



PNN PhD Survey

Asking the relevant questions

PhD criteria
Open Science
Recognition and rewards
Career

Promovendi Netwerk Nederland

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Summary

PhD criteria

- 83.9% of the PhDs indicate that they need to meet specific criteria in order to get their PhD. 33.4%-point indicate to have to meet formal criteria, 29.1%-point indicate having to meet criteria that are informal, and 21.4% have to meet criteria, but do not know whether these criteria are formal or not. 9.4% of the PhDs state that they do not have to meet criteria.
- The PhDs who need to meet criteria (of any type) on average need to meet 2.3 criteria, with 2 criteria being most common (36.7%). The most common criterion is a number of European Credits (ECs) (60.5%), followed by a number of published articles (53.6%).
- When PhDs need to have a number of published articles, on average they need 2.94 published articles. When a number of *publishable* articles is required, on average PhDs need 3.53 of them. If a number of chapters is required, on average PhDs need to write 4.37 chapters. If ECs need to be acquired, most PhDs need to obtain 30 ECs (65.9%).
- At University Medical Centers (UMCs), the criteria are relatively more often formal than at universities, where informal criteria are practically equally as common as formal criteria. PhDs at universities need to meet more criteria than PhDs at other types of institutions. PhDs at UMCs relatively often need to have a number of published articles, while PhDs at universities more often need to obtain ECs.
- In Agricultural sciences and Law, formal criteria are most common, while informal criteria are most common in Natural sciences and Technical sciences and Engineering. PhDs in Agricultural sciences need to meet most criteria (2.79), while PhDs in Law need to meet least criteria (1.74). Obtaining ECs is most common in Natural sciences, Agricultural sciences and Technical sciences and Engineering, while PhDs in Medical and Health sciences most often need to have published articles.
- While employee PhDs and scholarship PhDs relatively often have to meet informal criteria, external PhDs and other types of PhDs most often need to meet formal criteria. Scholarship PhDs indicate the highest number of criteria to meet (2.73), and external PhDs the lowest number of criteria (1.98). Employee PhDs and scholarship PhDs most often have to obtain ECs, while external PhDs and 'other' types of PhDs most often indicate that they need to have published articles.

Open science

- 25.9% of the PhDs are not encouraged to engage in Open Science practices. Publishing Open Access is the most common encouraged Open Science practice (63.3%).
- 42.3% of the external PhDs are not encouraged to engage in Open Science practices. While 47.4% of the PhDs in Law are not encouraged to engage in Open Science, PhDs in Technical sciences and Engineering are most often encouraged to engage in Open Science practices, with only 16.4% indicating that they are not encouraged to engage in Open Science practices.

Recognition and rewards

- In the assessment of their PhD projects, research is the most important topic PhDs want to have taken into account (96.3%). Relatively often, PhDs also want teaching (52.4%) and courses (51.8%) to be taken into account in the assessment of their PhD project.
- Only 27% of the PhDs want Open Science to be taken into account in the assessment of their PhD project.
- External PhDs attach less value to all possible activities that could be included in the PhD assessment than the rest of PhDs, which seems to indicate that they are less involved in such activities.

- PhDs in Natural sciences more often indicate they would like Open Science to be taken into account in their PhD assessment (32.4%), while this is only the case for 12.1% of the PhDs in Law.

Career

- Only 43.3% of the PhDs receive career guidance. PhDs in Medical and Health sciences relatively least often receive career guidance (34.7%), while PhDs in Economics and business most often receive career guidance (52%).
- 54.4% of the PhDs who do not get career guidance would like to receive career guidance, especially employee PhDs (56.4%), scholarship PhDs (65.2%), and PhDs in Law (65.7%).
- On average, PhDs who do get career guidance are satisfied with the guidance they get (3.5 on a scale of 1 to 5). PhDs in Agricultural sciences are most satisfied (3.85), PhDs in the Humanities are relatively least satisfied (3.08).
- PhDs in institutions other than (university) medical centers generally aspire to obtain research positions outside academia (66.6%) or inside academia (61.1%). PhDs at (University) medical centers aspire to obtain research positions in UMCs (44%), research positions outside academia (35.8%) and non-research positions in UMCs (25.2%).
- Women less often indicate to want to work in academia than men, both for PhDs outside medical centers (57% versus 66.4%) and inside medical centers (29.4% versus 37.1%).
- Scholarship PhDs most often aspire to have careers in academia (65.4%), while the other types of PhDs more often aspire to have careers in research outside academia. PhDs in Humanities, Behavioural and Social sciences and Law also relatively more often aspire to have a research career in academia.

Recommendations

- Let go of quantitative criteria for PhD trajectories and dissertations. In the transition to the new Recognition and Rewards of academics, Dutch academia is moving away from quantitative metrics. This should also be applied to PhDs. This means that dissertations should not be judged based on the number of publications/chapters/articles, but on the quality of its contents. This policy should be formally applied at all institutions so that PhDs who encounter informal quantitative criteria, for instance when a supervisor states that a number of publications is required, are always protected by this formal policy. The requirements for dissertations should be adapted to the field, instead of institutionalized.
- Broaden up the scope of the PhD assessment. At the moment, many PhDs are assessed on their dissertations only. However, doing a PhD is so much more than just writing a dissertation. Many PhDs are involved in teaching, they take courses, engage in the valorisation of their research, represent PhDs in PhD councils or employee representation, or do internships elsewhere. This all contributes to the development of the PhD, as an academic but also in a broader respect. It should therefore be possible to take these activities into account in the assessment of the PhD as well. This does *not* mean that all PhDs should engage in all of these activities, but rather that if a PhD chooses to do something other than just research, this should be recognized and valued as well. Some institutions have already implemented a policy stating that PhDs can add a chapter to their dissertation in which they can elaborate on all the other things they have done during the PhD project.
- Though the majority of PhDs is already encouraged to engage in Open Science, there is still some progress to be made, as 25.9% of PhDs is not encouraged to engage in Open Science yet. Further progress can be made by letting go of requirements for publishing in journals with certain quality criteria, but encouraging publishing Open Access instead. This includes institutes providing financial support for conducting Open Science research; as well as providing training on Open Science practices.
- Provide all PhDs with proper career development training. There is no room for all PhDs to progress in academia, so they need to be prepared for careers outside academia as well. Career development trainings can be a useful instrument for this. This career development should not be limited to short trainings or condensed at the end of the trajectory, but be integrated in the total PhD trajectory, including the starting stages. This can include encouraging collaborations with external parties
- Outside of the context of career development training, more attention should be paid to the development of broader skills than just research. This can be aligned with the broadening of the PhD assessment, encouraging PhDs to broaden their horizons. This means that, in the interest of the PhDs, supervisors should not always prioritize their projects, but also allow them to engage in non-project related activities, such as internships outside academia or employee representation.

Samenvatting

Promotiecriteria

- 83,9% van de promovendi zegt aan bepaalde criteria te moeten voldoen om te kunnen promoveren. 33,4% zegt aan formele criteria te moeten voldoen, 29,1% zegt aan informele criteria te moeten voldoen en 21,4% zegt aan criteria te moeten voldoen, maar weet niet of deze criteria formeel zijn of niet. 9,4% van de promovendi geeft aan dat er geen criteria zijn om aan te voldoen.
- De promovendi die moeten voldoen aan criteria (van welke aard dan ook) moeten gemiddeld aan 2,3 criteria voldoen, waarbij 2 criteria het meest gangbaar zijn (36,7%). Het meest voorkomende criterium is een aantal studiepunten (EC's) (60,5%), gevolgd door een aantal publicaties (53,6%).
- Wanneer promovendi een aantal artikelen moet publiceren, zijn er gemiddeld 2,94 publicaties nodig. Wanneer een aantal *publiceerbare* artikelen vereist is, hebben promovendi er gemiddeld 3,53 nodig. Wanneer een aantal hoofdstukken vereist is, moeten promovendi gemiddeld 4,37 hoofdstukken schrijven. Als er een aantal EC's moet worden behaald, zijn dat er meestal 30 (65,9%).
- Bij universitaire medische centra (UMC's) zijn de criteria relatief vaker formeel dan bij universiteiten, waar informele criteria vrijwel even vaak worden gehanteerd als formele criteria. Promovendi aan universiteiten moeten aan meer criteria voldoen dan promovendi aan andere soorten instellingen. Promovendi aan UMC's moeten relatief vaak een aantal publicaties hebben, terwijl promovendi aan universiteiten vaker EC's moeten verzamelen.
- In de landbouwwetenschappen en de rechtswetenschappen zijn formele criteria het meest gangbaar, terwijl informele criteria het meest gangbaar zijn in de natuurwetenschappen en de technische wetenschappen. Promovendi in de landbouwwetenschappen moeten aan de meeste criteria voldoen (2,79), terwijl promovendi in de rechtswetenschappen aan de minste criteria hoeven te voldoen (1,74). Het verzamelen van EC's komt het meest voor in de natuurwetenschappen, de landbouwwetenschappen en de technische wetenschappen, terwijl promovendi in de medische en gezondheidswetenschappen het vaakst een aantal publicaties moeten hebben.
- Terwijl werknemerpromovendi en beurspromovendi relatief vaak aan informele criteria moeten voldoen, moeten buitenpromovendi en overige typen promovendi vaker aan formele criteria voldoen. Beurspromovendi geven het hoogste aantal criteria aan waaraan moet worden voldaan (2,73), en buitenpromovendi het laagste aantal criteria (1,98). Werknemerpromovendi en beurspromovendi moeten meestal EC's verzamelen, terwijl buitenpromovendi en 'andere' soorten PhD's meestal aangeven dat ze een aantal publicaties moeten hebben.

Open Science

- 25,9% van de promovendi wordt niet aangemoedigd om zich bezig te houden met Open Science-praktijken. Open Access publiceren is de meest voorkomende, aangemoedigde Open Science-praktijk (63,3%).
- 42,3% van de buitenpromovendi wordt niet aangemoedigd om deel te nemen aan Open Science-praktijken. Terwijl 47,4% van de promovendi in de rechtswetenschappen niet wordt aangemoedigd om aan Open Science te doen, worden promovendi in Technische Wetenschappen het vaakst aangemoedigd om deel te nemen aan Open Science-praktijken: slechts 16,4% geeft aan dat ze niet worden aangemoedigd om deel te nemen aan Open Science-praktijken.

Erkennen en waarderen

- Bij de beoordeling van hun proefschrift is onderzoek het belangrijkste onderwerp dat promovendi mee willen laten nemen in de beoordeling (96,3%). Promovendi willen relatief

vaak ook onderwijs (52,4%) en gevolgd cursussen (51,8%) mee laten nemen in de beoordeling van hun proefschriften.

- Slechts 27% van de promovendi wil dat Open Science wordt meegenomen in de beoordeling van hun proefschriften.
- Buitenpromovendi hechten minder waarde aan alle mogelijke onderwerpen die zouden kunnen worden meegenomen in hun beoordeling dan de andere promovendi, wat aan lijkt te geven dat ze minder betrokken zijn bij dergelijke activiteiten.
- Promovendi in de natuurwetenschappen geven vaker aan dat ze willen dat Open Science wordt meegenomen in de beoordeling van hun proefschrift (32,4%), terwijl dit slechts het geval is voor 12,1% van de promovendi in de rechtswetenschappen.

