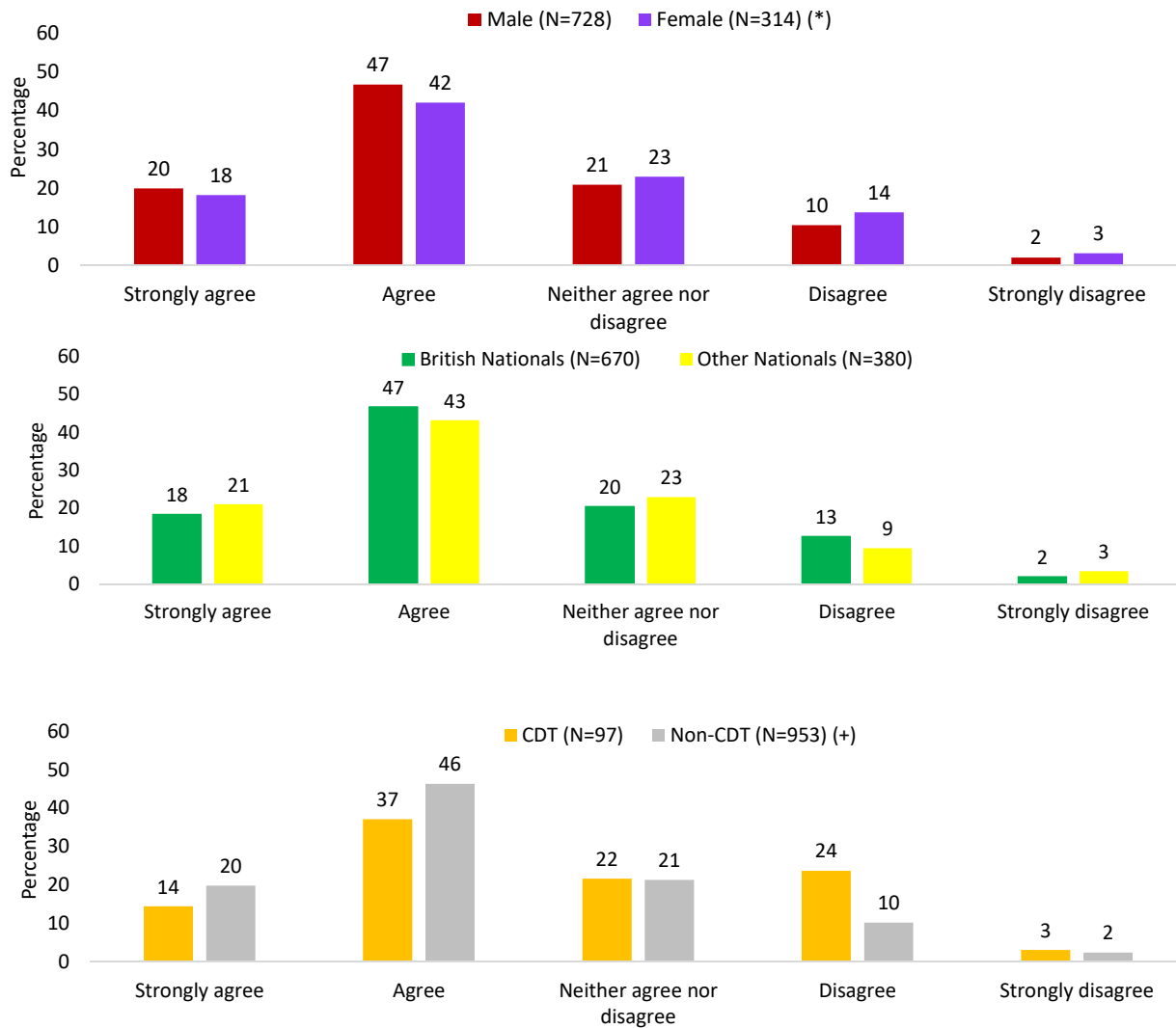
British nationals were more likely to strongly agree or agree than other nationals, as are CDT members in comparison to non-members. In the case of other nationals, the change in country for those other nationals moving to the UK for the first time may affect their feelings about the amount of information received. It is also likely that CDT members receive more information than non-members and that new members are likely to have researched what is involved in belonging to CDT before initially applying.



+ Statistically significant difference between the populations ($P < 0.05$). To measure significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.

* Respondents confined to just those institutions with CDT members responding to the survey.

Figure 6: How strongly respondents agreed with the statement, “I received adequate information about my doctorate during the application and interview process, so I had a good idea of what to expect from the department,” by gender and whether respondents were studying for their doctorate in the same institution as they studied for their first degree, by nationality and by whether respondents were members of a CDT

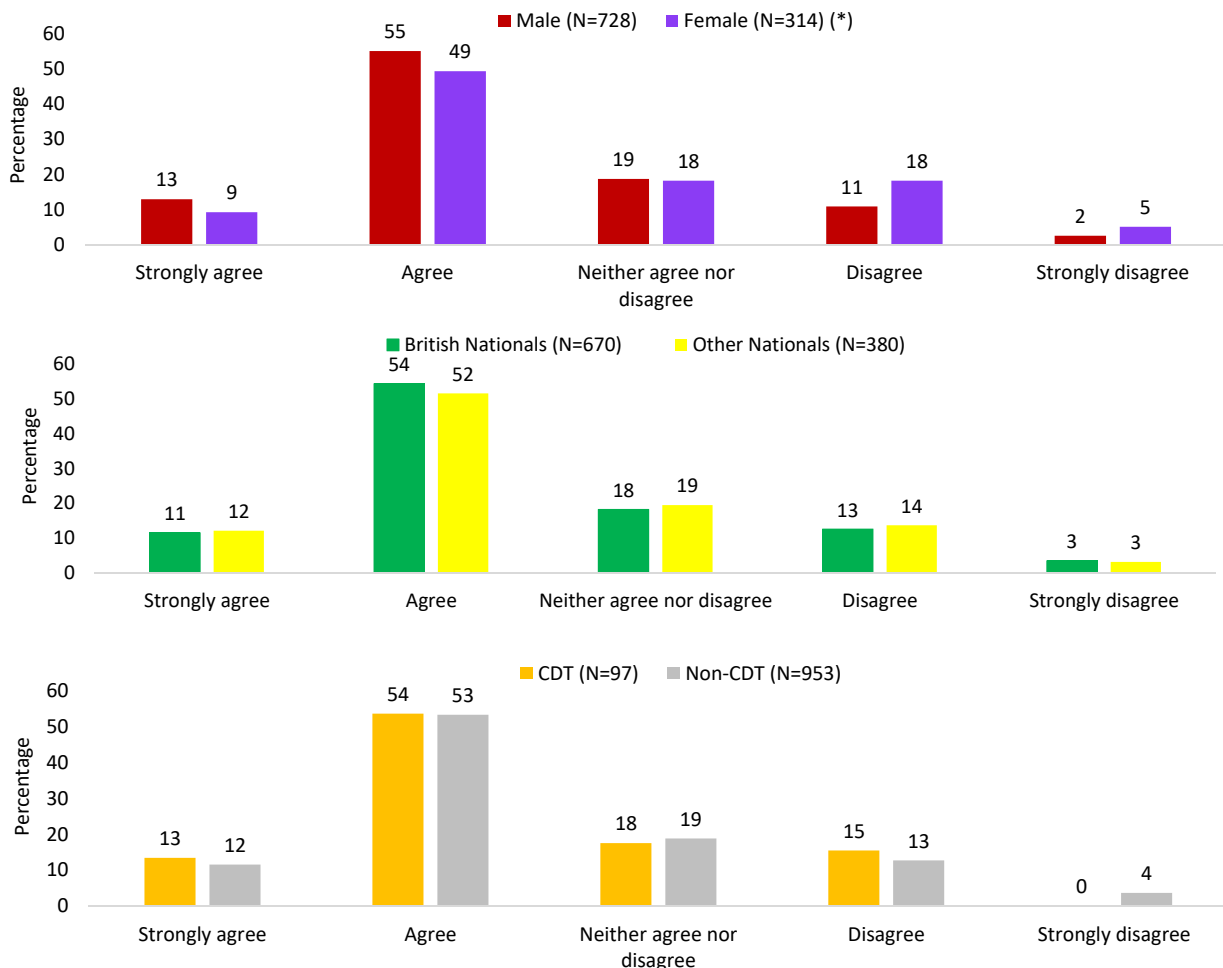


- * Statistically significant difference between the populations ($P < 0.1$). To measure significance the "strongly agree" and "agree", and "disagree" and "strongly disagree" categories were combined and a χ^2 test used.
- + Statistically significant difference between the populations ($P < 0.05$). To measure significance the "strongly agree" and "agree", and "disagree" and "strongly disagree" categories were combined and a χ^2 test used.

Figure 7: How strongly respondents agreed with the statement, "My doctoral supervisor gave me a realistic idea of the sort of time commitment that would be demanded of me during my doctorate." by gender, nationality and whether respondents were members of CDTs

Overall 64% of respondents strongly agreed or agreed with the statement, "My doctoral supervisor gave me a realistic idea of the sort of time commitment that would be demanded of me during my doctorate." As shown in figure 7 males were more likely to strongly agree or agree than females, 66% and 57%, respectively. Just 13% of respondents overall disagreed or strongly disagreed, 1% of males and 18% of females. The differences between the responses of males and females are statistically significant ($P < 0.05$). This result is in line with the responses for males and females about adequate information being received about the doctorate. Although the majority of males and females agreed that they have received adequate information about aspects of their doctorate, it appears that in general females feel less well informed than men.

Similar proportions of British national and other nationals strongly agreed or agreed, 65% and 64%, respectively. 51% of CDT members strongly agreed or agreed compared to 66% of non-members. Interestingly 27% of CDT members disagreed or strongly disagreed compared to 12% of non-members. The differences between the responses of CDT members and non-members are statistically significant ($P < 0.1$). This is in contrast to responses to the statement above about adequate information being received about the doctorate itself. It appears that in respect of the time commitment required, CDT members felt less well informed in advance than non-members.



* Statistically significant difference between the populations ($P < 0.05$). To measure significance the "strongly agree" and "agree", and "disagree" and "strongly disagree" categories were combined and a χ^2 test used.

Figure 8: How strongly respondents agreed with the statement, "Overall, my experiences during my doctorate are what I expected." by gender, nationality and whether respondents were members of CDTs

Figure 8 shows how strongly respondents agreed with the statement, "Overall, my experiences during my doctorate are what I expected." While the responses of British and other nationals, and those of CDT members and non-members are similar, males agreed more strongly than females. 68% of males and 58% of females strongly agreed or agreed with the statement and 13% of males and 23% of females disagreed or strongly disagreed with the statement. The differences between the responses of males and females are statistically significant ($P < 0.05$). The difference is in line with the earlier finding that women felt less well prepared than men but given that presumably males and female have access to the same information before starting their doctorates perhaps this suggests that females have higher expectations than males.

Table 35: Whether respondents reported that they were pleased with their decision to do a doctorate

Pleased with decision to do a doctorate	Gender		Overall
	Male	Female	
Yes	86%	83%	85%
Don't know	11%	13%	11%
No	3%	5%	4%
Total Respondents	747	320	1076

Respondents were asked whether they were pleased with their decision to do a doctorate. As table 35 shows, 86% of men and 83% of women report that they were pleased with their decision and 3% of men and 5% of women reported that they were not pleased. There is little variation with age, year of study or nationality. It is positive to find that 85% of respondents were pleased with their decision even though, as shown below, the proportion of respondents who were pleased with the way their doctorate is going is lower than this.

Table 36: Whether respondents reported that they were happy with the way their doctorate was going by year of study and gender

Happy with the way doctorate is going	Current year of study								Overall	
	1st		2nd		3rd		4th			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Yes	74%	80%	71%	67%	74%	57%	72%	66%	72%	65%
Not sure	17%	18%	20%	23%	17%	23%	20%	18%	18%	21%
No	8%	3%	9%	11%	9%	20%	8%	15%	10%	14%
Total Respondents	242	79	186	84	174	81	122	65	747	320

In a similar vein, respondents were asked whether they were happy with the way their doctorate was going. The results are shown in table 36. Overall 72% of men and 65% of women reported that they were happy with the way their doctorate was going and 10% of men and 14% of women reported that they were unhappy. There is, however, some variation in the responses of women by year of study, whereas the responses of men are essentially invariant. In the first year of study 80% of women reported that they were happy with the way their doctorate was going but this proportion falls to 57% in the third year and 66% in the fourth year. 3% of women reported that they were unhappy with the way their doctorate was going in the first year of study, but this figure rises to 20% in the third year and 15% in the fourth year. So the indications are that although similar proportions of men were happy with the way their doctorates were going in each year of study the proportion of women falls so that by the third year of study somewhere between 15 and 20% reported being unhappy with the way things were going. However, the difference between the responses of men and women by year of study are not statistically significantly different. Comparing the combined response of those in their first and second year of study, and those in their third and fourth year of study does allow a measure of statistical significance to be made. The responses for females in their first and second years of study are statistically significantly

different from responses of females in their third and fourth years of study ($P < 0.05$), whereas the responses of males groups in the same way are not statistically significantly different.

There is clearly an issue which requires further attention regarding, in particular, a significant minority of females' unhappiness with the way their doctorates are going.

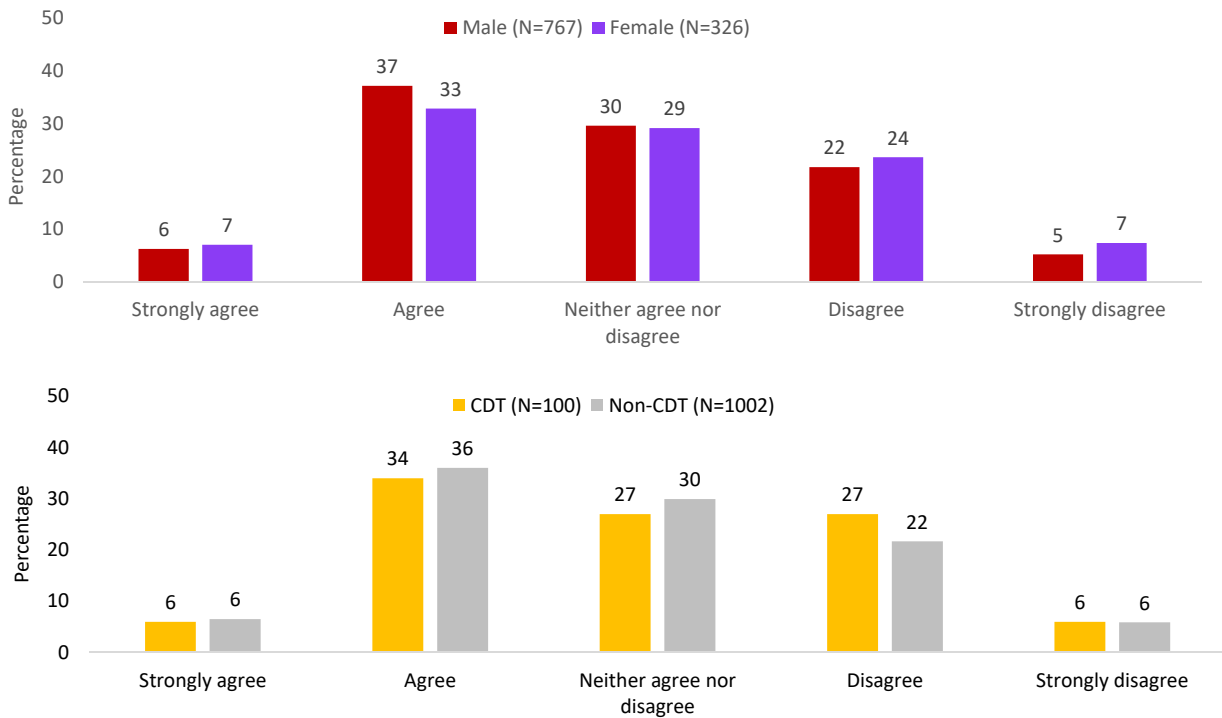


Figure 9: How strongly respondents agreed with the statement, “*There is little that can be improved about my doctorate,*” by gender and whether respondents were members of a CDT

Respondents were asked how strongly they agreed with the statement, “*There is little that can be improved about my doctorate.*” In line with the overall data presented in table 36 men were more likely than women to strongly agree or agree, 43% and 40%, respectively. However, the responses of males and females are not statistically significantly different. The responses of CDT members and non-members were similar.

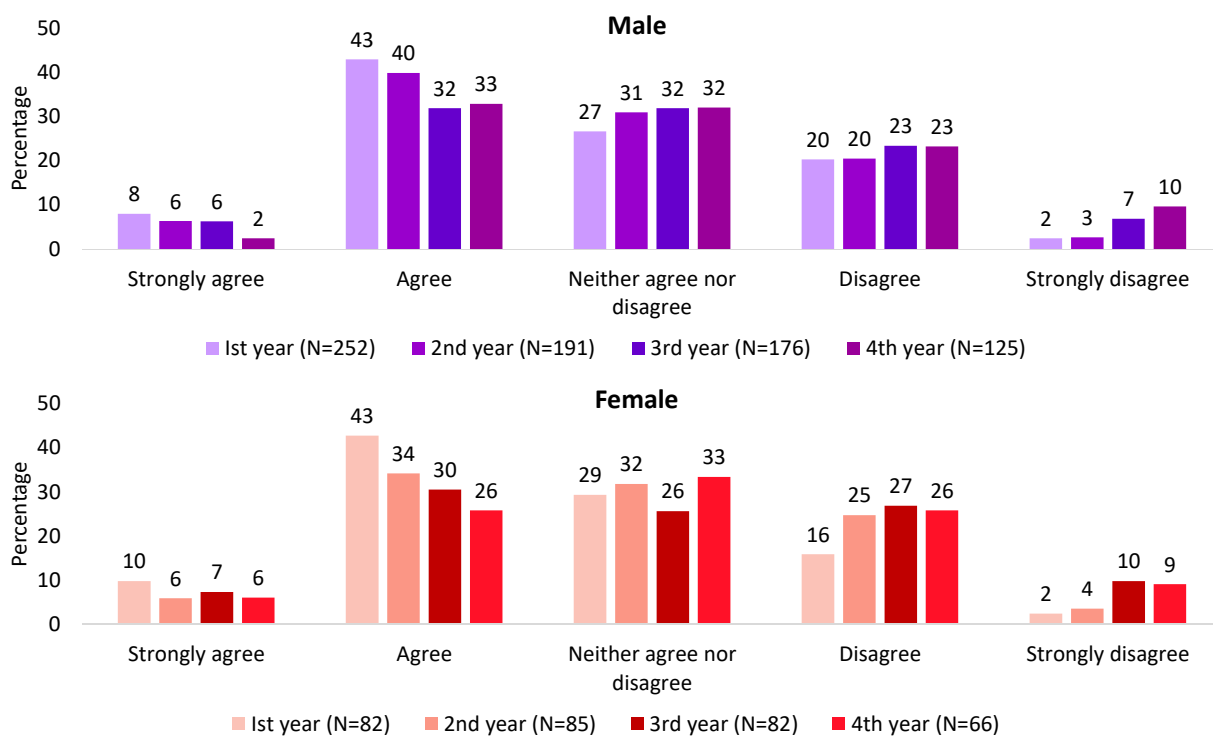


Figure 10: How strongly respondents agreed with the statement, “*There is little that can be improved about my doctorate,*” by gender and current year of study

Figure 10 presents data on how strongly males and females agreed with the statement, “*There is little that can be improved about my doctorate,*” by year of study. The proportions of males and females strongly agreeing and agreeing falls, and the proportion disagreeing and strongly disagreeing rises as year of study increases. For males and females, comparing the responses in the first year of study with responses in the second, third and fourth years shows that for both males and females, there are statistically significant differences between the responses in the first year of study and the responses in the third and fourth years of study ($P < 0.05$).⁷ These data are in line with the respondents’ feedback on whether they are happy with the way their doctorates are going.

When respondents were asked how strongly they agreed with the statement, “*I often have the opportunity to be creative,*” again men were more likely than women to strongly agree or agree, 77% and 70%, respectively as shown in figure 11, but the responses are not statistically significantly different. The responses of CDT members and non-members were similar.

⁷ To test statistical significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.

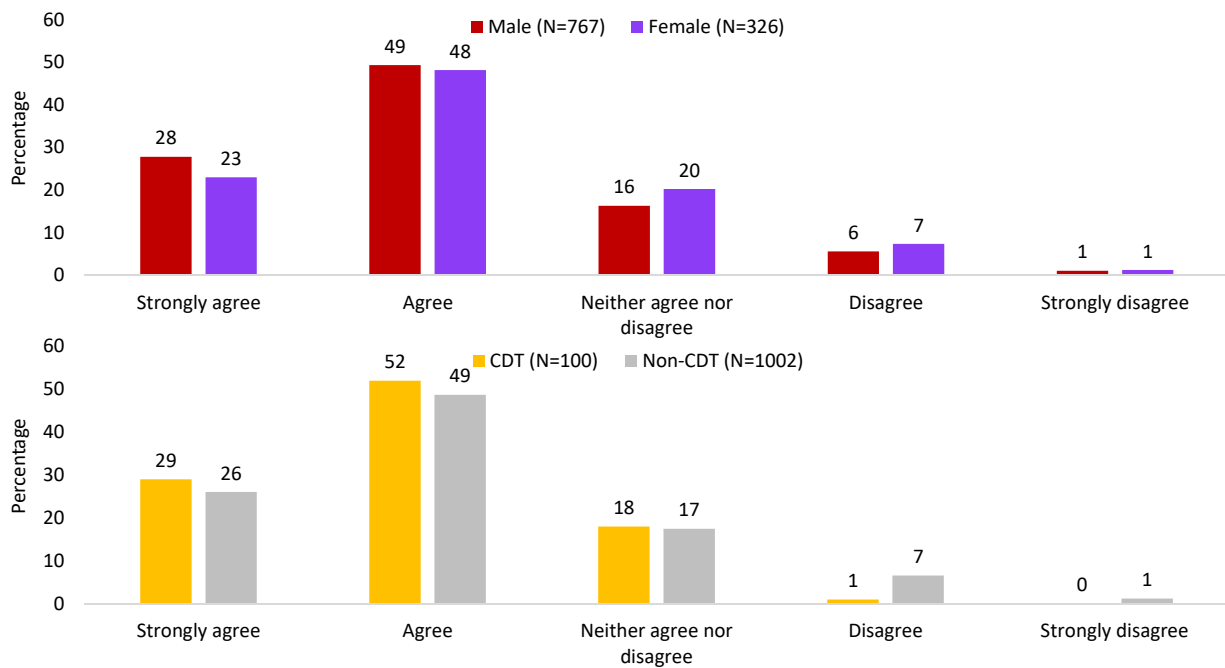


Figure 11: How strongly respondents agreed with the statement, “I often have the opportunity to be creative,” by gender and whether respondents were members of a CDT

Table 37: Whether respondents reported that they are members of graduate schools by gender

Member of Graduate School	Gender		Overall
	Male	Female	
Yes. Regularly use Graduate School facilities.	14%	18%	15%
Yes, but rarely have any contact with the Graduate School	40%	45%	42%
No	46%	37%	43%
Total Respondents	716	310	1034

Respondents were asked whether or not they were members of a graduate school: the details of what might constitute a graduate school were not given to respondents. Overall 15% of respondents reported regularly using graduate school facilities, and another 42% reported that they were members of a graduate school albeit they rarely used the facilities. The results are shown in table 37.

Examination of the data by institution shows that for the majority of institutions, and for all institutions with 9 or more respondents, there were some respondents that reported being members of a graduate school and others who reported that they were not. The likelihood is that within a given department of physics and/or astronomy, either all doctoral students are members of a graduate school, or none are. The issue here appears to be one of communication with doctoral students although interestingly, examination of the data by year of study shows no significant variation (see table 38) – usage of facilities may well be expected to fall in the 4th year as a significant proportion of students will be working hard to finish their research and/or writing up.

Table 38: Whether respondents reported that they are members of graduate schools by year of study

Member of Graduate School	Current year of Study				Overall
	1st	2nd	3rd	4th	
Yes. Regularly use Graduate School facilities	16%	15%	17%	12%	15%
Yes, but rarely have any contact with the Graduate School	41%	43%	40%	45%	42%
No	43%	42%	43%	43%	43%
Total Respondents	314	260	246	182	1034

Data in table 39 shows that doctoral students in CDTs appeared to use graduate school facilities more than other students. In table 39 only data from those institutions that had respondents in CDTs have been used for a better comparison.

Table 39: Whether respondents report that they are members of graduate schools by membership of a CDT*

Member of Graduate School	Member of CDT	Not member of CDT	Overall
Yes. Regularly use Graduate School facilities.	27%	16%	18%
Yes, but rarely have any contact with the Graduate School	36%	40%	40%
No	36%	44%	43%
Total Respondents	96	640	736

* Only data from those institutions that have respondents reporting to be members of CDTs have been included.

87% of respondents reported that there are formal assessments that they have to pass (e.g. qualifying masters, submission of yearly reports, etc.) during their doctorate. There is little difference between the responses of those respondents who were members of a CDT and those who were not. All institutions had a majority of respondents reporting that there are formal assessments suggesting that in the majority of institutions there is a small minority of doctoral students who are unclear of the requirements to pass interim assessments.

Doctoral students were asked how they would describe their relationship with their main supervisor. A summary of the results broken down by gender and whether or not respondents were members of a CDT are shown in figure 12. The majority of respondents rated their relationship with their main supervisor as excellent or good but overall 3% of males and 7% of females rated their relationship with their main supervisor as poor or very poor. The data do indicate that male students rated their relationship with their supervisor better than females - there is a statistically significant difference between the responses of males and females among CDT non-members ($P < 0.1$).⁸ Among males, CDT members appeared to rate their relationship less highly than females.

⁸ To test statistical significance the "excellent" and "good", and "poor" and "very poor" categories are combined and the χ^2 test used.

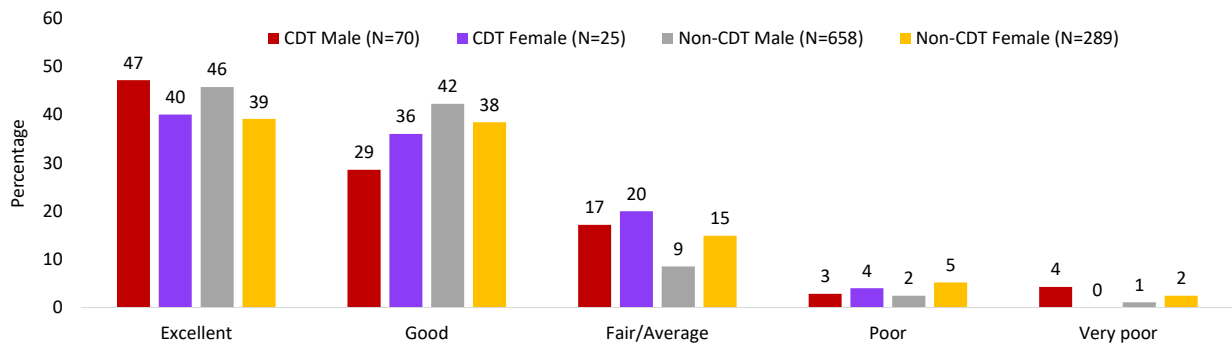


Figure 12: Respondents' rating of their relationship with their main supervisor

Examining the data by year of study, as presented in figure 13, suggests that although the majority of doctoral students rated their relationship with their main supervisor as good or excellent throughout the course of their studies, students did on average rate their relationship lower as time progresses. In particular, females' rating of the relationship with their main supervisor appeared to drop significantly between the first and second year of study. 70% of females in their fourth year rated their relationship as good or excellent compared to 93% in their first year of study. For males the comparative figures are 85% and 91%, respectively. Although the number of women in any one year is too low to assess statistical significance, some indication can be gained by combining the responses for the first and second years of study, and the third and fourth years of study, and by combining the "excellent" and "good", and "poor" and "very poor" categories. For males there is a statistically significant difference in the responses of first and second, and third and fourth year respondents ($P < 0.05$). There is also a statistically significant difference between the responses of third and fourth year males and third and fourth year females. The data also indicate that the differences between the responses of first and second year males and females are probably not significantly different, and that the responses between first and second year, and third and fourth year females are probably significantly different.⁹ **The data indicate that overall women's experiences of supervision are less good than those of men and that men's and women's rating of their relationship with their supervisor falls as year of study increases.**

⁹ The number of female respondents in their first and second years rating their relationship with their main supervisors as "poor" or "very poor" (5) is too low to allow the use of the χ^2 test.

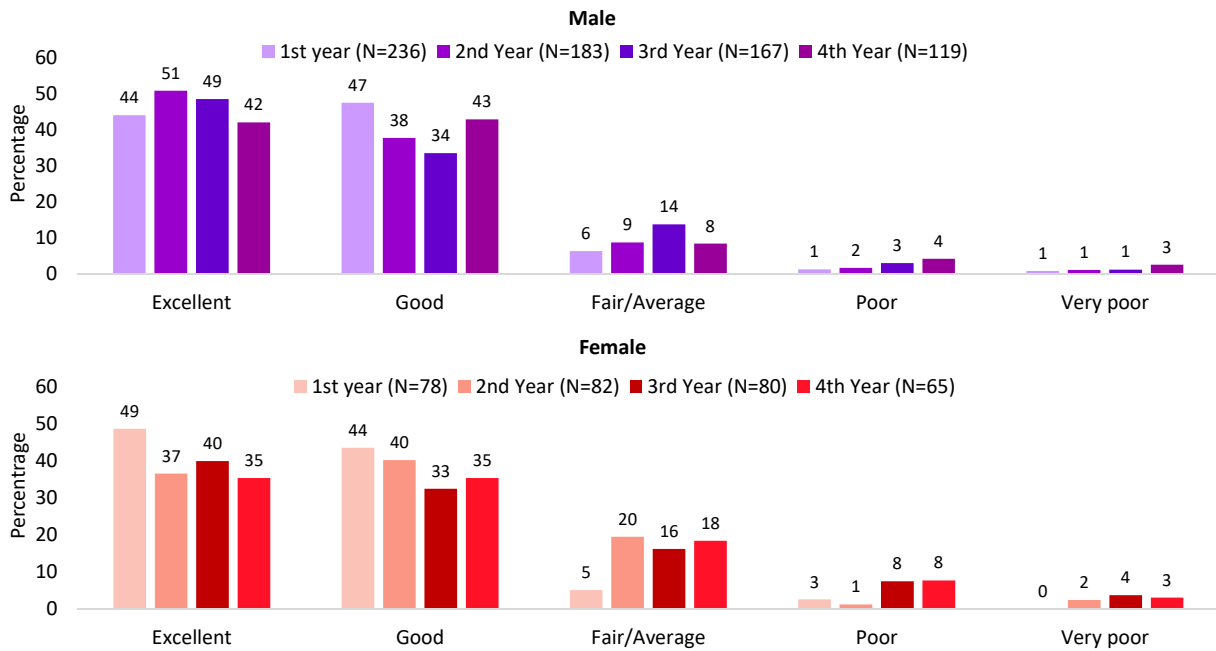
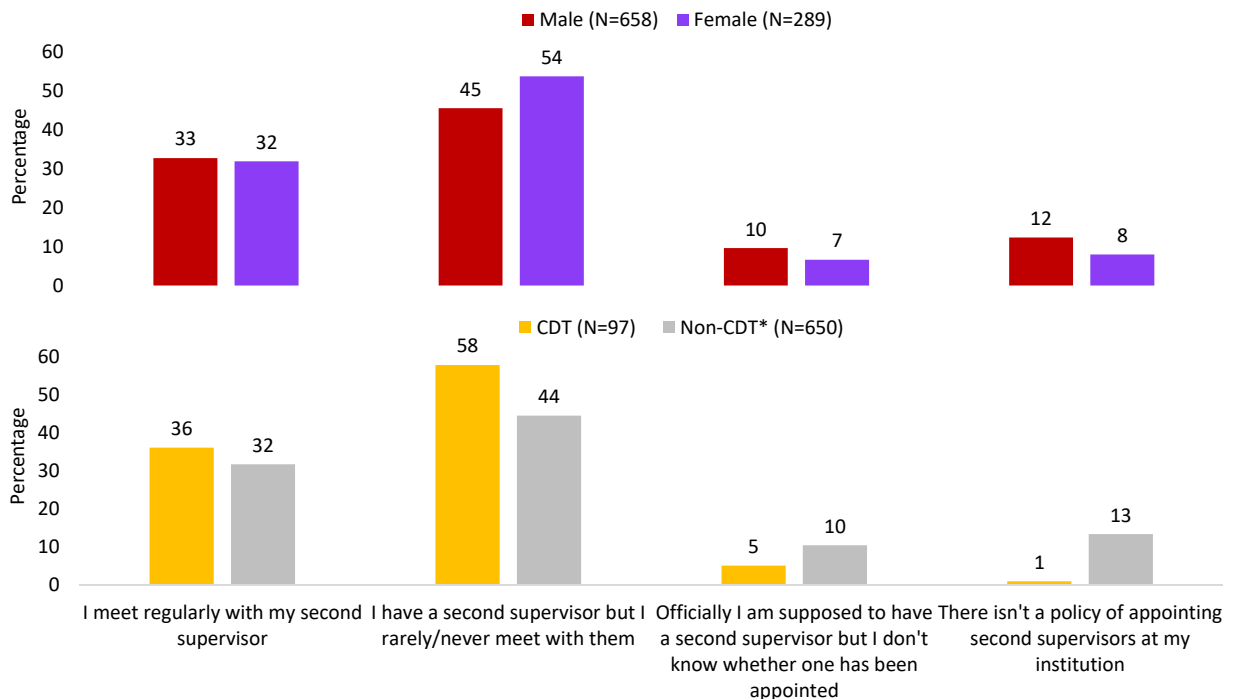


Figure 13: Respondents' rating of their relationship with their main supervisor by current year of study and gender



* Only data from those institutions that have respondents reporting to be members of CDTs have been included.

Figure 14: Whether respondents' reported having a second supervisor and whether they reported meeting with them regularly by gender and by membership of a CDT

Data on whether respondents reported having second supervisors are shown in figure 14. Similar proportions of male and female respondents, 33% and 32%, respectively, reported meeting regularly with their second supervisor. However, a higher proportion of females than males, 54% and 45%,

respectively, reported having a second supervisor with whom they rarely or never met. Analysing the data by membership of a CDT shows that although similar proportions of CDT members and non-members reported meeting regularly with their second supervisor, a higher proportion of CDT members than non-members reported having a second supervisor but meeting with them only rarely or never. Examining the data by year of study does not reveal much difference in respondents' knowledge of, and contact with, second supervisors. Furthermore, respondents' reported relationship with their main supervisor appeared to be unrelated to the respondents' reported knowledge of whether or not they have a second supervisor and whether they meet regularly with their second supervisor when they report having one. So, among the two-thirds of respondents who do not meet regularly with a second supervisor, a higher proportion of females than males, and CDT members than non-members reported having a second supervisor.