Carrière

- Slechts 43,3% van de promovendi krijgt loopbaanbegeleiding. Promovendi in de medische en gezondheidswetenschappen krijgen relatief het minst vaak loopbaanbegeleiding (34,7%), promovendi in de economie en het bedrijfsleven krijgen het vaakst loopbaanbegeleiding (52%).
- 54,4% van de promovendi die geen loopbaanbegeleiding krijgen, zouden wel graag loopbaanbegeleiding krijgen, vooral werknemerpromovendi (56,4%), beurspromovendi (65,2%), en promovendi in de rechtswetenschappen (65,7%).
- Gemiddeld zijn promovendi die wel loopbaanbegeleiding krijgen tevreden met de begeleiding die ze krijgen (3,5 op een schaal van 1 tot 5). De promovendi in de landbouwwetenschappen zijn het meest tevreden (3,85), de promovendi in de geesteswetenschappen zijn het minst tevreden (3,08).
- Promovendi in andere instellingen dan medische centra ambiëren in het algemeen onderzoeksfuncties buiten de wetenschap (66,6%) of binnen de wetenschap (61,1%). Promovendi in (universitaire) medische centra ambiëren onderzoeksfuncties in UMC's (44%), onderzoeksfuncties buiten de wetenschap (35,8%) en niet-onderzoeksfuncties in UMC's (25,2%).
- Vrouwen geven minder vaak aan een carrière in de wetenschap te ambiëren dan mannen, zowel voor promovendi buiten de medische centra (57% versus 66,4%) als binnen de medische centra (29,4% versus 37,1%).
- Beurspromovendi ambiëren meestal een carrière in de wetenschap (65,4%), terwijl de andere soorten promovendi vaker een carrière in onderzoek buiten de wetenschap ambiëren. PhD's in de geesteswetenschappen, gedrags- en sociale wetenschappen en rechten ambiëren ook relatief vaker een carrière in onderzoek in de wetenschap.

Aanbevelingen

- Laat kwantitatieve criteria voor promotietrajecten en proefschriften vallen. In de overgang naar het nieuwe Erkennen en Waarderen van academici, neemt de Nederlandse academische wereld afstand van de kwantitatieve kwaliteitsindicatoren. Dit zou ook moeten worden toegepast bij promovendi. Dit betekent dat proefschriften niet alleen moeten worden beoordeeld op basis van het aantal publicaties/hoofdstukken/artikelen, maar op basis van de kwaliteit van de inhoud. Dit beleid zou formeel moeten worden toegepast op alle instellingen, zodat promovendi die te maken krijgen met informele kwantitatieve criteria, bijvoorbeeld wanneer een promotor aangeeft dat een aantal publicaties nodig is, altijd kunnen terugvallen op dit formele beleid. De vereisten voor proefschriften zouden wel kunnen worden aangepast op het vakgebied, en hoeven niet noodzakelijkerwijs algemeen geldend te zijn.
- Verbreed de scope van de beoordeling van promovendi. Op dit moment worden veel promovendi alleen op hun proefschrift beoordeeld. Promoveren is echter zoveel meer dan alleen het schrijven van een proefschrift. Veel promovendi zijn betrokken bij het onderwijs, volgen cursussen, werken aan de valorisatie van hun onderzoek, vertegenwoordigen promovendi in promovendiraden of werknemersvertegenwoordiging, of lopen stage buiten hun instelling. Dit alles draagt bij aan de ontwikkeling van de promovendus, als academicus maar ook in een breder opzicht, aangezien niet alle promovendi een carrière in de wetenschap nastreven. Het zou dus mogelijk moeten zijn om deze activiteiten ook mee te nemen in de beoordeling van promovendi. Dit betekent echter niet dat alle promovendi zich met al deze activiteiten moeten bezighouden, maar wel dat, als een promovendus ervoor kiest om iets anders te doen dan alleen maar onderzoek, dit ook moet worden erkend en gewaardeerd. Sommige instellingen hebben al als beleid geïmplementeerd dat promovendi een hoofdstuk kunnen toevoegen aan hun proefschrift waarin ze alle andere dingen die ze tijdens het promotietraject hebben gedaan kunnen toelichten.
- Er is nog steeds ruimte voor vooruitgang in het bevorderen van Open Science voor promovendi. Hoewel het merendeel van de promovendi al wordt aangemoedigd om zich met Open Science bezig te houden, wordt 25,9% van de promovendi nog niet aangemoedigd om zich met Open Science bezig te houden. Verdere vooruitgang kan worden geboekt door eisen voor het publiceren in tijdschriften met bepaalde kwaliteitscriteria los te laten, maar in plaats daarvan Open Access publiceren en andere vormen van Open Science aan te moedigen. Dit betekent ook dat instellingen financiële ondersteuning moeten bieden voor Open Science onderzoek, en dat ze ook Open Science trainingen zouden moeten aanbieden.
- Zorg voor een goede loopbaanontwikkelingstraining voor alle promovendi. Niet alle promovendi kunnen of willen doorgaan in de academische wereld, dus ze moeten ook voorbereid zijn op een carrière buiten de academische wereld. Loopbaanontwikkelingstrainingen kunnen hiervoor een nuttig instrument zijn. Deze loopbaanontwikkeling moet niet beperkt korte trainingen aan het eind van het traject, maar geïntegreerd worden in het totale promotietraject, ook in het begin van het traject. Onderdeel hiervan kan het aanmoedigen van samenwerkingen met externe partijen zijn.
- Ook buiten de context van de loopbaanontwikkelingstraining zou echter meer aandacht kunnen worden besteed aan het ontwikkelen van bredere vaardigheden dan alleen onderzoek. Dit kan worden afgestemd op de verbreding van de beoordeling van promovendi, waardoor promovendi worden aangemoedigd hun horizon te verbreden. Dit betekent dat de begeleiders, in het belang van de promovendi, niet altijd prioriteit moeten geven aan hun projecten, maar hen ook in staat moeten stellen om niet-projectgebonden activiteiten uit te voeren, zoals stages buiten de wetenschap of werknemersvertegenwoordiging.

Introduction

Science is in transition. There are several interrelated processes going on that strive to take academia from a closed, hierarchical, competitive structure to an open, healthy working environment. Two processes are key in this: the steps towards a new system of Recognition and Rewards of academics, and the process to implement Open Science. The voices of young researchers are often less prominent in these discussions. They however are the ones that will be working the longest in these new systems. Their opinion should therefore be heard as well.

The PNN PhD survey, circulated between March 2nd and May 10th 2020, used the opportunity to ask PhDs in the Netherlands about the criteria they are currently assessed on, and which topics they think are important in the assessment of their PhD project. We furthermore asked them whether they are encouraged to engage in Open Science, and if so, what kinds of practices they are encouraged to engage in. Finally, we were interested in the career aspirations of PhDs, whether they intend to stay in academia or not. More information about this survey can be found in the [PNN Survey report on Survey information, Demographics and COVID-19](#).

This report presents the results of the PNN PhD survey on these topics, showing how PhDs in the Netherlands think about these topics. We encourage policy makers to use these results in the further development of policies concerning the new system of Recognition and Rewards and Open Science.

Methodology

PhD criteria

The questions concerning the PhD criteria were asked to all survey respondents. To measure the extent to which PhDs need to meet criteria in order to get their PhDs, we asked the question: “Are there any performance criteria you need to meet in order to get your PhD? (e.g. number of publications, number of submitted articles, number of chapters...)”. The PhDs were given four possible options:

- Yes, the criteria are formal (written down in regulations)
- Yes, but these criteria are informal and not written down in regulations
- Yes, but I don't know whether these criteria are formal or informal
- No, there are no fixed criteria

If the response to this question was any of the first three answers, this question was followed up by the question: “Which performance criteria do you need to meet in order to get your PhD?”. PhDs could then choose multiple options out of the following:

- A number of published articles, namely:
- A number of submitted articles, namely:
- A number of published articles in journal with a specified quality criterion, namely:
- A number of publishable¹ articles, namely:
- A number of chapters, namely:
- A number of ECs, namely:
- Other, namely:

As these items all took the form of dummy-variables, we computed a variable indicating how many criteria the PhDs stated to have to meet by summing up the scores on these items. Furthermore, for each of these items, the respondents were given the option to also answer the required number related to that option. As we unfortunately did not restrict these open answers to be numeric only, we had to code the given answers (that often contained text) manually to be numeric. Ambiguous answers (such as: “1/2 articles”) were coded to the mean (in this example: 1.5).² For the item concerning ECs, some PhDs filled in the number of hours they were required to spend in courses. These were recalculated into ECs by dividing the number of hours by 28. In the figures, we present ECs divided by 10, to allow for printing all criteria in one figure while keeping the results readable.

Open Science

All participants were asked about what types of Open Science practices they are encouraged to use in their PhD projects. The following seven answer options were given:

- Publishing open access
- Sharing research data
- Publishing codes/syntax
- Pre-registration
- Replication research
- Other, namely:
- I am not encouraged to engage in Open Science

¹ With publishable articles, we mean articles that do not necessarily have to be published, but are of such a level of quality that these articles could be published.

² An overview of all manual codings of these questions can be requested from the authors.

Recognition and Rewards

All participants were asked about what topics should be taken into account in the overall assessment of their PhD project. The following answer options were given:

- Research
- Teaching
- Courses/ECs³
- Valorisation/research impact
- Management tasks
- Additional activities
- Open Science
- Other, namely:

Participants that stated to be physician-researchers had an additional answer option:

- Clinical tasks/patient care

Results of these questions are presented for the total group of PhDs and per discipline, institution and type of PhD arrangement.

Career

On behalf of career guidance and career aspirations, all PhDs were asked the following questions:

- Do you receive career guidance from your institution? Yes/No.

If the answer was no, the following question was asked:

- Do you want to receive career guidance from your institution? Yes/No.

If the answer was yes, the following question was asked:

- How satisfied are you with the career guidance offered by your institution?
Very satisfied/satisfied/neither satisfied, nor dissatisfied/dissatisfied/very dissatisfied.

We asked PhDs that stated to work in institutions other than UMC's or non-University Medical Centers, in what sector they would like to work after obtaining their PhD. The following possible answers were given:

- Research inside academia
- Research outside academia
- Non-research
- Other, namely:

PhDs working in UMC's were asked where they wanted to work after obtaining their PhD. The following possible answers were given:

- University Medical Centre, research position
- University Medical Centre, non-research position
- Non-University Medical Centre
- Research inside academia
- Research outside academia
- Non-research, outside academia and medical centres
- Other, namely:

³ In the survey, we have mistakenly used the term ECTS rather than ECs. In the report, we will use the correct term ECs.

General variables

The results on the topics of this report are often presented using grouping variables. Here we shortly describe the construction of these variables.

Type of institution

The respondents were asked at what kind of institution they were doing their PhD. The respondents could choose between University, University Medical Center, non-University Medical Center, Research institutes connected to Universities, Independent Research Institutes Universities of Applied Sciences and Other. For those who answered “Other, namely...” and provided an open answer (n=22), we analysed the answers to see whether their institution could be categorized into one of the existing categories. This was the case for 9 respondents.

Due to small numbers in the categories other than University and UMC, we will use a 3-group classification of type of institution when discussing other survey results. In this classification, we combine the categories University and Research Institution affiliated to a university into one category, keep a separate category for University Medical Centers, and combine the independent Research Institutes, non-University Medical Centers, Universities of Applied Sciences and other into one category, labelled ‘Other’.

Type of PhD arrangement

The type of PhD arrangements was measured using a complex procedure that allowed to capture the large variation in PhD arrangements that exist in the Dutch academic system. For this purpose, different classification questions were used for different types of institutions. These institution-specific typologies were subsequently combined into one overall typology of PhD arrangements. A detailed account of this procedure can be found in the PNN Survey report on Survey information, demographics and COVID-19. The PhD typology used is the overall PhD typology that distinguishes between “Employee PhDs”, “Scholarship PhDs”, “External PhDs” and “Other” types of PhDs.

Discipline

We asked all PhDs in which discipline they are doing their PhDs. We used the HOOP-classification of disciplines. A significant proportion of the PhDs chose the option ‘Other, namely’ (6.4%). We analysed the responses to this item, and though some disciplines were indeed hard to classify (35%), many could be easily classified in one of the eight categories. We therefore manually assigned these PhDs to the matching discipline.⁴

Gender

At the beginning of the survey, we asked the participants what their gender is. Women are overrepresented in the survey: two thirds of the respondents is female, while less than one third is male. 0.4% of the participants did not identify as male or female, 1.2% chose the option prefer not to say, and 1 respondent did not answer this question. Given the low numbers for the category other and prefer not to say, we will not display any results for these categories in further analyses.

⁴ An overview of which types of fields have been classified manually can be requested from the authors.

Results

PhD criteria

Figure 1.1 gives insights in the extent to which PhDs need to meet criteria to get their PhD. One third of the respondents indicate that they have to meet formal, written down criteria to get their PhD. 29.1% state that they have to meet criteria, but that these criteria are informal and not written down in regulations. A group of 21.4% indicates to have to meet criteria, but does not know whether these criteria are formal or informal. Only 9.4% indicate not to have to meet any criteria. 6.8% of the respondents did not answer this question, which is likely due to the lack of an option "I don't know".

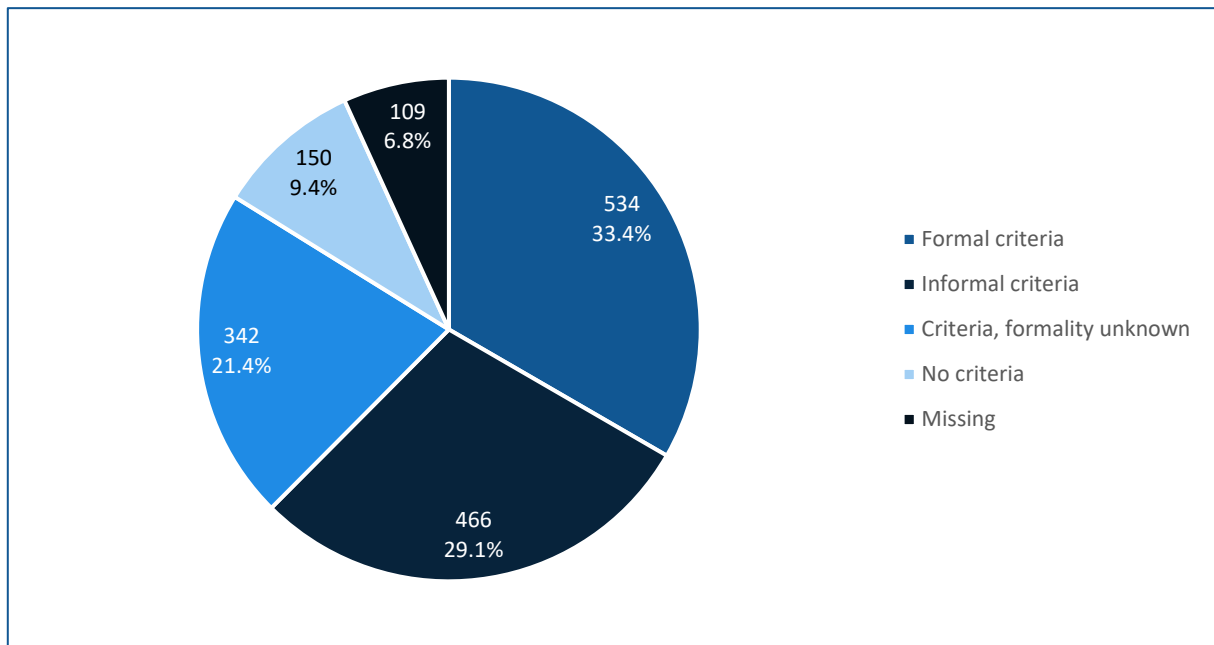


Figure 1.1: Responses to the question: "Are there any performance criteria you need to meet in order to get your PhD?" (n=1,492).

Those who indicated that they had to meet any type of criteria could subsequently select which types of criteria they had to meet. We then summed up how many criteria the PhDs had selected in total (Figure 1.2). Most PhDs selected two criteria (36.7%), followed shortly by three criteria (25.9%) and one criterion (25.1%). 12.3% of the PhDs indicated that they needed to meet four criteria or more. On average, the respondents selected 2.3 types of criteria, with a standard deviation of 1.08.

With regards to which type of criteria PhDs need to meet (Figure 1.3), we see that a number of ECs is most frequently mentioned (60.5%), followed by a number of published articles (53.6%). Least common are criteria to have a number of published articles that meet quality criteria (such as publishing in journals with a pre-specified impact factor or in the top n% of the field).

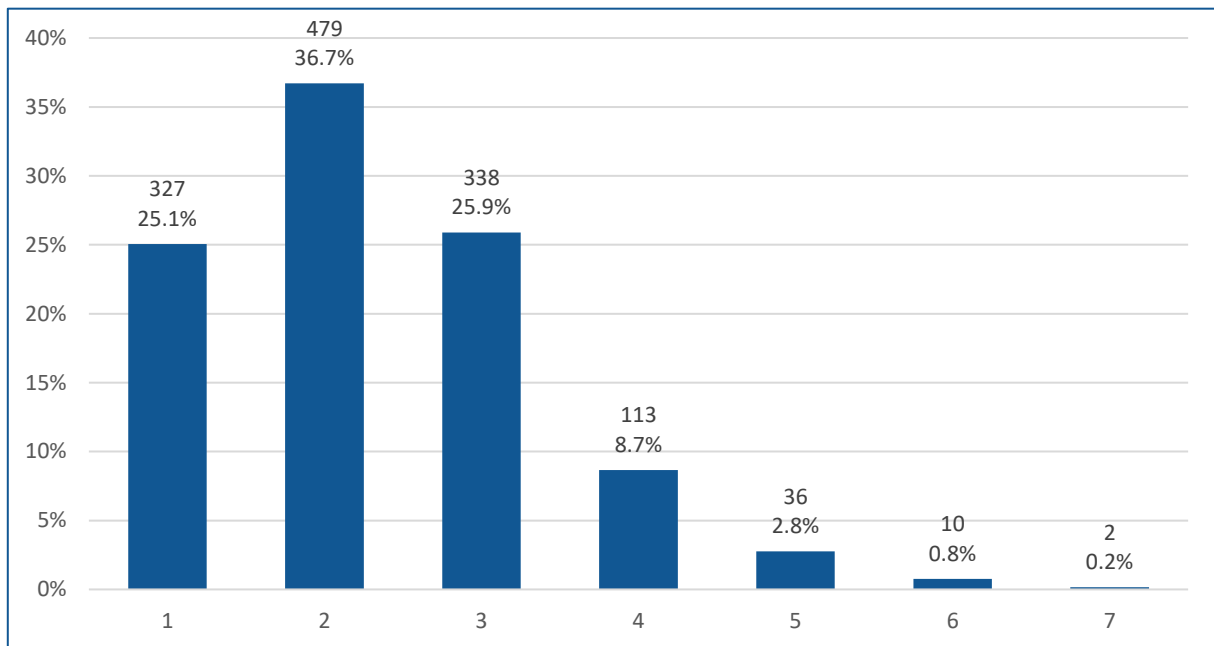


Figure 1.2: Number of criteria selected by the PhDs (n=1,305, mean=2.3, standard deviation=1.08).

The criterion option “Other, namely” was also selected quite frequently (12%). In this option, PhDs frequently mentioned that they were required to write a monograph or attend a number of conferences, but they also often explained here that they needed to take courses, indicating that the option “A number of ECTS” might not have been clear to all PhDs. We however did not include these responses in the category “A number of ECTS”.

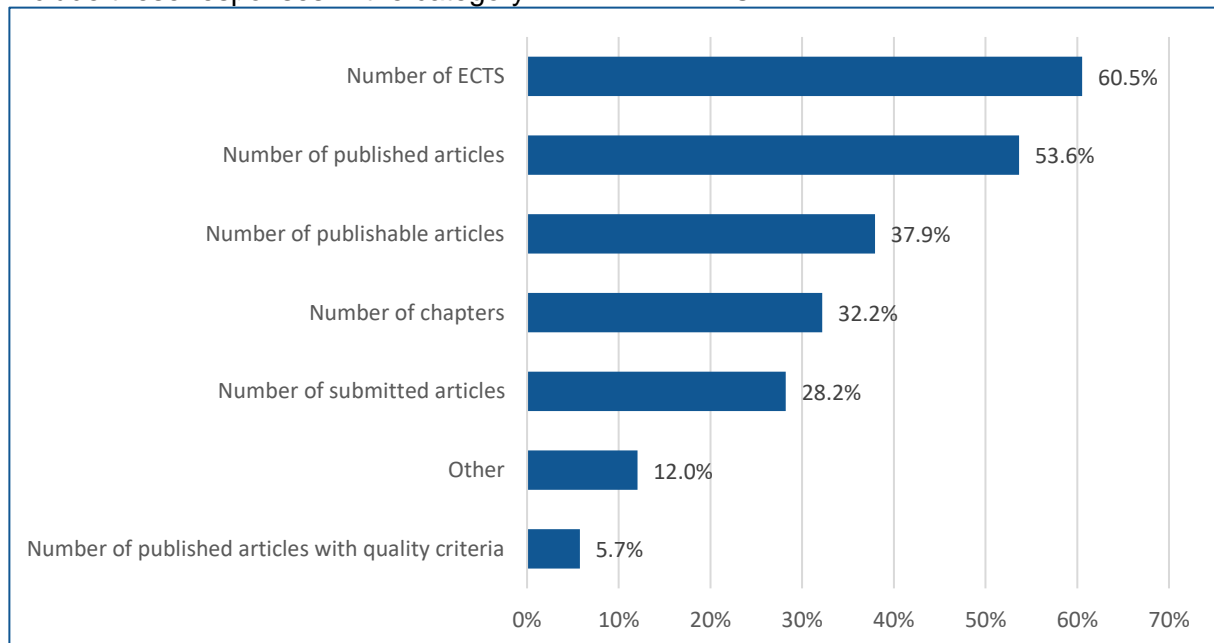


Figure 1.3: Types of performance criteria PhDs indicated they need to meet to get their PhD

Looking at the extent to which these criteria are formal (Figure 1.4), we see that Other types of criteria are relatively most often formal criteria, followed by the criterion to have a number of published articles with quality criteria. The criterion to have a number of chapters is most often an informal criterion, with a number of publishable articles coming in second place. The criterion to have a number of submitted articles as accompanied with relatively a lot of insecurity about whether this is a formal or an informal criterion.

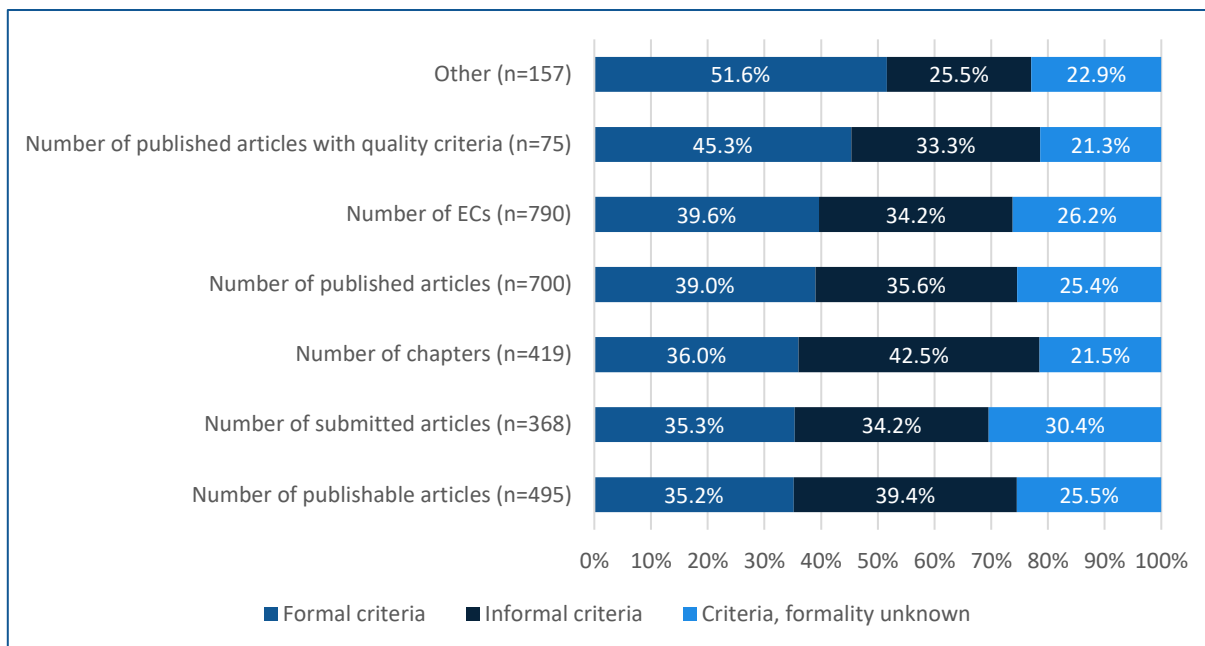


Figure 1.4: The formality of the different types of performance criteria.