Examination of the data on second supervisors by institution did show that all institutions had some respondents who reported having a second supervisor but respondents in 10 institutions reported that there was not a policy to appoint second supervisors, and respondents in 19 institutions reported that although there was a policy of appointing second supervisors they did not believe that had one. **These data suggest that for a minority of doctoral students, there is a need to clarify arrangements regarding second supervisors.**

Table 40 shows the contact time per week respondents reported having or having had with their main supervisor in each year of study. Table 41 shows the contact time per week reported by respondents in their current year of study. Comparing the data in table 40 and table 41 suggests that in general students inflate the amount of contact they had with their supervisor in past years. Overall the median contact time is 1-2 hours. Men reported greater contact time with their main supervisor than women and the average contact time appears to drop as the year of study increases so that in the fourth year of study, the median contact reported by both men and women in less than 1 hour. The reported differences in contact time between males and females are not statistically significant.

Table 40: Contact time per week with main supervisor in earlier years of study reported by respondents

Year of Study*	Gender	Reported Contact time per week					Number of respondents
		Less than 1 hour	1-2 hours	2-3 hours	3-4 hours	More than 4 hours	
1st	Male	20%	38%	19%	11%	13%	483
	Female	25%	33%	21%	9%	12%	232
2nd	Male	22%	40%	19%	9%	11%	305
	Female	30%	36%	15%	9%	11%	152
3rd	Male	25%	46%	21%	3%	5%	140
	Female	31%	44%	14%	1%	10%	72
4th	Male	22%	65%	9%	4%	0%	23
	Female	44%	33%	11%	0%	11%	9

* Data on respondents' current year of study are excluded.

Table 41: Contact time per week with main supervisor in current year of study reported by respondents

Current Year of Study	Gender	Reported Contact time per week					Number of respondents
		Less than 1 hour	1-2 hours	2-3 hours	3-4 hours	More than 4 hours	
1st	Male	17%	38%	25%	9%	10%	231
	Female	26%	42%	12%	9%	11%	76
2nd	Male	26%	40%	16%	8%	10%	181
	Female	30%	43%	15%	9%	4%	80
3rd	Male	27%	31%	18%	10%	13%	163
	Female	36%	36%	14%	7%	8%	76
4th	Male	40%	37%	13%	7%	3%	115
	Female	47%	34%	10%	3%	6%	62

Respondents were asked what they thought about the amount of contact time they had with their main supervisor. The results broken down by gender and by whether or not respondents were members of a CDT are shown in figure 15. Overall 74% of respondents felt that the contact time they had was about right: 22% of men and 28% of women reported that they felt the contact time was “too little” or “far too little.” The differences are not statistically significantly different. Table 42 shows the relationship of how respondents rated their relationship with their main supervisor and what respondents thought about the contact time they had with their main supervisor. 92% of respondents who rated their relationship as “excellent” felt that the contact time they had was “about right”. In contrast only 41% of those who rated their relationship as “fair/average” felt that the contact time they had was “about right”, and 53% felt the contact time was “too little” or “far too little”. Although the number of respondents who rated their relationship with their supervisor “poor” or “very poor” is relatively low, 34% and 16%, respectively, among both these groups combined 68% of respondents felt the contact time they had with their main supervisor was “too little” or “far too little”. **There is a clear relationship**

between how highly respondents rated their relationship with their supervisor and how content they were with the contact time they had with their supervisor.

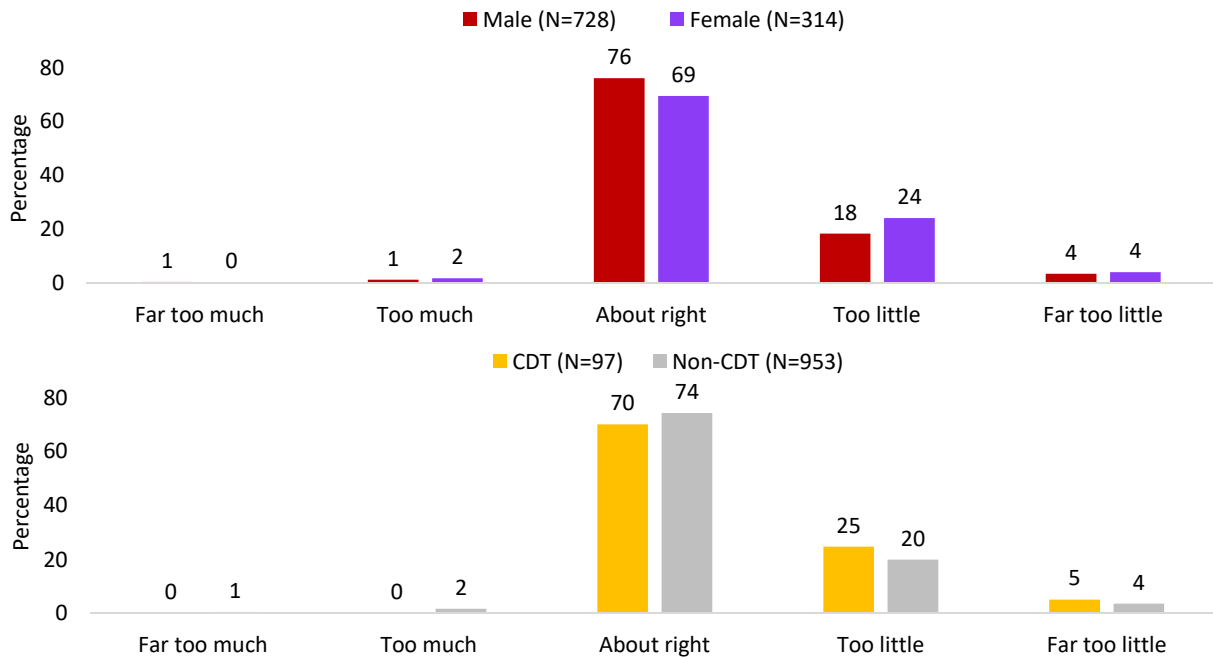


Figure 15: Respondents' opinion of the contact time they had with their main supervisor

Table 42: Respondents' opinion of the contact time they had with their main supervisor by respondents' assessment of the quality of the relationship with their main supervisor

What respondents thought about the contact time they have with their main supervisor	Respondents' rating of the relationship with their main supervisor					Overall	Total respondents
	Excellent	Good	Fair/Average	Poor	Very poor		
Far too much	0%	0%	2%	3%	6%	0%	5
Too much	1%	1%	4%	6%	6%	2%	16
About right	92%	70%	41%	26%	12%	74%	776
Too little	7%	26%	44%	38%	35%	20%	214
Far too little	0%	2%	9%	26%	41%	4%	39
Total respondents	458	424	117	34	17		1050

Table 43: Respondents’ opinion of the contact time they had with their main supervisor by the contact time per week with main supervisor in their current year of study reported by respondents

What respondents thought about the contact time they have with their main supervisor	Reported Contact time per week					Overall
	Less than 1 hour	1-2 hours	2-3 hours	3-4 hours	More than 4 hours	
Far too much	0%	1%	0%	0%	2%	0%
Too much	0%	2%	1%	1%	4%	1%
About right	47%	77%	81%	88%	89%	74%
Too little	40%	19%	17%	11%	2%	20%
Far too little	13%	2%	1%	0%	2%	4%
Total respondents	215	382	207	102	122	1028

Respondents’ view of the contact time they had with their main supervisor and the amount contact time they reported having in their current year of study are shown in table 43. 47% of those respondents who reported having less than 1 hour of contact time per week said that the contact time was about right, but 40% reported that the time was too little and 13% reported that the time was far too little. Of those respondents reporting having between 1 and 2 hours contact time per week, 77% reported that the time was about right and 19% reported that it was too little and 2% report that the time was far too little. At 2 to 3 contact hours per week, 81% of respondents reported that contact time was about right and 89% of respondents who said they had over 4 hours contact reported that this was about right. Similar patterns are observed for individual years of study. The data suggest that around 80% of respondents were content with between 1 and 2 hours contact time with their supervisor a week. However, around a fifth of respondents receiving between 1 and 2 hours contact felt this was too little. Data also suggest that however much contact time respondents have, they are unlikely to report that it is too much.

Respondents were asked about the other sources of supervision available to them and whether they used those other sources. 58% of respondents reported regularly consulting postdoctoral researchers in their research group, and 60% regularly consulting other, more experienced, doctoral students. Approximately 80% of respondents reported that there were postdoctoral researchers and 80% that there were more experienced doctoral students that they could consult. The responses of men and women in respect of consulting postdoctoral researchers and more experienced doctoral students are similar, but members of CDTs were more likely to report consulting more experienced doctoral students than those who were not members of CDTs.

25% of respondents reported regularly consulting their second supervisor and 29% reported regularly consulting another member of academic staff. Again there are not significant differences between the responses of men and women. CDTs members were more likely to report consulting their second supervisors, and less likely to consult other academics than those who were not members of CDTs.

Table 44: Proportions of respondents reporting availability and use of alternative sources of supervision by gender and by whether respondents were members of a CDT

Alternative supervision option	Regularity of consultation	Gender		Member of CDT		Overall	Totals
		Male	Female	Yes	No		
Second Supervisor	Yes, regularly consult	26%	24%	31%	25%	25%	267
	Yes, could consult but generally don't	45%	48%	47%	46%	46%	481
	Not available to consult/ NA	29%	27%	22%	29%	29%	302
Another academic (not my second supervisor)	Yes, regularly consult	29%	28%	25%	29%	29%	302
	Yes, could consult but generally don't	51%	48%	53%	50%	50%	525
	Not available to consult/ NA	20%	24%	23%	21%	21%	223
Head of research group (if not supervisor/ second supervisor)	Yes, regularly consult	4%	4%	5%	4%	4%	42
	Yes, could consult but generally don't	34%	32%	28%	34%	33%	350
	Not available to consult/ NA	62%	64%	67%	62%	63%	658
Head of department (if not supervisor/ second supervisor)	Yes, regularly consult	1%	2%	1%	1%	1%	12
	Yes, could consult but generally don't	32%	33%	34%	32%	32%	337
	Not available to consult/ NA	67%	65%	65%	67%	67%	701
Postdoc(s) in my research group	Yes, regularly consult	60%	54%	62%	58%	58%	612
	Yes, could consult but generally don't	20%	26%	16%	22%	22%	230
	Not available to consult/ NA	19%	20%	22%	20%	20%	208
Other (more experienced) doctoral students	Yes, regularly consult	61%	59%	68%	60%	60%	635
	Yes, could consult but generally don't	22%	19%	18%	21%	21%	220
	Not available to consult/ NA	17%	22%	14%	19%	19%	195
Total		728	314	97	953	1050	

Respondents were asked about the type of contact they had with their main supervisor and the results are shown in table 45 and table 46. As shown in table 45, overall 57% of men and 49% of women reported having prearranged meetings with their supervisor, and 77% of men and 72% of women reported having casual chats with their supervisor. It is notable that the proportion of women reporting having prearranged meetings with their supervisor falls from 60% in their first year of study to 42% in their third and fourth years (see figure 16), while the proportion of men reporting having prearranged meetings varied from year to year but did not fall significantly. The differences between the proportions of males and females reporting having prearranged meetings in the third and fourth years of study are statistically significant (3rd year $P < 0.05$; 4th year $P < 0.1$). Clearly there is a question as to whether the fall in the proportion of females reporting prearranged meetings as year of study increases is observed generally, and, if so, why this should be the case. Perhaps in later years of study supervisors are more

inclined to leave it to students to arrange meetings and, that being so, perhaps males are more proactive in setting up meetings.

Table 45: Proportions of respondents who reported having prearranged meetings and/or casual chats with the main supervisors by current year of study and gender

Type of contact with main supervisor	Current year of study								Overall	
	1st		2nd		3rd		4th			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Prearranged meetings	58%	60%	54%	51%	60%	42%	55%	42%	57%	49%
Casual chats	78%	67%	75%	73%	78%	78%	74%	73%	77%	72%
Total respondents	232	78	178	81	166	78	117	64	716	310

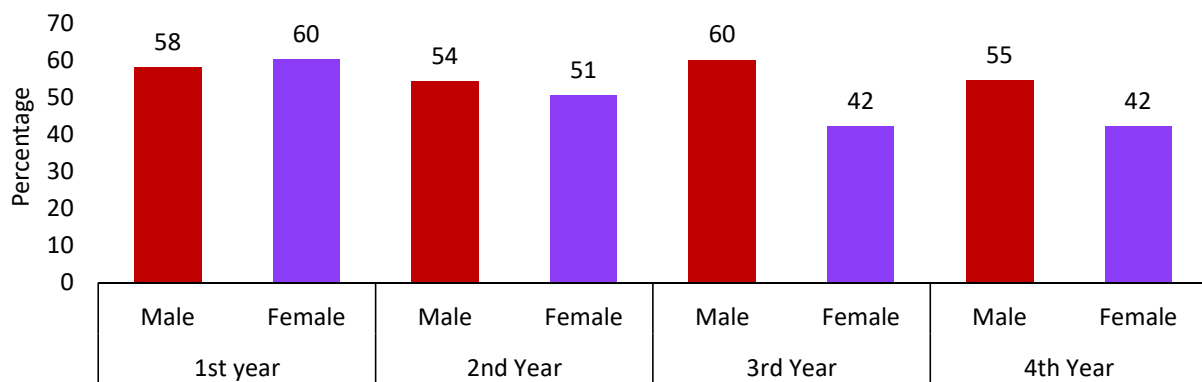


Figure 16: Proportions of respondents who reported holding prearranged meetings with their main supervisor by gender and current year of study

Table 46: Proportions of respondents who reported having prearranged meetings and/or casual chats with their main supervisors by current year of study and whether respondents were members of a CDT

Type of contact with main supervisor	Current year of study								Overall	
	1st		2nd		3rd		4th			
	Member of CDT	Not member of CDT	Member of CDT	Not member of CDT	Member of CDT	Not member of CDT	Member of CDT	Not member of CDT	Member of CDT	Not member of CDT
Prearranged meetings	67%	58%	57%	53%	57%	54%	92%	48%	65%	54%
Casual chats	73%	75%	68%	75%	57%	80%	67%	74%	67%	76%
Total respondents	30	284	28	232	23	223	12	170	96	938

Members of CDTs were more likely to hold prearranged meetings with their main supervisor than respondents who were not members of CDTs, 65% and 54%, respectively. In contrast, members of CDTs were less likely to have casual chats with their main supervisor than respondents who were not

members of CDTs, 67% and 76%, respectively. Perhaps arrangements in CDTs tend to be more formalised than those outside CDT leading to more frequent prearranged meetings.

Data presented in table 47 show that the better respondents rated their relationship with their main supervisor the more likely they were to report having prearranged meetings and/or casual chats with their supervisor.

Table 47: Proportions of respondents who reported having prearranged meetings and/or casual chats with the main supervisors by respondents' assessment of the quality of the relationship with their main supervisor

Type of contact with main supervisor	Rating of relationship with main supervisor				
	Excellent	Fair/Average	Good	Poor	Very poor
Prearranged meetings	62%	46%	53%	35%	6%
Casual chats	80%	76%	63%	56%	38%
Total respondents	451	116	417	34	16

Table 48 presents data on respondents' views of whether the feedback that they received was useful by year of study and gender. Overall 77% of men and 70% of women reported that the feedback they received was generally useful. There is some variation by year of study in that although the proportions of respondents who rated the feedback as useful remained more or less the same, the proportions of respondents who rated the feedback as not useful rose and the proportion stating that they didn't know fell. In particular, the proportion of women in their first year who rated the feedback as not useful was 14% but this proportion rose to 22% in the second year, and to 29% in the third year. Although the number of respondents answering don't know was too low to allow reliable assessments of statistically significant differences between males and females in single years of study, there is a statistically significant difference between the overall responses of males and females across all years of study ($P < 0.05$).

Table 48: Respondents' views of the usefulness of feedback about progress by current year of study and gender

Feedback about progress useful	Current year of study								Overall	
	1st		2nd		3rd		4th			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Useful	77%	74%	78%	72%	78%	65%	73%	70%	77%	70%
Not useful	13%	14%	16%	22%	18%	29%	19%	27%	16%	23%
Don't know	10%	12%	6%	6%	4%	6%	8%	3%	8%	7%
Total respondents	231	78	176	81	165	77	116	64	711	309

As shown in table 49, members of CDTs were less likely than respondents who were not members of CDTs to rate the feedback they received on their progress as useful, 70% and 75%, respectively.

Proportion of both CDT members' and non-members' rating the feedback as not useful rose as year of study increased.

Table 49: Respondents' views of the usefulness of feedback about progress by current year of study and whether respondents were members of a CDT

Feedback about progress useful	Current year of study								Overall	
	1st		2nd		3rd		4th			
	Member of CDT	Not member of CDT	Member of CDT	Not member of CDT	Member of CDT	Not member of CDT	Member of CDT	Not member of CDT	Member of CDT	Not member of CDT
Useful	73%	77%	75%	76%	70%	75%	58%	73%	70%	75%
Not useful	10%	13%	25%	17%	30%	20%	25%	21%	22%	17%
Don't know	17%	10%	0%	7%	0%	5%	17%	6%	8%	7%
Total respondents	30	283	28	230	23	221	12	169	96	932

Data presented in table 50 show that the better respondents rated their relationship with their main supervisor the more likely they were to report having useful feedback on their progress.

Table 50: Respondents' views of the usefulness of feedback about progress by respondents' assessment of the quality of their relationship with their main supervisor

Feedback about progress useful	Reported relationship with main supervisor				
	Excellent	Good	Fair/Average	Poor	Very poor
Useful	88%	75%	45%	15%	31%
Not useful	7%	16%	43%	79%	69%
Don't know	5%	9%	11%	6%	0%
Total respondents	448	415	115	34	16

Table 51 presents data on respondents' views of whether they receive the right amount of feedback by year of study and gender. Overall 73% of men and 68% of women reported that they received about the right amount of feedback, and 24% of males and 29% of females felt they received too little feedback. A relatively small proportion of respondents reported receiving too much feedback. As year of study increases the proportions of respondents assessing that they receive about the right amount of feedback falls and the proportion reporting that they receive too little feedback increases. There are statistically significant differences ($P < 0.05$) between the responses of males in the first year of study and in the third and fourth years combined (the responses for "too much" and "about right" were combined for the purposes of the analyses) and for females in the first year of study and third and fourth years combined. The differences between the responses of males and females in any one year are not statistically significant.

Table 51: Respondents' views of whether they received the right amount of feedback about progress by current year of study and gender

Right amount of feedback	Current year of study								Overall	
	1st		2nd		3rd		4th			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Too much	0%	3%	4%	4%	3%	3%	4%	2%	3%	3%
About right	81%	81%	71%	67%	68%	61%	71%	67%	73%	68%
Too little	19%	17%	25%	30%	28%	36%	25%	31%	24%	29%
Total respondents	231	78	176	81	165	77	116	64	711	309

Data in table 52 shows that there were few differences between CDT members and non-members in respect of the patterns by current year of study as to whether they felt the amount of feedback they received was about right. Overall 68% of CDT members and 72% of non-CDT members felt the amount of feedback they received was about right, and 30% of CDT members and 25% of non-CDT members felt they received too little feedback. The proportions of both CDT members and non-CDT members rating the feedback they received as “about right” falls, and as “too little” rises as year of study increases.

Table 52: Respondents' views of whether they receive the right amount of feedback about progress by current year of study and whether respondents were members of a CDT

Right amount of feedback	Current year of study								Overall	
	1st		2nd		3rd		4th			
	Member of CDT	Not member of CDT	Member of CDT	Not member of CDT	Member of CDT	Not member of CDT	Member of CDT	Not member of CDT	Member of CDT	Not member of CDT
Too much	0%	1%	0%	5%	4%	3%	8%	3%	2%	3%
About right	87%	81%	71%	69%	57%	67%	42%	71%	68%	72%
Too little	13%	18%	29%	26%	39%	30%	50%	26%	30%	25%
Total respondents	30	283	28	230	23	221	12	169	96	932

Data presented in table 53 show that the better respondents rated their relationship with their main supervisor the more likely they were to report having about the right amount of feedback. 87% of respondents who rated their relationship with their main supervisor as “excellent” reported that the amount of feedback they received was “about right”. In contrast, only 39% of those rating their relationship as “good” reported that they received about the right amount of feedback and 57% reported that they received “too little”. Of respondents rating their relationship with their supervisor as “poor” or “very poor” 80% rated the amount of feedback they received as “too little”.

Table 53: Respondents' views of whether they received the right amount of feedback about progress and their assessment of the quality of their relationship with their main supervisor

Right amount of feedback	Relationship with main supervisor				
	Excellent	Fair/Average	Good	Poor	Very poor
Too much	3%	1%	4%	0%	13%
About right	87%	70%	39%	18%	13%
Too little	9%	29%	57%	82%	75%
Total respondents	448	415	115	34	16

Similarly, data presented in table 54 demonstrates the relationship between respondents reporting whether the amount of feedback they received was about right and whether the feedback they received was useful. 85% of respondents who reported that the feedback they received was generally useful reported that the amount of feedback was about right. In contrast, 76% of those that reported that the feedback they received was generally not useful said they received too little feedback.

Table 54: Respondents' views of whether they received the right amount of feedback about progress and their assessment of the usefulness of feedback about progress

Right amount of feedback	Feedback about progress useful		
	Useful	Not useful	Don't know
Too much	3%	3%	0%
About right	85%	21%	57%
Too little	12%	76%	43%
Total respondents	767	184	77

The data suggest that those respondents who reported having better relationships with their main supervisors also are more likely to have reported that the amount of contact they had with their main supervisor was about right, that they had prearranged meetings and casual chats with their main supervisor, and that the amount of feedback they received was about right and that it was useful. It does appear that when a doctoral student rates their relationship with their supervisor as poor a number of other indicators such as the amount and quality of contact are also rated as inadequate which might suggest a general breakdown in the student-supervisor relationship.

As shown earlier, reasonably high proportions of respondents reporting even low contact time with their supervisor reported that contact time was about right. It is therefore a possibility that **the key issue in supervision is the quality and appropriateness of the contact time which in turn will depend on the abilities and personalities of both the supervisor and the doctoral student.** To some extent this will depend on the amount of contact time since although the data suggest that it is difficult to over supervise doctoral students, a sizeable minority feel under supervised. Nonetheless, the reasons underlying why women were more likely than men to report unsatisfactory supervision experiences are not discernible from the quantitative data alone.

A sensible approach might be for there to be independent monitoring of how doctorate students are progressing so that action can be taken in cases where students feel they need more, or more appropriate, support. Such monitoring could be carried out by a graduate tutor, a supervisory team, or through a graduate school.

Moving away from academic supervision and feedback, respondents were asked about the availability of other staff with whom they could discuss non-research matters. The proportions of respondents who reported that specific staff were available are shown in table 55. In general women were less likely than men, and likewise CDT non-members were less likely than CDT members, to report that specific people were available. Some 10% of respondents reported that there wasn't anyone obvious other than their supervisor with whom they could discuss non-research matters and 11% of respondents reported that they did not know. Examining the data by year of study did not show any patterns: proportions reporting the availability of different staff did not vary much by year of study. Examining data by institution showed that in all institutions with more than 6 respondents, there were mixed responses for all categories of staff. These data suggest that the majority of institutions have a variety of staff other than their supervisors available for doctoral students to discuss non-research matters. While these staff may not all hold official pastoral positions it seems that some doctoral students did feel that they were available. It would appear that in particular the existence of staff like graduate tutors and staff in graduate schools need publicising better to the majority of physics and astronomy doctoral students.

Table 55: Proportions of respondents reporting the availability of staff other than their supervisors with whom they could discuss non-research issues

Someone to discuss non-research issues with...	Gender		Member of CDT		Overall
	Male	Female	Yes	No	
Graduate tutor in the department/CDT	48%	39%	45%	48%	45%
Other academics in the department/CDT	58%	49%	54%	68%	55%
Staff in the Graduate School.	25%	21%	24%	23%	24%
Staff outside the department/CDT	30%	26%	28%	33%	29%
No, there isn't anyone obvious.	8%	14%	10%	7%	10%
Don't know	11%	10%	11%	8%	11%
Total respondents	716	310	96	938	1034

3.9 Life as a Doctoral Researcher

Respondents were presented with a series of statements about their life as a doctoral researcher and asked how strongly they agreed. The responses broken down by gender are shown in table 56 and by whether or not respondents were members of CDTs are shown in table 57. Respondents' responses will depend on a number of factors but in many cases will be dominated by their experiences in their research group and with their supervisor.

Table 56: Proportions of respondents who agreed or disagreed with statements about their experiences as a doctoral student by gender

Statement	Gender	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total respondents
I have flexible working hours	Male	55%	36%	5%	2%	1%	728
	Female	47%	41%	7%	4%	1%	314
I have independence and freedom*	Male	35%	48%	13%	3%	1%	728
	Female	33%	44%	17%	5%	1%	314
I undertake exciting and interesting projects**	Male	26%	54%	14%	5%	0%	728
	Female	28%	47%	20%	4%	2%	314
I enjoy researching my topic	Male	35%	52%	10%	2%	1%	728
	Female	34%	51%	11%	4%	0%	314
I find my research repetitive and frustrating	Male	4%	17%	28%	41%	11%	728
	Female	5%	18%	26%	40%	11%	314
I like the general working environment	Male	32%	48%	12%	6%	2%	728
	Female	28%	48%	14%	8%	3%	314
I feel there are not many positive aspects to my doctorate	Male	3%	10%	11%	46%	30%	728
	Female	4%	10%	15%	47%	24%	314

* Statistically significant difference between the populations ($P < 0.05$). To measure significance the "strongly agree" and "agree", and "disagree" and "strongly disagree" categories were combined and a χ^2 test used.

** Statistically significant difference between the populations ($P < 0.1$). To measure significance the "strongly agree" and "agree", and "disagree" and "strongly disagree" categories were combined and a χ^2 test used.

91% of males and 88% of females strongly agreed or agreed that they had *flexible working hours*, although males tended to agree more strongly than females. 91% of CDT members and 90% of non-members strongly agreed or agreed that they had *flexible working hours*, but non-members tended to agree more strongly than females. This latter observation tallies with the fact that members of CDT have a more structured program of training and events that they need to attend.

Table 57: Proportions of respondents who agreed or disagreed with statements about their experiences as a doctoral student by whether they were members of a CDT

Statement*	CDT	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total respondents
I have flexible working hours	Member	45%	46%	6%	2%	0%	97
	Non-Member	53%	37%	6%	3%	1%	953
I have independence and freedom	Member	37%	44%	14%	4%	0%	97
	Non-Member	34%	48%	14%	4%	1%	953
I undertake exciting and interesting projects	Member	30%	52%	15%	3%	0%	97
	Non-Member	26%	52%	16%	5%	1%	953
I enjoy researching my topic	Member	42%	46%	8%	3%	0%	97
	Non-Member	34%	52%	10%	3%	1%	953
I find my research repetitive and frustrating	Member	4%	18%	26%	40%	12%	97
	Non-Member	4%	17%	28%	40%	10%	953
I like the general working environment	Member	33%	52%	6%	9%	0%	97
	Non-Member	30%	48%	13%	6%	2%	953
I feel there are not many positive aspects to my doctorate	Member	4%	8%	11%	46%	30%	97
	Non-Member	3%	10%	13%	46%	27%	953

* None of the differences were found to be statistically different. To test significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.

Respondents were asked whether they agreed that they had *independence and freedom*. 83% of males and 77% of females, and 81% of members and 82% of non-members of CDTs, strongly agreed or agreed. However, smaller proportions strongly agreed that they had *independence and freedom* than with the statement about flexibility. There were statistically significant differences between the responses of males and females ($P < 0.05$).

80% of males and 75% of females, and 82% of members and 78% of non-members of CDTs, strongly agreed or agreed that they *undertake exciting and interesting projects*. The differences in the responses of males and females are statistically significant ($P < 0.1$). There was relatively little difference between the responses of CDT members and non-members. In a similar vein 87% of males and 85% of females, and 88% of members and 86% of non-members of CDTs, strongly agreed or agreed, that they *enjoyed*

researching their topic, although CDT members were more likely than non-members to strongly agree. Very small proportions of any groups disagreed or strongly disagreed that they *undertake exciting and interesting projects* or that they *enjoyed researching their topics*.

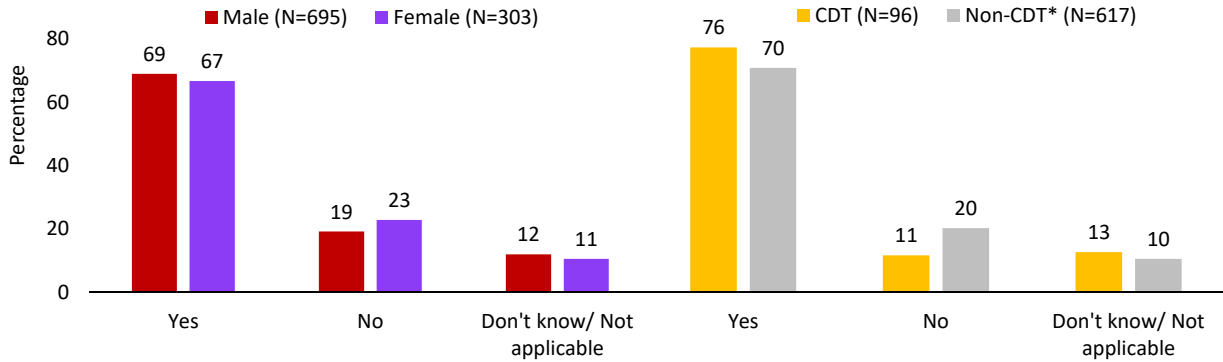
Respondents were also asked how strongly they agreed that they found their *research repetitive and frustrating*. There was very little difference between the responses of any of the four groups under consideration: 52% of males and 51% of females, and 52% of members and 50% of non-members of CDTs, disagreed or strongly disagreed, but 21% of males and 23% of females, and 22% of members and 21% of non-members of CDTs, strongly agreed or agreed. It seems that although no more than 4 or 5% of respondents do not enjoy research their topics there is a sizable minority of respondents who find research repetitive and frustrating. This probably reflects a contrast between the process of actually carrying out research, and the interest that respondents have in physics and/or astronomy and in discovering new information.

Respondents were asked whether they agreed that they *liked the working environment*. 80% of males and 76% of females, and 85% of members and 78% of non-members of CDTs, strongly agreed or agreed. 8% of males and 11% of females and 9% of members and 8% of non-members of CDTs, disagreed or strongly disagreed. So, although the majority of respondents are positive about their working environments, around 1 in 10 are unhappy with their working environments.

Finally, respondents were asked whether they agreed that *there are not many positive aspects to their doctorates*. 13% of males and 14% of female strongly agreed or agreed, and so did 12% of CDT members and 13% of non-members. In contrast, 76% of males and 71% of females, and 76% of CDT members and 73% of non-members, disagreed or strongly disagreed with the statement. In the same vein as the responses to the statement about working environment, there appears to be just over 1 in 10 respondents who find few positive aspects in their doctorate.

3.10 Departmental Culture

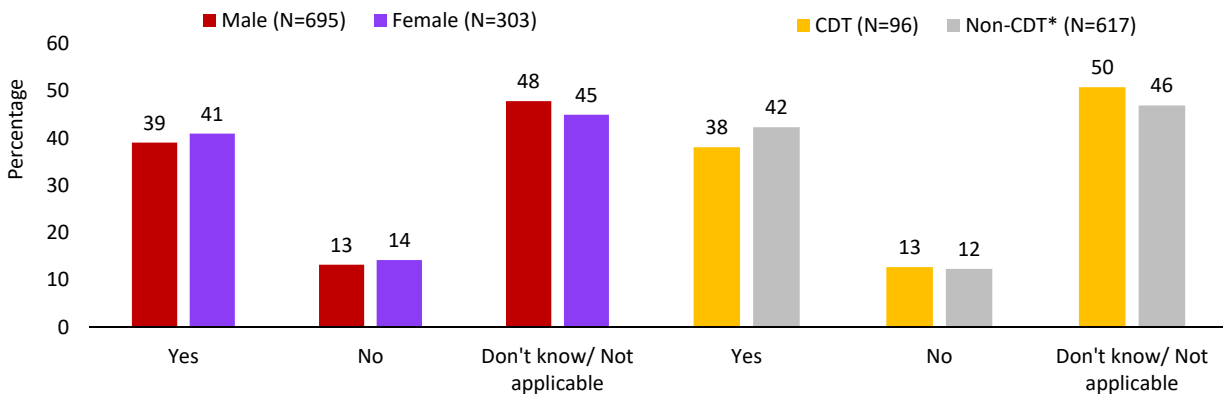
Respondents were asked a series of questions relating to the culture of their home department and graduate school. Questions covered topics such as doctoral student representation in meetings, social events and issues relating to diversity including the representation of females among academic staff.



* Respondents confined to just those institutions with CDT members responding to the survey.

Figure 17: Proportions of respondents who confirmed that their, “home department runs social events which give me the opportunity to meet other doctoral students and members of the department,” by gender and whether respondents were members of CDTs

Data in figure 17 show that around 68% of respondents reported that their department ran social events that gave them the opportunity to meet other members of the department. The data also show that in institutions where there were respondents in CDTs, members of CDTs were slightly more likely to report that there were social events. All institutions had some respondents reporting that there were social events, and in the majority of institutions over 50% of respondents reported this, but a small number of institutions had low proportions reporting departmental social events.



* Respondents confined to just those institutions with CDT members responding to the survey.

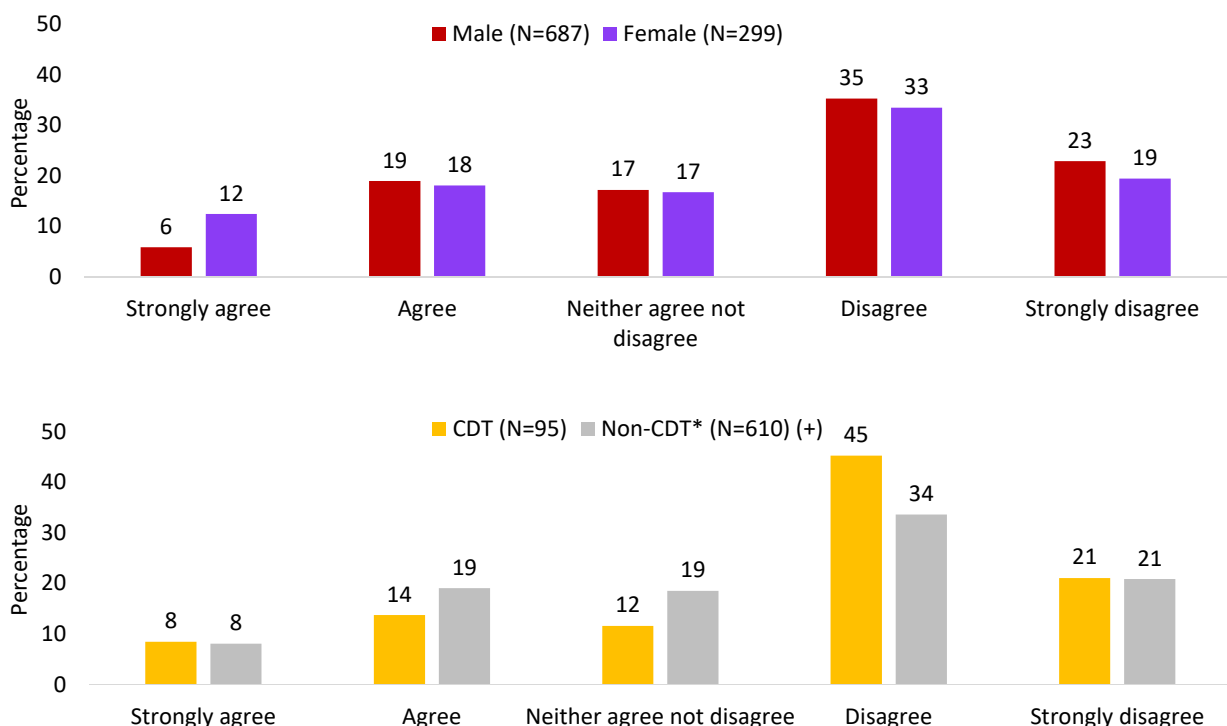
Figure 18: Proportions of respondents who confirmed that their, “Graduate School runs social events which give me the opportunity to meet other doctoral students and members of the department,” by gender and whether respondents were members of CDTs

Figure 18 presents data on whether graduate schools were reported to run social events. Around 39% of respondents reported that graduate schools ran social events but 47% of respondents did not know, or reported that the question was not applicable. There is no significant difference in the responses of members and non-members of CDTs. All but two institutions had respondents reporting that the

graduate school ran social events. The responses suggests that a minority of respondents had contact with graduates schools which is why the largest proportion of respondents are not clear about social activities run by graduates schools. On the other hand, the pattern of responses does suggest that the majority of institutions have graduates schools which do run social events.