The average amounts related to the criteria can be found in Figure 1.5. PhDs who are required to have a number of published articles need to have 2.94 articles published. The criteria for those who need a number of submitted articles or articles meeting quality criteria are just slightly lower, with 2.78 and 2.73 articles respectively. The required number of publishable articles is significantly higher, at 3.53. If a number of chapters is required, then 4.37 chapters are required. For readability, the number of ECs are omitted from figure 1.5. When ECs are required, then the average required amount is 29 ECs. However, the largest group of PhDs who need to acquire ECs need to get 30 ECs (65.9%).

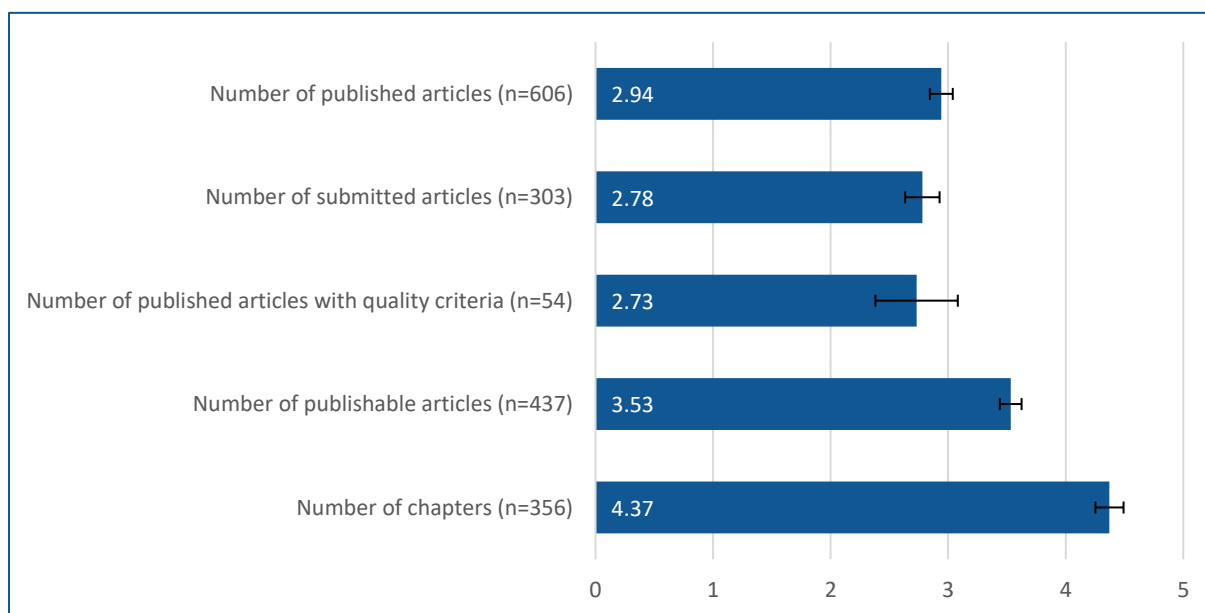


Figure 1.5: The amounts related to the criteria. 95%-confidence intervals included.

An analysis of the relation between the amounts of the criteria and the formality of the criteria (Figure 1.6) shows that it does not matter at all whether the criterion is formal or not: the number of required articles or chapters is the same, regardless of whether the rules are formal, informal or when the formality of the criteria is unknown. When criteria are informal, the number of required ECs is on average slightly lower (28 rather than 29), but also in that group, the majority needs to collect 30 ECs (63.4%).

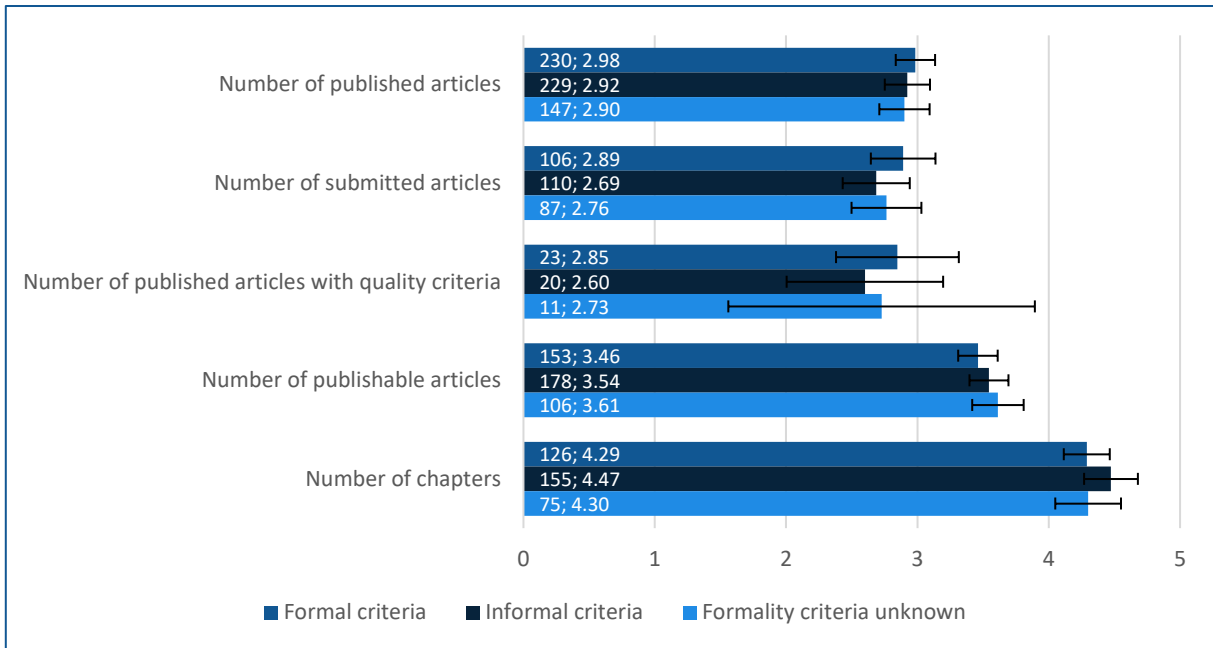


Figure 1.6: The amounts related to the criteria, dependent on the formality of the criterion. N for subgroups and mean displayed in figure. 95%-confidence intervals included.

In the next sections, we will look into differences between types of institutions, disciplines and types of PhDs in their PhD criteria. As the numbers of individuals reporting an amount related to the criteria becomes too low for a large number of these subgroups, we will refrain from presenting these results per subgroup.

Type of institution

We furthermore investigate to what extent the presence of PhD criteria and the type of PhD criteria per type of institution. Figure 1.7 shows that formal criteria are most common at all types of institutions. However, these are relatively more often found at University Medical Centers (UMCs). Universities and other types of institutions have relatively a lot of informal criteria, whereas other types of institutions also relatively often have criteria of which the formality is unknown. It is least common at all types of institutions to have no criteria at all, but this is relatively more often the case at Universities, while it is very rare at UMCs.

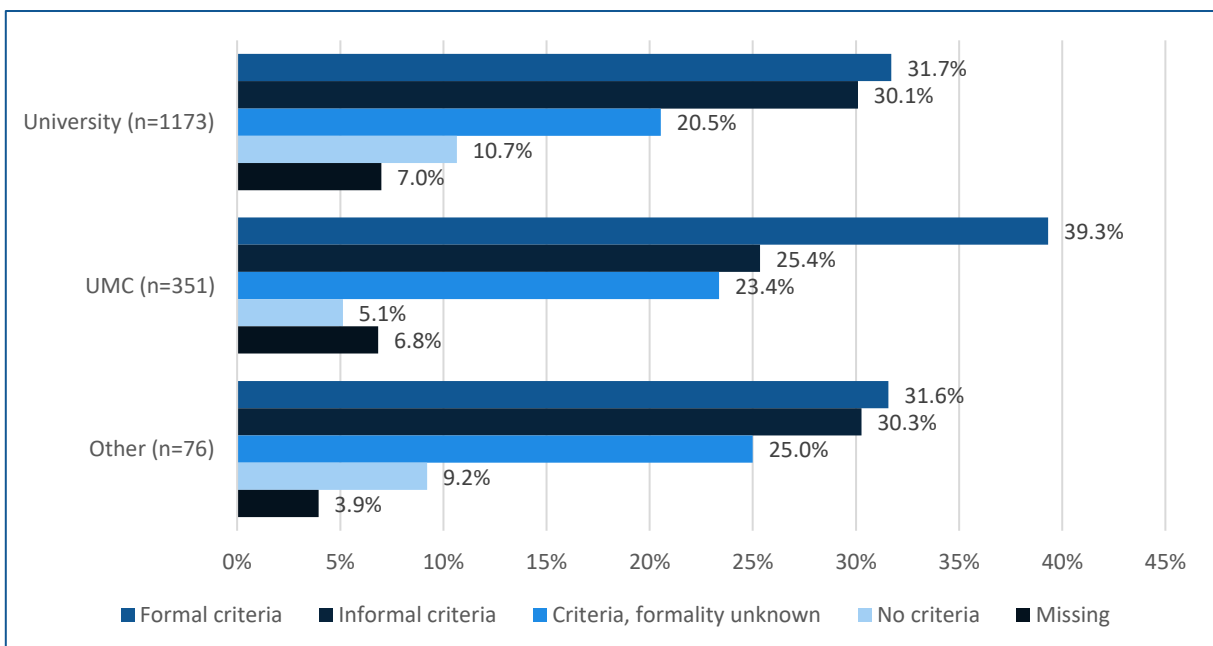


Figure 1.7: Formality of criteria, per type of institution.

The number of criteria PhDs need to meet also varied per type of institution (Figure 1.8). The average number of criteria was highest at universities, followed by UMCs. The PhDs at other types of institutions mentioned significantly less criteria than PhDs at universities, but not significantly less than UMC PhDs.

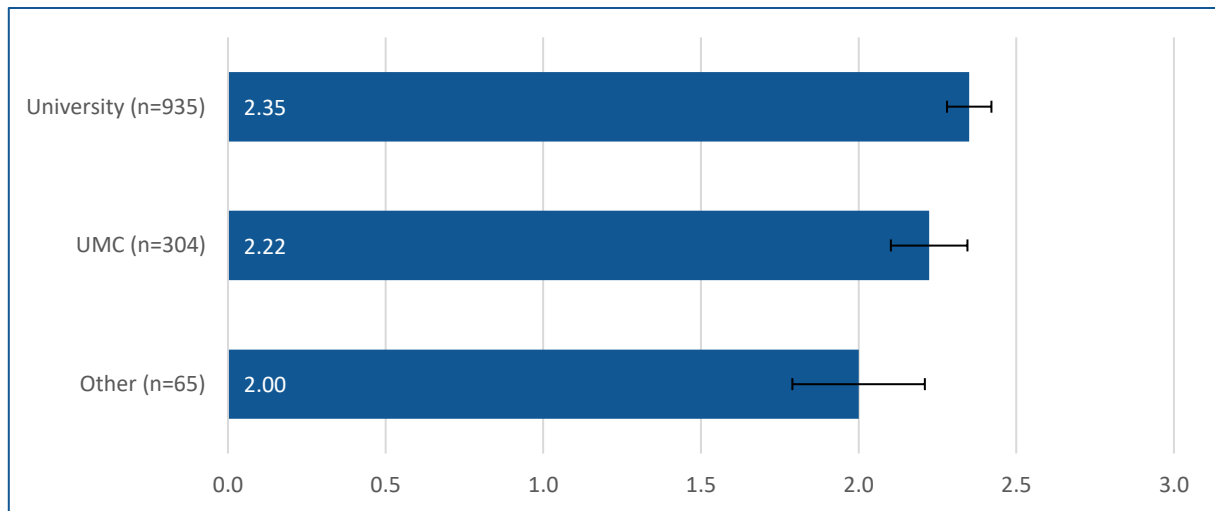


Figure 1.8: Number of criteria, per type of institution. 95%-confidence intervals included.

When it comes to the differences in types of criteria (Figure 1.9), we see that in UMCs, the criterion to have a number of published articles is most common⁵. For universities and other institutions, a required number of ECs is the most frequently mentioned criterion. The criteria about publishable articles and chapters are relatively more common at universities, while a required number of submitted articles is relatively more common at UMCs and other types of institutions. Finally, the criterion requiring a number of published articles with quality criteria is relatively much more common at UMCs, but even there, it is the least mentioned criterion.

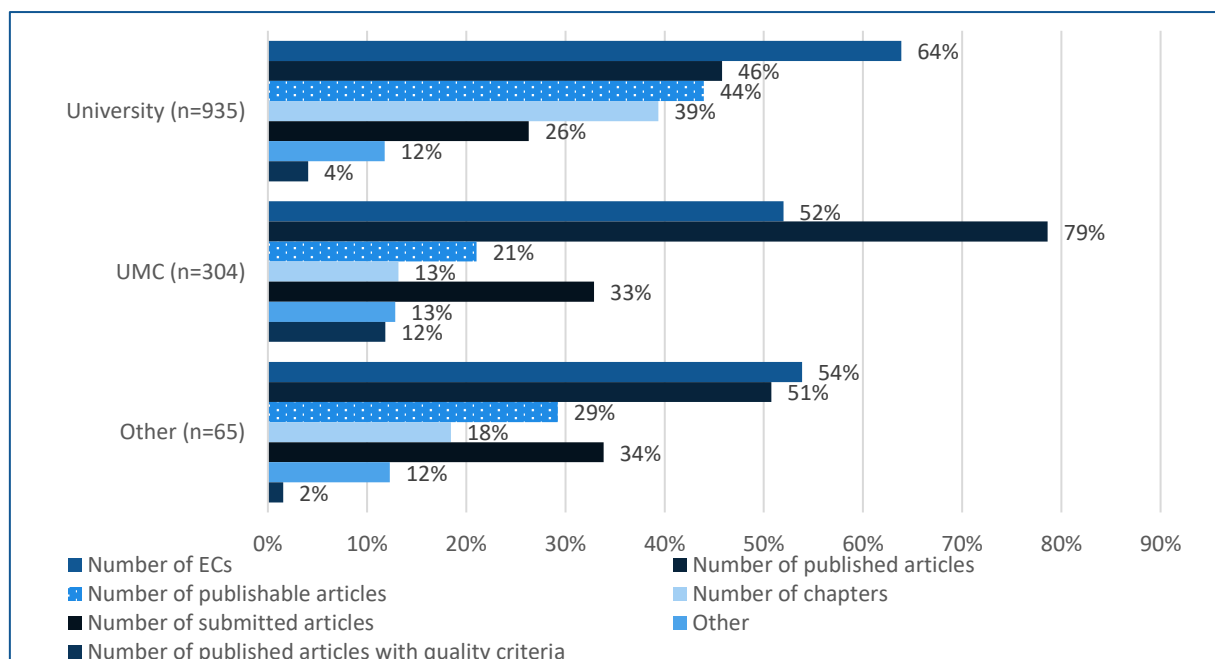


Figure 1.9: Types of performance criteria, per type of institution.

⁵ As UMC PhDs from Erasmus MC and LUMC are overrepresented in the survey and are known to have a publication criterion, we checked whether a number of published articles is also a common criterion at PhDs from the other UMCs. Though PhDs at other UMCs relatively less often indicate needing to have a number of published articles (65%) than PhDs at Erasmus MC and LUMC (82.5%), this criterion is the most frequently mentioned criterion at the other UMCs as well.

Type of PhD arrangement

Finally, we wanted to assess whether there are differences in the criteria between the various types of PhDs that exist in the Dutch academic system. Figure 1.10 shows that for all types of PhDs, formal criteria are most common. However, external PhDs and other types of PhDs are more often required to meet formal criteria compared to employee PhDs and scholarship PhDs. In exchange, scholarship PhDs relatively more often have to meet informal criteria, whereas employee PhDs relatively more often have to meet criteria about which they do not know whether they are formal or not. Having to meet no criteria at all is mentioned most by external PhDs.

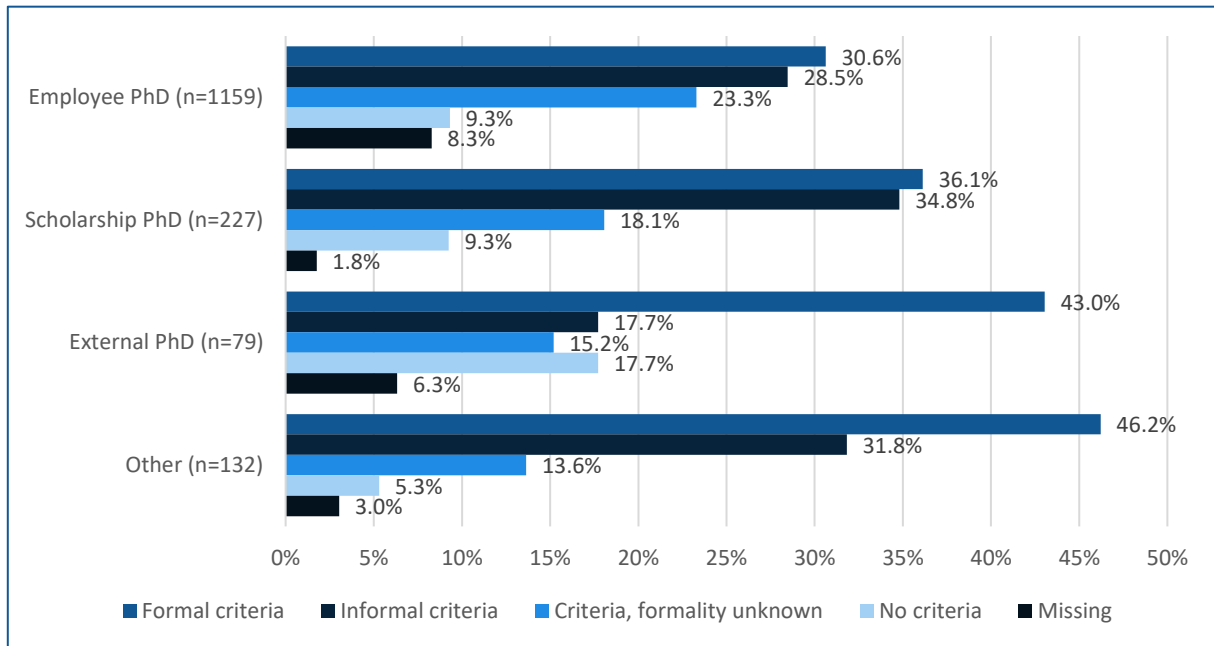


Figure 1.10: Formality of performance criteria, per type of PhD arrangement.

The results of Figure 1.11 show that scholarship PhDs have selected significantly more criteria than all other types of PhDs, on average indicating they have to meet 2.73 criteria. The three other types of PhDs do not differ significantly in the number of criteria they say they have to meet, with their averages varying from 1.98 for external PhDs to 2.25 for employee PhDs.

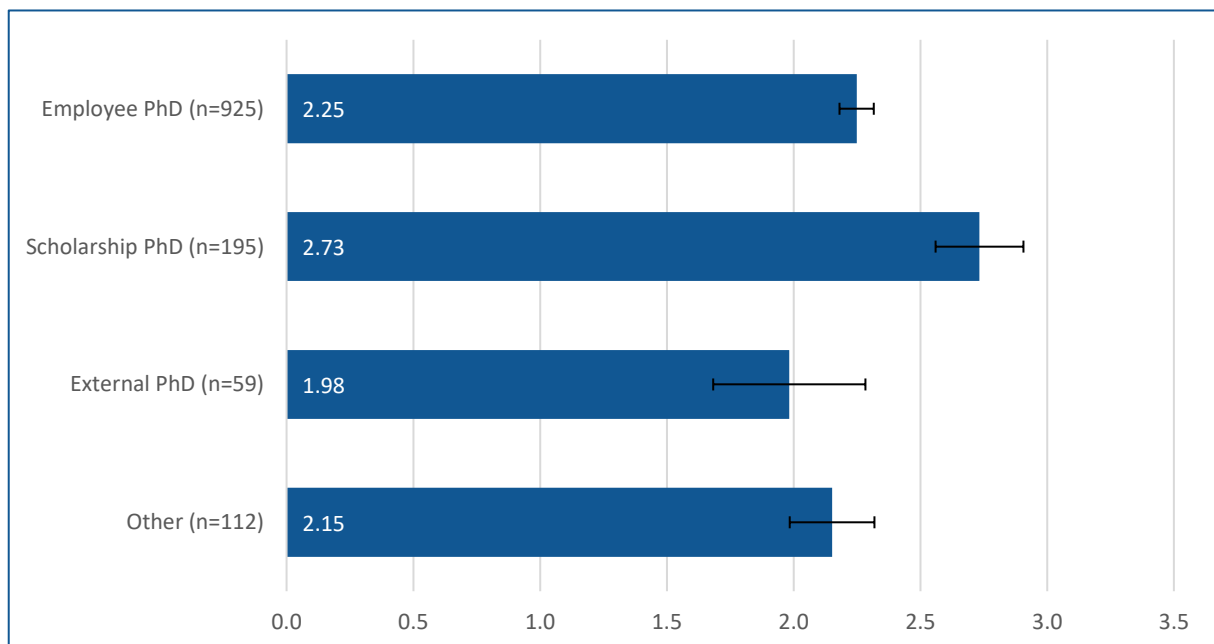


Figure 1.11: Number of performance criteria, per type of PhD arrangement. 95%-confidence intervals included.

Which kind of criteria need to be met also differs per type of PhD to some extent (figure 1.12) Employee PhDs and scholarship PhDs both most often need to meet an ECs criterion, though employee PhDs have to meet this criterion relatively less often. External PhDs and other types of PhDs most often indicate be required to have a number of published articles compared to the other criteria, but this criterion also ranks second for both employee PhDs and scholarship PhDs. The criterion about a number of chapters is also relatively more often mentioned by scholarship PhDs compared to the other criteria, while the other three types of PhDs mention the criterion about publishable articles more often than the chapter criterion. Again, the least common criterion for all types of PhDs is the criterion about published articles meeting quality criteria, but compared to the other types of PhDs, it is relatively more often mentioned by external PhDs.

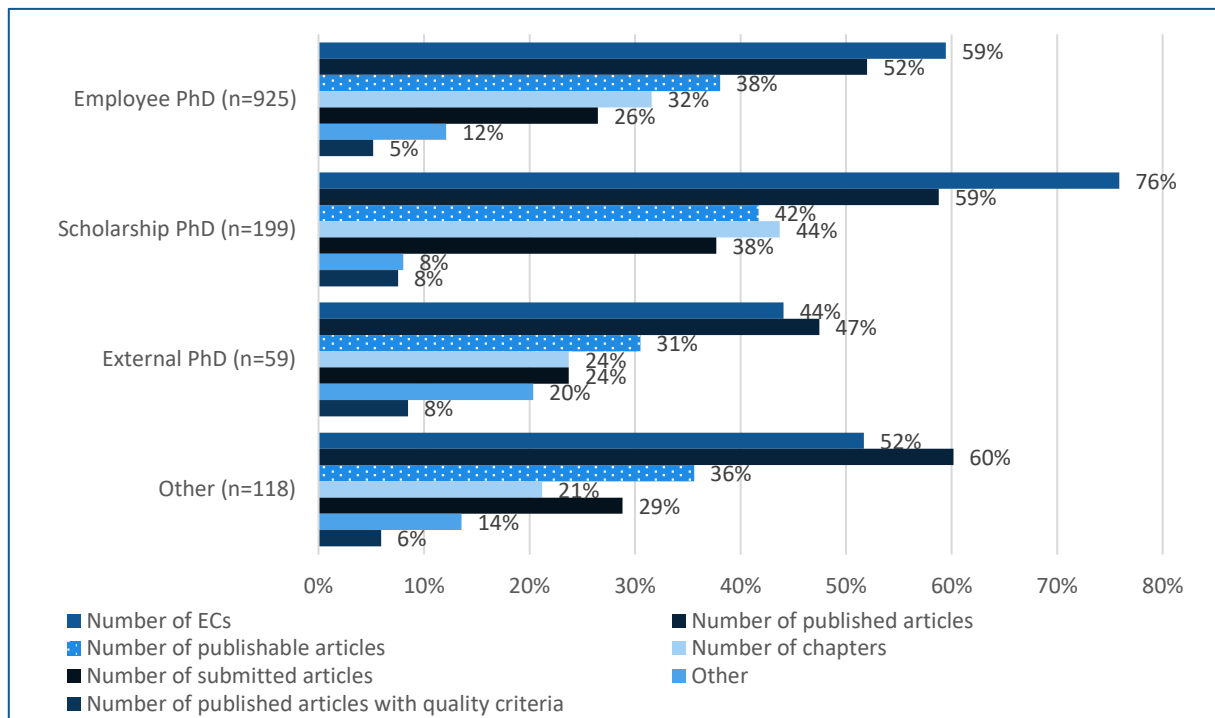


Figure 1.12: Type of PhD criteria, per type of PhD arrangement.