Turning to Centres for Doctoral Studies, 90% of CDT members reported that their CDT ran social events. Only 4% reported that their CDT did not run social events.

Overall, based on the pattern of responses at the institutional level, the vast majority of departments, graduate schools and CDTs appear to run some social events. There are a small number of departments that probably do not run social events, and there are also a number of doctoral students who are not aware of the social events run by their departments. Greater numbers of respondents are not aware of social events put on by their graduate schools.



* Respondents confined to just those institutions with CDT members responding to the survey.

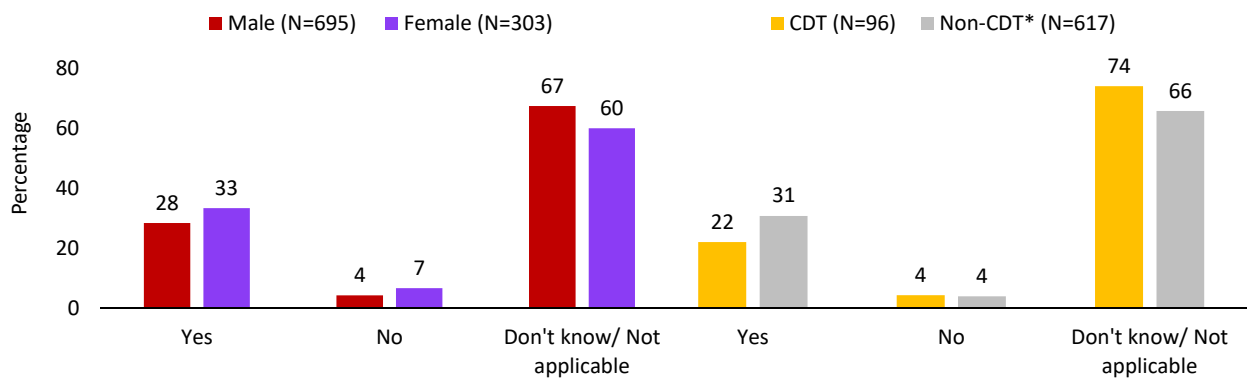
+ Statistically significant difference between the populations ($P < 0.1$). To measure significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.

Figure 19: How strongly respondents agreed with the statement, “While on my doctorate, I have felt socially isolated,” by gender and whether respondents were members of a CDT

Respondents were asked how strongly they agreed with the statement, “While on my doctorate, I have felt socially isolated” and the responses are shown in figure 19. Overall 27% of respondents strongly agreed or agreed with the statement. Females were more likely than males to strongly agree or agree, 30% and 25%, respectively. CDT members agreed less strongly than non-members perhaps reflecting the greater collegiate nature of CDT cohorts compared doctoral students outside CDTs. The differences between the responses of CDT members and non-members are statistically significant ($P < 0.1$). The responses of British and other nationals are also similar. It is concerning to note that within all the

groups of respondents examined there was a sizable minority of doctoral students who have felt socially isolated.

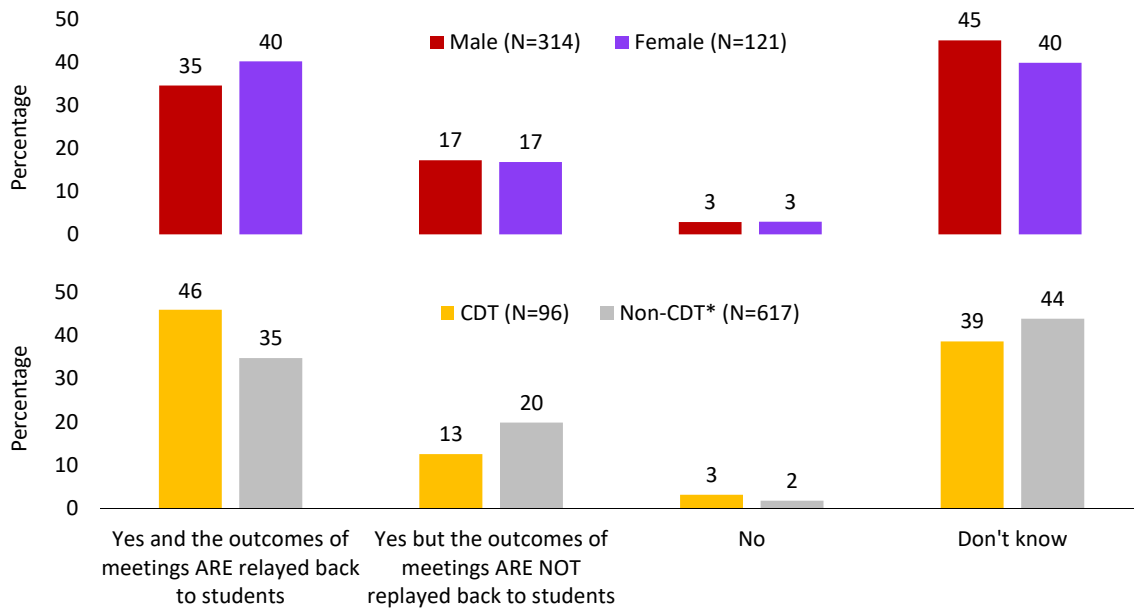
Moving to examine representation of doctoral students on committees, respondents were asked whether there was doctoral student representation on the department’s equality and diversity (Juno committee) and the responses are shown in figure 20. The majority of respondents did not know: 30% of students reported that there was representation and 5% reported that there was no representation. CDT members were less likely to report that there was representation than non-members. Examining the responses by institution shows that the majority of institutions have some respondents reporting that there is representation on the department’s equality and diversity committee, and proportions reporting this ranged from 76% to 0%. The likelihood is that a reasonable number of departments do have doctoral representation on the equality and diversity committee, but there are probably also a small number of respondents who have reported incorrectly that there is representation. However, the main issue is that the majority of doctoral students are unclear about the situation.



* Respondents confined to just those institutions with CDT members responding to the survey.

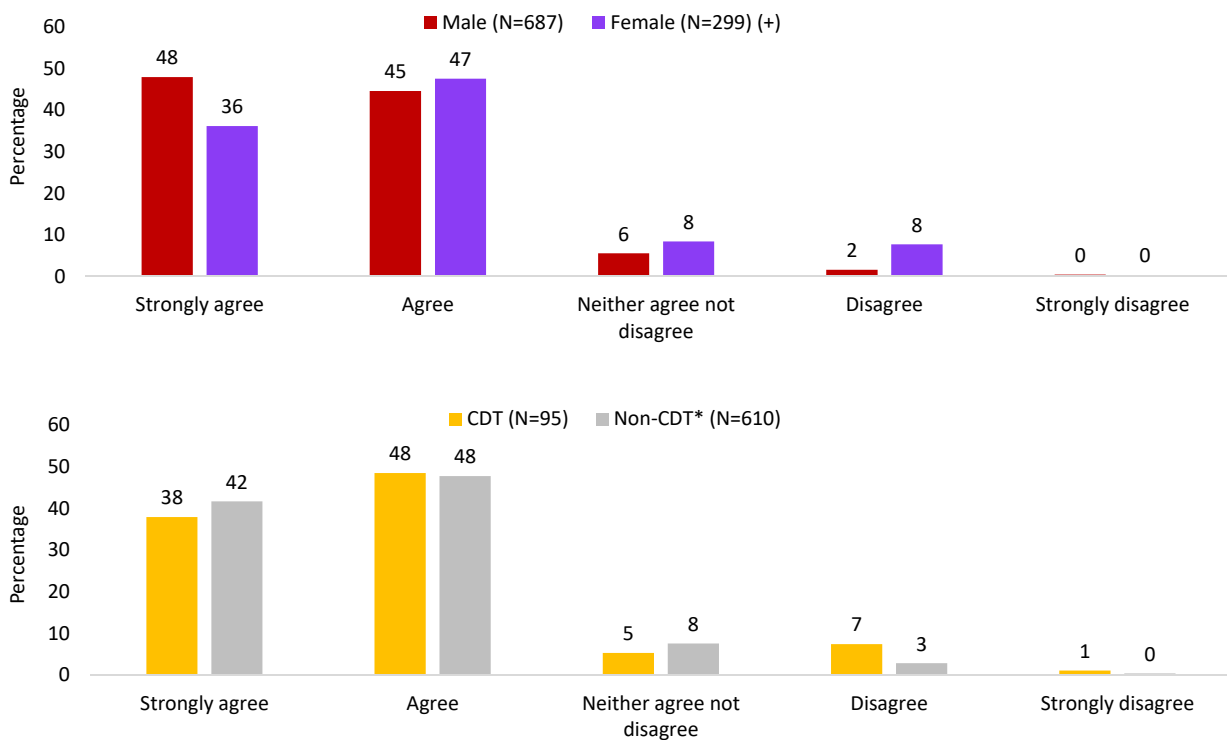
Figure 20: Proportions of respondents who confirmed that, “There is doctoral student representation on my department’s equality and diversity committee (Juno committee),” by gender and by whether respondents were members of CDTs

Higher proportions of respondents reported that there was doctoral student representation in important meetings than reported that there was representation on the department’s equality and diversity committee. As shown in figure 21, 36% reported that there was representation and outcomes were fed back, and 17% reported that there was representation but outcomes were not fed back. However, a large proportion of respondents, 43%, were not clear whether or not there was representation. Again, patterns of responses varied by institution with all but one institution having at least one respondent reporting that there was representation. CDT members were more likely than non-members, and females were more likely than males, to report representation with feedback. It appears that the majority of departments do have some doctoral student representation on important committees, but, while around half respondents are aware of this, a large proportion of respondents are unsure of the situation.



* Respondents confined to just those institutions with CDT members responding to the survey.

Figure 21: Whether there is doctoral student representation in important meetings and whether the outcomes of those meetings are relayed back by gender and by whether respondents were members of CDTs



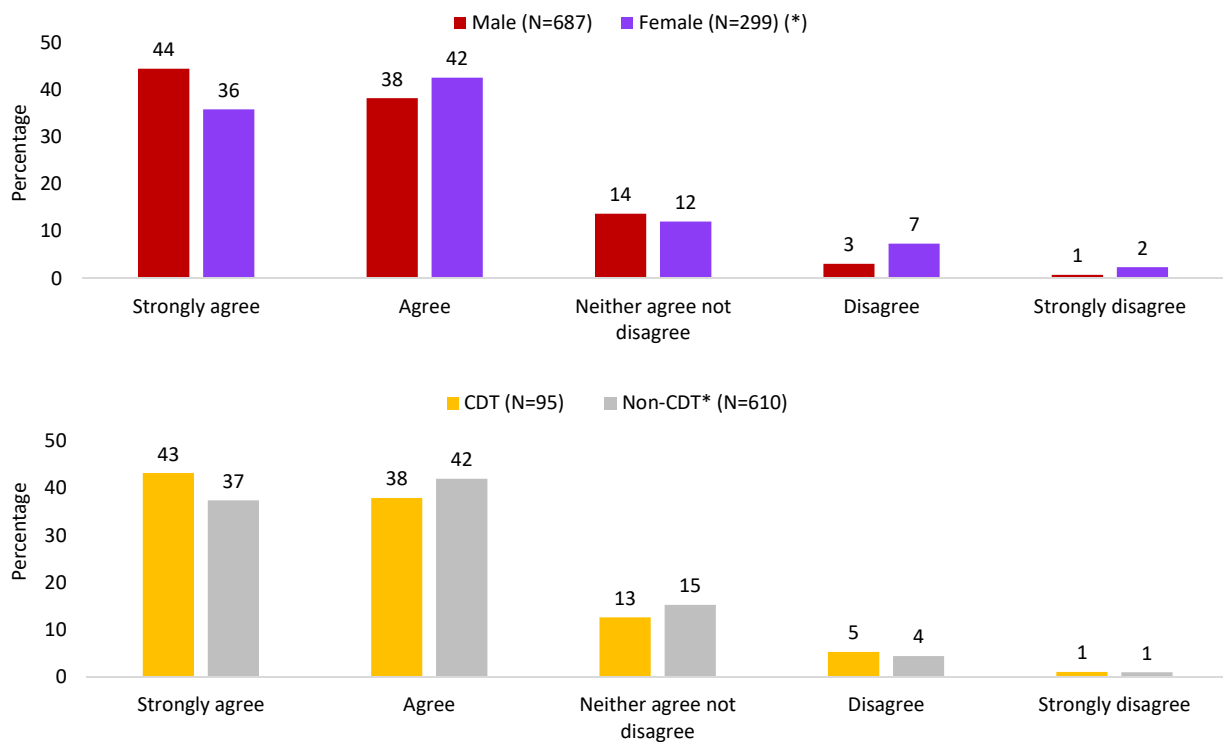
+ Statistically significant difference between the populations ($P < 0.05$). To measure significance the "strongly agree" and "agree", and "disagree" and "strongly disagree" categories were combined and a χ^2 test used.

* Respondents confined to just those institutions with CDT members responding to the survey.

Figure 22: How strongly respondents agreed with the statement, "I have been treated as an equal by my fellow students," by gender and whether respondents were members of a CDT

Figure 22 shows that the majority of both males (93%) and females (83%) strongly agreed or agreed that they had been treated as an equal by their fellow students but males agreed more strongly than females. 8% of females disagreed that they had been treated as an equal by their fellow students compared to only 2% of males. The differences in the responses of males and females are statistically significant ($P < 0.05$). There was relatively little difference between the responses of members and non-members of CDTs. Examining the responses by nationality shows that among males respondents the responses of British and other nationals were very similar, but among females, although similar proportions of British and other nationals strongly agreed or agreed that they are treated as equals, a smaller proportion of other nationals than British nationals strongly agreed.

Similar patterns are seen when respondents were asked how strongly they agreed that “Academic staff give male and female students the same opportunities and support” as shown in figure 23. While the vast majority of males (82%) and females (78%) strongly agreed or agreed with the statement, males agreed more strongly than females, and the differences between the responses of males and females are statistically significant ($P < 0.05$). Similarly, CDT members agreed more strongly than non-members, and British nationals agreed more strongly than other nationals.



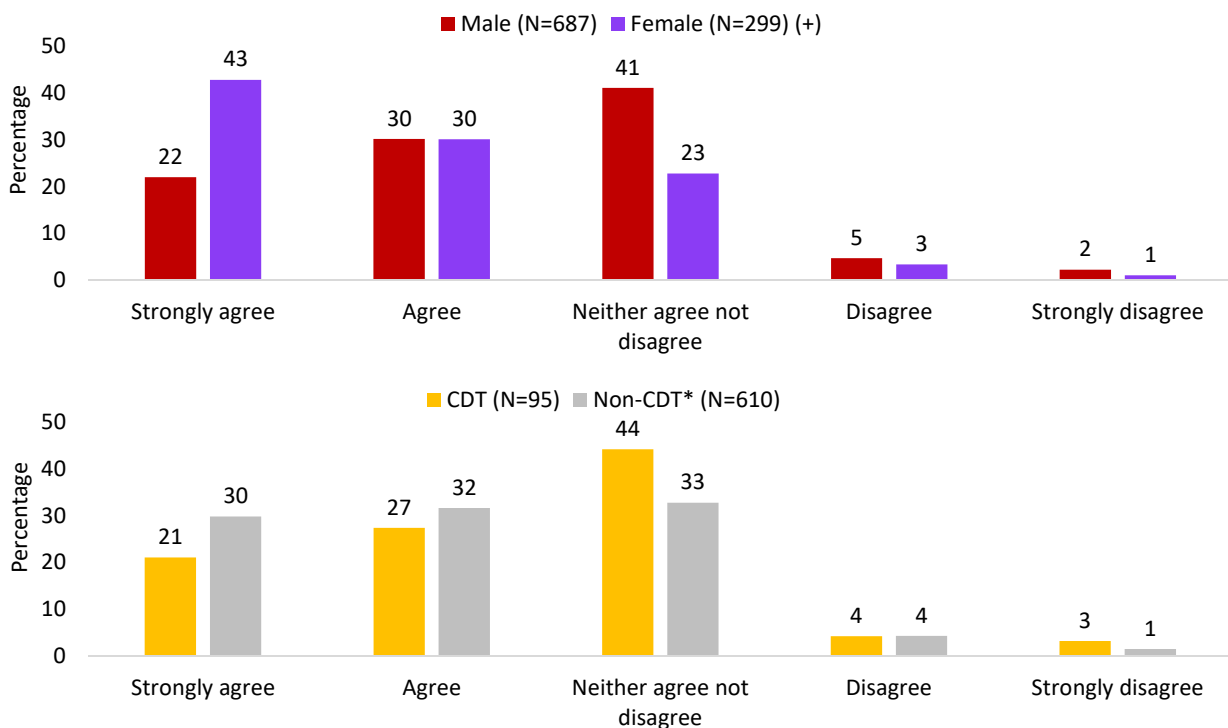
+ Statistically significant difference between the populations ($P < 0.05$). To measure significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.

* Respondents confined to just those institutions with CDT members responding to the survey.

Figure 23: How strongly respondents agreed with the statement, “Academic staff give male and female students the same opportunities and support,” by gender and whether respondents were members of a CDT

Respondents were asked how strongly they agreed that, “there should be more female academics.” The responses are shown in figure 24. 52% of males and 73% of females strongly agreed or agreed that there should be more female academics: 22% of male and 43% of females strongly agreed. The differences between the responses of males and females are statistically significant ($P < 0.05$). 48% of

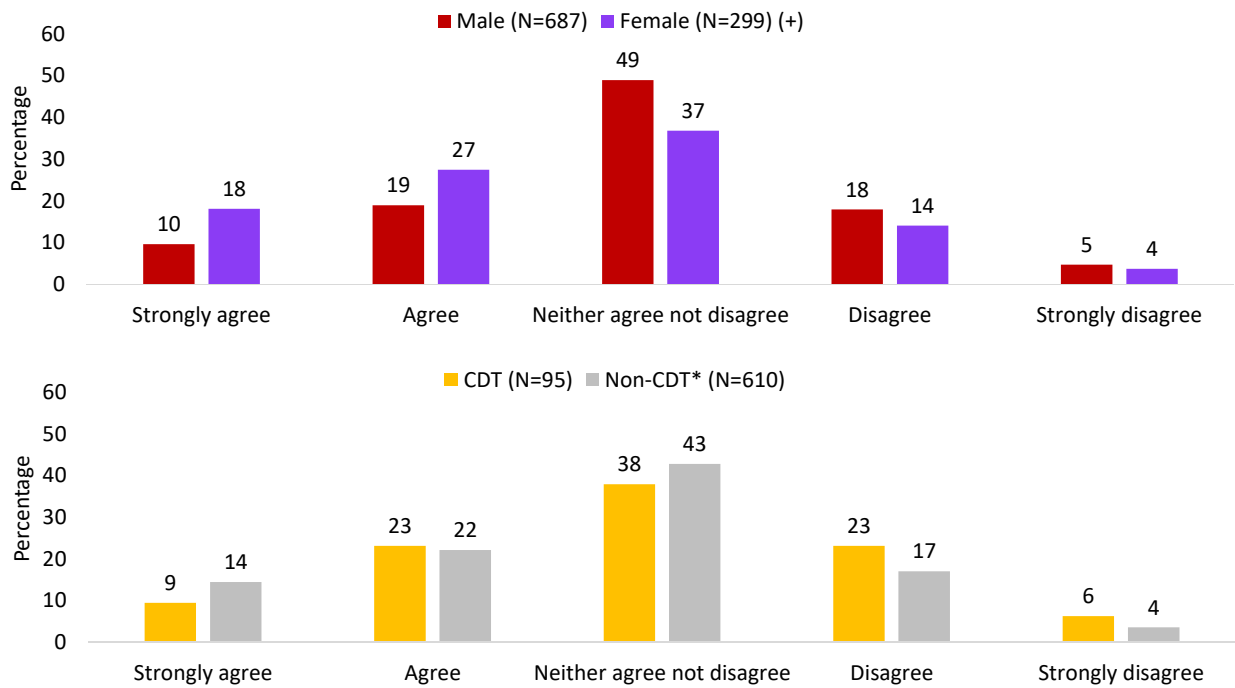
CDT members and 62% of non-members strongly agreed or agreed that there should be more female academics. It is perhaps surprising that there is such a large difference between the responses of males and females, although nonetheless over 50% of males agreed that there should be more female academics. The fact that around 40% of males neither agreed nor disagreed perhaps suggests that a significant proportion of males have not really considered the issue before, whereas female doctoral students are more acutely aware of the gender imbalance in physics/astronomy academic staff and consequently have stronger opinions. It will be interesting to know whether raising the awareness of the gender imbalance in physics/astronomy will result in a higher proportion of male doctoral students agreeing that there should be more female academics.



+ Statistically significant difference between the populations ($P < 0.05$). To measure significance the "strongly agree" and "agree", and "disagree" and "strongly disagree" categories were combined and a χ^2 test used.
 * Respondents confined to just those institutions with CDT members responding to the survey.

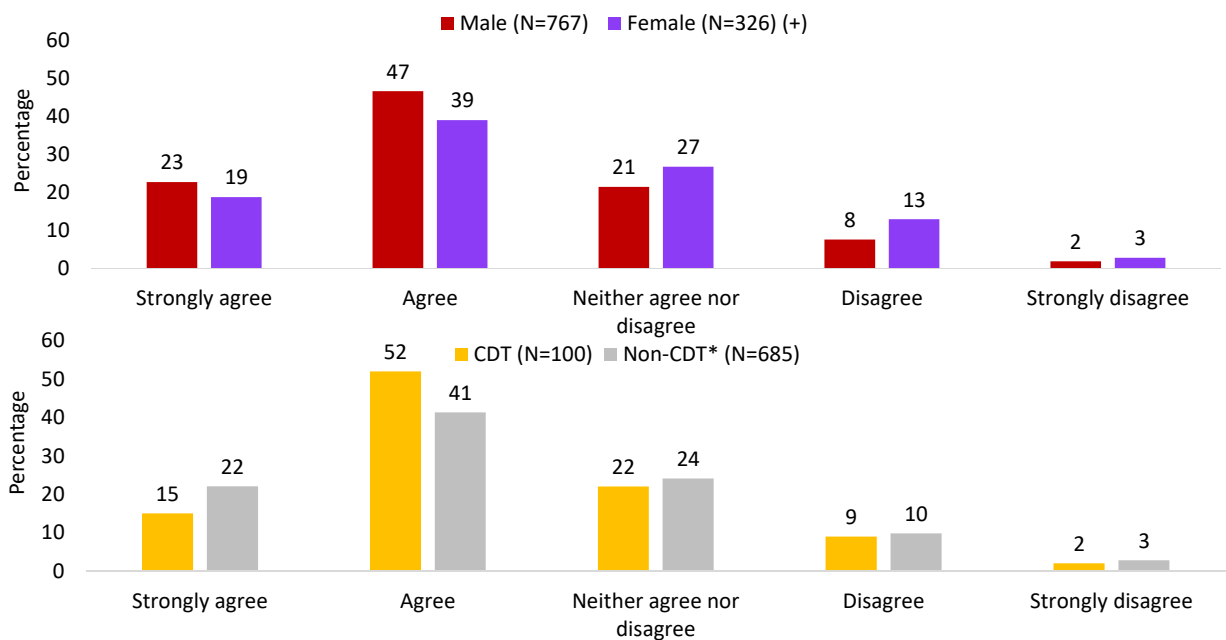
Figure 24: How strongly respondents agreed with the statement, "I feel that there should be more female academics," by gender and whether respondents were members of a CDT

Respondents were also asked how strongly they agreed with the statement that, "I feel my department would benefit if there was a more diverse mix of people and staff." Figure 25 illustrates that opinions were more evenly distributed across the options than the responses to the statement about female academics. Nonetheless a larger proportion of females than males strongly agreed or agreed with the statement, 45% and 29%, respectively. 48% of males and 37% of females neither agreed nor disagreed with the statement. The differences between the responses of males and females are statistically significant ($P < 0.05$). Responses of CDT members and non-members were broadly similar, with CDT members displaying a greater tendency to agree than non-members. Examining the breakdown of responses by nationality shows that for males there was relatively little difference in the responses of British and other nationals, but among females a higher proportion of other nationals strongly agreed or agreed than British nationals, 49% and 43%, respectively, but it is also worth noting that 23% of other nationals and 15% of British nationals strongly agreed.



- + Statistically significant difference between the populations ($P < 0.05$). To measure significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.
- * Respondents confined to just those institutions with CDT members responding to the survey.

Figure 25: How strongly respondents agreed with the statement, “I feel my department would benefit if there was a more diverse mix of people and staff,” by gender and whether respondents were members of a CDT

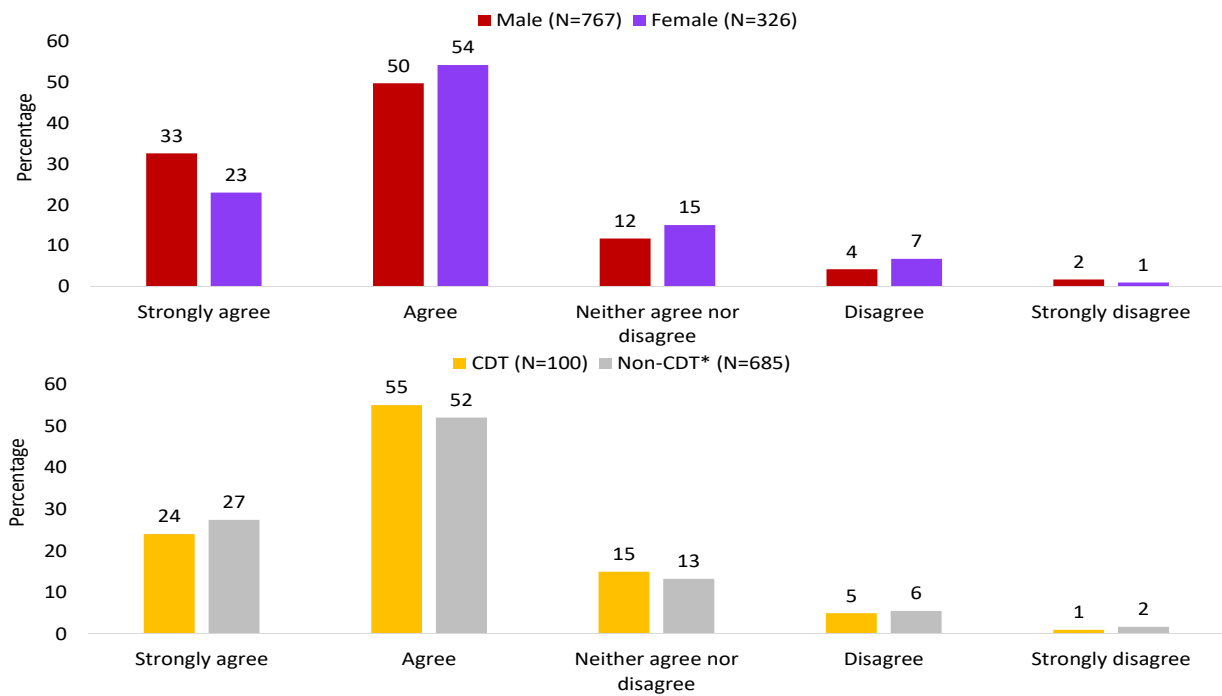


- + Statistically significant difference between the populations ($P < 0.05$). To measure significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.
- * Respondents confined to just those institutions with CDT members responding to the survey.

Figure 26: How strongly respondents agreed with the statement, “There is a strong equality and diversity culture,” by gender and whether respondents were members of a CDT

In a similar vein respondents were asked how strongly they agreed that, “*There is a strong equality and diversity culture.*” As shown in figure 26, 70% of males and 58% of females strongly agreed or agreed with the statement. The differences in the responses of males and females are statistically significant ($P < 0.05$). 67% of CDT members and 63% of non-members strongly agreed or agreed with the statement.

In respect of the statements about equality and diversity, it is noteworthy that females feel more strongly than males that there should be greater diversity both generally and, in particular in respect of increasing the number of female academics. Females also feel less strongly than males that there is a strong equality and diversity culture in their departments. Furthermore, among males the responses of British and other nationals are similar, but among females other nationals feel more strongly than British nationals that there should be greater diversity. Perhaps females, and in particular females of non-British nationality, are more sensitive to issues of equality and diversity because they are in minority groups. Males on the other hand are more accepting of the *status quo* because to a large extent they have become used to an environment in physics and astronomy where women, in particular, are a minority group.



* Respondents confined to just those institutions with CDT members responding to the survey.

Figure 27: How strongly respondents agreed with the statement, “*Doctoral students are respected and well regarded by staff,*” by gender and whether respondents were members of a CDT

Respondents were also asked how strongly they agreed that, “*Doctoral students are respected and well regarded by staff.*” As illustrated in table 31, the responses of males and females were broadly similar with 83% of male and 77% of female respondents strongly agreeing or agreeing with the statement, although males were more likely to agree strongly than females, 33% and 23%, respectively. The responses of CDT members and non-members were also broadly similar. The difference in the responses of males and females perhaps suggest that some staff are less respectful to female doctoral students than to male doctoral students, or may be related to differences in the attitudes of males and females.

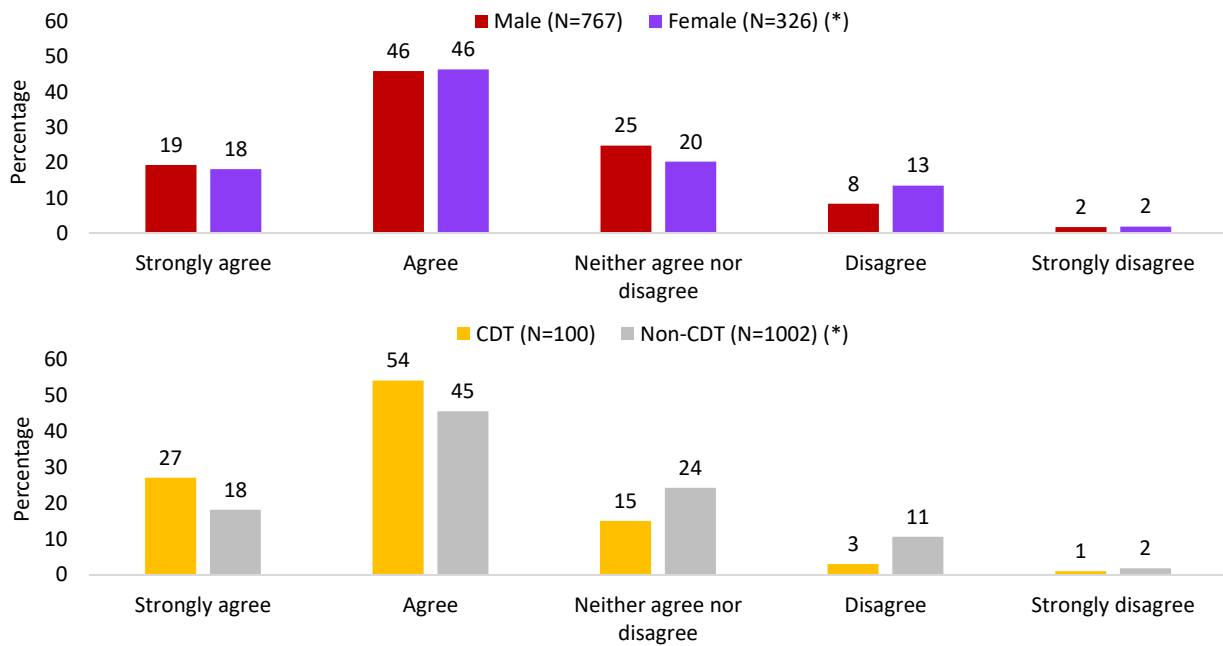
3.11 Training and Activities

Respondents were asked how strongly they agreed with the statement, “*I am gaining transferable skills.*” The results are shown in figure 28. The differences in the responses of males and females were not significantly different with 80% of males and 84% of females strongly agreeing or agreeing. Members of CDTs agreed more strongly than non-members, with 88% of CDT members and 80% of non-members strongly agreeing or agreeing. This is in line with CDTs being tasked to provide additional transferable skills training.



Figure 28: How strongly respondents’ agreed with the statement, “*I am gaining transferable skills,*” by gender and by whether respondents are members of CDTs

Respondents were also asked how strongly they agreed with the statement, “*The quality of the transferable skills training I receive is high.*” The results are shown in figure 29. There are statistically significant differences between the responses of males and females, and CDT members and non-members. 65% of males and 64% of females strongly agreed or agreed and 81% of CDT members and 63% of non-members strongly agreed or agreed.



* Statistically significant difference between the populations ($P < 0.05$). To measure significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.

Figure 29: How strongly respondents’ agreed with the statement, “The quality of the transferable skills training I receive is high,” by gender and by whether respondents were members of CDTs

Respondents were asked whether they believed they possessed the majority of general skills (defined as non-technical skills e.g. communication, team-working and problem-solving skills) looked for by employers.

As shown in table 58, overall around 80% of respondents reported that they believed that possessed, and 5% reported that they believed they did not possess, the majority of general skills for which employed often looked. There are few differences between the responses of men and women, either overall or by year of study, in line with the data presented in figure 29 . There is a trend for a larger proportion of respondents to report that they believed they possessed the majority of the general skills for which employers often looked as year for study increased. Overall 75% of respondents in their first year believed they possessed the skills and 85% of respondents in their fourth year believed they possessed the majority of the general skills for which employers often looked. Similar patterns are noticeable when comparing the responses of doctoral students who were and were not members of CDTs. Overall 84% of respondents who were members of CDTs and 80% of respondents who were not members of CDTs reported that they believed they possessed the majority of the general skills for which employers often looked.