Discipline

There are quite some differences between disciplines when it comes to the PhD criteria. The extent to which the formality of the criteria differs per discipline is depicted in Figure 1.13. The most formal criteria are found in Agricultural sciences and Law, while only 22.1% of the PhDs in Technical sciences indicate to have to meet any formal criteria. There, informal criteria are much more common (38.1%), just like in Natural sciences (28.2%). Informal criteria are very rare in Law and also not very common in Humanities. Compared to other disciplines, PhDs in Behavioural and Social Sciences most often indicate that they do not know whether their criteria are formal or informal, while PhDs in Law have least doubts about the formality of their criteria. Finally, Humanities and Law stand out when it comes to having no formal criteria for PhDs to meet, while it is very rare for there to be no criteria in Medical and Health sciences.

Figure 1.14 shows that PhDs from Agricultural sciences listed the highest number of criteria (2.79), followed at quite a distance by Technical sciences (2.46) and Natural sciences (2.38). The least criteria could be found in Law (1.74) and Humanities (1.93), both indicating significantly less criteria than the two disciplines with the highest mean number of criteria.

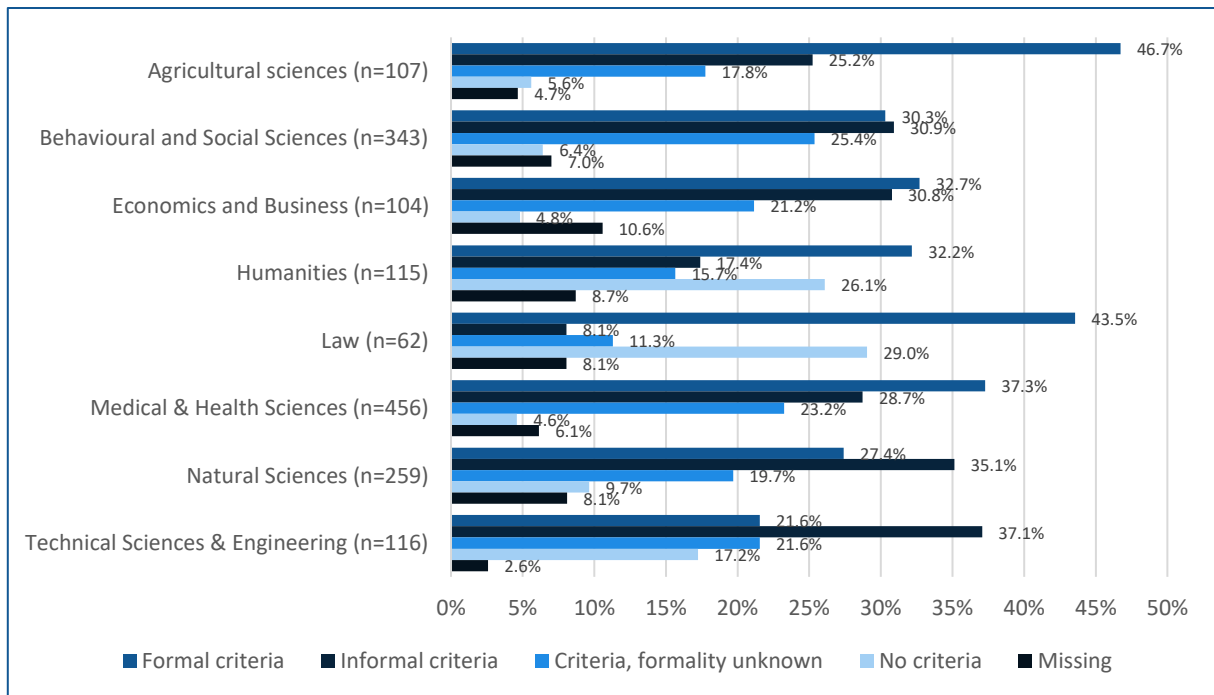


Figure 1.13: Formality of performance criteria, per discipline.

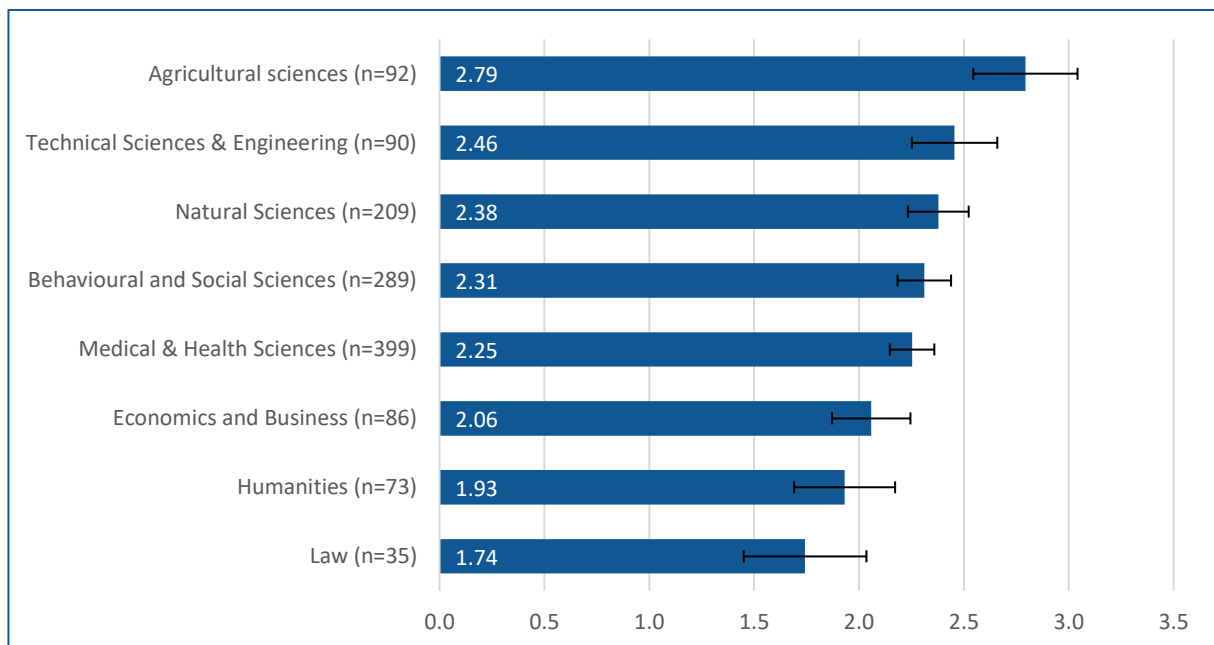


Figure 1.14: Number of performance criteria, per discipline. 95%-confidence intervals included.

The disciplines also vary in the type of criteria they ask their PhDs to meet (Figure 1.15). Acquiring a number of ECs is for instance much more common in Natural sciences, Agricultural sciences and Technical sciences than in Law or Humanities. These latter disciplines in contrast stand out for relatively often having other criteria for PhDs to meet. The criterion to have published articles is most frequently mentioned in Medical and Health sciences, Technical sciences and Behavioural and Social sciences, while this is much less often mentioned by PhDs in Economics and Business. In Economics and Business, the focus seems to lie more on the number of publishable articles or the number of chapters. The latter is also a very common criterion in Agricultural sciences. Compared to the other disciplines, Medical and Health sciences most often requires PhDs to have a number of published articles that meet quality criteria.

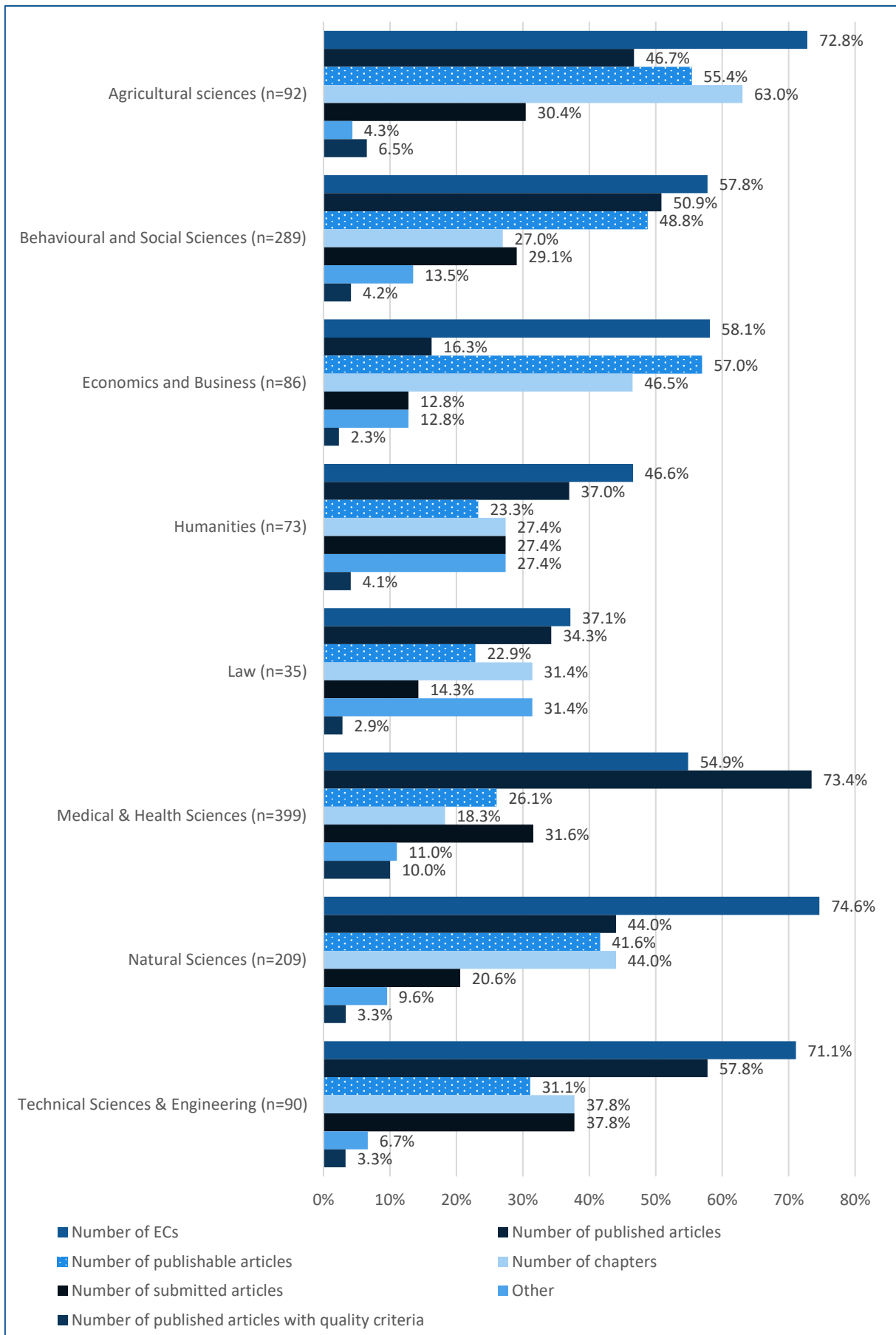


Figure 1.15: Type of performance criteria, per discipline.

Open Science

A total of 1,457 participants responded to the question concerning what types of Open Science practices they are encouraged to use in their PhD projects (figure 2.1). 25.9% of the PhDs is not encouraged to engage in Open Science at all. When PhDs are encouraged to engage in Open Science, almost two thirds of the participants (63.3%) stated to be encouraged to publish open access and a third (34.1%) is encouraged to share research data. Practices like publishing codes/syntaxes, pre-registration and replication research were mentioned less frequent. 58 PhDs filled out the 'other, namely'. Amongst these open answers, not being in the stage of publishing was the most common, with it being mentioned 18 times. Seven participants stated not to know what Open Science was about.

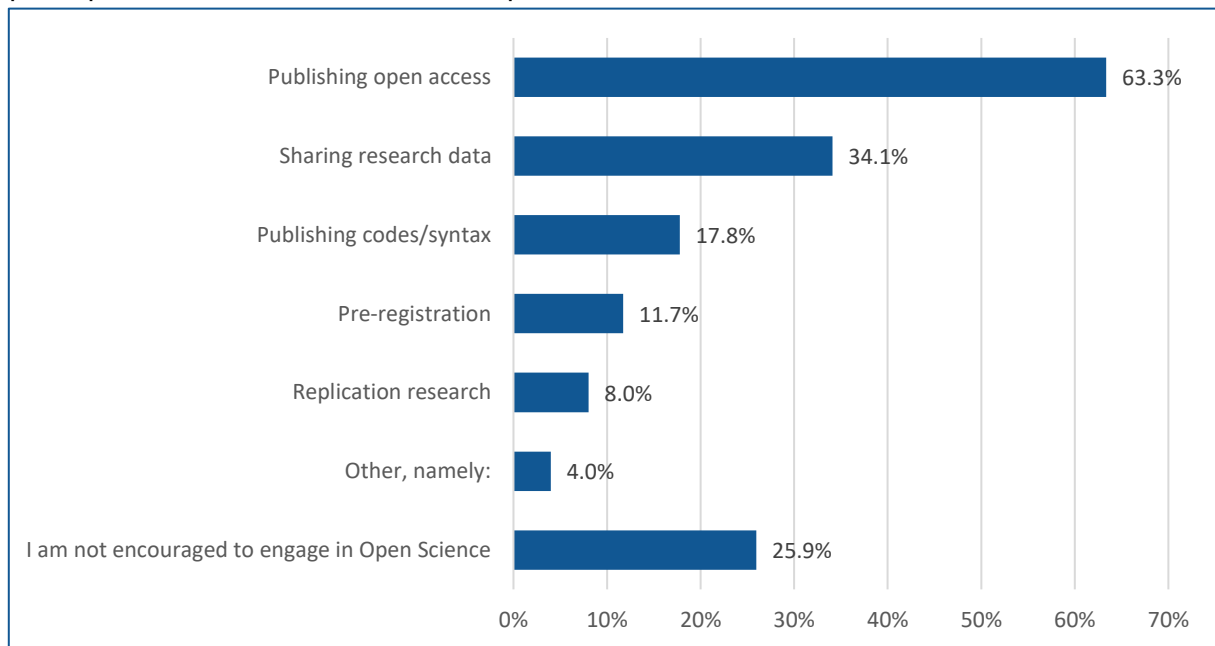


Figure 2.1: Responses to the question: "Which types of Open Science practices are you encouraged to use in your PhD project?" (n=1,457).

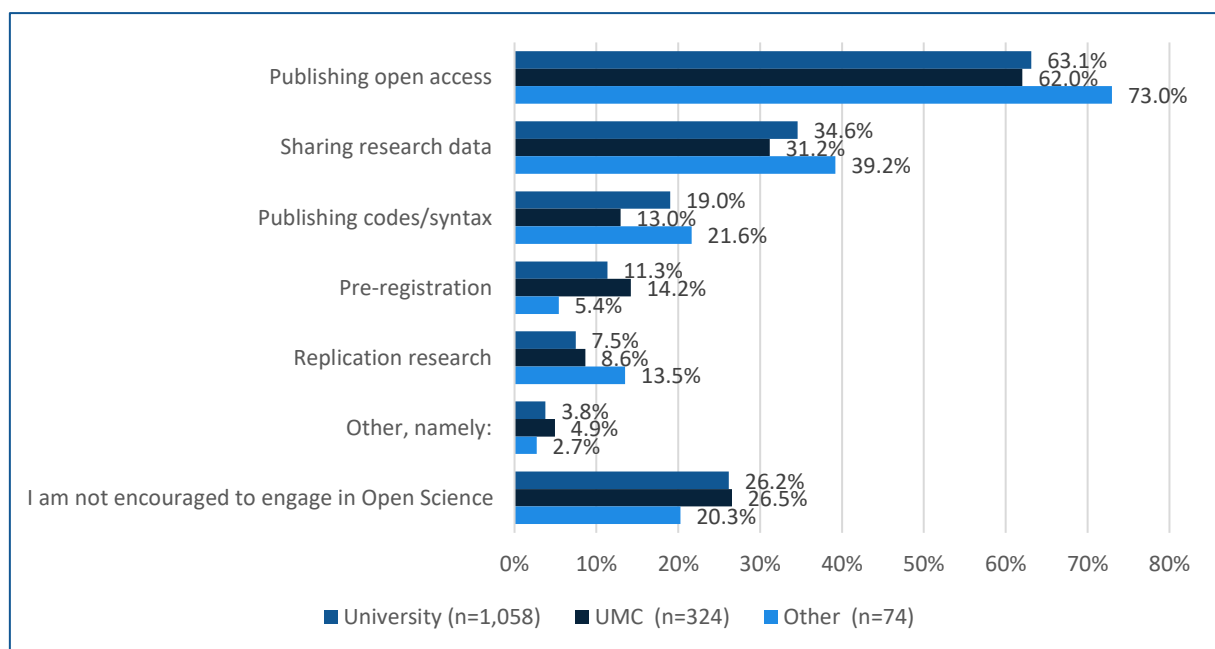


Figure 2.2: Responses to the question: "Which types of Open Science practices are you encouraged to use in your PhD project?", per type of institution.

Type of institution

The differences between types of institutions in types of Open Science that are encouraged are not very large (figure 2.2). PhDs at other types of institutions are a bit more often encouraged to engage in Open Science (79.7%) than PhDs at universities or UMCs (73.8% and 73.5%). There, PhDs also relatively more often are encouraged to publish Open Access, share research data or to replicate research. They are, in contrast to universities and UMCs, relatively less likely to pre-register research.

Type of PhD arrangement

Figure 2.3 shows the differences in Open Science practices between types of PhDs. External PhDs relatively often (42.3%) indicate that they are not encouraged to engage in Open Science and are much less often encouraged to use all other Open Science practices compared to the three other types of PhD arrangements. Employee PhDs are relatively more often encouraged to publish codes/syntax or to pre-register research.

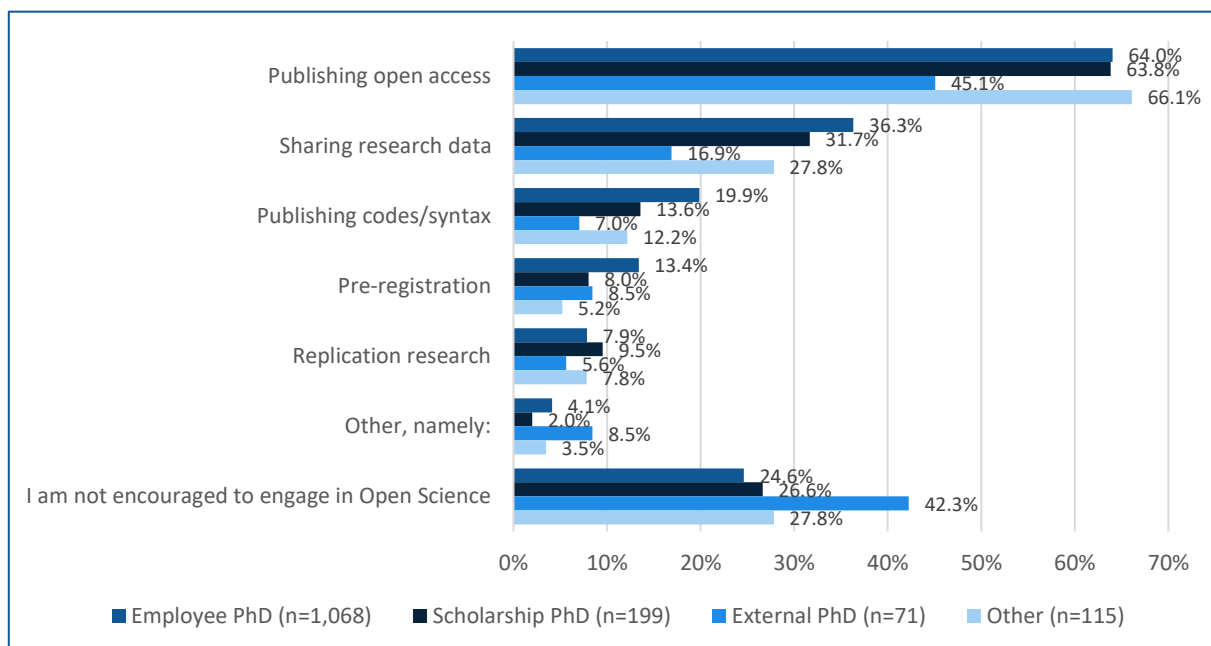


Figure 2.3: Responses to the question: "Which types of Open Science practices are you encouraged to use in your PhD project?", per type of PhD arrangement.

Discipline

Disciplines vary considerably in the extent to which they encourage Open Science and which types of Open Science are encouraged (figure 2.4). PhDs in Law relatively most often indicate that they are not encouraged to engage in Open Science (47.4%), while PhDs in Technical sciences and Engineering least often indicate that they are not encouraged to engage in Open Science (16.4%). In all disciplines, publishing Open Access is encouraged most, though only 39.6% of the PhDs in Economics and business indicate to be encouraged to publish Open Access. Sharing research data and publishing codes is relatively more common in Technical sciences and Engineering and Natural sciences, while pre-registering research is relatively more common in Behavioural and social sciences, Economics and business and Medical and health sciences. PhDs in Agricultural sciences are relatively often encouraged to replicate research (12%). In Law, the only type of Open Science practices that is really encouraged is publishing Open Access (50.9%). Sharing research data is in Law relatively least often encouraged compared to other disciplines.

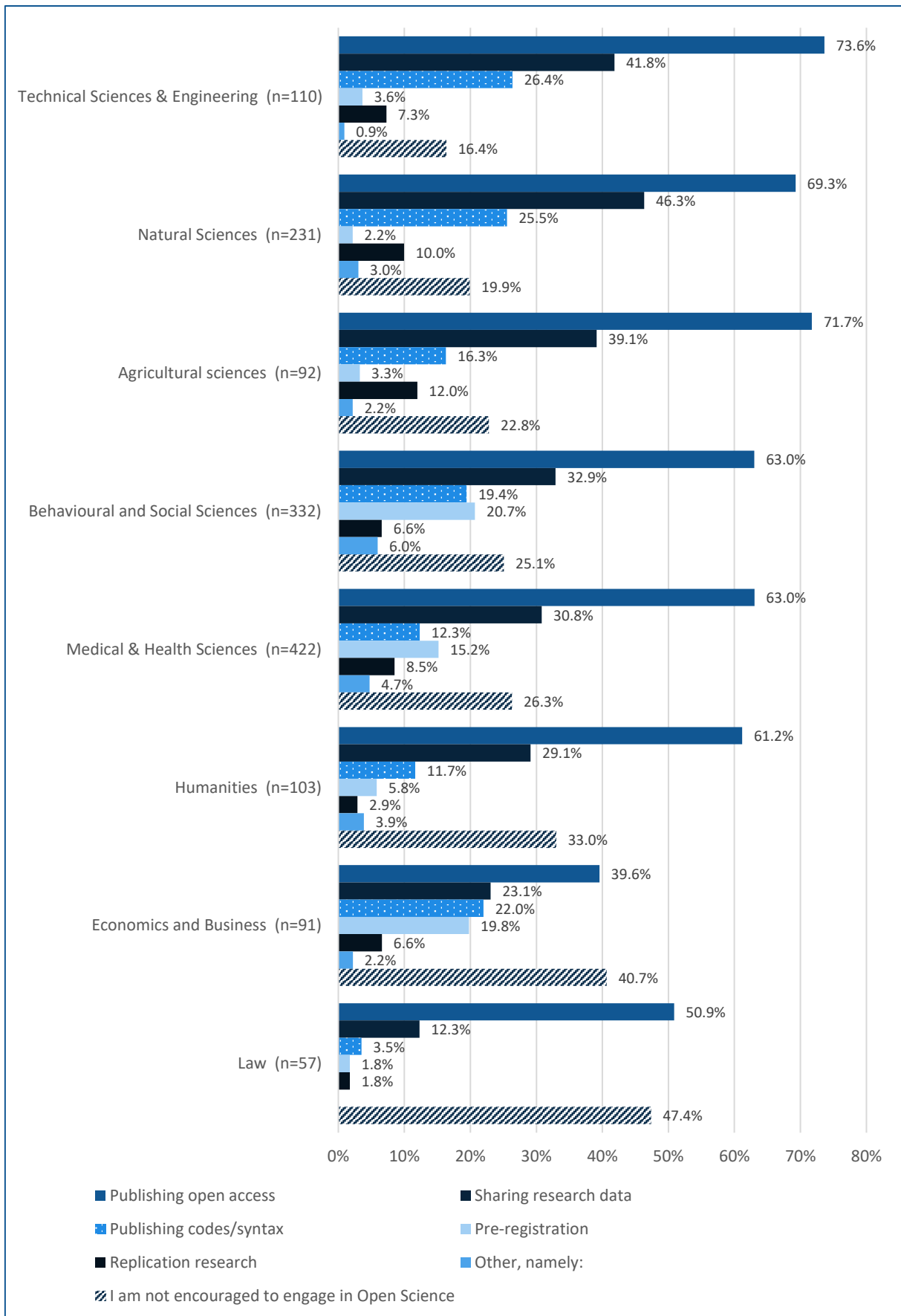


Figure 2.4: Responses to the question: “Which types of Open Science practices are you encouraged to use in your PhD project?”, per discipline.