Table 58: Respondents' views of whether they possessed the majority of general skills often looked for by employers by current year of study and gender

Possess general skills?	Current year of study								Overall	
	1st		2nd		3rd		4th			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Yes	75%	78%	83%	78%	83%	81%	85%	84%	81%	80%
Don't know	18%	15%	13%	15%	13%	13%	11%	14%	15%	15%
No	7%	6%	4%	7%	4%	6%	3%	2%	5%	5%
Total respondents	232	78	178	81	166	78	117	64	716	310

Table 59: Respondents' views of whether they possessed the majority of general skills often looked for by employers by current year of study and whether respondents are members of a CDT

Possession of general skills	Current year of study								Overall	
	1st		2nd		3rd		4th			
	Member of CDT	Non-member of CDT	Member of CDT	Non-member of CDT	Member of CDT	Non-member of CDT	Member of CDT	Non-member of CDT	Member of CDT	Non-member of CDT
Yes	80%	75%	82%	81%	86%	82%	91%	85%	84%	80%
Don't know	13%	18%	14%	13%	5%	14%	9%	12%	10%	15%
No	7%	7%	4%	5%	9%	4%	0%	3%	5%	5%
Total respondents	30	280	28	231	22	222	11	170	96	938

Respondents were asked whether they had to take transferable skills courses as part of their course and if so, whether there was any sanction if they didn't. The results broken down by gender and whether or not respondents were members of CDTs are shown in table 60. Overall about 63% of respondents reported that they had to attend a minimum number of courses, and around 60% of these respondents, 39% overall, reported that they needed to do this to complete their doctorate. The distributions of responses for men and women were similar. In contrast, 65% of CDT members reported that they needed to attend a minimum number of courses to complete their doctorates and another 24% reported that they needed to complete a minimum number of courses although there were no sanctions if they failed to do this: among non-CDT members the figures are 37% and 24%, respectively. This is to be expected as members of CDTs are required to complete a programme of study in their first year.

Table 60: Proportions of respondents reporting whether they are obliged to attend a minimum number of transferable skills training courses by gender and whether respondents were members of a CDT

Required to attend transferable skills training courses?	Gender		Member of CDT		Overall
	Male	Female	Yes	No	
Yes. I need to attend a minimum number of courses to complete my doctorate.	40%	38%	65%	37%	39%
Yes, but there is no real sanction if I don't.	23%	25%	24%	24%	24%
No. Transferable skills courses are available but I don't have to attend any.	32%	29%	8%	33%	31%
No. I am not aware of any transferable skills courses that I can attend.	6%	8%	3%	7%	7%
Total respondents	716	310	96	938	1034

Interestingly, the proportion of non-CDT members reporting that they needed to complete a minimum of courses to complete their doctorate falls as the year of study increases from 46% in year one to 30% in year three before rising again to 35% in year four.

Only one institution had no respondents reporting that they were required to undertake a minimum number of courses, and all but two institutions had respondents reporting that they were required to complete a minimum number of courses to obtain their doctorate.

Respondents were asked to indicate whether or not they had attended training courses in a number of specific areas. The proportions of respondents that reported that they had attended courses in specific areas are shown in table 61. Patterns of course uptake vary and may be affected by the availability of specific courses at particular institutions. Examination of the data at institution level shows that in all areas the majority of institutions have at least some respondents indicating they have undertaken training. It is apparent though that a small number of institutions possibly do not offer training in some areas such as entrepreneurial and business skills. It is reasonable to assume that the patterns of uptake observed are indicative of the overall national picture.

Popularity of different areas of training varies with presentation and communication skills the most popular and leadership skills and entrepreneurial and business skills the least. In some areas uptake did not increase to any great degree as year of study increased, e.g., computational skills and leadership skills, while in other areas, such as career planning/job searching uptake did increase over time. It is likely that in the majority of institutions students are required to undertake a minimum number of training courses in the earlier years of their course. Thereafter doctoral student only take courses they feel are useful to them, such as training related to job searching.

Table 61: Proportions of respondents who indicated they had attended training courses covering selected specific areas by current year of study and gender

Training course	Current year of study								Overall	
	1st		2nd		3rd		4th			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Computational skills	49%	56%	58%	49%	50%	45%	54%	53%	52%	51%
Project planning and management	29%	31%	39%	27%	38%	24%	35%	36%	35%	29%
Leadership skills	13%	12%	16%	12%	23%	12%	16%	23%	17%	14%
Team working	23%	27%	33%	26%	34%	24%	31%	45%	29%	30%
Presentation and communication skills	47%	54%	62%	57%	60%	65%	62%	78%	57%	62%
Technical research skills	50%	40%	53%	42%	46%	40%	53%	53%	51%	44%
Networking skills	18%	18%	22%	27%	25%	26%	24%	39%	22%	27%
Entrepreneurial and business skills	11%	9%	16%	9%	22%	14%	16%	13%	16%	11%
Career planning/job searching	17%	14%	17%	10%	28%	31%	30%	39%	22%	23%
Total respondents	232	78	178	81	166	78	117	64	716	310

The number of courses respondents reported having taken in the specific areas listed in table 61 are shown in table 62, together with data on the average and median number of courses for all respondents and for specific groups: males and females, and, CDT members and non-members. The data show that the average doctoral student reported taking two or three courses in the areas specified in their first year and then took only another one course during the other years of study. On average women reported having taken more courses than men; CDT members took notably more courses than non-CDT members. The data suggest that CDT members took at least 2 more courses in the specific areas surveyed than non-CDT members but again the bulk of courses are taken during CDT members' first year. The observations are in line with doctoral students being required to take a minimum number of training courses early in their course, and with CDT members being required to take more training courses than non-members.

Table 62: The numbers of training courses in selected specific areas that respondents had attended by current year of study and average and median number of courses attended by various groups by current year of study

Number of selected courses attended		Current year of study				Total
		1st	2nd	3rd	4th	
0		51	29	21	19	120
1		71	30	51	19	171
2		51	53	33	22	159
3		54	53	39	34	180
4		39	35	29	30	133
5		31	26	25	21	103
6		16	19	25	19	79
7		11	16	10	17	54
8		12	11	17	9	49
9		9	5	6	5	25
10		5	6	8	4	23
Total Respondents		350	283	264	199	1096
Median number of selected courses		3	3	3	4	3
Average number of selected courses		2.99	3.48	3.66	3.92	3.44
Average number of selected courses	Male	2.97	3.62	3.78	3.69	3.45
	Female	3.11	3.17	3.44	4.30	3.47
Median number of selected courses	Male	3	3	3	4	3
	Female	3	3	3	4	3
Average number of selected courses	CDT Members	4.55	5.00	5.57	5.58	5.06
	CDT Non-Members	2.84	3.28	3.47	3.81	3.29
Median number of selected courses	CDT Members	5	5	5	6.5	5
	CDT Non-Members	2	3	3	4	3

Data in table 63 show the proportions of respondents reporting having undertaken, or expecting to undertake, various activities by current year of study and, for those respondents in their third year, by gender and whether or not respondents were members of a CDT. In all cases, and as would be expected, the proportion of respondents reporting experience of particular activities increased with increasing year of study. Considering the data for those respondents in their third year, there were some small differences between the proportions of males and females and between the proportions of CDT members and non-members reporting experience of particular activities. Some of the differences between CDT members and non-members are to be expected, for example, CDTs are often normally interdisciplinary in nature and hence the fact that 70% of third year CDT members report experience of this compared to 35% of non-CDT members is not surprising. On the whole the reported experiences of activities of male and female doctoral students appear similar.

Table 63: Activities undertaken by respondents in their third year by gender and whether respondents were members of a CDT, and by current year of study

Activity	Experience of activity	Respondents in 3 rd year of study				Current year of study				Overall
		Gender		Member of CDT		1st	2nd	3rd	4th	
		Male	Female	Yes	No					
Creation of posters	I regularly/ sometimes do this	92%	86%	96%	89%	30%	71%	90%	91%	67%
	No but EXPECT TO in future	5%	6%	0%	6%	67%	27%	5%	4%	30%
	No and NOT SURE if I will in future	2%	6%	0%	4%	3%	1%	4%	2%	3%
	No and DO NOT expect to in future	1%	1%	4%	0%	0%	1%	1%	3%	1%
Attend conferences	I regularly/ sometimes do this	93%	83%	78%	74%	46%	82%	89%	93%	75%
	No but EXPECT TO in future	7%	12%	21%	24%	54%	18%	9%	4%	24%
	No and NOT SURE if I will in future	1%	4%	1%	1%	1%	0%	2%	1%	1%
	No and DO NOT expect to in future	0%	1%	0%	1%	0%	0%	0%	2%	1%
Give internal presentations	I regularly/ sometimes do this	95%	96%	100%	95%	60%	89%	95%	92%	82%
	No but EXPECT TO in future	3%	3%	0%	4%	37%	9%	3%	3%	15%
	No and NOT SURE if I will in future	1%	1%	0%	1%	3%	1%	1%	3%	2%
	No and DO NOT expect to in future	1%	0%	0%	0%	0%	0%	0%	2%	1%
Give external presentations	I regularly/ sometimes do this	78%	78%	87%	77%	22%	55%	78%	77%	55%
	No but EXPECT TO in future	16%	15%	13%	16%	%	40%	16%	15%	40%
	No and NOT SURE if I will in future	3%	5%	0%	4%	4%	3%	4%	4%	4%
	No and DO NOT expect to in future	2%	1%	0%	2%	0%	1%	2%	4%	2%
Team working	I regularly/ sometimes do this	77%	77%	83%	77%	60%	76%	77%	76%	71%
	No but EXPECT TO in future	11%	8%	9%	10%	27%	11%	10%	8%	15%
	No and NOT SURE if I will in future	9%	12%	4%	10%	12%	11%	10%	11%	11%
	No and DO NOT expect to in future	3%	4%	4%	3%	1%	2%	3%	5%	3%
Networking	I regularly/ sometimes do this	64%	63%	65%	64%	39%	63%	64%	66%	57%
	No but EXPECT TO in future	20%	22%	30%	19%	44%	23%	20%	18%	27%
	No and NOT SURE if I will in future	11%	14%	4%	13%	15%	10%	13%	9%	12%
	No and DO NOT expect to in future	4%	1%	0%	4%	3%	4%	3%	7%	4%
Collaboration/contact with researchers in industry	I regularly/ sometimes do this	30%	21%	43%	26%	15%	28%	27%	26%	23%
	No but EXPECT TO in future	20%	17%	13%	20%	34%	16%	19%	10%	21%
	No and NOT SURE if I will in future	27%	38%	17%	31%	34%	33%	30%	34%	32%
	No and DO NOT expect to in future	23%	24%	26%	23%	16%	23%	24%	30%	23%

Teaching - small group tutorials for undergraduates	I regularly/ sometimes do this	56%	50%	48%	55%	38%	46%	54%	57%	47%
	No but EXPECT TO in future	11%	15%	9%	13%	40%	16%	12%	14%	21%
	No and NOT SURE if I will in future	16%	21%	22%	17%	18%	24%	17%	16%	19%
	No and DO NOT expect to in future	17%	14%	22%	16%	4%	14%	16%	14%	12%
Laboratory supervision for undergraduates	I regularly/ sometimes do this	57%	62%	52%	59%	36%	55%	59%	69%	53%
	No but EXPECT TO in future	5%	6%	4%	6%	33%	11%	6%	5%	15%
	No and NOT SURE if I will in future	16%	12%	17%	14%	19%	%13%	14%	8%	14%
	No and DO NOT expect to in future	22%	21%	26%	21%	12%	22%	22%	18%	18%
Interdisciplinary collaboration	I regularly/ sometimes do this	39%	36%	70%	35%	23%	38%	39%	45%	35%
	No but EXPECT TO in future	14%	10%	9%	13%	35%	18%	13%	13%	21%
	No and NOT SURE if I will in future	31%	37%	13%	35%	35%	35%	33%	27%	32%
	No and DO NOT expect to in future	16%	17%	9%	17%	7%	9%	16%	15%	12%
Assisting in grant writing/doing preliminary work for a new grant	I regularly/ sometimes do this	17%	22%	30%	17%	23%	38%	39%	45%	14%
	No but EXPECT TO in future	36%	22%	26%	32%	35%	18%	13%	13%	32%
	No and NOT SURE if I will in future	28%	38%	30%	32%	35%	35%	33%	27%	37%
	No and DO NOT expect to in future	19%	18%	13%	19%	7%	9%	16%	15%	17%
Writing for an academic audience (e.g. journal articles)	I regularly/ sometimes do this	72%	72%	74%	72%	25%	53%	72%	75%	53%
	No but EXPECT TO in future	23%	24%	26%	23%	71%	43%	24%	17%	42%
	No and NOT SURE if I will in future	4%	3%	0%	4%	4%	2%	4%	5%	4%
	No and DO NOT expect to in future	1%	1%	0%	1%	0%	1%	1%	3%	1%
Total respondents		166	78	23	223	314	260	246	182	1034

3.12 Careers Advice

Respondents were asked how they rated their knowledge of careers options within and outside academia.

Figure 30 presents data on how respondents rated their knowledge of career options within academia by current year of study. In general reported knowledge increased with increasing year of study. It is difficult to compare the responses of men and women given the relatively small number of women in each year of study but overall the responses of men and women are similar.

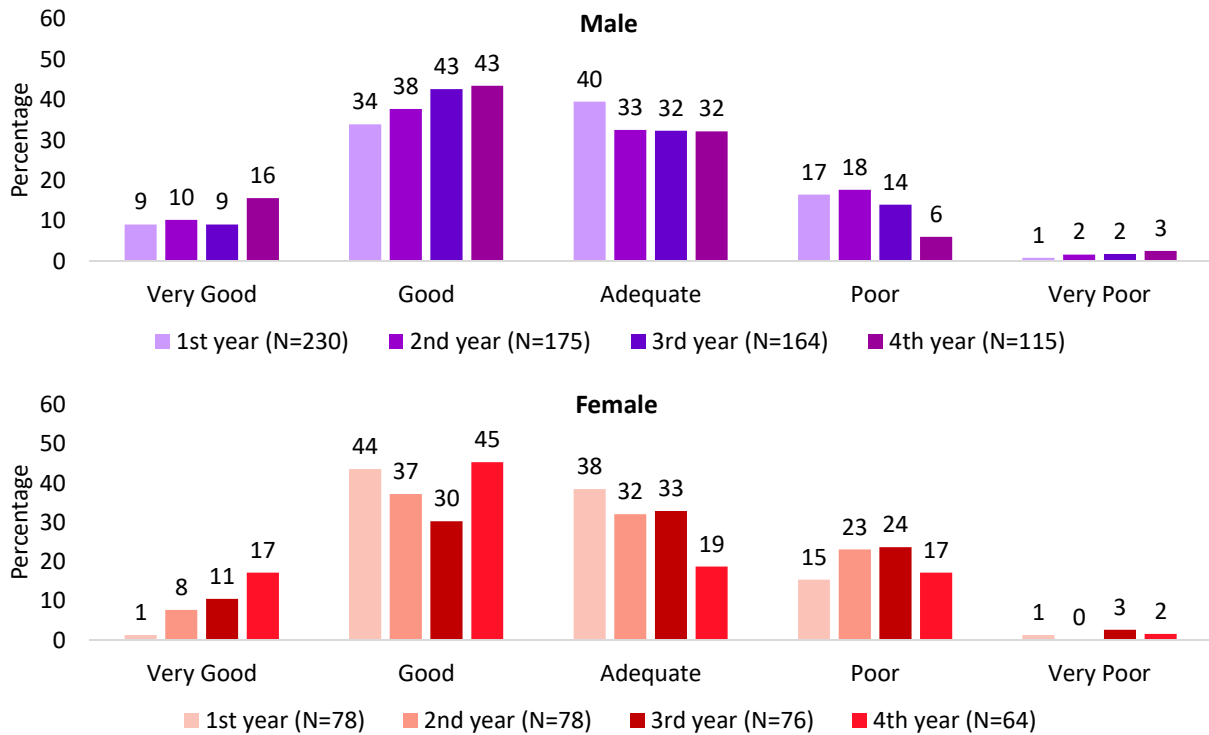


Figure 30: How respondents rated their knowledge of career options within academia by gender and by current year of study

Data on how respondents rated their knowledge of career options outside academic are shown in figure 31. Data for men and women by year of study are shown separately. In general, respondents' reported knowledge increased as year of study increased. Bearing in mind the relatively low number of female respondents when broken down by year of study, it appears that men's and women's reported knowledge is similar in years 1 and 2, but men report better knowledge in years 3 and 4. Overall, as would be expected, men and women who have worked before their doctorate reported higher knowledge than those who had not. Interestingly, working before the doctorate appears to make a bigger difference to women's responses than men's. 33% of men who have worked rated their knowledge as very good or good, and 32% rated their knowledge as poor or very poor compared to 28% who have not worked rating their knowledge as very good or good, and 35% who rated their knowledge as poor or very poor. In contrast, 28% of women who have worked rated their knowledge as very good

or good, and 35% rated their knowledge as poor or very poor compared to 22% who have not worked rating their knowledge as very good or good, and 52% who rated their knowledge as poor or very poor.

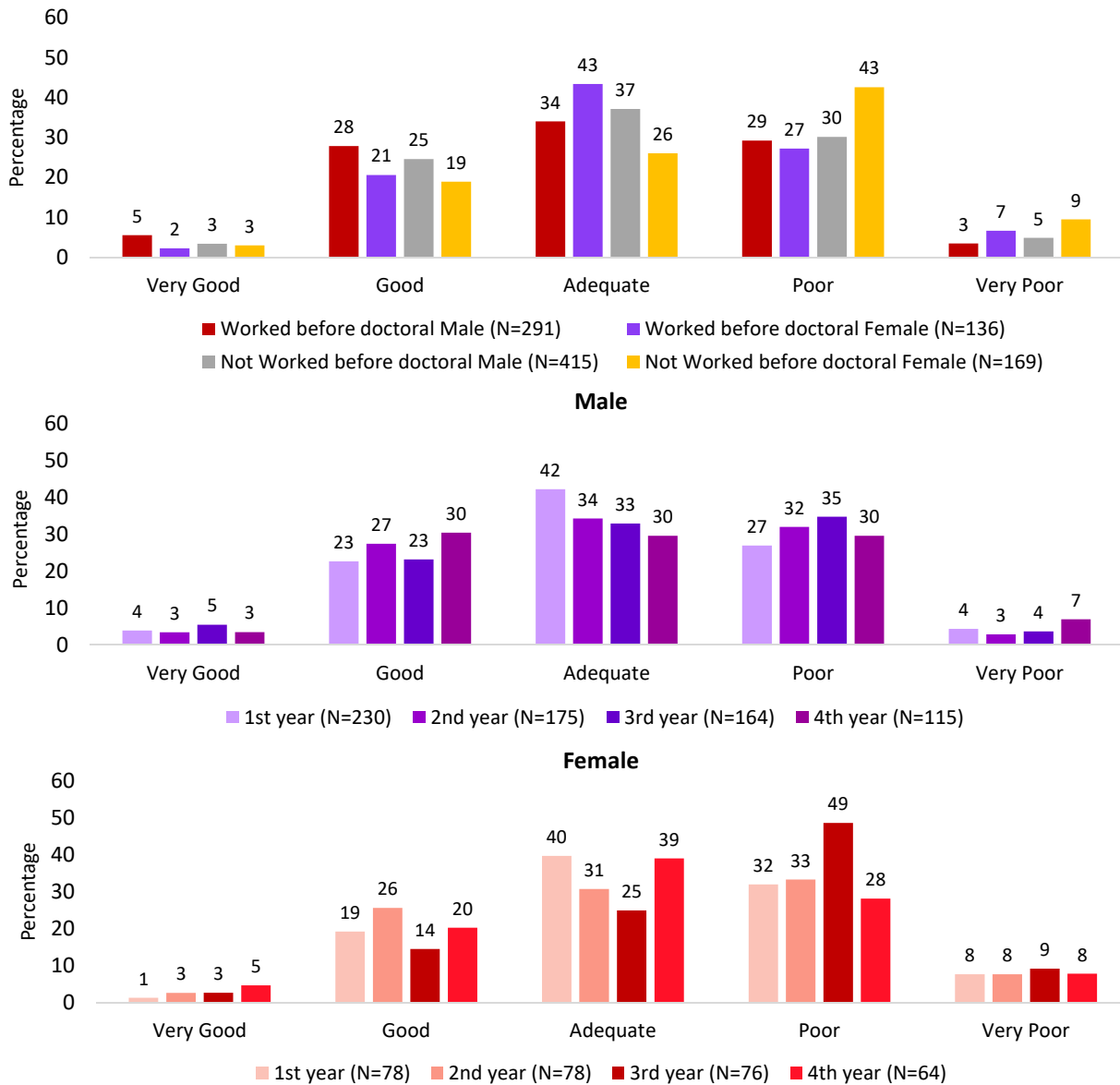
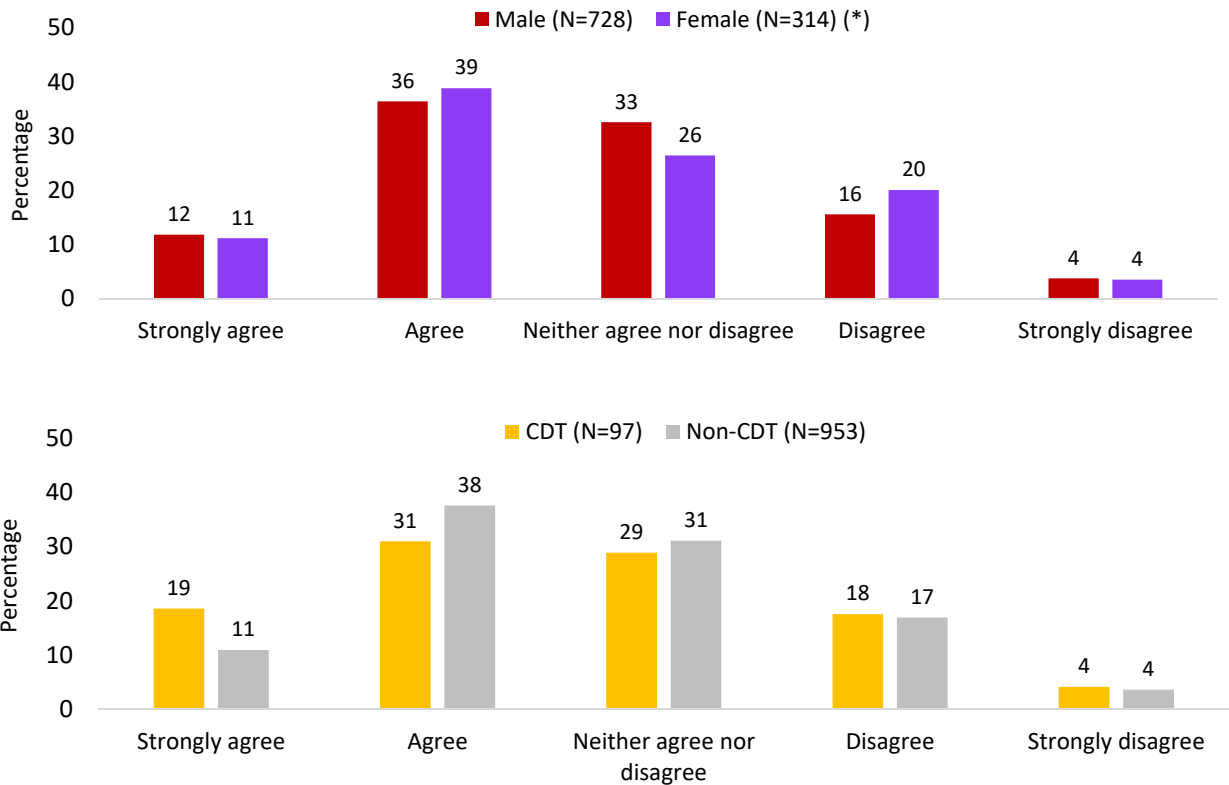


Figure 31: How respondents rated their awareness of career options outside academia by gender and whether respondents had worked before their doctoral, and by current year of study and gender

Respondents were asked how strongly they agreed with the statement, “Undertaking a doctorate has helped me clarify my career plans.” As shown in figure 32 males were more in agreement with the statement than females – the differences are statistically significant ($P < 0.1$) - and CDT members were slightly more in agreement than non-members.



* Statistically significant difference between the populations ($P < 0.1$). To measure significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.

Figure 32: How strongly respondents agreed with the statement, “Undertaking a doctorate has helped me clarify my career plans,” by gender and whether respondents were members of CDTs

There is some variation by year of study as shown in figure 33 but it is difficult to discern a clear pattern. The data for males indicate that an increasing proportion strongly agreed or agreed as year of study increased from the first year to the third, but then falls in the fourth year. For females, although numbers in each year of study is relatively small, as year of study increased from first to third the proportion strongly agreeing and agreeing and the proportion disagreeing and strongly disagreeing both increased.

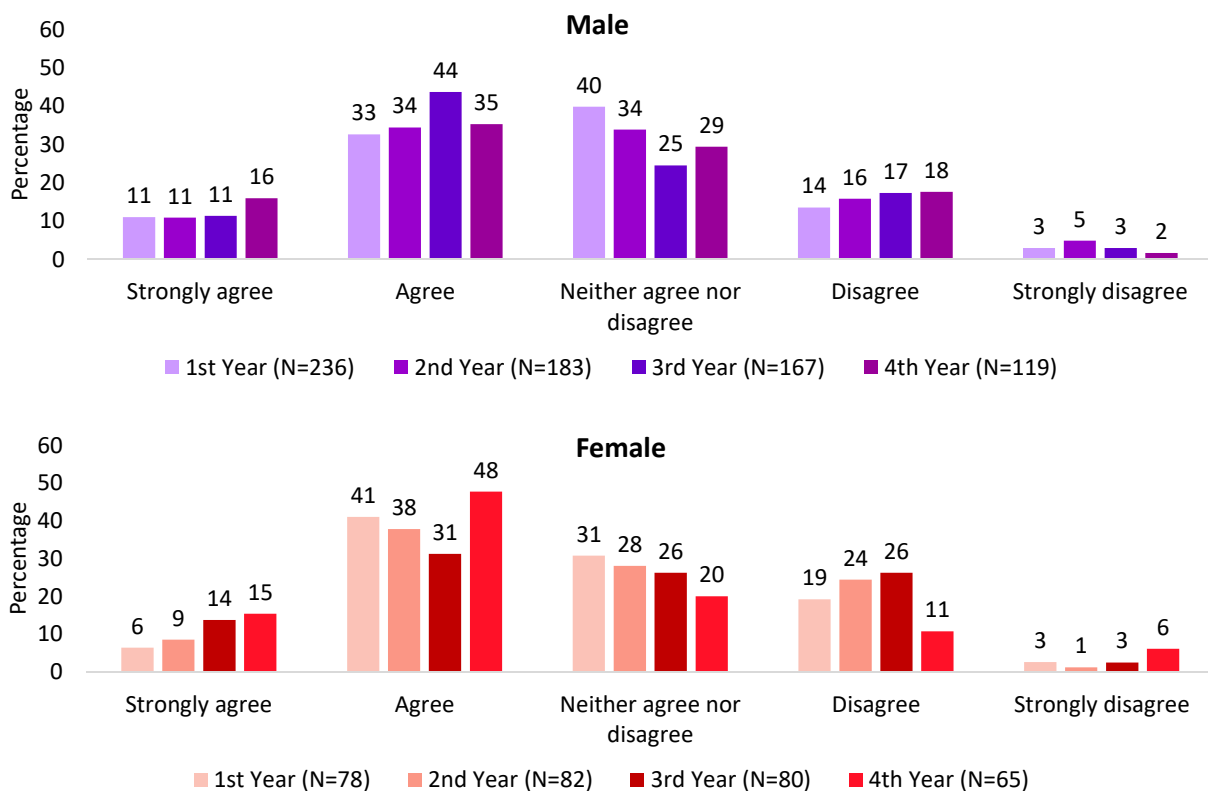


Figure 33: How strongly respondents agreed with the statement, “Undertaking a doctorate has helped me clarify my career plans,” by gender and current year of study

Respondents were also asked how strongly they agreed with the statement, “I now have a better understanding of a scientist’s work.” 90% of both males and females strongly agreed or agreed with the statement, but males were more likely to strongly agree than females. Likewise, 92% of CDT members and non-members strongly agreed or agreed with the statement, but CDT members were more likely than non-members to strongly agree. The differences between males and females, and CDT members and non-members are not statistically significant.

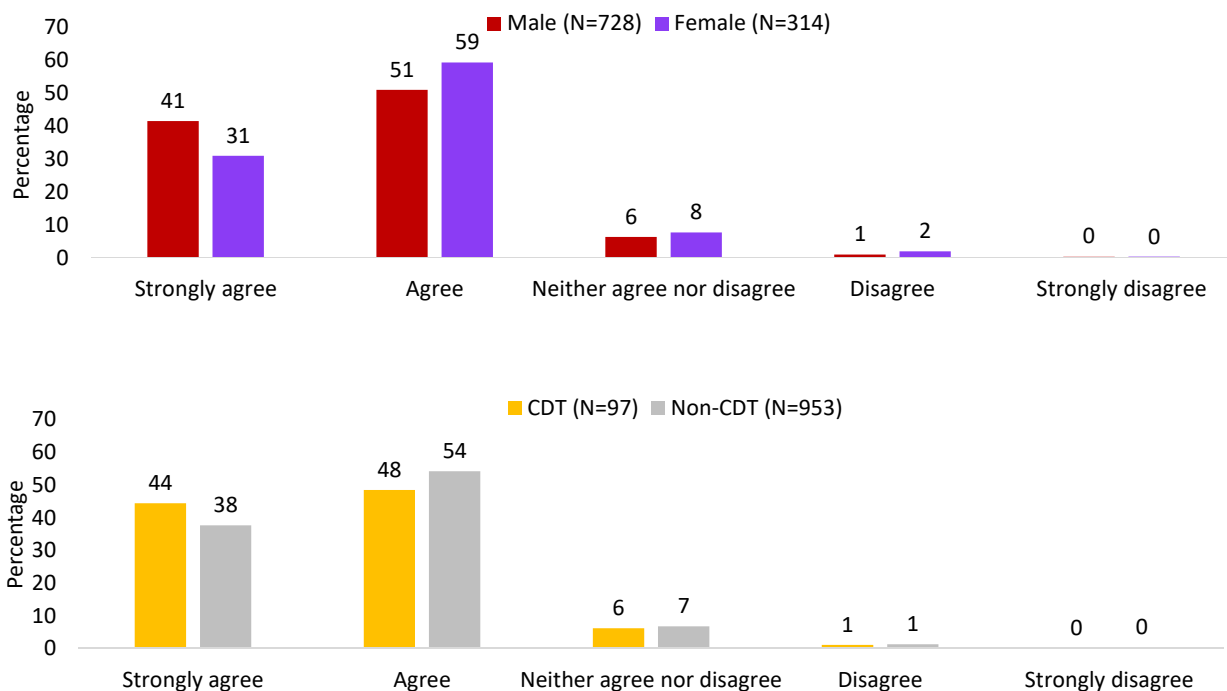


Figure 34: How strongly respondents agreed with the statement, “I now have a better understanding of a scientist’s work,” by gender and whether respondents were members of CDTs

Table 64: Proportions of respondents who reported consulting different sources for careers advice before beginning their doctorate by nationality and gender, and by whether respondents were members of a CDT.

Source of careers advice before doctorate	British		Other nationalities		Member of CDT		Overall
	Male	Female	Male	Female	Yes	No	
University careers service	50%	53%	39%	30%	54%	44%	45%
Workplace colleagues	18%	16%	22%	17%	23%	18%	19%
Industrial placement supervisors	8%	5%	4%	6%	17%	5%	6%
Careers/recruitment fairs	39%	45%	20%	19%	38%	32%	33%
Your project supervisor	36%	42%	29%	31%	28%	36%	35%
Other academic staff	31%	29%	26%	32%	27%	30%	30%
Research council	2%	1%	2%	0%	2%	2%	2%
Family or friends	42%	46%	38%	40%	43%	41%	41%
IOP careers events	10%	10%	3%	5%	8%	7%	8%

The proportions of respondents who reported using various specified sources of careers advice prior to starting their doctorate are shown in table 64 and the numbers of specified sources respondents reported consulting are shown in table 65. Women reported having consulted a greater number of sources than men, and British nationals reported consulting a greater number of sources than non-

British nationals. Members of CDTs also reported having consulted a greater number of sources than CDT non-members.

Table 65: Proportions of respondents reporting consulting various numbers of specified sources of careers advice prior to beginning their doctoral studies by nationality and gender, and by whether respondents are members of a CDT

Number of sources of advice consulted	Nationalities				Member of CDT		Overall
	British		Other nationalities		Yes	No	
	Male	Female	Male	Female			
0	27%	17%	36%	29%	24%	28%	28%
1	13%	17%	20%	20%	16%	16%	16%
2	20%	25%	20%	27%	26%	22%	22%
3	18%	17%	11%	15%	14%	16%	16%
4	11%	13%	5%	4%	8%	9%	9%
5	8%	9%	4%	4%	6%	7%	7%
6	3%	2%	2%	0%	4%	2%	2%
7	0%	0%	1%	1%	2%	0%	1%
Average	2.13	2.25	1.52	1.63	2.09	1.92	1.93
Number of respondents	523	201	294	138	110	1053	1167

Around half the British respondents reported having used their university career service, around 40% reported having gone to a career/recruitment fair, and 43% reported using family or friends for careers advice. Project supervisors were also a popular source of advice for British respondents with 38% reporting having consulted their supervisors. The patterns of sources consulted for men and women are similar. Lower proportions of other nationals than British nationals reported using all sources except workplace colleagues. Provision of careers services in universities is much more widespread in the UK than in most other countries so it is not surprising that British nationals are more likely to report having used them and are more likely to report having attended careers/recruitment fairs as these are often organised by university careers services.

Table 66: Proportions of respondents who reported consulting different sources for careers advice during their doctorate by current year of study and gender

Source of careers advice during doctorate	Advice received and whether it was useful	Current year of Study							
		1st		2nd		3rd		4th	
		M	F	M	F	M	F	M	F
University careers service	Useful advice	15%	9%	9%	12%	28%	20%	23%	36%
	Advice not useful	7%	8%	6%	6%	6%	16%	17%	25%
Industrial placement supervisors	Useful advice	4%	5%	6%	9%	6%	3%	4%	5%
	Advice not useful	1%	1%	0%	4%	2%	4%	1%	3%
Attending a specific course on career planning	Useful advice	5%	5%	6%	9%	13%	13%	16%	17%
	Advice not useful	5%	8%	3%	0%	7%	7%	7%	11%
Careers/recruitment fairs	Useful advice	8%	6%	8%	15%	22%	16%	23%	28%
	Advice not useful	8%	6%	14%	17%	10%	18%	18%	16%
Your project supervisor	Useful advice	26%	29%	36%	27%	49%	41%	65%	45%
	Advice not useful	4%	0%	5%	5%	3%	14%	9%	19%
Other academic staff	Useful advice	22%	23%	29%	27%	42%	34%	50%	38%
	Advice not useful	3%	1%	2%	3%	3%	9%	7%	8%
Research council	Useful advice	3%	3%	3%	5%	3%	4%	2%	0%
	Advice not useful	1%	0%	0%	0%	4%	1%	4%	2%
Family or friends	Useful advice	23%	27%	28%	41%	37%	29%	43%	44%
	Advice not useful	8%	8%	9%	14%	10%	9%	13%	14%
IOP careers events	Useful advice	4%	6%	6%	5%	6%	5%	6%	8%
	Advice not useful	1%	1%	1%	1%	3%	3%	1%	5%
Number of respondents		230	78	175	78	164	76	115	64

Table 66 presents data on the proportions of respondents who have consulted specified sources of careers advice during their doctoral studies and whether the advice received was rated as useful by gender and year of study.

Overall women were more likely than men to report using any single source but of those who do use a specific source, women were less likely to report that the advice received from that source was useful. Considering only those respondents in their third and fourth years, data on the proportion of male and female respondents who had used a particular source for careers advice, and the proportions of those

using the source who reported finding the advice useful are shown in table 67. There is some variation in the relative usage of particular sources by gender. Women were more likely to use the university careers service than men, and men were more likely to consult academic staff other than their project supervisor. Similar proportions of men and women reported using the other sources listed. For all sources except the research councils, which few respondents reported consulting, a smaller proportion of women than men rated the advice as useful. Presumably the advice received by male and female respondents is the same, or at least similar, so the conclusion is that on average women's needs are being met less than men's. **It is important to establish why women are less satisfied than men and to better define the careers information that, in particular, female doctoral students are seeking.**

Table 67: Proportions of respondents in their third or fourth year of study who reported consulting different sources for careers advice during their doctorate and the proportions of those using the source rating the source as useful by gender

Source of careers advice during doctorate	Proportion using/consulting source		Proportion of those using source rating the source as useful	
	Male	Female	Male	Female
University careers service	37%	47%	71%	58%
Industrial placement supervisors	7%	7%	75%	50%
Attending a specific course on career planning	21%	24%	66%	64%
Careers/recruitment fairs	36%	39%	63%	56%
Supervisor	61%	59%	91%	72%
Other academic staff	50%	44%	91%	81%
Research council	7%	4%	39%	60%
Family or friends	50%	47%	78%	76%
IOP careers events	8%	10%	74%	64%

Given the relatively low number of respondents who were members of CDTs it is difficult to draw firm conclusions about usage of sources of careers advice. Table 68 shows the usage levels of respondents in their third and fourth years by whether or not they were members of CDTs, and the proportions of those using the source who report finding the advice useful.

Table 68: Proportions of respondents in their third or fourth year for study who report consulting different sources for careers advice during their doctorate and the proportions of those using the source rating the source as useful by whether respondents were members of a CDT

Source of careers advice during doctorate	Proportion using/consulting source		Proportion of those using source rating the source as useful	
	Member of CDT	Not member of CDT	Member of CDT	Not member of CDT
University careers service	43%	40%	53%	67%
Industrial placement supervisors	26%	5%	89%	57%
Attending a specific course on career planning	34%	21%	75%	63%
Careers/recruitment fairs	40%	37%	64%	59%
Supervisor	54%	61%	84%	85%
Other academic staff	40%	49%	100%	87%
Research council	9%	5%	100%	38%
Family or friends	49%	49%	77%	78%
IOP careers events	11%	9%	50%	69%

3.13 Application Process

Respondents were asked whether the application process for their doctorate involved certain specified elements. Respondents were also given the opportunity of outlining other elements that the application process they had experienced included. The proportions of respondents not applying to a CDT who underwent particular elements are shown in table 69.

Table 69: Proportions of respondents outside CDTs reporting experiencing specific elements as part of the application process for their doctorates

Element of application process	Proportion of respondents reporting that their application process included element		
	Male	Female	Overall
Filling in a general application form for entry to a doctorate	91.9%	87.9%	90.7%
A formal interview with the project supervisor	57.4%	52.8%	56.2%
A formal interview with a panel of staff	44.9%	39.0%	42.9%
A presentation	9.3%	8.5%	9.2%
Meeting members of the research group	51.3%	50.8%	51.2%
Other elements	11.1%	16.4%	12.6%

Examination of the data by institution showed that all 44 institutions had some respondents reporting that they had completed a general application form. All but one institution had respondents reporting that they had a formal interview with their project supervisor, and all but three had respondents reporting that they had a formal interview with a panel of staff. 32 institutions had some respondents reporting that they gave a presentation and all but five had some respondents reporting that they had met members of their research group.

Considering those respondents reporting that they had a formal interview with their project supervisor and/or with a panel of staff, 22% of respondents reported having both an interview with their project supervisor and a panel, and 23% reported that they did not have a formal interview. However, some respondents who reported other elements explained that they had not had an interview with their supervisor because they already knew them as they had done an undergraduate or masters project with them. Other respondents reported having some sort of informal interview or chat with their supervisor, or a series of informal interviews with a number of potential supervisors. Also a few respondents had been interviewed using Skype. In addition, a small number of respondents reported having an interview with the research group head who was not necessarily their supervisor. Overall the data suggest that a number of formal and informal interview mechanisms operate for potential doctoral students.

Other elements that were mentioned included submitting a CV, submission of course details so that qualifications can be verified, and problem solving. Examination of data at institution level suggests that all doctoral students at the same institution did not experience the same selection process. Although difficult to generalise, it does seem likely that students staying on at their undergraduate and/or masters

institution may experience a less formal application process than those student entering from elsewhere.

A variety of suggestions were made as to how the application process could be improved although many suggestions will only be relevant for specific institutions. Among the more common improvements suggested were more formal interviews, greater clarity on the schedule for department visits, more time to talk to potential supervisors about projects on offer, time to speak to other doctoral students, and shortening the time between application and applicants being informed of the decision. This last point was particularly relevant for respondents applying to more than one institution. Related to this point were suggestions that there could be better coordination across the sector and that a centralised list of doctoral projects on offer through the UK would be helpful.

Table 70: Proportions of respondents in CDTs reporting experiencing specific elements as part of the application process for their doctorates

Element of application process	Proportion of respondents reporting the their application process included element
Filling in an application form specifically for the CDT	65%
Filling in a general application form for all CDTs at the university	7%
Filling in a general application form for entry to a doctorate	50%
A formal interview with CDT staff	81%
An informal session with CDT staff	32%
A presentation	9%
Meeting student members of the CDT	51%
Other elements	7%
Total respondents	101

All but six applicants to CDTs reported filling out some kind of application form and all but 10 reported having a formal and/or an informal interview. It should be noted that a number of respondents were entering brand new CDTs so there were no current students for them to meet and also it is likely that applications processes have changed and improved as CDTs have become better established. 11 respondents felt the application process could be improved. Among improvements suggested were that better information should be available, that the application process should be more robust and that response time should be shorter. There was some acknowledgement on the part of respondents that as CDTs were new things would change.

Overall there does not appear to be any typical applications process or experience for those applying for doctorates in physics or astronomy. The majority of respondents report filling in an application form and having some kind of formal or informal interview.

3.14 Centres for Doctoral Training

Respondents were asked how strongly they agreed with a series of statements concerning why they joined a CDT. The responses are presented in table 71. The number of respondents in CDTs was too low to break down responses by other traits.

The statement that the greatest proportion of respondents agreed with was, “I joined a CDT because I liked the multidisciplinary nature.” 88% of respondents strongly agreed or agreed. 65% of respondents strongly agreed or agreed with the statement “I joined a CDT because I liked idea of the six months of taught courses,” and 68% of respondents strongly agreed or agreed with the statement, “I joined a CDT because it specialised in my preferred field.” 53% of respondents strongly agreed or agreed with the statement, “I joined a CDT because I liked the fact that I didn't have to decide on the topic of my major research project until the end of the first year,” and 41% strongly agreed or agreed with the statement, “I joined a CDT because the level of funding was greater than other non-CDT doctorates.”

So, almost 90% of CDT members report being most attracted by the multidisciplinary nature of most CDTs. The six months of taught courses is also attractive to about two thirds of CDT members. More specifically, the choice of CDT is also driven by the area of specialism. Less of an issue was the fact that the final choice of research project does not need to be made until towards the end of the first year of study. The least strongly agreed with reason was the level of funding, although around 40% of CDT members reported being influenced by the funding.

Table 71: How strongly respondents belonging to CDTs agreed with statements about the reason why they joined a CDT

I joined a CDT because.....	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total respondents
<i>I liked the multidisciplinary nature.</i>	48%	40%	9%	3%	1%	101
<i>I liked idea of the six months of taught courses.</i>	30%	35%	25%	7%	4%	101
<i>it specialised in my preferred field.</i>	22%	46%	22%	9%	2%	101
<i>I liked the fact that I didn't have to decide on the topic of my major research project until the end of the first year.</i>	33%	20%	28%	13%	7%	101
<i>the level of funding was greater than other non-CDT doctorates.</i>	18%	23%	29%	19%	12%	101

Table 72 shows how strongly respondents agreed with some statements about CDTs. 82% of respondents strongly agree or agree that they are pleased with their decision to join a CDT and only 3% disagree. 57% of CDT members strongly agreed or agreed that the training they received is better than the training CDT non-member doctoral students received with only 3% disagreeing or strongly agreeing. 79% of respondents strongly agreed or agreed that CDT members have more resources available to them than CDT non-members.

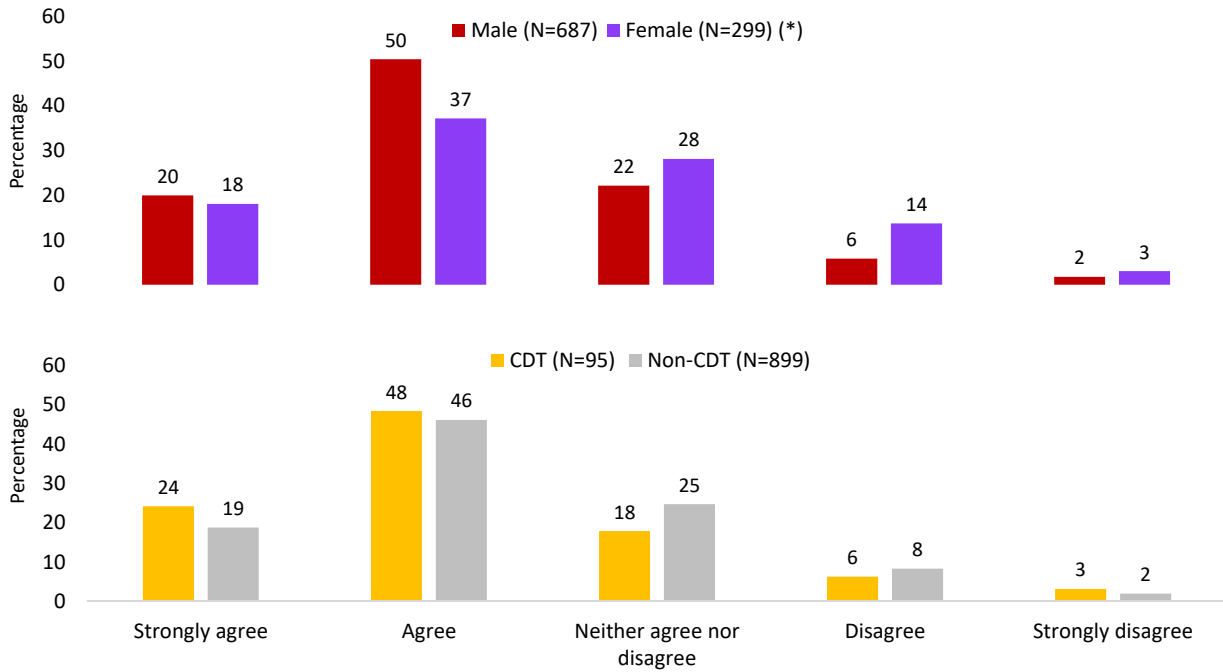
The data suggest that the vast majority of CDT members were pleased with their decision to join a CDT. Data also suggest that the majority of CDT members agreed that they have more resources available to them than those doctoral students outside CDTs and that the level of training of they received is better. Overall CDT members appreciated the advantages of being a member of a CDT and were pleased that they belong to one.

Table 72: How strongly respondents belonging to CDTs agreed with statements about CDTs

Statement	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total respondents
<i>I am pleased with my decision to join a CDT</i>	52%	30%	15%	3%	0%	101
<i>The training I receive is better than the training non-CDT doctoral students receive</i>	32%	45%	21%	2%	1%	101
<i>CDT students have more resources available to them than non-CDT students</i>	33%	46%	17%	4%	1%	101

3.15 Careers Intentions

Respondents were asked how strongly they agreed with the statement, “I feel confident that I would make a good research scientist.” The results broken down by gender and by whether or not respondents were members of a CDT are shown in figure 35 and by year of study and gender in figure 36.



* Statistically significant difference between the populations ($P < 0.05$). To measure significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.

Figure 35: How strongly respondents agreed with the statement, “I feel confident that I would make a good research scientist,” by gender and by whether respondents were members of a CDT

Overall 70% of men reported that they agreed or agreed strongly that they would make a good research scientist, compared to 55% of women. The differences are statistically significant. Given the sample size, there is not a great deal of difference between the responses of members and non-members of CDTs. There is relative little variation in the proportion of men who agreed or agreed strongly by year of study, although the proportion disagreeing or disagreeing strongly does rise from around 5% in the first year of study to 11% and 10% in the third and fourth years of study, respectively. In contrast, the proportion of women agreeing or strongly agreeing with the statement that they would make good research scientists varied from 65% in the first year of study to 50%, 46% and 60% in the second, third and fourth years of study, respectively. Like men, the proportion of women disagreeing or disagreeing strongly rose from 7% in the first year of study to 19%, 20% and 22% in the second, third and fourth years of study, respectively. The differences between the responses of women in their first year of study and those in their second, third and fourth years of study are statistically significant ($P < 0.05$).¹⁰ There

¹⁰ Statistical significance was measured by combining the “strongly agree” and “agree” and the “disagree” and “strongly disagree” categories and using a χ^2 test.

are also statistically significant differences between the responses of males and females in their second, third and fourth years of study, respectively.

The majority of both men and women believed they would make good research scientists, but women were less confident in their ability to make good research scientists than men, and relative to men, women become less confident the more time they spent on a doctorate. After the first year of study, around 1 in 5 female respondents reported that they disagreed or strongly disagreed with the statement that “I feel confident that I would make a good research scientist.”

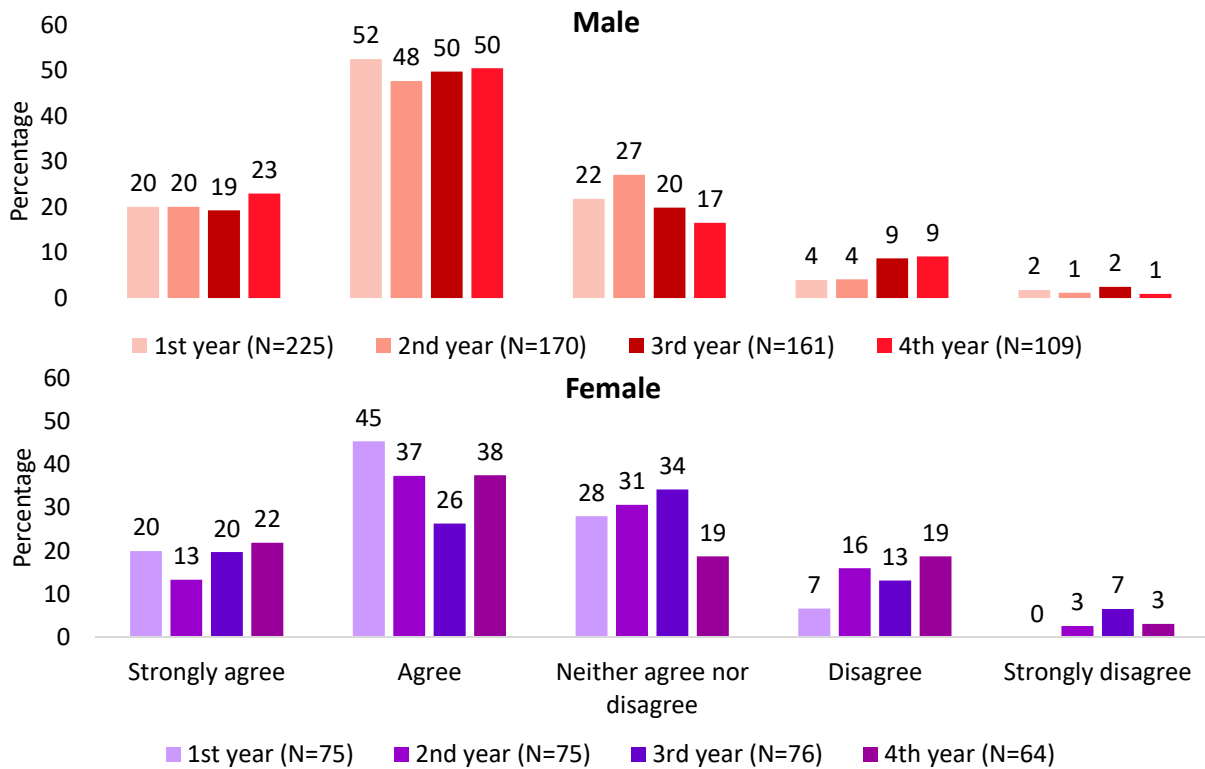


Figure 36: How strongly respondents agreed with the statement, “I feel confident that I would make a good research scientist,” by year of study and gender

Information on how strongly respondents agreed with the statement “I feel confident that I would make a good research scientist,” by nature of their research project (whether the project is experimental, theoretical, or a mixture of both) and gender are shown in figure 37 and by whether their research project is physics or astronomy-based and gender in figure 38. There are no clear patterns that men or women are more or less confident about their ability to make a good research scientist dependent upon the nature of their doctoral research project or on whether their project is physics or astronomy-based. The overarching pattern in both cases is that women were less confident than men. The data do suggest that in general respondents whose project is a mix of theory and experiment are slightly more confident than those with predominantly experimental or theoretical projects.

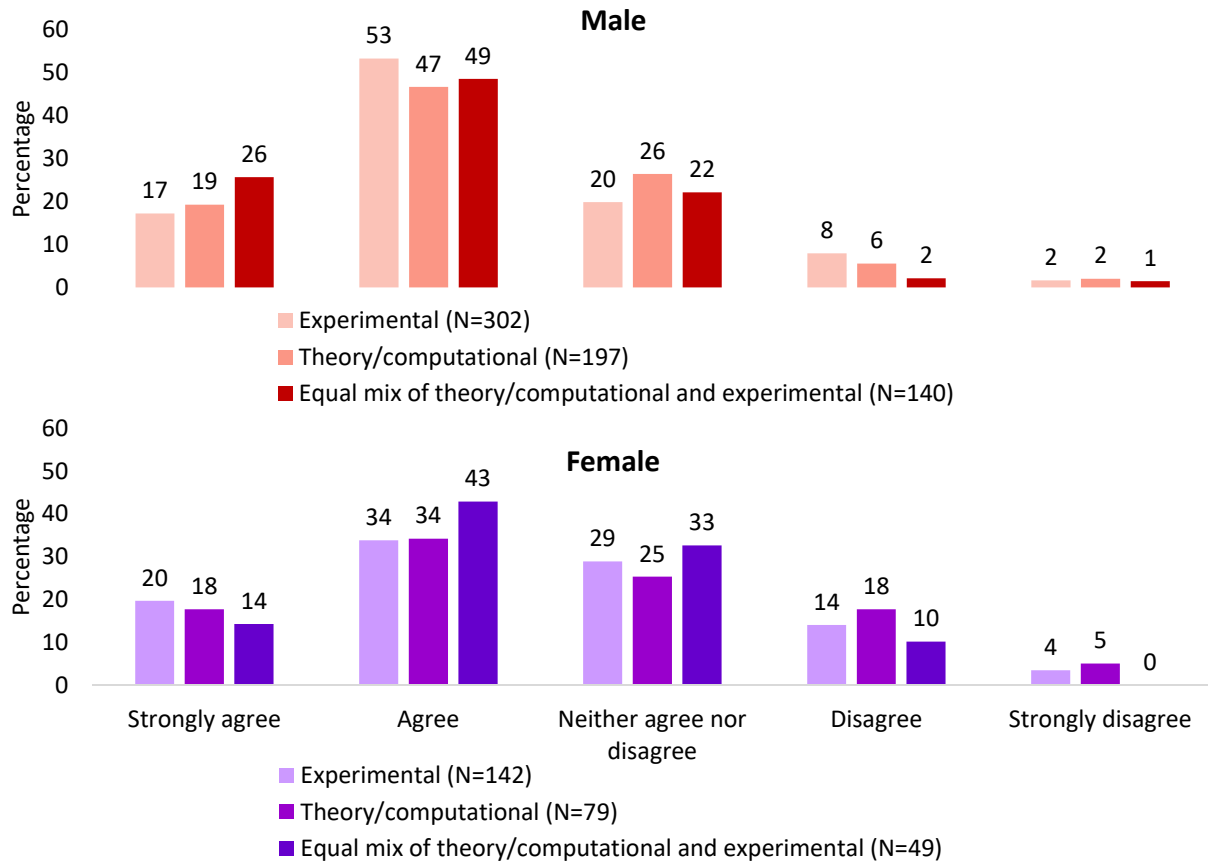


Figure 37: How strongly respondents agreed with the statement, “I feel confident that I would make a good research scientist,” by nature of research project and gender

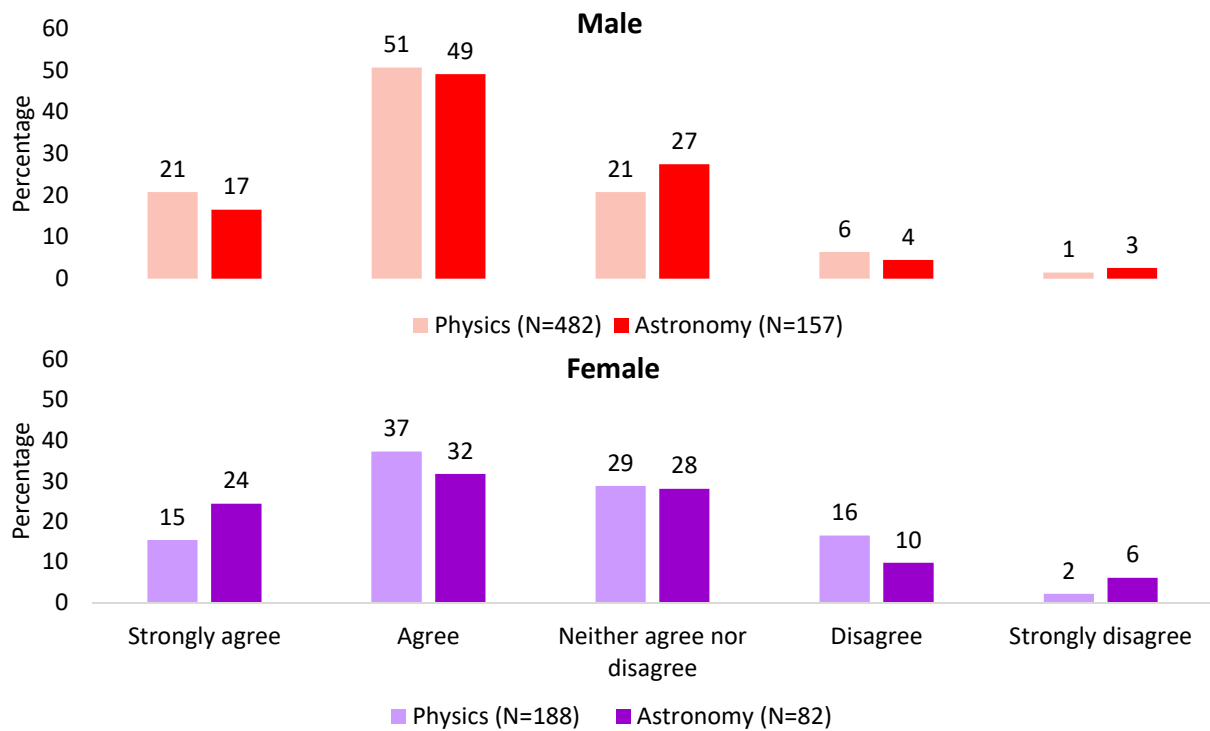


Figure 38: How strongly respondents agreed with the statement, “I feel confident that I would make a good research scientist,” by whether the research project is physics or astronomy-based and gender

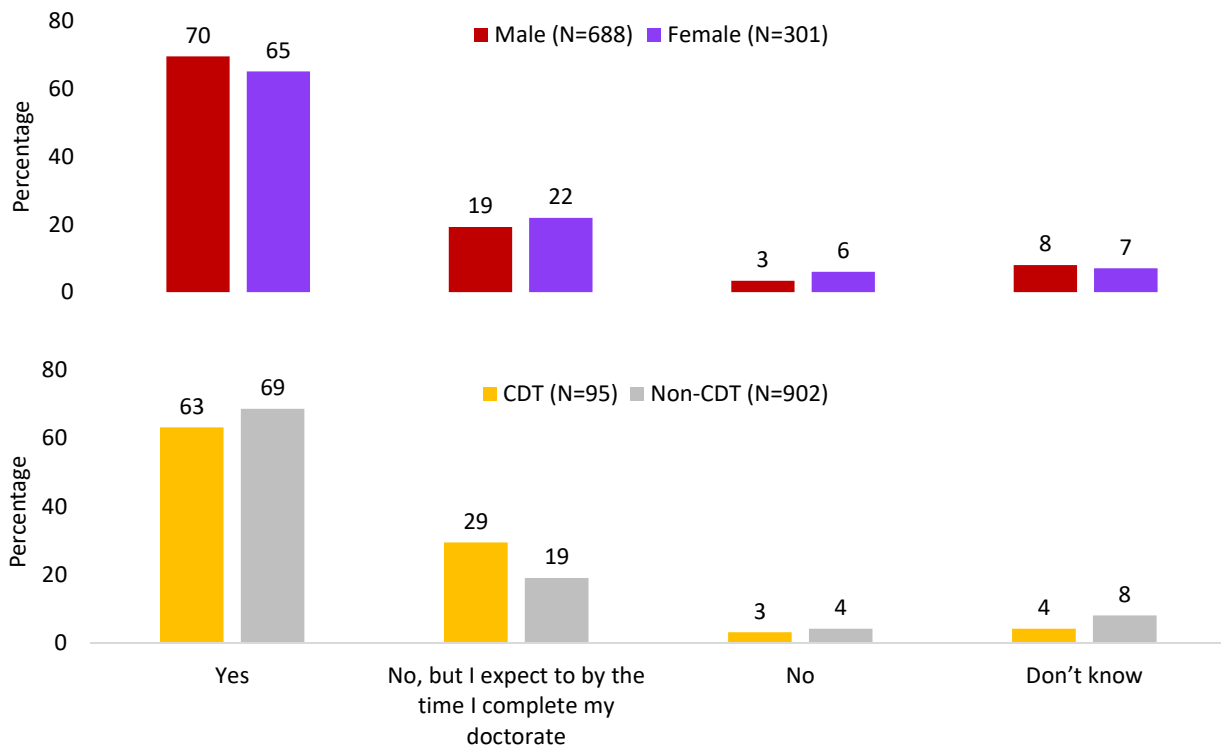


Figure 39: Whether respondents believed that they possessed the majority of technical skills that employers often look for by gender and by whether respondents were members of a CDT

In a similar vein to the question about making a good research scientist, respondents were asked whether they believed they possessed the majority of technical skills that employers look for. The results broken down by gender and by whether or not respondents were members of a CDT are shown in figure 39 and by year of study and gender in figure 40.

A higher proportion of men than women believed that they possessed the technical skills employers look for, but the proportions of men and women who believed that they already had the skills or who believed that they would have by the time they completed their doctorate are essentially the same, 88% and 87%, respectively.

A lower proportion of members of CDTs than non-members believed that they possessed the technical skills employers look for, but as with gender the proportions of members and non-members who believed that they already had the skills or who believed that they would have by the time they completed their doctorate are similar, 92% and 88%, respectively.

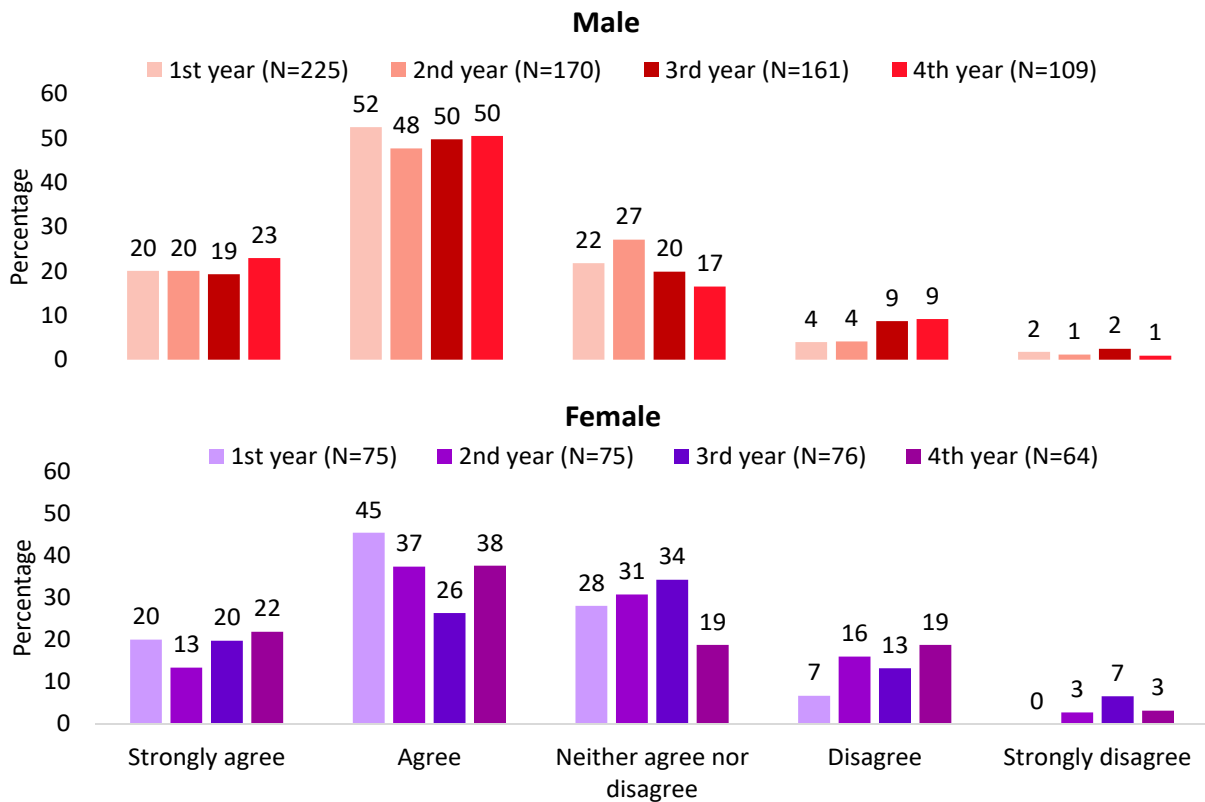
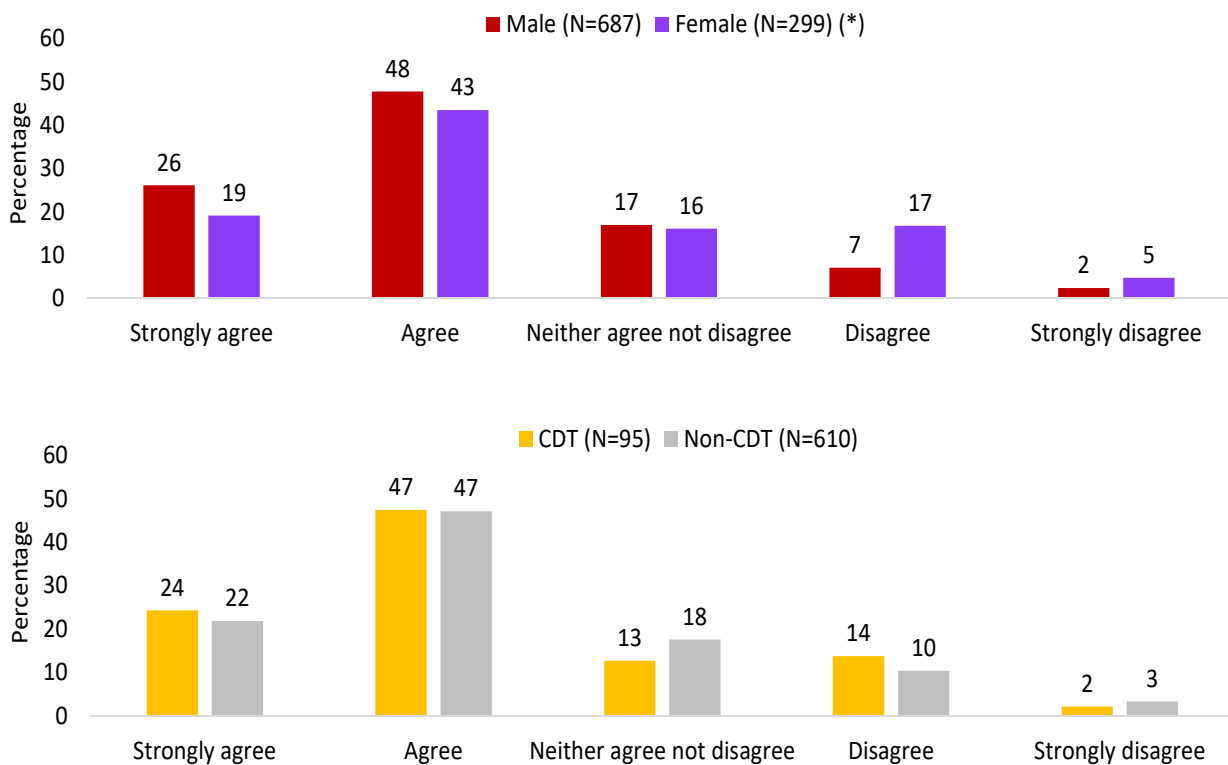


Figure 40: Whether respondents believed that they possessed the majority of technical skills that employers often look for by current year of study and gender

The data in figure 40 suggest that the proportions of both men and women who believed they possessed the technical skills employers look for increases with year of study but a lower proportion of women than men believed they possessed those technical skills, in particular in the first and second years of study. So it appears that in the initial stages of doctoral study, women were less confident of their technical skills than men but that women’s confident catches up with men’s as doctoral study progresses.

Data were also examined in respect of the nature of respondents' research project and gender and whether the project is physics or astronomy-based and gender but there were no clear differences in either case above and beyond those observed for gender.

Respondents were asked whether their experiences of studying had provided them with good role models to encourage them to pursue a career in scientific research. As shown in figure 41 males agreed more strongly than females: 74% of males and 62% of females strongly agreed or agreed that their experiences of studying provided them with good role models. In contrast, 9% of males and 22% of females disagreed or strongly disagreed that their experiences of studying provided them with good role models. The differences are statistically significant ($P < 0.05$). So, although the majority of males and females agreed that their experiences of studying had provided them with good role models, females did not agree as strongly as males and there was a significant minority of females who disagreed. Data also show that there is relatively little difference between the responses of CDT members and non-members.



* Statistically significant difference between the populations ($P < 0.05$). To measure significance the “strongly agree” and “agree”, and “disagree” and “strongly disagree” categories were combined and a χ^2 test used.

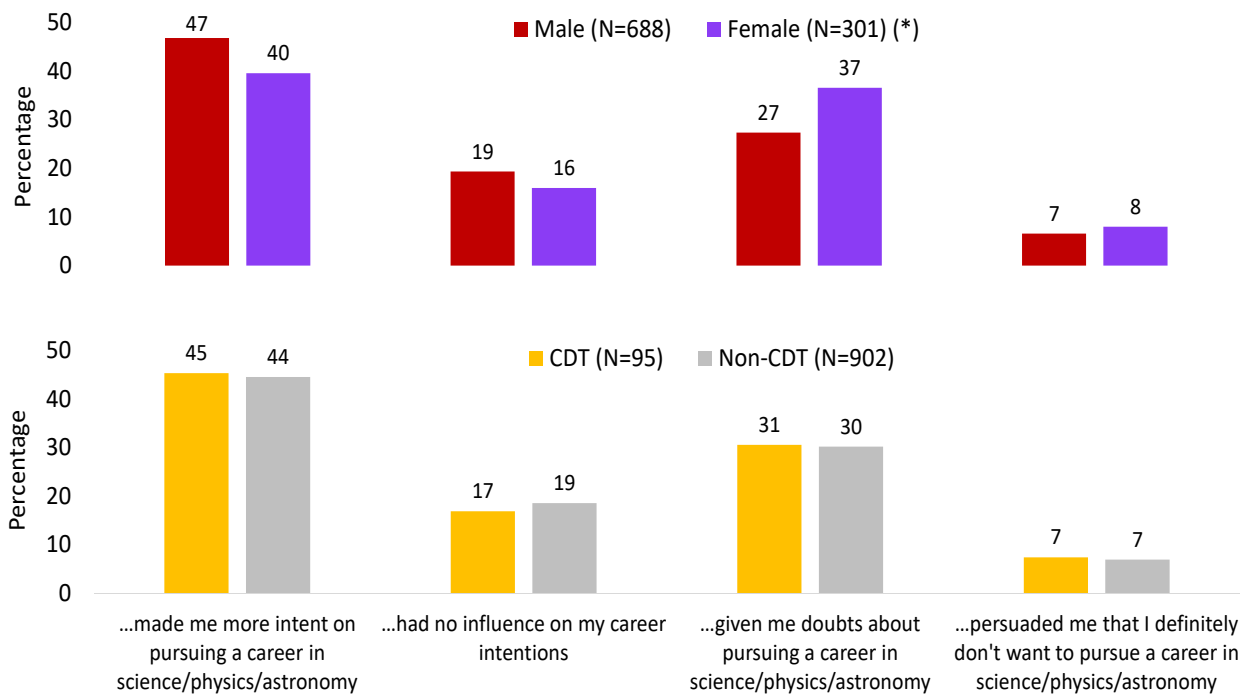
Figure 41: How strongly respondents agreed with the statement, “My experiences of studying for my doctorate have provided me with good role models to encourage me to pursue a career in scientific research,” by whether the research project is physics or astronomy-based and gender

The question arises as to why females were less likely than males to report coming across good roles models. The differences in responses might be because there are significantly fewer female than male

academic staff, or it could be that female doctoral students are more sensitive to issues around work life balance and simply do not see as many examples as males of working practices which attract them.

Respondents were asked what effect their experience as a physics/astronomy student had had on their career intentions. The results broken down by gender and by whether or not respondents were members of a CDT are shown in figure 42 and by year of study and gender in figure 43. Whereas there are few differences between the responses of members and non-members of CDTs there are differences between the responses of men and women, with females being more likely than males to report having doubts or definitely not want to pursue a career in science, 45% and 34%, respectively. The differences in responses of males and females are statistically different ($P < 0.05$).

Examination of the responses by year of study provides more insight. The responses of men and women in their first year of study are very similar. Thereafter, while the proportion of men who were more intent on a career in science fell a little, from 53% in the first year of study to 42% in the second year, and 45% in the third and fourth years, the proportion of women fell from 53% in the first year to 39%, 37% and 30% in the second, third and fourth year, respectively.



* Statistically significant difference between the populations ($P < 0.05$). To measure significance a χ^2 test used.

Figure 42: The effect of respondents' experiences as physics/astronomy doctoral students on career intentions by gender and by whether respondents are members of a CDT

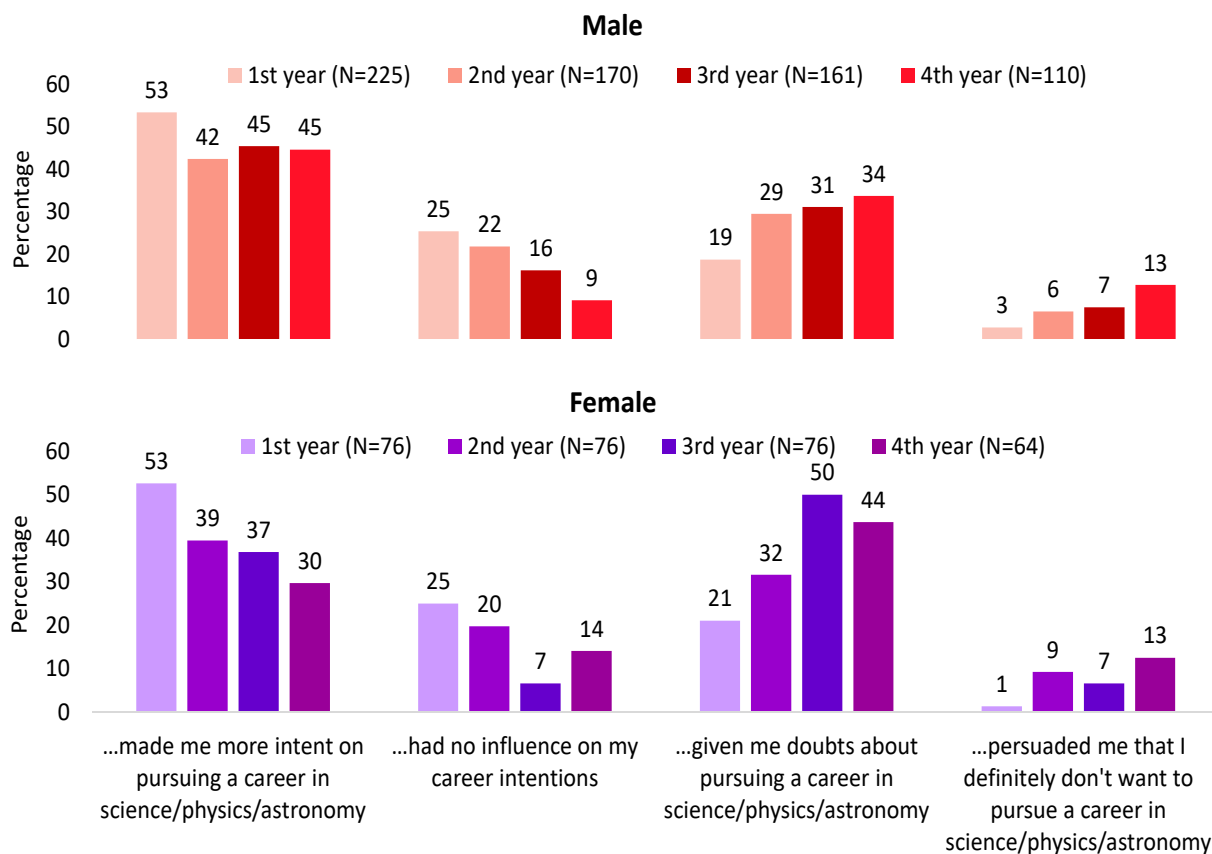


Figure 43: The effect of respondents' experiences as physics/astronomy doctoral students on career intentions by year of study and gender

The corollary is that the proportion of men who had doubts about, or definitely didn't want to pursue, a career in science rose from 22% in the first year of study to 35%, 38% and 47% in the second, third and fourth years of study, while for women the respective figures are 22% rising to 41%, 57% and 57%.

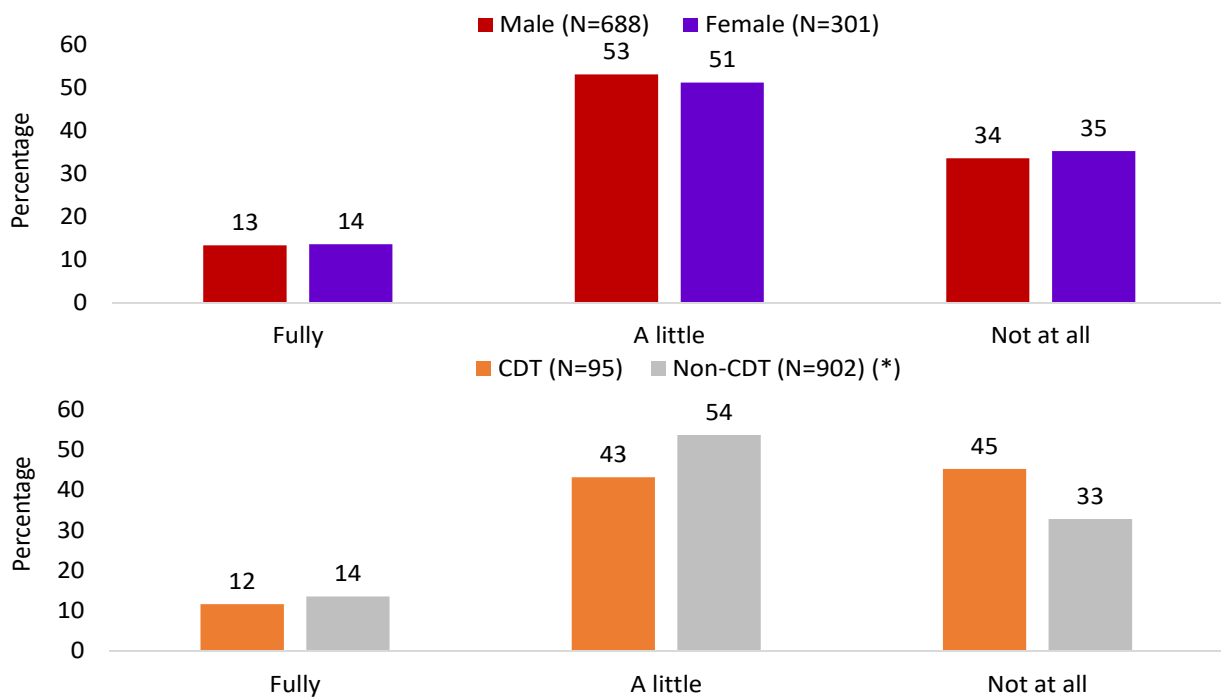
To examine statistical significance, data for the "...given me doubts about pursuing a career in science/physics/astronomy" and "...persuaded me that I definitely don't want to pursue a career in science/physics/astronomy" categories are combined, and the data for males and females in their first and second years of study, and data for the third and fourth years of study were also combined. There was no significant difference between the responses for males and females in their first and second years of study. However, there are statistically significant differences between the response of males in their first and second years of study, and in their third and fourth years of study ($P < 0.05$), and between females in their first and second years of study, and in their third and fourth years of study ($P < 0.05$). There are also statistically significant differences between males in their third and fourth years of study and females in their third and fourth years of study ($P < 0.05$).

The data suggest that as length of study increased the proportions of both men and women with doubts about, or definitely not wanting to pursue a career in science increased, but the proportion of women increased more than the proportion of men such that by the third and fourth years of study

57% of women had doubts or did not want to pursue a career in science compared to 38% of men in the third year and 47% in the fourth year.

Data were also examined by whether respondents were pursuing physics and astronomy-based projects and by gender but no clear differences were found between the behaviours of the physics-based and astronomy-based respondents.

Respondents were asked a series of questions about career planning and career intentions. As shown in figure 44, there was little difference between the overall responses of men and women, and members of CDTs reported planning their careers to a lesser extent than non-members. The differences between the responses of CDT members and non-members are statistically significant ($P < 0.05$).



* Statistically significant difference between the populations ($P < 0.05$). To measure significance a χ^2 test was used.

Figure 44: The extent to which respondents reported having planned their careers by gender and by whether respondents were members of a CDT

Examination of the career planning data by year and gender, as shown in figure 45, shows that there are few differences in the patterns of responses from men and women by year of study. Overall the proportions of respondents who reported having fully planned their careers rose from 5% in the first year of study to 16% in the third year and 35% in the fourth year. The proportion of respondents who reported not planning their careers at all fell from 51% in the first year to 24% in the third year and 13% in the fourth.

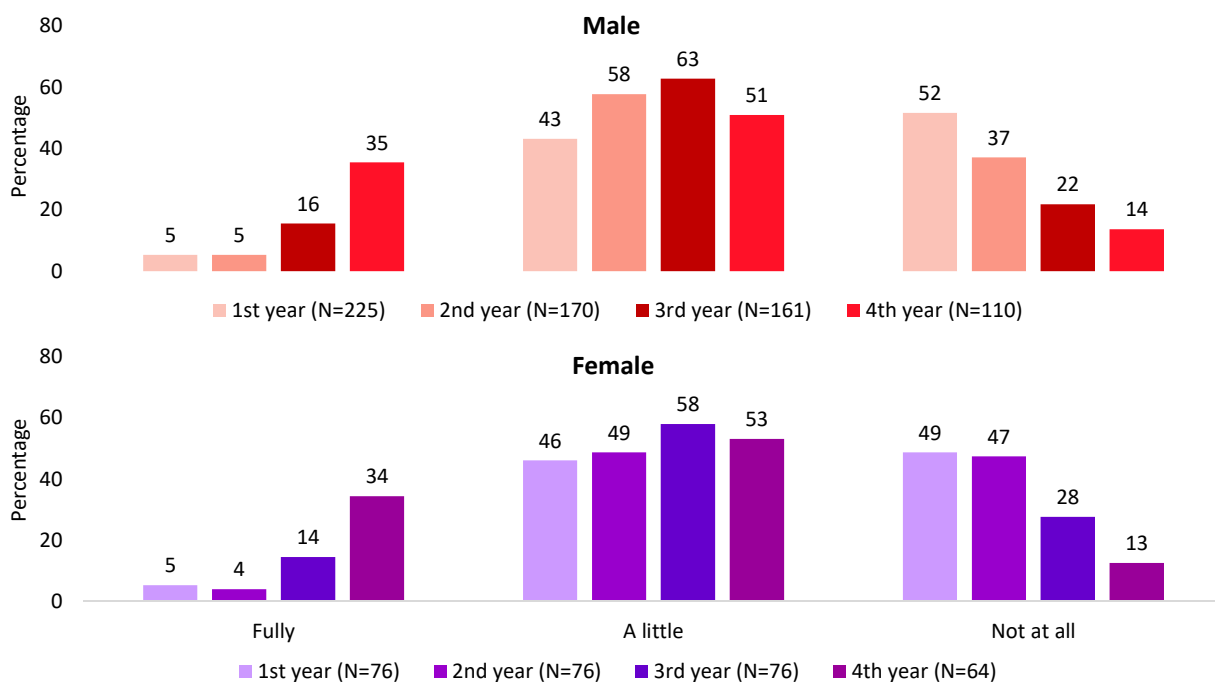


Figure 45: The extent to which respondents reported having planned their careers by gender and by current year of study

Short-term and longer-term career expectations

Respondents were asked which from a list of specified jobs they thought they were most likely to be doing in the short-term (i.e. in 3-5 years' time) and longer-term (i.e. in 6-10 years' time). Respondents could select up to two choices and were also given the option of specifying another role. Of the 996 respondents who selected jobs they expected to be doing in the short-term, 273 specified a single job and 723 specified two jobs. The overall results broken down by gender are shown in table 73 and broken down by current year of study and gender are shown in table 74.

Table 73: Percentage of respondents specifying roles they believed they were most likely to be doing in 3-5 years' time by gender

Role*	Male	Female	Overall
Postdoc/Research assistant	68.2%	60.7%	65.9%
Scientist: industry/commerce (including start-ups)	30.1%	26.0%	28.8%
Academic	15.6%	12.3%	14.6%
Scientist: public sector	8.7%	12.7%	9.8%
Teacher	6.4%	10.7%	7.7%
Consultant	6.7%	5.0%	6.2%
IT Professional or Technician	7.1%	4.3%	6.2%
Financial Professional	6.1%	5.3%	5.8%
Self-employed/Running my own business/Entrepreneur	4.9%	2.7%	4.3%
Government/Civil Service	3.6%	3.7%	3.7%
Writer/Journalist/Broadcaster	1.6%	4.3%	2.4%
Scientific Publishing	1.0%	4.0%	1.9%
Other roles	3.2%	5.7%	3.9%
Don't know	11.0%	11.0%	11.2%
Total respondents	688	300	996

* Respondents were allowed to specify one or two roles. 273 specified a single role and 723 specified two roles

The patterns of the roles men and women envisage they may be undertaking in 3-5 years' time are similar. 68% of men and 61% of women thought that they might be a postdoctoral research associate and 30% of men and 26% of women thought that they might be a scientist in industry. Another 16% of men and 12% of women though that they might be an academic. Examining the data broken down by the year of study shows that the proportions of men and women indicating roles they believed they were likely to be doing in 3-5 years varies with year of study but overall by the third and fourth year smaller proportions of women than men indicted they believed they are likely to be a postdoctoral researcher or a scientist in industry or an academic, which are the most popular choices for both men and women. The proportion of men indicating that they felt they are likely to be a postdoctoral research assistant fell from 76% in the first year of study to 69% and 61% in the third and fourth years, respectively. For women the proportion fell from 82% in the first year to 63% and 48% in the third and fourth years, respectively.

Considering those individuals who envisaged that they might have a role in a university either as an academic and/or a postdoctoral researcher, in the first year 78% of men felt this is likely compared to 71% in the third year of study and 65% in the fourth year of study. In contrast, 82% of women in their first year felt that they were likely to have a university role in 3-5 years' time and this falls to 63% in the third year and 48% in the fourth year.

Table 74: Percentage of respondents who specified roles they believed they were most likely to be doing in 3-5 years' time by gender and current year of study

Role*	Male				Female			
	1st Year	2nd Year	3rd year	4th Year	1st Year	2nd Year	3rd year	4th Year
Postdoc/Research assistant	76%	66%	69%	61%	76%	64%	59%	45%
Scientist: industry/commerce (including start-ups)	31%	32%	30%	27%	24%	24%	38%	13%
Academic	18%	12%	13%	21%	16%	11%	9%	13%
Scientist: public sector	5%	12%	9%	8%	12%	13%	11%	14%
Teacher	6%	6%	3%	11%	5%	11%	11%	17%
Consultant	5%	7%	10%	3%	4%	4%	4%	9%
IT Professional or Technician	4%	10%	6%	12%	3%	3%	3%	8%
Financial Professional	4%	8%	7%	7%	3%	9%	8%	2%
Self-employed/Running my own business/Entrepreneur	4%	6%	4%	4%	4%	4%	3%	0%
Government/Civil Service	2%	4%	6%	4%	0%	5%	4%	5%
Writer/Journalist/Broadcaster	2%	2%	0%	2%	3%	5%	4%	6%
Scientific Publishing	0%	1%	2%	1%	7%	3%	1%	3%
Other roles	3%	3%	2%	5%	4%	1%	7%	13%
Don't know	15%	10%	9%	7%	12%	15%	9%	9%
Total respondents	225	170	161	110	76	75	76	64

* Respondents were allowed to specify one or two roles. 273 specified a single role and 723 specified two roles

Table 75: Percentage of respondents who specified roles they believed they were most likely to be doing in 6-10 years' time by gender

Role*	Male	Female	Overall
Academic	45.9%	37.3%	43.4%
Scientist: industry/commerce (including start-ups)	29.1%	26.7%	28.3%
Postdoc/Research assistant	20.8%	15.7%	19.1%
Scientist: public sector	10.0%	12.7%	10.8%
Self-employed/Running my own business/Entrepreneur	9.9%	6.0%	8.7%
Teacher	7.0%	11.7%	8.4%
Consultant	7.8%	6.7%	7.5%
Financial Professional	6.3%	3.0%	5.2%
IT Professional or Technician	5.4%	2.7%	4.5%
Writer/Journalist/Broadcaster	2.8%	4.7%	3.3%
Other roles	9.6%	16.0%	11.5%
Don't know	17.4%	20.7%	18.6%
Total respondents	688	300	996

* Respondents were allowed to specify one or two roles. 296 specified a single role and 669 specified two roles

Turning to the data for the roles respondents envisaged they would be undertaking in the longer-term, of the 996 respondents who selected jobs they expected to be doing in 6-10 years' time, 296 specified a single job and 669 specified two jobs. The overall results broken down by gender are shown in table 75 and broken down by current year of study and gender are shown in table 76. Overall 46% of men and 37% of women envisaged that they were likely to be academics, 29% of men and 28% of women envisaged that they were likely to be scientists in industry and 21% of men and 16% of women felt that they were likely to be postdoctoral researchers. Examining the data by year of study show that the proportion of men who felt they are likely to be academics is between 48% and 45% in years one to four. In contrast the proportion of women fell from 47% in the first year to 36% in the second and third years and 33% in the fourth year. The proportion of men envisaging being a scientist in industry remained at between 27% and 30%, while that for women varied more but is around 26%. By the third and fourth years of study around 1 in 5 men envisaged being a postdoctoral researcher in 6-10 years' time compared to only around 1 in 10 women.

Considering those individuals who envisaged that they might have a role in a university either as an academic or a postdoctoral researcher, in the first year 63% of men felt this is likely compared to 56% in the third year of study and 54% in the fourth year of study. In contrast, 51% of women in their first year felt that they were likely to have a university role in 6-10 years' time and this fell to 42% in the third year and 36% in the fourth year.

Table 76: Percentage of respondents who specified roles they believed they were most likely to be doing in 6-10 years' time by gender and year of study

Role*	Male				Female			
	1st Year	2nd Year	3rd year	4th Year	1st Year	2nd Year	3rd year	4th Year
Academic	48%	45%	48%	45%	47%	36%	36%	33%
Scientist: industry/commerce (including start-ups)	29%	30%	27%	29%	26%	27%	33%	17%
Postdoc/Research assistant	26%	16%	19%	20%	18%	23%	9%	13%
Scientist: public sector	8%	12%	7%	13%	11%	12%	14%	13%
Self-employed/Running my own business/Entrepreneur	10%	10%	11%	7%	8%	5%	9%	2%
Teacher	8%	5%	5%	11%	9%	11%	12%	16%
Consultant	5%	11%	9%	5%	8%	5%	1%	11%
Financial Professional	4%	9%	7%	5%	3%	5%	4%	0%
IT Professional or Technician	3%	6%	6%	9%	0%	3%	3%	3%
Writer/Journalist/Broadcaster	2%	4%	2%	3%	4%	3%	8%	5%
Other roles	7%	10%	12%	11%	11%	11%	16%	30%
Don't know	19%	18%	16%	16%	18%	25%	20%	19%
Total respondents	225	170	161	110	76	75	76	64

* Respondents were allowed to specify one or two roles. 296 specified a single role and 669 specified two roles

So looking at the data for respondents' choices of the short-term and longer-term roles that they felt they were likely to be undertaking, the proportions of men and women indicating they felt they were likely to be in university-based roles fell with increasing year of study, but the proportion of women fell more sharply than the proportion of men. The proportions of men and women who indicated that they were likely to be scientists in industry are similar in the short and longer-term with around 30% of men and 26% of women.

It is also interesting to note the proportions of men and women who indicated choices other than the four most popular (academic, industrial scientist, postdoctoral researcher and public sector scientist). In the short-term between 40% and 46% of men and women in their third and fourth years indicated choices other than the top four. In the longer-term significantly higher proportions of men than women indicated choices other than the top four. 49% of men in their third year and 44% in their fourth year selected roles outside the top four while 63% of women in their third year and 67% of women in their fourth year do so.

Overall the indications are that towards the end of their doctoral studies, in the short and longer-term women were less likely than men to see themselves in university-based roles, but were as likely as men to see themselves in scientific roles in industry. In the longer-term women were more likely than men to see themselves in roles other than academics or postdoctoral researchers or as scientists in the private or public sectors.

To look at this in a little more detail the data in table 77 show the proportion of males and females by year of study who selected at least one of "Academic", "Scientist: industry/commerce (including start-ups)", "Postdoc/Research assistant" or "Scientist: public sector" as a role that they believe they are most likely to be doing in 6-10 years' time. It is difficult to draw any firm conclusions from the data as to whether there is any clear difference in whether men or women see themselves in a scientific role.

Table 77: Percentage of respondents selecting as a role they believe they are most likely to be doing in 6-10 years' time at least one of "Academic", "Scientist: industry/commerce (including start-ups)", "Postdoc/Research assistant" or "Scientist: public sector" by gender and year of study

Gender		Proportion selecting at least one role			
		1st Year	2nd Year	3rd year	4th Year
Male	Proportion	67%	63%	63%	60%
	Total	260	196	179	129
Female	Proportion	65%	55%	65%	52%
	Total	85	86	82	69
Overall	Proportion	66%	60%	63%	58%
	Total	350	283	264	199

There are few differences between the career expectations of those studying physics-based and astronomy-based doctorates. Data for 3rd and 4th doctoral students combined are presented in table 78 and show respondents' reported likely roles in the short and longer-term. In the short-term the major difference is in the proportions of respondents who indicate that they felt likely that they would be working as a scientist in industry and/or in the public sector with 40% of physics-based respondents in their third or fourth years and 21% of astronomy-based respondents. In the longer-term, astronomy-based respondents were more likely to envisage working in university-based roles than physics-based respondents, and less likely to envisage themselves working as a scientist in industry and/or in the public sector. Overall in the longer-term 55% of astronomy-based respondents in their third or fourth years of study envisaged working in a university-based role and 19% envisaged working as a scientist in industry and/or in the public sector. In contrast, 47% of physics-based respondents in their third or fourth years of study envisaged working in a university-based role and 40% envisaged working as a scientist in industry and/or in the public sector.

It appears that those respondents carrying out astronomy-based projects were more likely than those carrying out physics-based projects to see their longer-term careers in universities, and were less likely to see their careers based in industry. It is not known whether this is because those studying astronomy believe the skills and subject knowledge they build up are more applicable to university environments and less applicable to industry environments than those studying physics-based projects, or because those who choose to study astronomy-related projects are more inclined towards university environments and less inclined towards industry environments than those who chose to study physics-related projects.

Table 78: Percentage of respondents in their third or fourth year of study who specified roles they believed they were most likely to be doing in 3-5 and 6-10 years' time by whether respondents were undertaking physics-based or astronomy-based projects

Role*	Physics-based research		Astronomy-based research	
	3-5 years' time	6-10 years' time	3-5 years' time	6-10 years' time
Academic	14%	40%	15%	47%
Scientist: industry/commerce (including start-ups)	32%	32%	17%	14%
Postdoc/Research assistant	60%	15%	66%	20%
Scientist: public sector	11%	13%	5%	5%
Self-employed/Running my own business/Entrepreneur	3%	8%	3%	7%
Teacher	8%	8%	14%	11%
Consultant	7%	6%	5%	8%
Financial Professional	6%	5%	6%	4%
IT Professional or Technician	8%	6%	4%	4%
Writer/Journalist/Broadcaster	1%	3%	3%	5%
Other roles	11%	15%	13%	19%
Don't know	11%	17%	11%	19%
Total respondents	299	299	95	95

* Respondents were allowed to specify one or two roles. 273 specified a single role and 723 specified two roles when specifying short-term roles and 296 specified a single role and 669 specified two roles when specifying longer-term roles.

Data on the likely short and longer-term roles of 3rd and 4th year respondents combined broken down by whether or not they were members of CDTs are presented in table 79. The numbers of CDT members are too small to draw any firm conclusions.

Table 79: Percentage of respondents in their third or fourth year of study who specified roles they believed they were most likely to be doing in 3-5 and 6-10 years' time by whether respondents were members of a CDT

Role*	CDT member		CDT non-member	
	3-5 years' time	6-10 years' time	3-5 years' time	6-10 years' time
Academic	14%	54%	14%	41%
Scientist: industry/commerce (including start-ups)	31%	29%	28%	27%
Postdoc/Research assistant	71%	11%	60%	17%
Scientist: public sector	20%	14%	9%	11%
Self-employed/Running my own business/Entrepreneur	6%	17%	3%	7%
Teacher	6%	3%	9%	10%
Consultant	6%	6%	7%	7%
Financial Professional	3%	3%	7%	5%
IT Professional or Technician	0%	3%	8%	6%
Writer/Journalist/Broadcaster	3%	3%	2%	4%
Other roles	18%	20%	12%	15%
Don't know	3%	11%	9%	18%
Total respondents	35	35	379	379

* Respondents were allowed to specify one or two roles. 273 specified a single role and 723 specified two roles when specifying short-term roles and 296 specified a single role and 669 specified two roles when specifying longer-term roles.

Respondents who have already accepted a job or training offer

10% of male respondents and 11% of female respondents indicated that they had already accepted a job offer or an offer of training. Around 50% of both the men and women reported that they had accepted a postdoctoral researcher role and around 20% that they had accepted a role as a scientist in industry or in the public sector. A small number of respondents reported that they had a role as a lecturer in academia but all but one of these were from abroad. In all likelihood these individuals already held teaching posts in their home countries and had travelled to the UK to enhance their qualifications while retaining their posts.

Around 80% of the respondents reported that they would be undertaking scientific research in their roles. Of the 16 respondents who were not going to be carrying out scientific research, eight reported that they began their doctorates thinking they would have a career in scientific research, and seven reported that they were not sure. The reasons given by those who had expected a career in scientific research for changing their minds varied but included poor job security and poor pay, and a feeling that the general atmosphere in academia was not good. The majority of reasons given referred to negative feelings about university roles rather than roles elsewhere like industry.

Respondents who have not already accepted a job or training offer

Respondents who had not already accepted a job or training offer were asked about the locations of employment or training offers that they would consider. The results, broken down by nationality and gender, whether respondents' research was physics-based or astronomy-based, or whether respondents were members of a CDT are shown in table 80.

Table 80: The locations of employment or training respondents who have not already accepted a job offer or an offer of training would consider by nationality and gender, whether respondents' research was physics-based or astronomy-based, or whether respondents were members of a CDT

Location of employment or training respondents would consider	British						Other nationalities			
	Male	Female	Physics-based research	Astronomy-based research	Member of CDT	Not member of CDT	Male	Female	Physics-based research	Astronomy-based research
In the UK	30%	31%	33%	25%	22%	31%	15%	15%	16%	8%
In another country	6%	6%	7%	5%	10%	6%	7%	8%	7%	11%
In home country (if not the UK)							8%	12%	10%	9%
Would consider all options	60%	58%	57%	65%	63%	59%	65%	50%	57%	68%
Undecided	4%	5%	4%	5%	4%	5%	5%	15%	10%	5%
Total respondents	408	160	383	154	67	507	213	108	223	66

Overall 30% of British respondents said they would seek roles in the UK only, 6% would seek roles in another country, and 60% would consider all options. The patterns for males and females are the same. Patterns for respondents of other nationalities show some difference between the response of males and females. Females were more likely than males to say they were undecided and were less likely to state that they would consider all options. Astronomy-based respondents were less likely than physics-based respondents, whether British or of other nationalities, to say that they would seek roles in the UK only, and more likely to say that they would consider all options. British members of CDTs were less likely than those who were not members of CDT to say they would seek roles in the UK only. For British and other nationality respondents there is not a great deal of variation in the patterns of responses by year of study.

Respondents who had not already accepted a job or training offer were asked whether they intended to seek employment as a research scientist, or undertake further study related to research. The results broken down by year of study and gender are shown in figure 46. The patterns of responses for men and women were very similar in the first year of study. However, while the proportion of men indicating a positive response increased slightly with year of study from 59% in the first year to 64% in the fourth

year, the proportion of women fell from 58% on the first year to 43% in the fourth year. The proportions of men and women answering “no” to the question increased with year of study but the data indicated that the proportion of women increased more than the proportion of men. The proportions of men and women who were unsure varied but in general a higher proportion of women than men were unsure.

Overall physics-based and astronomy-based respondents showed similar patterns of responses but the numbers of astronomy-based respondents was too small to break down by year of study and gender so it is not possible to examine whether patterns related to gender and year of study are different for physics-based and astronomy-based respondents. Likewise, the responses of members of CDTs and respondents who were not members of CDTs are similar.

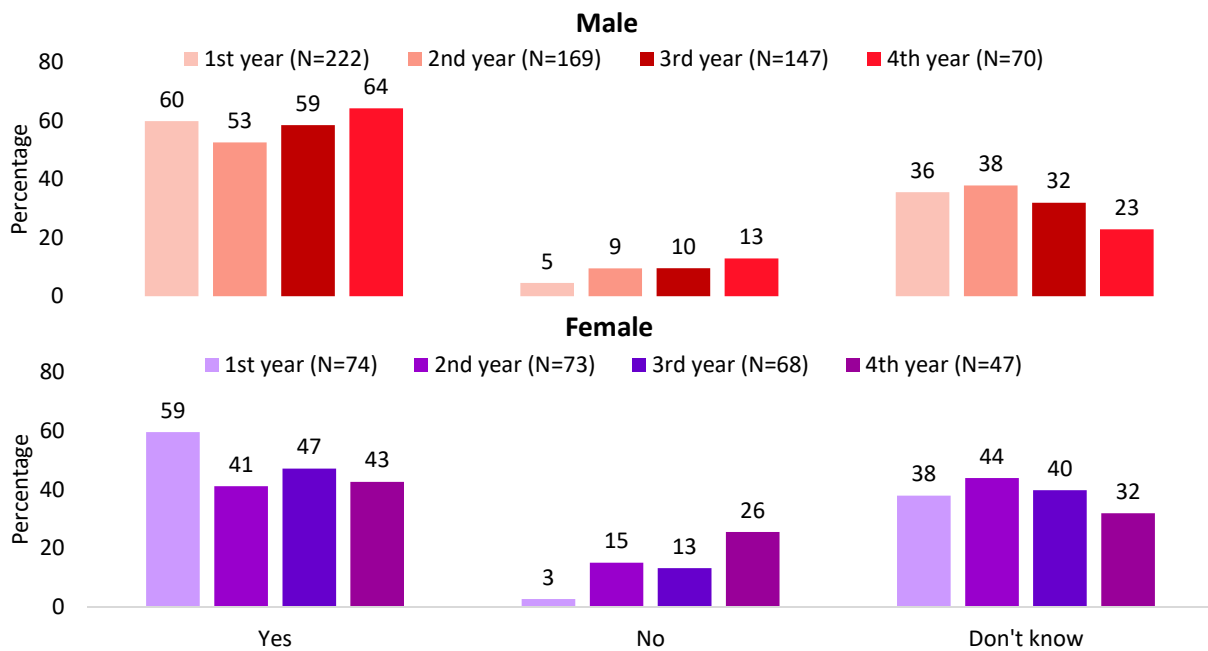


Figure 46: Whether respondents who had not accepted a job or training offer intended to seek employment as a research scientist, or undertake further study related to research by gender and current year of study

Looking in more detail at just those respondents that intended to seek work as a research scientist, or undertake further study related to research, showed that there were few differences in the patterns of what they intended to do on completion of their courses by gender or by year of study (see table 81 and table 82). Around 70% of men and women expected to undertake a period of postdoctoral research in a university or research institute and around 13% expected to undertake work in the private or commercial sector. In line with the data about the short-term career intentions of respondents, a higher proportion of astronomy-based doctoral researchers than physics-based researchers intended to carry out postdoctoral research in a university or research institute, 68% and 83% respectively. So, for those respondents who wanted a research-based career there is little variation in what they intended to do by gender or year of study with the majority wanting to be a postdoctoral researcher. However, a higher proportion of astronomy-based researchers than physics-based researchers intended to follow this path.

Table 81: What respondents who had not accepted a job or training offer and who intended to seek employment as a research scientist, or undertake further study related to research, intended to do on completion of their course by gender

Intended Role/activity after completion of course	Male	Female
University/research institute (as a postdoctoral researcher)	73%	67%
Private/commercial sector	11%	16%
University/research institute (as a permanent academic/researcher)	6%	7%
University spin-off	2%	2%
Public Sector	1%	2%
Self-employment	0%	0%
Other	1%	1%
Don't know	5%	6%
Total respondents	356	126

Table 82: What respondents who had not accepted a job or training offer and who intended to seek employment as a research scientist, or undertake further study related to research, intended to do on completion of their course by current year of study

Intended Role/activity after completion of course	Current year of study			
	1st	2nd	3rd	4th
University/research institute (as a postdoctoral researcher)	69%	69%	75%	75%
Private/commercial sector	11%	12%	16%	12%
University/research institute (as a permanent academic/researcher)	10%	8%	1%	5%
University spin-off	2%	3%	3%	0%
Public Sector	2%	0%	0%	2%
Self-employment	0%	1%	0%	0%
Other	1%	2%	0%	2%
Don't know	6%	4%	5%	5%
Total respondents	178	118	118	65

Looking at the data for all respondents who had not already accepted a job or training offer overall, the proportion intending to work in a university/research institute as a postdoctoral researcher can be calculated. The results are shown in figure 47. The data underline that men were more likely than women to state that they intended to be a postdoctoral researcher and that the proportion of men increased with year of study while the proportion of women stayed essentially the same. The figures do not vary a great deal by nationality.

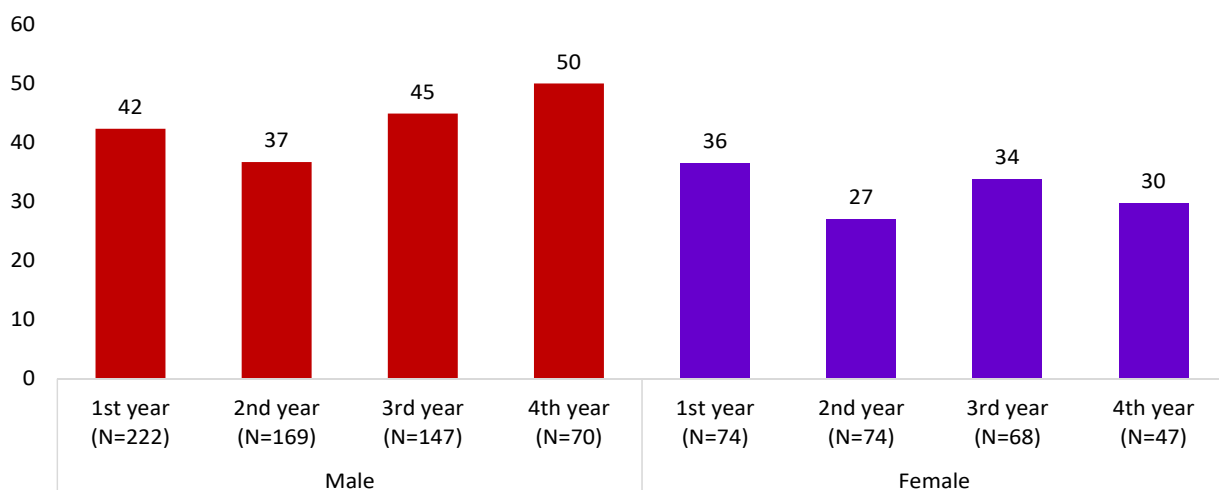


Figure 47: Whether respondents who had not accepted a job or training offer intended to seek employment as postdoctoral researcher in a university/research institute

Turning to the respondents who did not intend to, or were not sure if they would, seek work as a research scientist, as shown in table 83, 66% stated that they intended to seek a role which made use of their scientific background, 31% stated that they didn't know, and only 4% stated that would not seek a role which used their scientific background. Overall the responses by gender suggest that women were more likely than men to state that they would seek a role which used their scientific background, 70% and 63%, respectively. The proportion stating that they would seek a role which used their scientific background varies relatively little by year of study and is the same whether respondents' research is physics-based or astronomy-based.

Table 83: Whether respondents who had not accepted a job or training offer and who did not or did not know if they intended to seek employment as a research scientist, or undertake further study related to research, intended to seek a role on completion of their course which required and/or made use of their science background by gender and by current year of study

Role which requires and/or makes use of science background?	Gender		Research area		Current year of study				Overall
	Male	Female	Physics-based	Astronomy-based	1st	2nd	3rd	4th	
Yes	63%	70%	65%	64%	66%	70%	64%	62%	66%
Don't know	32%	28%	32%	33%	31%	27%	33%	34%	31%
No	5%	2%	3%	3%	3%	3%	3%	4%	4%
Total respondents	265	142	284	95	122	125	99	53	412

The respondents who said they would seek a role which used their scientific background, and those who were not sure if they would, were asked in more detail about what they were likely to do on completion of their course. Overall 50% of respondents did not know what they would be doing, but that proportion fell from 60% in the first year of study to 53% in the second year, 49% in the third and 24% in the fourth year of study. More detail is given in table 84 but it should be borne in mind that number of respondents is small when broken down by year and so proportions should only be taken as indicative.

Table 84: What respondents who had not accepted a job or training offer and who intended to seek employment as a research scientist, or undertake further study related to research, intended to do on completion of their course by gender

Intended Role/activity after completion of course	Gender		Research area		Current year of study			
	Male	Female	Physics-based	Astronomy-based	1st	2nd	3rd	4th
Travel or take time out	8%	8%	7%	8%	5%	10%	5%	21%
Work in a non-scientific role in industry/commerce	8%	2%	8%	3%	6%	10%	2%	3%
Self-employment/Set up my own business	5%	4%	5%	3%	4%	5%	6%	3%
Work as an IT Professional or Technician	7%	1%	4%	7%	6%	2%	5%	3%
Work as a Financial Professional (in banking, accountancy, etc.)	5%	3%	5%	3%	4%	7%	2%	3%
Teacher Training	3%	6%	3%	8%	3%	2%	5%	9%
Work in a non-research scientific role in industry	4%	5%	6%	0%	3%	2%	8%	6%
Other	10%	18%	15%	10%	9%	7%	19%	27%
Don't know	50%	53%	48%	57%	53%	49%	24%	51%
Total respondents	165	99	184	61	79	86	63	33

The small number of respondents who stated that they did not intend to seek a role using their scientific background (15 in total) were asked whether or not they began their doctoral studies thinking that they would have a career related to science, and those who said that they had done so (7) were asked why they had changed their minds. The reasons given varied and included general disillusionment with science, including the funding mechanisms, a dislike of science culture, a dislike of academia, and a positive decision to do something different.

If it is assumed that respondents are representative of the population of physics and astronomy doctoral students then it is possible to calculate an estimate of the gender balance of the postdoctoral population. Considering the respondents who had accepted a job offer as a postdoctoral researcher, and the third and fourth year respondents who indicated that they intended to be a postdoctoral researcher, leads to the conclusion that 42% of females and 51% of males towards the end of their courses intend to be postdoctoral researchers. Using the overall gender balance of the doctoral population (23% of which are female) leads to the conclusion that the gender balance of the population of those intending to be postdoctoral researchers is 80% male and 20% female. In 2011/12, 18% of the researcher population was female. This figure is in line with the career intentions data. Furthermore

previous work suggested that females spend less time as postdoctoral researchers than men,¹¹ which would lead to a decrease in the proportion of females in the overall population relative to the proportion of females in the population who become postdoctoral researchers.

¹¹ *Mapping the Future: Physics and Chemistry Postdoctoral Researchers' Experiences and Career Intentions*, Institute of Physics, London, 2011

Appendix A: The Sample Demographics

Table 85: Survey respondents by institution and whether or not they completed the survey fully

Institution	Number who completed survey	Number who did not complete survey	Number started Survey	Number registered for a research doctorate in physics or astronomy (HESA 2012/13)	Response rate: completed survey (%)	Response rate: started survey (%)
University of Aberdeen	5		5	22	23	23
Aberystwyth University	6	1	7	12	58	50
University of Bath	7	1	8	35	23	20
University of Birmingham	30	3	33	83	40	36
University of Bristol	34	4	38	114	33	30
University of Cambridge	85	14	99	335	30	25
Cardiff University	9	2	11	67	16	13
University of Central Lancashire*	13	1	14	14	100	93
University of Dundee	4	2	6	30	20	13
University of Durham	59	5	64	98	65	60
University of Edinburgh	41	11	52	114	46	36
University of Exeter	20	3	23	58	40	34
University of Glasgow	29	6	35	156	22	19
Heriot-Watt University	18	5	23	119	19	15
University of Hertfordshire	1		1	18	6	6
University of Hull	5		5	10	50	50
Imperial College	65	6	71	317	22	21
University of Keele	3	1	4	19	21	16
King's College London	4		4	6	67	67
University of Lancaster	20	4	24	76	32	26
University of Leeds	28	5	33	49	67	57
University of Leicester	18	2	20	63	32	29
University of Liverpool	10	2	12	67	18	15
Liverpool John Moores University*	9	1	10	4	250	225
University of Manchester	25	5	30	194	15	13
University of Nottingham	31	5	36	94	38	33
Nottingham Trent University*	3		3			
University of Oxford	84	24	108	306	35	27
Open University	21	2	23	42	55	50
Queen Mary, University of London	16	2	18	73	25	22
Queen's University Belfast	28	11	39	92	42	30

University of Portsmouth	6		6	15	40	40
Royal Holloway, University of London	17	3	20	37	54	46
University of Salford	8	1	9	11	82	73
University of Sheffield	30	9	39	71	55	42
University of Southampton	31	5	36	156	23	20
University of St Andrews	19	2	21	59	36	32
University of Strathclyde	19	4	23	92	25	21
University of Surrey	13	1	14	71	20	18
University of Sussex	23	6	29	48	60	48
Swansea University	4	1	5	19	26	21
University College London	43	5	48	279	17	15
University of Warwick	34	6	40	186	22	18
University of York	17	1	18	71	25	24
Total respondents	995	172	1167	3802	31	26

* In the case of Liverpool John Moores University and University of Central Lancashire the likelihood is that the physics and astronomy departments return some of their data to HESA under subjects other than physics and astronomy.

Table 86: Survey respondents by gender, year of study and whether they report themselves as being part of a CDT

Gender	Year of study	CDT			Total
		Yes	No	Not sure	
Male	1st	23	172	65	260
	2nd	21	137	38	196
	3rd	18	126	35	179
	4th	9	98	22	129
	5th	2	14	2	18
	6th		2		2
	7th		4		4
	Total		73	553	162
Female	1st	8	56	21	85
	2nd	11	64	11	86
	3rd	4	61	17	82
	4th	2	50	17	69
	5th	1	6	1	8
	6th		1		1
	9+		2		2
	Total		26	240	67
Do not wish to say	1st		2	3	5
	2nd		1		1
	3rd	1	2		3
	4th	1			1
	Total		2	5	3
Total respondents		95	101	798	232

It is assumed that those respondents who are part of a CDT will be clear about this, while those that reported that they are not sure are almost certainly not part of a CDT. This set of respondents have been treated as not belonging to a CDT in the analyses.

Table 87: Survey respondents by whether they are registered as a home, EU/EEA, or overseas student and nationality

Registration Status	Nationality			Total
	British	Irish	Other	
Home student	711	12	24	747
European Union/European Economic Area student	2	18	213	233
Overseas student	2		149	151
Total respondents	715	30	386	1131

Table 88: Survey respondents by known nationality

Nationality	Number of respondents
Asian	1
Australian	2
Austrian	3
Bangladeshi	2
Belgian	6
Brazilian	1
British	715
British/Irish	2
British/Mauritian	1
British/Swedish (dual)	1
Bulgarian	2
Cameroonian	1
Canadian	7
Chilean	10
Chinese	21
Colombian	1
Croatian	1
Cypriot	8
Czech	1
Danish	2
Dual citizen (UK-US)	1
Dutch	4
Egyptian	1
Filipino	1
Finnish	1
French	15
German	43

German/Greek	1
Greek	20
Indian	17
Iranian	4
Iraqi	10
Irish	30
Italian	44
Italian and British	1
Japanese	1
Jordanian	1
Lithuanian	2
Malaysian	3
Maltese	1
Mexican	9
Mongolia	1
New Zealander	1
Nigerian	3
Norwegian	3
Omani	1
Pakistani	3
Polish	22
Portuguese	11
Romanian	7
Russian	4
Saudi Arabian	3
Singaporean	2
Slovak	2
South African	1
South Korean	2
Spanish	16
Sri Lankan	1
Swedish	8
Swiss	3
Taiwanese	5
Thai	5
Turkish	6
Turkish-Iranian	1
Ukrainian	1
USA	15
Total respondents	1126

Table 89: Ethnicity of British respondents

Ethnicity	Gender					Total	
	Male		Female		Do not wish to say	N	%
	N	%	N	%			
White	466	89.1	185	92.0	4	655	89.4
Asian or Asian British	12	2.3	3	1.5		15	2.0
Chinese	6	1.1	4	2.0		10	1.4
Mixed/Dual Heritage	12	2.3	5	2.5		17	2.3
Other	3	0.6	1	0.5		4	0.5
Do not wish to say	24	4.6	3	1.5	5	32	4.4
Total respondents	523		201		9	733	

Table 90: Disability status of all respondents by gender

Disability	Gender					Total	
	Male		Female		Do not wish to say	N	%
	N	%	N	%			
Disability	31	3.8	13	3.8		44	3.8
No Disability	763	93.3	318	93.8	6	1087	93.1
Do not wish to say	24	2.9	8	2.4	5	37	3.2
Total respondents	818		339		11	1168	

Table 91: Details of disabilities declared by respondents

Disability	Male	Female	Total
A long-standing illness or health condition	5	1	6
A physical impairment or mobility issues	1	2	3
A physical impairment or mobility issues/A long-standing illness or health condition		1	1
A physical impairment or mobility issues/Another disability, impairment or medical condition		1	1
Another disability, impairment or medical condition		1	1
Deaf or a serious hearing impairment	2		2
Mental health condition	2	2	4
Social communication/Autistic spectrum disorder	5		5
Social communication/Autistic spectrum disorder/Specific learning difficulty	1		1
Specific learning difficulty	14	5	19
Specific learning difficulty/Another disability, impairment or medical condition	1		1
Total respondents	31	13	44

Table 92: Age of all respondents by gender

Age	Gender			Total	Age Distribution (%)			
	Male	Female	Do not wish to say		Sample Male	2012/13 HESA Data*	Sample Female	2012/13 HESA Data*
21	0	0	0	0		0.8		0.5
22	29	12	1	42	4.2	6.4	4.0	6.6
23	108	41	2	151	15.8	14.9	13.7	15.3
24	122	61	2	185	17.8	17.5	20.4	19.6
25	115	60		175	16.8	14.6	20.1	16.9
26	102	35	1	138	14.9	11.0	11.7	11.0
27	58	22		80	8.5	9.1	7.4	7.4
28	36	16		52	5.3	6.6	5.4	5.2
29	27	13		40	3.9	4.2	4.3	3.7
30-34	49	28	1	78	7.2	7.4	9.4	7.7
35-39	18	6		24	2.6	2.9	2.0	2.3
40-49	12	3		15	1.8	1.3	1.0	1.5
50-59	7	2		9	1.0	1.3	0.7	0.6
60 or older	2			2	0.3	0.1	0.0	0.3
Do not wish to say	2	1	1	4				
Total respondents	687	300	8	995				

* The HESA census date is 31 August while the survey was launched in March and closed in May. The HESA data have been adjusted to match the date of when the survey was run.

Table 93: Research topics of respondents who reported a single topic

Research Topic	Gender			Total
	Male	Female	Do not wish to say	
Astronomy, astrophysics, cosmology and space science	115	63	1	179
Particle physics	71	32		103
Nanoscience	24	11	1	36
Optics, photonics and lasers	18	5		23
Atomic and molecular physics (including cold atoms)	15	7		22
Biological and biophysics	8	13		21
Plasma physics	16	2		18
Magnetism and metals	14	3		17
Surfaces, interfaces and materials	11	5		16
Nuclear physics	9	3		12
Quantum information and technology	8	3	1	12
Atmospheric, environmental and geophysics	9	2		11
Semiconductors	5	6		11
Soft condensed matter	6	4		10
Superconductivity and quantum fluids	4	4		8
Mathematical physics (including string theory and quantum gravity)	6			6
Accelerator physics	4	2		6
Medical physics	5			5
Scientific Computing	1	1		2
Accelerator physics: non-linear beam dynamics	1			1
Applied Physics	1			1
Astrobiology		1		1
Chaos theory	1			1
Climate physics	1			1
Condensed Matter Theory		1		1
Crystallography	1			1
Explosives and Adhesion	1			1
Gravitational Wave Research		1		1
Hard condensed matter	1			1
Physics Education Research		1		1
Quantum Physics	1			1
Not decided yet			1	1
Total respondents	357	170	4	531

Table 94: Research topics of respondents who reported two topics

Research Topic 2	Research Topic 1																	
	Nanoscience	Optics, photonics and lasers	Astronomy, astrophysics, cosmology and space science	Soft condensed matter	Particle physics	Atomic and molecular physics (including cold atoms)	Magnetism and metals	Medical physics	Nuclear physics	Mathematical physics (including string theory and quantum gravity)	Surfaces, interfaces and materials	Biological and biophysics	Semiconductors	Superconductivity and quantum fluids	Plasma physics	Atmospheric, environmental and geophysics	Quantum information and technology	Total
Semiconductors	14	18	1	8	2	1	4		1		7			2				58
Surfaces, interfaces and materials	16	9	2	11		3	5		2			1						49
Biological and biophysics	13	10		8				9		2								42
Optics, photonics and lasers	21		10		1			4										36
Quantum information and technology	4	14				8						1	5	3				35
Astronomy, astrophysics, cosmology and space science					18				2	4								24
Magnetism and metals	10	4		2		3		1		2		1						23
Atomic and molecular physics (including cold atoms)	1	14	4									1						20
Superconductivity and quantum fluids	2			1		3	10		1	2	1							20
Plasma physics		4	10			3		1	1									19
Soft condensed matter	9	2							2									13
Atmospheric, environmental and geophysics		1	6									1			2			10
Mathematical physics (including string theory and quantum gravity)	1				7													8
Particle physics									3									3
Accelerator physics					3													3
Medical physics	1																	1
Nuclear physics								1										1

Accelerator		1																1
Applied nuclear physics relevant to fusion technology								1										1
Complex Systems											1							1
Computing technology			1															1
Condensed Matter Theory																	1	1
Crystallography, Nonlinear Optics, Charge Density Analysis		1																1
Electron vortex beams				1														1
Geophysics						1												1
Hydrogen energy storage											1							1
Magnetic Resonance Imaging									1									1
Materials Science			1															1
molecular simulations	1																	1
Main focus is hydrodynamics, particularly at colloidal scales											1							1
Phonons													1					1
Plasmonics								1										1
RF Science															1			1
satellite remote sensing																	1	1
Scintillation Detectors									1									1
Statistical mechanics				1														1
Ultrasonics		1																1
Undergraduate physics education			1															1
X-ray imaging		1																1
Total respondents	93	80	36	32	31	22	19	17	15	10	10	6	6	5	3	1	1	387

Table 95: Nature of research

Nature of research	Gender					Total	
	Male		Female		Do not wish to say		
	N	%	N	%		N	%
Theory/computational	227	31.3	91	30.4	3	321	31.1
Experimental	338	46.6	153	51.2	4	495	47.9
Equal mix of theory/computational and experiment	160	22.1	55	18.4	2	217	21.0
Total respondents	725		299		9	1033	

Appendix B: The Questionnaire

The questionnaire below is a paper version of the web-based survey. In the web version the system was set up to navigate respondents to the appropriate questions depending on their responses.

Survey of Physics and Astronomy Doctoral Students

Introduction

The Institute of Physics (IOP) and the Royal Astronomical Society (RAS) would like to know about your experiences of studying for your doctorate and the training and support that you have received from your department. We would like to hear from you whether you are at the beginning of your doctorate or just about to submit.

We want to ensure that, as physics and astronomy doctoral students, you are getting the most out of your studies, that you are receiving the training you need to complete your doctorate successfully, and that you have access to all the information and skills training you need to pursue your desired career either within or outside academia. We are also interested in comparing the experiences of those who are in Centres for Doctoral Training (CDTs) with those who are not.

The IOP and the RAS will use the findings of the report to raise broader awareness of the concerns of current doctoral students to the academic physics and astronomy communities with the purpose of improving supervision, training and careers advice for the future for all students of all backgrounds and circumstances. We will also be looking to see if there are gaps in terms of soft or transferable skills training that the Institute could provide.

Once you have completed the questionnaire you will be given the chance to enter a prize draw. Simply fill in your details at the end of the questionnaire and you will be entered into the prize draw to have a chance of winning one of the 12 following prizes:

- § First Prize: £100 Amazon token
- § Second Prize: £50 Amazon token
- § Third Prizes: 10 x £10 Amazon tokens

The closing date for entering the prize draw is 5th May 2014. The draw will take place during the week beginning 12th May 2014 and winners will be informed by email.

The questionnaire should take about 20 minutes.

There is a comment box at the end of the survey and we would encourage you to submit any further comments that you would like to make.

We will be conducting focus groups in departments to follow up our survey findings later in the year and we would appreciate it if you could express your interest in participating in one of these at the end of the survey.

If you would be interested in hearing more about our research and the outcomes of the survey and focus groups, there will be an opportunity to include your email so that we can keep you informed of our work in this area.

We would encourage all doctoral students, of all backgrounds, including those who are traditionally under-represented in physics, to fill in our questionnaire to make your views known.

None of the information gathered in this survey will be used in a way that could make you identifiable to the department/institution at which you are based. Any submitted names and emails will be stored separately from the bulk of the data and will only be used for the purposes stated.

Section A: About You

A1 At which institution are you registered as a doctoral student?

A2. What is your gender?

Male Female Do not wish to say

A3. How old are you?

A4. Are you registered as a Home student, EU/EEA student or Overseas student?

Home student European Union/European Economic Area student Overseas student

A5. What is your nationality?

British **Go to Question A6** Irish **Go to Question A7** Other (please specify.....) **Go to Question A7**

A6. How would you describe your ethnic origin?

White Asian or Asian British Black or Black African Chinese
 Mixed/Dual Heritage Other Do not wish to say

A7. Do you consider yourself to have a disability?

Yes **Go to Question A8** No **Go to Question A9** Do not wish to say **Go to Question A9**

A8. What is the nature of your disability?

Please mark all that apply.

- Blind or a serious visual impairment
- Deaf or a serious hearing impairment
- A physical impairment or mobility issues
- Personal care support
- Mental health condition
- A long-standing illness or health condition
- Social communication/Autistic spectrum disorder
- Specific learning difficulty
- Another disability, impairment or medical condition
- Do not wish to say

A9. Are you part of a Centre for Doctoral Training (CDT)?

Yes **Go to Question B1** No **Go to Question C1** Not sure **Go to Question C1**

Section B: Centre for Doctoral Training

B1. I joined a CDT because,

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I liked the multidisciplinary nature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I liked the fact that I didn't have to decide on the topic of my major research project until the end of the first year.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
the level of funding was greater than other non-CDT doctorates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I liked idea of the six months of taught courses.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
it specialised in my preferred field.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B2 Will you/Did you receive a masters qualification (e.g. MSc or MRes) on successfully completing the first year in the CDT?

Yes No

B3. Please indicate which of the following elements were included in the application and selection process for the CDT.

- Filling in an application form specifically for your CDT
- Filling in a general application form for all CDTs at your university
- Filling in a general application form for entry to a doctorate
- A formal interview with CDT staff
- An informal session with CDT staff
- A presentation
- Meeting student members of the CDT
- Other (please specify).....

B4. Do you think the selection process could be improved? If yes, please provide details.

No Yes (please provide details).....

B5. Which research council(s) fund your CDT? Please mark all that apply.

EPSRC STFC BBSRC NERC Don't know

B6. Please indicate how strongly you agree or disagree with each of the statements below:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The training I receive is better than the training non-CDT doctoral students receive.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CDT students have more resources available to them than non-CDT students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am pleased with my decision to join a CDT.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B7. What year of your doctoral study are you in?

1st Year **Go to Question E3** 2nd Year **Go to Question E1** 3rd Year **Go to Question E1**
 4th Year **Go to Question E1** 5th Year **Go to Question E1**

Section C: About your doctorate

C1 Please indicate which of the following elements were included in the application and selection process for your doctorate.

- Filling in a general application form for entry to a doctorate
- A formal interview with your project supervisor
- A formal interview with a panel of staff
- A presentation
- Meeting members of your research group
- Other (please specify).....

C2. Could the selection process have been improved in any way? If yes, please provide details.

- No Yes (please provide details).....

C3. Are you studying full-time or part-time?

- Full-time Part-time

C4. What year of your doctoral study are you in?

- 1st Year 2nd Year 3rd Year 4th Year 5th Year
 6th Year 7th Year 8th Year 9+ Year

Section D: Funding for your doctorate

D1. Funding for your doctorate:

- I receive funding for my doctorate **Go to Question D2.** I fund my doctorate myself **Go to Question E1**

D2. From which source(s) is your doctorate funded? Please select all options that apply.

- UK Research Council (including CASE awards) **Go to Question D3**
- Departmental funding **Go to Question E1**
- University scholarship **Go to Question E1**
- Industrial Funding **Go to Question E1**
- Government funding from (non-UK) home country **Go to Question E1**
- European Union funding **Go to Question E1**
- Don't know **Go to Question E1**
- Other (please specify)..... **Go to Question E1**

D3. Which research council funds your doctorate? Please mark all that apply.

- EPSRC STFC BBSRC MRC NERC
 Other (please specify).....

D4. Do you have a CASE award?

- Yes No Not sure

Section E: About your doctorate 2

E1. Please indicate the area(s) of your research by choosing one or two close match(es) from the list below, or if the topic of your research has not been decided yet please indicate by selecting "Not decided yet".

Please do try to find matches from the list rather than using the "Other" field.

- | | |
|--|--|
| <input type="checkbox"/> 1. Nanoscience | <input type="checkbox"/> 10. Atomic and molecular physics (including cold atoms) |
| <input type="checkbox"/> 2. Medical physics | <input type="checkbox"/> 11. Plasma physics |
| <input type="checkbox"/> 3. Nuclear physics | <input type="checkbox"/> 12. Atmospheric, environmental and geophysics |
| <input type="checkbox"/> 4. Particle physics | <input type="checkbox"/> 13. Magnetism and metals |
| <input type="checkbox"/> 5. Mathematical physics (including string theory and quantum gravity) | <input type="checkbox"/> 14. Surfaces, interfaces and materials |
| <input type="checkbox"/> 6. Astronomy, astrophysics, cosmology and space science | <input type="checkbox"/> 15. Superconductivity and quantum fluids |
| <input type="checkbox"/> 7. Optics, photonics and lasers | <input type="checkbox"/> 16. Semiconductors |
| <input type="checkbox"/> 8. Soft condensed matter | <input type="checkbox"/> 17. Quantum information and technology |
| <input type="checkbox"/> 9. Biological and biophysics | <input type="checkbox"/> Not decided yet |
| <input type="checkbox"/> Other (please specify)..... | |

E2. Would you describe your PhD as being mainly:

- Theory/computational? Experimental? Equal mix of theory/computational and experiment?

E3. What is your level of annual stipend? (this refers to your main source of funding)

- Less than £10,000 £10,000-£12,000 £12,000-£14,000 £14,000-£16,000
 £16,000-£18,000 More than £18,000

E4. How long is your doctorate funded for?

- Not applicable - self funded 3 years 3.5years 4 years
 4.5 years More than 4.5 years (please specify to the nearest half year).....

E5. Roughly how long in total do you expect to spend on your doctorate including write-up? Please give your best guess unless you are really not sure.

- 3 years 3.5 years 4-5 years 5-6 years 6-7 years 7-8 years
 9 years or more Not sure

E6. Please indicate how strongly you agree or disagree with each of the following statements about your doctorate.

Please mark one choice in each row.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Doctoral students are respected and well regarded by staff.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The quality of the technical training I receive is high.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The quality of the transferable skills training I receive is high.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have access to state-of-the-art equipment/resources.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I often have the opportunity to be creative.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am intellectually stimulated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel under pressure financially.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is a strong equality and diversity culture.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is little that can be improved about my doctorate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E7. Are you a member of a professional body/learned society?

Please mark all options that apply.

- Yes, Institute of Physics
- Yes, Royal Astronomical Society
- Yes, other UK-based
- Yes, other non-UK-based
- No

Section F: Your previous experience

The next few questions ask you about your previous experience in higher education and work.

F1. What was the subject of your first degree? Please indicate the main subject, e.g. physics, mathematics, astronomy, chemistry, etc., rather than more complex course titles.

- | | |
|---|---|
| <input type="checkbox"/> Physics | <input type="checkbox"/> Mathematics |
| <input type="checkbox"/> Astronomy/Astrophysics | <input type="checkbox"/> Electronics/Electrical Engineering |
| <input type="checkbox"/> Physics and Astronomy/Astrophysics | <input type="checkbox"/> Materials |
| <input type="checkbox"/> Physics and Mathematics | <input type="checkbox"/> Chemistry |
| <input type="checkbox"/> Other (please specify)..... | |

F2. Did you obtain your first degree from a UK institution or from an institution outside the UK?

- From a UK institution **Go to Question F3**
- From an institution outside the UK **Go to Question F7**

Your first degree (UK Institution)

F3. Where did you obtain your first degree from?.....

F4. What qualification did you obtain?

- BSc
- MPhys/MSci
- BA/MA
- Other (please specify).....

F5. Which degree classification did you obtain?

- First (1)
- Upper second (2.1)
- Lower second (2.2)
- Third (3)
- Other
- Not applicable

F6. Did you do a postgraduate masters (i.e. MSc/MPhil rather than a 4-year undergraduate MPhys/MSci)?

- Yes, in the UK - **Go to Question F9**
- Yes, outside the UK- **Go to Question F11**
- No- **Go to Question F12**

Your first degree (institution outside the UK)

F7. Where did you obtain your first degree from?
Please indicate the name of the institution and location.

Institution.....
Location.....

F8. Did you do a postgraduate masters (i.e. MSc/MPhil rather than a 4-year undergraduate MPhys/MSci)?

- Yes, in the UK - **Go to Question F9**
- Yes, outside the UK- **Go to Question F11**
- No- **Go to Question F12**

Your masters degree (UK institution)

F9. Where did you obtain your masters degree from?.....

F10. What classification did you get?

- Distinction
- Merit
- Pass
- Other
- Not applicable

Go to Question F12

Your masters degree (institution outside the UK)

F11. Where did you obtain your masters degree from?
Please indicate the name of the institution and location.

Institution.....
Location.....

Go to Question F12

Work experience before undertaking your doctorate

F12. Did you spend time (at least one month) working in an area related to your doctorate before you began your course?

In this context work includes work placements as part of a course, or internships. Work related to your course might include working in the financial sector, scientific publishing, etc.

- Yes - **Go to Question F13** No - **Go to Question G1**

F13. Please indicate the nature of your work experiences.

Please select all that apply but please only include work related to your doctorate including working in the financial sector, scientific publishing, etc.

- A work placement as part of a previous degree course
- An internship
- A job before starting my doctorate
- A job before starting my first degree/postgraduate masters
- Other (please specify).....

F14. How long in total did you spend working in areas related to your doctorate?

- 1-3 months 4-6 months 7-12 months Between 1 and 2 years Between 2 and 3 years
 Between 3 and 4 years Between 4 and 5 years More than 5 years

Section G: Your motivations

G1. Which of the following statements best describe the MAIN reason(s) you decided to undertake your doctorate?

Please select one choice from the main reason column and, if you wish to, one in the second reason column

	Main reason	Second reason
To improve my employability	<input type="checkbox"/>	<input type="checkbox"/>
I have an aptitude for science/physics/astronomy	<input type="checkbox"/>	<input type="checkbox"/>
Because I love my subject and wanted to learn more	<input type="checkbox"/>	<input type="checkbox"/>
A doctorate is a pre-requisite for the career I want	<input type="checkbox"/>	<input type="checkbox"/>
I realised that others I knew were applying for doctorates	<input type="checkbox"/>	<input type="checkbox"/>
To enhance my earning potential	<input type="checkbox"/>	<input type="checkbox"/>
I was inspired/encouraged by a tutor/staff member	<input type="checkbox"/>	<input type="checkbox"/>
I was inspired/encouraged by a family member/friend	<input type="checkbox"/>	<input type="checkbox"/>
I "wandered" into a doctorate after my first degree	<input type="checkbox"/>	<input type="checkbox"/>
Don't know why	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify).....		

G2. Which of the following statements best describe the MAIN reason(s) you chose your research group/institution?

- I wanted to get a doctorate from a prestigious institution
- To be near my partner's work/study institution
- I was offered a place by my undergraduate/masters department
- The doctorate had a higher level of funding than others
- It was a group with one of the best reputations in my field of interest
- I had heard that it was a great team with a supportive atmosphere
- I was attracted by the location/city
- It was one of the few groups/institutions that I could get funding to work in
- Other (please specify).....

G3. Looking back, are you pleased that you decided to do a doctorate?

- Yes Not sure
- No (please indicate why).....

G4. Overall, are you happy with the way your doctorate is going?

- Yes Not sure
- No (please indicate why).....

G5. Have you spent one month or more in total on placement working in industry or at another institution/research institute during your doctoral studies?

- Yes, in industry **Go to Question H1**
- Yes, in industry and in another institution/research institute **Go to Question H1**
- Yes, in another institution/research institute **Go to Question H1**
- No **Go to Question I1**

Section H: Your placement

You have indicated that you have spent at least a month on placement.

H1. How long cumulatively have you spent on placements?

- 1 months 2-3 months 3-4 months 5-6 months more than 6 months

H2. Please select the statement that best describes the effect of your placement(s) on your career intentions:

- My placement(s) made me more intent on pursuing a career in science
- My placement(s) made me less intent on pursuing a career in science
- My placement(s) had no effect on my career intentions

Go to Question I1

Section I: Your experiences during your doctorate

11. Please indicate to what extent you agree or disagree with the following statements about when you started your doctorate:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
My doctoral supervisor gave me a realistic idea of the sort of time commitment that would be demanded of me during my doctorate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall, my experiences during my doctorate are what I expected.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt well prepared from my previous studies and experience to embark on independent research.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I received adequate information about my doctorate during the application and interview process, so I had a good idea of what to expect from the department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. Thinking about life in your department or CDT, please indicate how strongly you agree or disagree with the following statements.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I undertake exciting and interesting projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I find my research repetitive and frustrating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like the general working environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Undertaking a doctorate has helped me clarify my career plans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am gaining transferable skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have independence and freedom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have flexible working hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel there are not many positive aspects to my doctorate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I enjoy researching my topic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I now have a better understanding of a scientist's work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. Before embarking on my doctorate....

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
there wasn't anything that realistically could have prepared me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had already developed the necessary skills to start independent research.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
an additional one-year funded research masters course would have helped me prepare for independent research.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a funded short research taster course would have helped me prepare.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. How would you describe your relationship with your MAIN supervisor?

Excellent Good Fair/Average Poor Very poor

15. Do you have a second supervisor? Please select the most appropriate statement to reflect your experience.

- I meet regularly with my second supervisor
- I have a second supervisor but I rarely/never meet with them
- Officially I am supposed to have a second supervisor but I don't know whether one has been appointed
- There isn't a policy of appointing second supervisors at my institution

16. How could your experience of supervision be enhanced, if at all?

Please mark all that apply.

- More research support
- Could not be enhanced
- More general advice & mentoring
- More careers advice
- Other (please specify).....

17. On average how much one-to-one contact time did you/do you have with your supervisor(s) in a typical week? When answering please include the time spent in contact by email and telephone.

If you not have reached that year yet please select not applicable.

	Less than 1 hour	1-2 hours	2-3 hours	3-4 hours	More than 4 hours	Don't remember	Not applicable
During your 1st year	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
During your 2nd year	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
During your 3rd year	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
During your 4th year	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
During your 5th year	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
During your 6th year	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Overall is the amount of contact you CURRENTLY have with your supervisor:

- Far too little
- Too little
- About right
- Too much
- Far too much

19. Other than your main supervisor, who else could you consult about your research and who else do you actually consult?

Please select the appropriate response for each person/group.

	Yes, I regularly consult	Yes, I could consult but I generally don't	Not available to consult/ Not applicable
My second supervisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Another academic (not my second supervisor)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Head of research group (if not supervisor/second supervisor)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Head of research group (if not supervisor/second supervisor)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Postdoc(s) in my research group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (more experienced) doctoral students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

110. As part of your PhD have you needed to access national or international facilities such as Diamond, CERN, Herschel Telescope, VLT, etc.?

- Yes **Go to Question J1**
- No **Go to Question K1**

Section J: National or International facilities

J1. Have you experienced any difficulties in gaining access to the national and/or international facilities you need?

- Yes **Go to Question J2**
- No **Go to Question K1**
- Not yet needed access **Go to Question K1**

J2. Difficulties in accessing national and/or international facilities have been caused by:

Please select all that apply

- Low level of funds
- Not granted enough time by research councils/facility managers
- Not enough time assigned by supervisor
- Other (please specify).....

Go to Question K1

Section K: Your training

K1. Would you say you possess the majority of general skills that employers often look for?

Note: 'General skills' refers to non-technical skills e.g. communication, team-working and problem-solving skills

- Yes
- No
- Don't know

K2. For each of the following areas, please indicate whether or not you have attended a training course DURING YOUR DOCTORATE.

	Yes	No
Entrepreneurial and business skills	<input type="checkbox"/>	<input type="checkbox"/>
Project planning and management	<input type="checkbox"/>	<input type="checkbox"/>
Presentation and communication skills	<input type="checkbox"/>	<input type="checkbox"/>
Technical research skills	<input type="checkbox"/>	<input type="checkbox"/>
Leadership skills	<input type="checkbox"/>	<input type="checkbox"/>
Career planning/job searching	<input type="checkbox"/>	<input type="checkbox"/>
Computational skills	<input type="checkbox"/>	<input type="checkbox"/>
Networking skills	<input type="checkbox"/>	<input type="checkbox"/>
Team working	<input type="checkbox"/>	<input type="checkbox"/>

K3. Are you required to attend transferable skills courses?

- Yes. I need to attend a minimum number of courses to complete my doctorate.
- Yes, but there is no real sanction if I don't.
- No. Transferable skills courses are available but I don't have to attend any.
- No. I am not aware of any transferable skills courses that I can attend.

K4. For each of the following activities, have you done this or do you expect to in the future?

Please select the response that best reflects your situation.

	I regularly/ sometimes do this	No but EXPECT TO in future	No and NOT SURE if I will in future	No and DO NOT expect to in future
Give external presentations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Writing for an academic audience (e.g. journal articles)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Give internal presentations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Laboratory supervision for undergraduates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interdisciplinary collaboration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teaching - small group tutorials for undergraduates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Team working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Networking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assisting in grant writing/doing preliminary work for a new grant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collaboration/contact with researchers in industry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attend conferences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Creation of posters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

K5. Are you a member of a Graduate School?

- Yes. I regularly use Graduate School facilities.
 Yes, but I rarely have any contact with the Graduate School.
 No

Section L: Feedback on your progress

L1. Please indicate which of the following apply to you.

Please mark all that apply.

- There are formal assessments that I have to pass (e.g. qualifying masters, submission of yearly reports, etc.).
 I have prearranged meetings with my supervisor(s) where we discuss my progress.
 I have casual chats with my supervisor(s) where we discuss my progress.

L2. In general, do you find the feedback you receive about your progress useful?

This question refers to feedback about your progress towards successful completion of your doctorate, rather than advice on how to approach a specific research issue.

- Yes, in general No, in general Don't know

L3. Do you feel that you receive the right amount of feedback on your work/progress towards successful completion of your doctorate?

- Too much About right Too little

L4. Is there someone other than your supervisor(s) that you can approach to discuss non-research issues that might affect you?

Such issues might include a difficult relationship with your supervisor and/or personal problems that you don't feel able to discuss with your supervisor.

Please mark all that apply.

- Yes, there is a graduate tutor in the department/CDT who doctoral students can talk to.
- Yes, there are other academics in the department/CDT who I can talk to.
- Yes, there are staff in the Graduate School who I can talk to.
- Yes, there are staff outside the department/CDT who I can talk to.
- No, there isn't anyone obvious who I can talk to.
- I don't know.

Section M: Careers guidance

M1. How would you rate your awareness of career options WITHIN academia?

- Very Good Good Adequate Poor Very Poor

M2. How would you rate your awareness of career options OUTSIDE academia?

- Very Good Good Adequate Poor Very Poor

M3. PRIOR TO UNDERTAKING YOUR POSTGRADUATE STUDIES did you receive careers advice from any of the following sources?

Please mark all that apply.

- University careers service
- Workplace colleagues
- Industrial placement supervisors
- Careers/recruitment fairs
- Your project supervisor
- Other academic staff
- Research council
- Family or friends
- IOP careers events

M4. DURING YOUR DOCTORAL STUDIES have you sought careers advice from any of the following sources? If you have, how useful was the advice?

Please select the response that best reflects your situation.

	Yes, useful advice	Yes, advice not useful	No/ Not applicable
University careers service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Industrial placement supervisors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attending a specific course on career planning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Careers/recruitment fairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your supervisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other academic staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Research council	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Family or friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IOP careers events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

M5. What was/were the topic(s) of the careers advice you've received (during your doctoral studies)?

Please mark all that apply.

- Types of jobs available and/or where to look for jobs
- Filling out application forms and writing a CV
- Insights into working in particular jobs e.g. pay, conditions
- How to search for post doctoral positions
- Interview techniques
- Don't know/Not applicable

M6. Please indicate how strongly you agree or disagree with the following statements.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
There is plenty of careers advice available specifically for doctoral students in my institution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think that there should be more careers advice available for doctoral students in my institution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think there should be more advice on how to search for postdoctoral positions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall, I find it difficult to get specific advice on what to do with a physics/astronomy doctorate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section N: Culture

N1. When I started my doctorate.....

Please select an appropriate response for the university and the department/CDT

	I was given a formal induction which was useful and informative.	I was given an induction which, overall, was neither useful nor informative.	I was not given a formal induction and feel that having a formal induction would have been useful.	I was not given a formal induction and feel that I did not need one.
Department/CDT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
University	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

N2. Please select a response for each of the following statements.

Please select an appropriate response for the university and the department/CDT

	Yes	No	Don't know/Not applicable
My home department runs social events which give me the opportunity to meet other doctoral students and members of the department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Graduate School runs social events which give me the opportunity to meet other doctoral students and members of the department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Centre for Doctoral Studies to which I belong runs social events which give me the opportunity to meet other doctoral students and members of the department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is doctoral student representation on my department's equality and diversity committee (Juno committee)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

N3. Is there doctoral student representation in important meetings (e.g. departmental meetings, graduate school meetings, etc.)?

- Yes and the outcomes of meetings ARE relayed back to students
- Yes but the outcomes of meetings ARE NOT replayed back to students
- No
- Don't know

Section O: Your next steps

O1. Would you say you possess the majority of technical skills that employers often look for?

Technical skills refers to the skills you use in carrying out your research such as problem solving skills, programming skills, ability to plan experiments, etc.

- Yes
- No
- No, but I expect to by the time I complete my doctorate
- Don't know

O2. How much have you planned your next (i.e. once you've completed your doctorate) career steps?

- Fully
- A little
- Not at all

O3. My experience as a physics/astronomy doctoral student has...

Please mark the most appropriate statement.

- ...made me more intent on pursuing a career in science/physics/astronomy
- ...had no influence on my career intentions
- ...given me doubts about pursuing a career in science/physics/astronomy
- ...persuaded me that I definitely don't want to pursue a career in science/physics/astronomy

O4. Have you already accepted a job offer or already been accepted on a programme of further study or training, due to start on or near completion of your doctoral studies?

- Yes **Go to Question O5**
- No **Go to Question O9**

Your Next Steps: the job you have accepted

05. Which of the following best describes the job or study/training offer you have accepted?

Please mark one choice.

- | | |
|---|--|
| <input type="checkbox"/> Academic: postdoc/research assistant | <input type="checkbox"/> Consultant |
| <input type="checkbox"/> Academic: lecturer | <input type="checkbox"/> IT Professional or Technician |
| <input type="checkbox"/> Further Study: scientific | <input type="checkbox"/> Writer/Journalist/Broadcaster |
| <input type="checkbox"/> Further Study: non-scientific | <input type="checkbox"/> Sales (inc. technical) |
| <input type="checkbox"/> Teacher Training | <input type="checkbox"/> Marketing/PR Officer |
| <input type="checkbox"/> Scientific Publishing | <input type="checkbox"/> Financial Professional |
| <input type="checkbox"/> Scientist: industry/commerce | <input type="checkbox"/> Government/Civil Service |
| <input type="checkbox"/> Scientist: public sector | <input type="checkbox"/> Other (please specify)..... |

06. In your role, will you be undertaking scientific research?

- Yes **Go to Question P1**
- No **Go to Question O7**

07. Did you begin your doctoral studies thinking you would have a career in scientific research?

- Yes **Go to Question O8**
- No **Go to Question P1**
- I wasn't sure **Go to Question P1**

08. What has made you change your mind about pursuing a career in scientific research? Please indicate briefly what has made you change your mind.....

Go to Question P1

Your Next Steps: have not accepted a job or training

09. When you complete your doctorate, where would you consider employment or further study?

Please select all that apply.

- In the UK
- In my home country (if not the UK)
- In another country
- Would consider all options
- Undecided

010. When you complete your doctorate do you intend to seek employment as a research scientist, or undertake further study related to research?

- Yes **Go to Question O16**
- No **Go to Question O11**
- Don't know **Go to Question O11**

Your Next Steps: not intending to seek employment as a research scientist, or not sure whether you will

O11. Although not intending to seek employment as a research scientist, or not sure whether you will, do you intend to seek employment in a role which requires and/or makes use of your science background (e.g. technical publishing, scientific civil service, teaching, etc.)?

- Yes **Go to Question O14** No **Go to Question O12** Don't know **Go to Question O15**

O12. Did you begin your doctorate thinking you would have a career related to science?

- Yes **Go to Question O13** No **Go to Question O14** Don't know **Go to Question O14**

O13. What has made you change your mind about pursuing a career related to science? Please indicate briefly what has made you change your mind.....

Go to Question P1

Your Next Steps: intending to seek a role which requires and/or makes use of your science background

O14. Which of the following best describes the job or study/training offer you have accepted?

Please mark one choice.

- | | |
|---|---|
| <input type="checkbox"/> Further Study: non-science related | <input type="checkbox"/> Work in Management Consultancy |
| <input type="checkbox"/> Work as a Financial Professional (in banking, accountancy, etc.) | <input type="checkbox"/> Teacher Training |
| <input type="checkbox"/> Self employment/Set up my own business | <input type="checkbox"/> Work in Publishing |
| <input type="checkbox"/> Work in a non-scientific role in industry/commerce | <input type="checkbox"/> Sales (inc. technical) |
| <input type="checkbox"/> Work a non-scientific role in government/public sector/civil service | <input type="checkbox"/> Travel or take time out |
| <input type="checkbox"/> Work as an IT Professional or Technician | <input type="checkbox"/> Voluntary work |
| <input type="checkbox"/> Work in Sales (inc. technical sales) | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> Other (please specify)..... | |

Go to Question P1

Your Next Steps: not sure if intending to seek a role which requires and/or makes use of your science background

O15. Which of the following best describes the job or study/training offer you have accepted?

Please mark one choice.

- | | |
|---|--|
| <input type="checkbox"/> Further Study: science-related | <input type="checkbox"/> Government/Public Sector/Civil Service: scientific role |
| <input type="checkbox"/> Further Study: non-science-related | <input type="checkbox"/> Government/Public Sector/Civil Service: non-scientific role |
| <input type="checkbox"/> Teacher Training | <input type="checkbox"/> Work as an IT Professional or Technician |
| <input type="checkbox"/> Industry/Commerce: scientific role | <input type="checkbox"/> Self employment/Set up my own business |
| <input type="checkbox"/> Industry/Commerce: non-scientific role | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> Other (please specify)..... | |

Go to Question P1

Your Next Steps: career as a research scientist

Q16. Which of the following describes where you think you are MOST LIKELY to carry on your career as a research scientist after your doctorate (and after you have taken any time off if that is your intention)?

Please mark one choice.

- | | |
|---|--|
| <input type="checkbox"/> University/research institute (as a postdoc) | <input type="checkbox"/> University spin-off |
| <input type="checkbox"/> University/research institute (as a permanent academic/researcher) | <input type="checkbox"/> Self employment |
| <input type="checkbox"/> Public Sector (e.g. health service, Environment Agency) | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> Private/commercial sector (Energy sector, defence industry, IT sector, etc.) | |
| <input type="checkbox"/> Other (please specify)..... | |

Go to Question P1

Section P: Your longer term plans

P1. In the short-term future (i.e. in 3-5 years' time), which of these job(s) do you think you are most likely to be doing?

Please mark no more than TWO boxes.

- | | |
|---|---|
| <input type="checkbox"/> Postdoc/Research assistant | <input type="checkbox"/> Writer/Journalist/Broadcaster |
| <input type="checkbox"/> Academic | <input type="checkbox"/> Human Resources/Recruitment |
| <input type="checkbox"/> Teacher | <input type="checkbox"/> Sales (inc. technical) |
| <input type="checkbox"/> Scientific Publishing | <input type="checkbox"/> Marketing/PR Officer |
| <input type="checkbox"/> Scientist: industry/commerce (including start ups) | <input type="checkbox"/> Financial Professional |
| <input type="checkbox"/> Scientist: public sector | <input type="checkbox"/> Government/Civil Service |
| <input type="checkbox"/> Consultant | <input type="checkbox"/> Self employed/Running my own business/Entrepreneur |
| <input type="checkbox"/> IT Professional or Technician | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> Other (please specify)..... | |

P2. In the longer-term future (i.e. in 6-10 years' time), which of these job(s) do you think you are most likely to be doing?

Please mark no more than TWO boxes.

- | | |
|---|---|
| <input type="checkbox"/> Postdoc/Research assistant | <input type="checkbox"/> Writer/Journalist/Broadcaster |
| <input type="checkbox"/> Academic | <input type="checkbox"/> Human Resources/Recruitment |
| <input type="checkbox"/> Teacher | <input type="checkbox"/> Sales (inc. technical) |
| <input type="checkbox"/> Scientific Publishing | <input type="checkbox"/> Marketing/PR Officer |
| <input type="checkbox"/> Scientist: industry/commerce (including start ups) | <input type="checkbox"/> Financial Professional |
| <input type="checkbox"/> Scientist: public sector | <input type="checkbox"/> Government/Civil Service |
| <input type="checkbox"/> Consultant | <input type="checkbox"/> Self employed/Running my own business/Entrepreneur |
| <input type="checkbox"/> IT Professional or Technician | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> Other (please specify)..... | |

Section Q: Your experiences

Q1. How strongly do you agree or disagree with the following statements?

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I feel my department would benefit if there was a more diverse mix of people and staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel confident that I would make a good research scientist.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel that there should be more female academics.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My experiences of studying for my doctorate have provided me with good role models to encourage me to pursue a career in scientific research.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
While on my doctorate, I have felt socially isolated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Academic staff give male and female students the same opportunities and support.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have been treated as an equal by my fellow students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section R: Your Comments and Prize Draw Entry

In the space below please feel free to make any comments about your doctoral experiences, and in particular on the quality of the training you have received and how that training could be improved, if at all.

May we contact you?

All responses to this questionnaire will remain anonymous.

If you wish to provide your contact details TO PARTICIPATE IN ANY FOLLOW-UP WORK, please provide your preferred contact details below. This information will be stored separately from the questionnaire and will only be used for the purpose of contacting you about future or follow-up work related to this study.

Name:
 Email Address:
 Mobile Phone No:

If you wish to be INCLUDED IN THE PRIZE DRAW then please enter your details below. These details will be stored separately to the main questionnaire and will only be used in connection with the prize draw. They will not be used for any other purpose, or passed on to any other third party.

Name:
 Email Address:
 Mobile Phone No:

Thank you very much for your time in completing this questionnaire.
 Should you wish to review your responses, you may do so by using the navigation buttons below.
 To submit your responses, please click the 'Done' button.

Appendix C: List of Tables

Table 1: Proportions of UK domiciled students who are female in physics and astronomy	14
Table 2: Proportions of all students who are female in physics and astronomy	15
Table 3: Proportions of UK national academic staff who are female in the physics cost centre (teaching and research, and, research-only employment functions)	16
Table 4: Survey respondents who began the survey by doctoral subject, nationality and gender	19
Table 5: Whether or not respondents reported that they were members of Centres for Doctoral Training	21
Table 6: Respondents' reported year of study	21
Table 7: Respondents' reported first degree subjects	22
Table 8: Respondents' reported first degree classifications from UK Institutions	22
Table 9: Respondents' reported first degree qualifications from UK Institutions	23
Table 10: Respondents' reported first degree qualifications from UK Institutions and whether or not they reported holding a postgraduate masters qualification	23
Table 11: Whether respondents reported possessing a postgraduate masters degree by nationality and gender	24
Table 12: Whether respondents reported that were studying in the same institution as they studied for their first degree by whether respondents' research was physics-based or astronomy-based and gender	24
Table 13: Whether British respondents reported that they were studying in the same institution as they studied for their first degree by whether respondents' research was physics- or astronomy-based and gender	25
Table 14: Main and secondary reasons given by respondents for undertaking their doctorates by whether respondents' research was physics or astronomy-based and gender	27
Table 15: Main reasons given by respondents for choosing their research group/institution by gender and whether respondents' research was physics-based or astronomy-based or whether or not respondents were studying in the same institution as their first degree	28
Table 16: Whether respondents who were not members of a CDT reported receiving funding for their doctorate by nationality and gender	30
Table 17: Funding sources reported by British respondents who were not members of a CDT by gender	31
Table 18: Funding sources for their doctorate reported by non-British national respondents who were not members of a CDT by gender	32
Table 19: Research councils reported as providing funding for respondents who were not members of a CDT by nationality and gender	32

Table 20: Level of annual living expenses reported received by respondents by gender and whether respondents were members of CDTs	33
Table 21: How strongly respondents agreed with the statement, <i>"I feel under pressure financially,"</i> by level of annual living expenses received by respondents	35
Table 22: Length of time which respondents who were not members of a CDT reported their doctorate was funded for by nationality and gender	35
Table 23: Length of time respondents who were not members of a CDT believed they would take to complete their doctorate by current year of study and gender	36
Table 24: Length of time respondents who were not members of a CDT believed they would take to complete their doctorate by length of time for which doctorate was funded and gender	37
Table 25: When respondents reported having had jobs before undertaking doctorate by gender	38
Table 26: Distribution of respondents' reported time spent working before doctorate by gender	38
Table 27: Reported nature of work experience before undertaking doctorate by gender	39
Table 28: Distribution of respondents' reported time spent on work placements and/or internships before doctorate by gender	39
Table 29: Distribution of types of work undertaken by respondents before doctorate by current year of study	40
Table 30: Proportions of respondents who agreed or disagreed with statements about their experiences as a doctoral student by gender	44
Table 31: Proportions of respondents who agreed or disagreed with statements about their experiences as a doctoral student by nationality	46
Table 32: Proportions of respondents who agreed or disagreed with statements about their experiences as a doctoral student by whether respondents were members of a CDT	46
Table 33: The nature of any departmental/CDT induction that respondents reported undergoing by gender, by whether respondents were members of a CDT, or by whether respondents were at the same institution as for their first degree	47
Table 34: The nature of any university induction that respondents underwent by gender or by whether respondents were members of a CDT	48
Table 35: Whether respondents reported that they were pleased with their decision to do a doctorate	52
Table 36: Whether respondents reported that they were happy with the way their doctorate was going by year of study and gender	52
Table 37: Whether respondents reported that they are members of graduate schools by gender	55

Table 38: Whether respondents reported that they are members of graduate schools by year of study	56
Table 39: Whether respondents report that they are members of graduate schools by membership of a CDT*	56
Table 40: Contact time per week with main supervisor in earlier years of study reported by respondents	60
Table 41: Contact time per week with main supervisor in current year of study reported by respondents	60
Table 42: Respondents' opinion of the contact time they had with their main supervisor by respondents' assessment of the quality of the relationship with their main supervisor	61
Table 43: Respondents' opinion of the contact time they had with their main supervisor by the contact time per week with main supervisor in their current year of study reported by respondents	62
Table 44: Proportions of respondents reporting availability and use of alternative sources of supervision by gender and by whether respondents were members of a CDT	63
Table 45: Proportions of respondents who reported having prearranged meetings and/or casual chats with the main supervisors by current year of study and gender	64
Table 46: Proportions of respondents who reported having prearranged meetings and/or casual chats with their main supervisors by current year of study and whether respondents were members of a CDT	64
Table 47: Proportions of respondents who reported having prearranged meetings and/or casual chats with the main supervisors by respondents' assessment of the quality of the relationship with their main supervisor	65
Table 48: Respondents' views of the usefulness of feedback about progress by current year of study and gender	65
Table 49: Respondents' views of the usefulness of feedback about progress by current year of study and whether respondents were members of a CDT	66
Table 50: Respondents' views of the usefulness of feedback about progress by respondents' assessment of the quality of their relationship with their main supervisor	66
Table 51: Respondents' views of whether they received the right amount of feedback about progress by current year of study and gender	67
Table 52: Respondents' views of whether they receive the right amount of feedback about progress by current year of study and whether respondents were members of a CDT	67
Table 53: Respondents' views of whether they received the right amount of feedback about progress and their assessment of the quality of their relationship with their main supervisor	68
Table 54: Respondents' views of whether they received the right amount of feedback about progress and their assessment of the usefulness of feedback about progress	68

Table 55: Proportions of respondents reporting the availability of staff other than their supervisors with whom they could discuss non-research issues	69
Table 56: Proportions of respondents who agreed or disagreed with statements about their experiences as a doctoral student by gender	70
Table 57: Proportions of respondents who agreed or disagreed with statements about their experiences as a doctoral student by whether they were members of a CDT	71
Table 58: Respondents' views of whether they possessed the majority of general skills often looked for by employers by current year of study and gender	83
Table 59: Respondents' views of whether they possessed the majority of general skills often looked for by employers by current year of study and whether respondents are members of a CDT	83
Table 60: Proportions of respondents reporting whether they are obliged to attend a minimum number of transferable skills training courses by gender and whether respondents were members of a CDT	84
Table 61: Proportions of respondents who indicated they had attended training courses covering selected specific areas by current year of study and gender	85
Table 62: The numbers of training courses in selected specific areas that respondents had attended by current year of study and average and median number of courses attended by various groups by current year of study	86
Table 63: Activities undertaken by respondents in their third year by gender and whether respondents were members of a CDT, and by current year of study	87
Table 64: Proportions of respondents who reported consulting different sources for careers advice before beginning their doctorate by nationality and gender, and by whether respondents were members of a CDT.	93
Table 65: Proportions of respondents reporting consulting various numbers of specified sources of careers advice prior to beginning their doctoral studies by nationality and gender, and by whether respondents are members of a CDT	94
Table 66: Proportions of respondents who reported consulting different sources for careers advice during their doctorate by current year of study and gender	95
Table 67: Proportions of respondents in their third or fourth year of study who reported consulting different sources for careers advice during their doctorate and the proportions of those using the source rating the source as useful by gender	96
Table 68: Proportions of respondents in their third or fourth year for study who report consulting different sources for careers advice during their doctorate and the proportions of those using the source rating the source as useful by whether respondents were members of a CDT	97
Table 69: Proportions of respondents outside CDTs reporting experiencing specific elements as part of the application process for their doctorates	98

Table 70: Proportions of respondents in CDTs reporting experiencing specific elements as part of the application process for their doctorates	99
Table 71: How strongly respondents belonging to CDTs agreed with statements about the reason why they joined a CDT	101
Table 72: How strongly respondents belonging to CDTs agreed with statements about CDTs	102
Table 73: Percentage of respondents specifying roles they believed they were most likely to be doing in 3-5 years' time by gender	113
Table 74: Percentage of respondents who specified roles they believed they were most likely to be doing in 3-5 years' time by gender and current year of study	114
Table 75: Percentage of respondents who specified roles they believed they were most likely to be doing in 6-10 years' time by gender	115
Table 76: Percentage of respondents who specified roles they believed they were most likely to be doing in 6-10 years' time by gender and year of study	116
Table 77: Percentage of respondents selecting as a role they believe they are most likely to be doing in 6-10 years' time at least one of "Academic", "Scientist: industry/commerce (including start-ups)", "Postdoc/Research assistant" or "Scientist: public sector" by gender and year of study	117
Table 78: Percentage of respondents in their third or fourth year of study who specified roles they believed they were most likely to be doing in 3-5 and 6-10 years' time by whether respondents were undertaking physics-based or astronomy-based projects	119
Table 79: Percentage of respondents in their third or fourth year of study who specified roles they believed they were most likely to be doing in 3-5 and 6-10 years' time by whether respondents were members of a CDT	120
Table 80: The locations of employment or training respondents who have not already accepted a job offer or an offer of training would consider by nationality and gender, whether respondents' research was physics-based or astronomy-based, or whether respondents were members of a CDT	121
Table 81: What respondents who had not accepted a job or training offer and who intended to seek employment as a research scientist, or undertake further study related to research, intended to do on completion of their course by gender	123
Table 82: What respondents who had not accepted a job or training offer and who intended to seek employment as a research scientist, or undertake further study related to research, intended to do on completion of their course by current year of study	124
Table 83: Whether respondents who had not accepted a job or training offer and who did not or did not know if they intended to seek employment as a research scientist, or undertake further study related to research, intended to seek a role on completion of their course which required and/or made use of their science background by gender and by current year of study	125

Table 84: What respondents who had not accepted a job or training offer and who intended to seek employment as a research scientist, or undertake further study related to research, intended to do on completion of their course by gender	126
Table 85: Survey respondents by institution and whether or not they completed the survey fully	128
Table 86: Survey respondents by gender, year of study and whether they report themselves as being part of a CDT	129
Table 87: Survey respondents by whether they are registered as a home, EU/EEA, or overseas student and nationality	130
Table 88: Survey respondents by known nationality	130
Table 89: Ethnicity of British respondents	132
Table 90: Disability status of all respondents by gender	132
Table 91: Details of disabilities declared by respondents	132
Table 92: Age of all respondents by gender	133
Table 93: Research topics of respondents who reported a single topic	134
Table 94: Research topics of respondents who reported two topics	135
Table 95: Nature of research	137

Appendix D: List of Figures

Figure 1: Proportions of UK domiciled students who are female in physics and astronomy in 2011/12	15
Figure 2: Age of respondents who began the survey by gender	20
Figure 3: How strongly respondents agreed with the statement, <i>“I feel under pressure financially,”</i> by gender and whether respondents were members of a CDT	34
Figure 4: How strongly respondents agreed with the statement, <i>“I felt well prepared from my previous studies and experience to embark on independent research,”</i> by gender, nationality, whether respondents were members of a CDT, and whether respondents had worked before undertaking their doctorate	42
Figure 5: How strongly respondents agreed with the statement, <i>“Before embarking on my doctorate, I had already developed the necessary skills to start independent research”</i> by gender, nationality, whether respondents were members of a CDT and whether respondents had worked before undertaking their doctorate	43
Figure 6: How strongly respondents agreed with the statement, <i>“I received adequate information about my doctorate during the application and interview process, so I had a good idea of what to expect from the department,”</i> by gender and whether respondents were studying for their doctorate in the same institution as they studied for their first degree, by nationality and by whether respondents were members of a CDT	49
Figure 7: How strongly respondents agreed with the statement, <i>“My doctoral supervisor gave me a realistic idea of the sort of time commitment that would be demanded of me during my doctorate.”</i> by gender, nationality and whether respondents were members of CDTs	50
Figure 8: How strongly respondents agreed with the statement, <i>“Overall, my experiences during my doctorate are what I expected.”</i> by gender, nationality and whether respondents were members of CDTs	51
Figure 9: How strongly respondents agreed with the statement, <i>“There is little that can be improved about my doctorate,”</i> by gender and whether respondents were members of a CDT	53
Figure 10: How strongly respondents agreed with the statement, <i>“There is little that can be improved about my doctorate,”</i> by gender and current year of study	54
Figure 11: How strongly respondents agreed with the statement, <i>“I often have the opportunity to be creative,”</i> by gender and whether respondents were members of a CDT	55
Figure 12: Respondents’ rating of their relationship with their main supervisor	57
Figure 13: Respondents’ rating of their relationship with their main supervisor by current year of study and gender	58
Figure 14: Whether respondents’ reported having a second supervisor and whether they reported meeting with them regularly by gender and by membership of a CDT	58
Figure 15: Respondents’ opinion of the contact time they had with their main supervisor	61

Figure 16: Proportions of respondents who reported holding prearranged meetings with their main supervisor by gender and current year of study	64
Figure 17: Proportions of respondents who confirmed that their, <i>“home department runs social events which give me the opportunity to meet other doctoral students and members of the department,”</i> by gender and whether respondents were members of CDTs	73
Figure 18: Proportions of respondents who confirmed that their, <i>“Graduate School runs social events which give me the opportunity to meet other doctoral students and members of the department,”</i> by gender and whether respondents were members of CDTs	73
Figure 19: How strongly respondents agreed with the statement, <i>“While on my doctorate, I have felt socially isolated,”</i> by gender and whether respondents were members of a CDT	74
Figure 20: Proportions of respondents who confirmed that, <i>“There is doctoral student representation on my department's equality and diversity committee (Juno committee),”</i> by gender and by whether respondents were members of CDTs	75
Figure 21: Whether there is doctoral student representation in important meetings and whether the outcomes of those meetings are relayed back by gender and by whether respondents were members of CDTs	76
Figure 22: How strongly respondents agreed with the statement, <i>“I have been treated as an equal by my fellow students,”</i> by gender and whether respondents were members of a CDT	76
Figure 23: How strongly respondents agreed with the statement, <i>“Academic staff give male and female students the same opportunities and support,”</i> by gender and whether respondents were members of a CDT	77
Figure 24: How strongly respondents agreed with the statement, <i>“I feel that there should be more female academics,”</i> by gender and whether respondents were members of a CDT	78
Figure 25: How strongly respondents agreed with the statement, <i>“I feel my department would benefit if there was a more diverse mix of people and staff,”</i> by gender and whether respondents were members of a CDT	79
Figure 26: How strongly respondents agreed with the statement, <i>“There is a strong equality and diversity culture,”</i> by gender and whether respondents were members of a CDT	79
Figure 27: How strongly respondents agreed with the statement, <i>“Doctoral students are respected and well regarded by staff,”</i> by gender and whether respondents were members of a CDT	80
Figure 28: How strongly respondents' agreed with the statement, <i>“I am gaining transferable skills,”</i> by gender and by whether respondents are members of CDTs	81
Figure 29: How strongly respondents' agreed with the statement, <i>“The quality of the transferable skills training I receive is high,”</i> by gender and by whether respondents were members of CDTs	82
Figure 30: How respondents rated their knowledge of career options within academia by gender and by current year of study	89

Figure 31: How respondents rated their awareness of career options outside academia by gender and whether respondents had worked before their doctoral, and by current year of study and gender	90
Figure 32: How strongly respondents agreed with the statement, <i>“Undertaking a doctorate has helped me clarify my career plans,”</i> by gender and whether respondents were members of CDTs	91
Figure 33: How strongly respondents agreed with the statement, <i>“Undertaking a doctorate has helped me clarify my career plans,”</i> by gender and current year of study	92
Figure 34: How strongly respondents agreed with the statement, <i>“I now have a better understanding of a scientist’s work,”</i> by gender and whether respondents were members of CDTs	93
Figure 35: How strongly respondents agreed with the statement, <i>“I feel confident that I would make a good research scientist,”</i> by gender and by whether respondents were members of a CDT	103
Figure 36: How strongly respondents agreed with the statement, <i>“I feel confident that I would make a good research scientist,”</i> by year of study and gender	104
Figure 37: How strongly respondents agreed with the statement, <i>“I feel confident that I would make a good research scientist,”</i> by nature of research project and gender	105
Figure 38: How strongly respondents agreed with the statement, <i>“I feel confident that I would make a good research scientist,”</i> by whether the research project is physics or astronomy-based and gender	106
Figure 39: Whether respondents believed that they possessed the majority of technical skills that employers often look for by gender and by whether respondents were members of a CDT	106
Figure 40: Whether respondents believed that they possessed the majority of technical skills that employers often look for by current year of study and gender	107
Figure 41: How strongly respondents agreed with the statement, <i>“My experiences of studying for my doctorate have provided me with good role models to encourage me to pursue a career in scientific research,”</i> by whether the research project is physics or astronomy-based and gender	108
Figure 42: The effect of respondents’ experiences as physics/astronomy doctoral students on career intentions by gender and by whether respondents are members of a CDT	109
Figure 43: The effect of respondents’ experiences as physics/astronomy doctoral students on career intentions by year of study and gender	110
Figure 44: The extent to which respondents reported having planned their careers by gender and by whether respondents were members of a CDT	111
Figure 45: The extent to which respondents reported having planned their careers by gender and by current year of study	112

Figure 46: Whether respondents who had not accepted a job or training offer intended to seek employment as a research scientist, or undertake further study related to research by gender and current year of study 122

Figure 47: Whether respondents who had not accepted a job or training offer intended to seek employment as postdoctoral researcher in a university/research institute 124