Recognition and rewards

In the light of the new plans for recognizing and rewarding academics, we asked our respondents which topics they think should be taken into account in the overall assessment of their PhD projects (figure 3.1). Almost all participants (96.3%) stated that their research should be taken into account. Half of the participants stated that they would like to also be assessed based on their teaching (52.4%). This however differs between PhDs who teach and PhDs who don't teach: 64.8% for PhDs who teach in practice would like teaching to be taken into account, while this is only 27.2% for PhDs who do not teach. Courses/ECTS (51.8%) and valorisation/research impact (48%) are important topics for PhDs as well. 44% of the PhDs furthermore indicated they would also have liked their management tasks to be taken into account in their assessment. Additional activities (35.4%) and Open Science (27%) were mentioned less frequently. As other topics that could be included in the assessment of their PhD projects, PhDs for example mentioned personal development and networking skills.

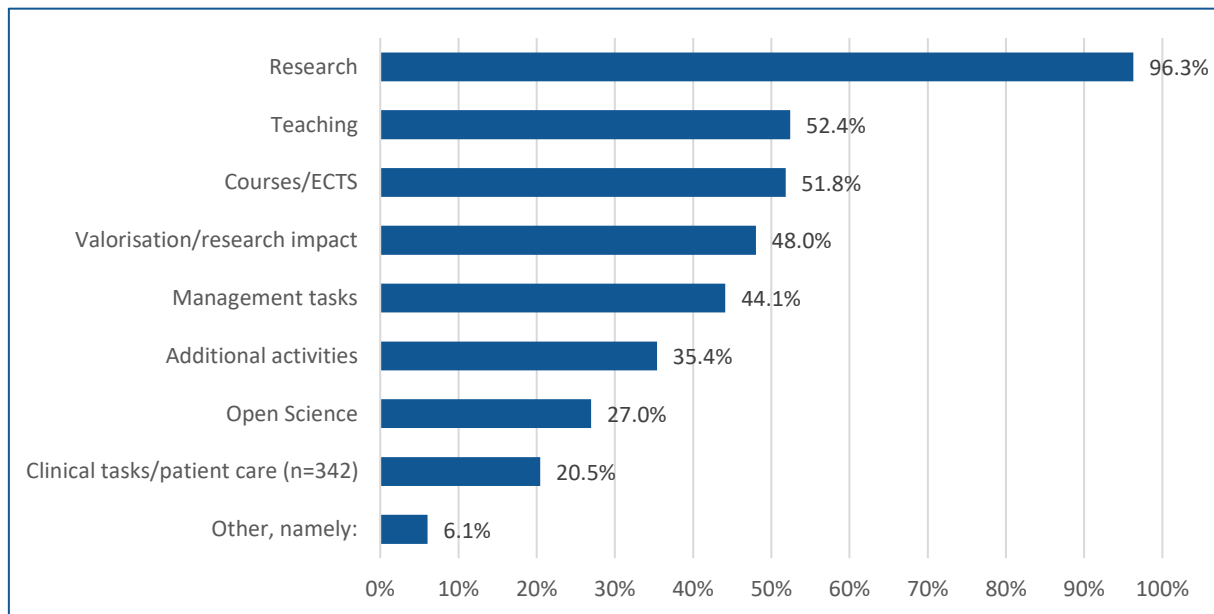


Figure 3.1: Responses to the question: "Which of the following topics do you think should be taken into account in the overall assessment of your PhD project?" (n=1,532).

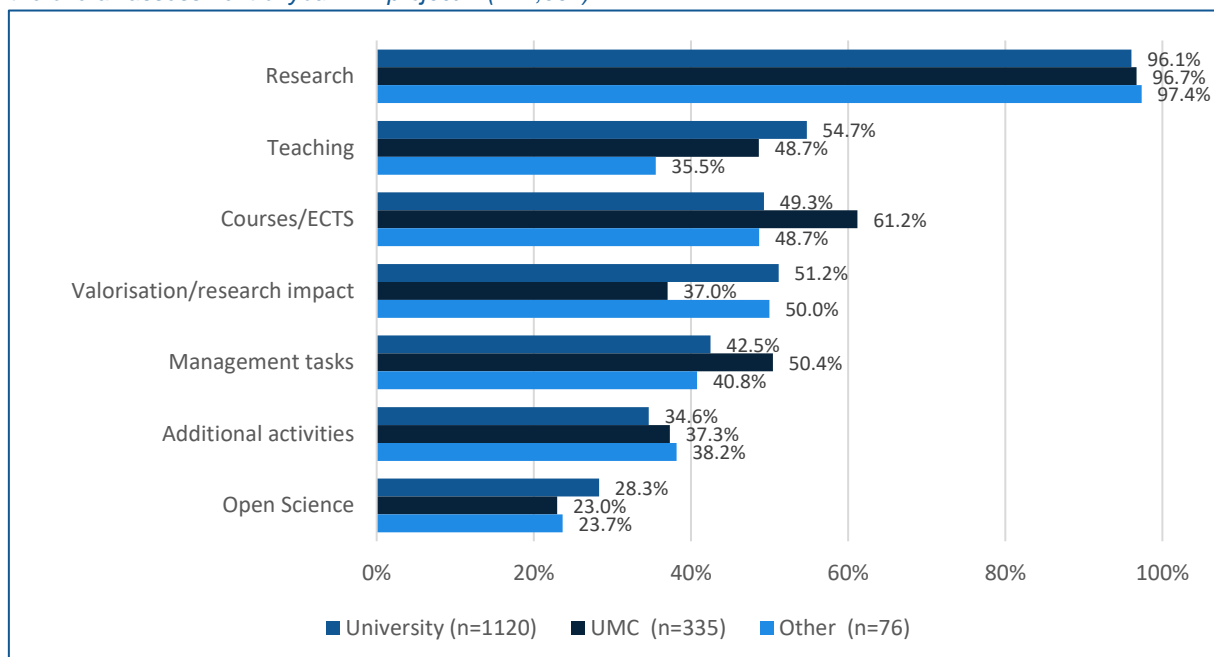


Figure 3.2: Responses to the question: "Which of the following topics do you think should be taken into account in the overall assessment of your PhD project?", per type of institution.

Type of institution

Between types of institutions, there are differences in what PhDs indicate they would like to be included in the assessment of their PhD projects (figure 3.2). Of course, PhDs at all types of institutions think that research should be part of the assessment of their PhD projects. PhDs at universities relatively most often indicate that they would like to have their teaching included in the assessment of their PhD project (54.7%), while PhDs at UMCs relatively more often indicate that they want the courses they take to be part of the PhD assessment (61.2%). Valorisation and research impact in contrast are less important for PhDs at UMCs (37%) compared to PhDs at universities (51.2%) and other types of institutions (50%).

Type of PhD arrangement

Which topics are considered important in the assessment of PhD projects also differs per type of PhD arrangement (figure 3.3). Employee PhDs relatively more often attach value to teaching (59.3%). This is likely due to the fact that employee PhDs relatively more often teach than the other types of PhDs. Scholarship PhDs in contrast relatively more often indicated that the courses they took should be taken into account in their PhD assessment. External PhDs attached less value to all topics compared to the other types of PhDs. This is likely due to the fact that they are less involved in other tasks than doing research, as they pursue their PhD mainly in their own time.

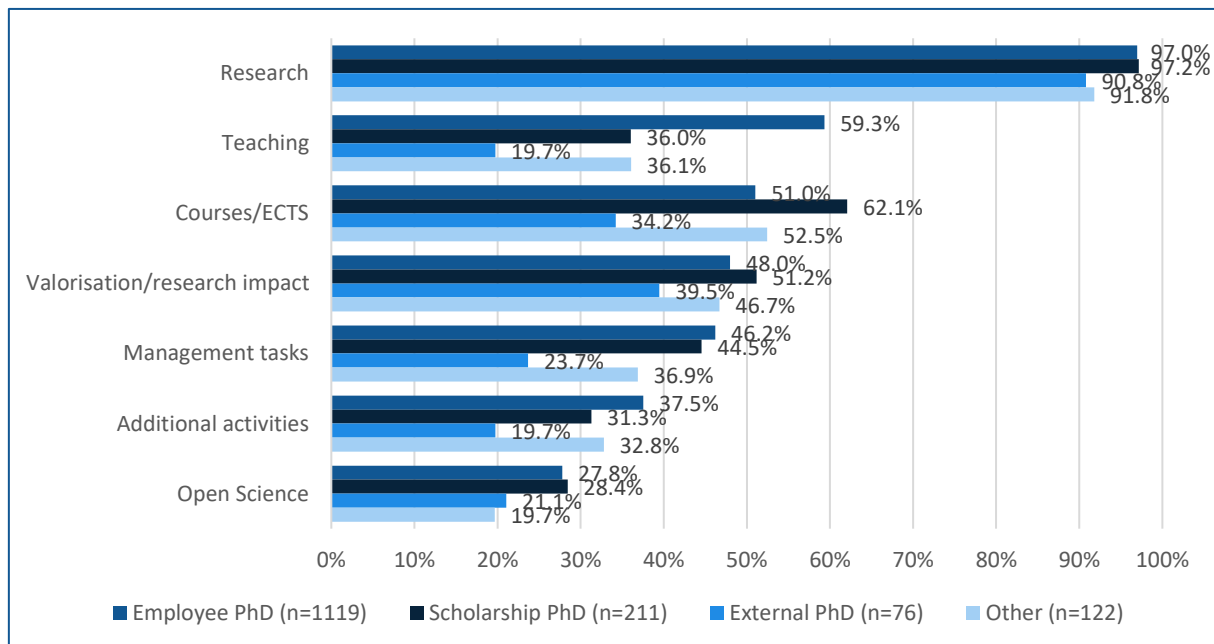


Figure 3.3: “Which of the following topics do you think should be taken into account in the overall assessment of your PhD project?”, per type of PhD arrangement.

Discipline

Disciplines also differ in which topics they would like to have included in their PhD assessment (figure 3.4). Research is again valued most in all disciplines. PhDs in Natural sciences attach relatively more value to teaching (62.8%), while PhDs in Law and Agricultural sciences less often want teaching to be part of their PhD assessment (44.8% and 44.9%). The value attached to taking courses varies greatly, with PhDs in Agricultural sciences valuing this most often (64.3%) while PhDs in Humanities and Law select this option much less often (27% and 27.6%). PhDs in Natural sciences relatively most often indicate that they would like Open Science to be part of their PhD assessment (32.4%), while only 12.1% of the PhDs in Law think this should be part of the PhD assessment.

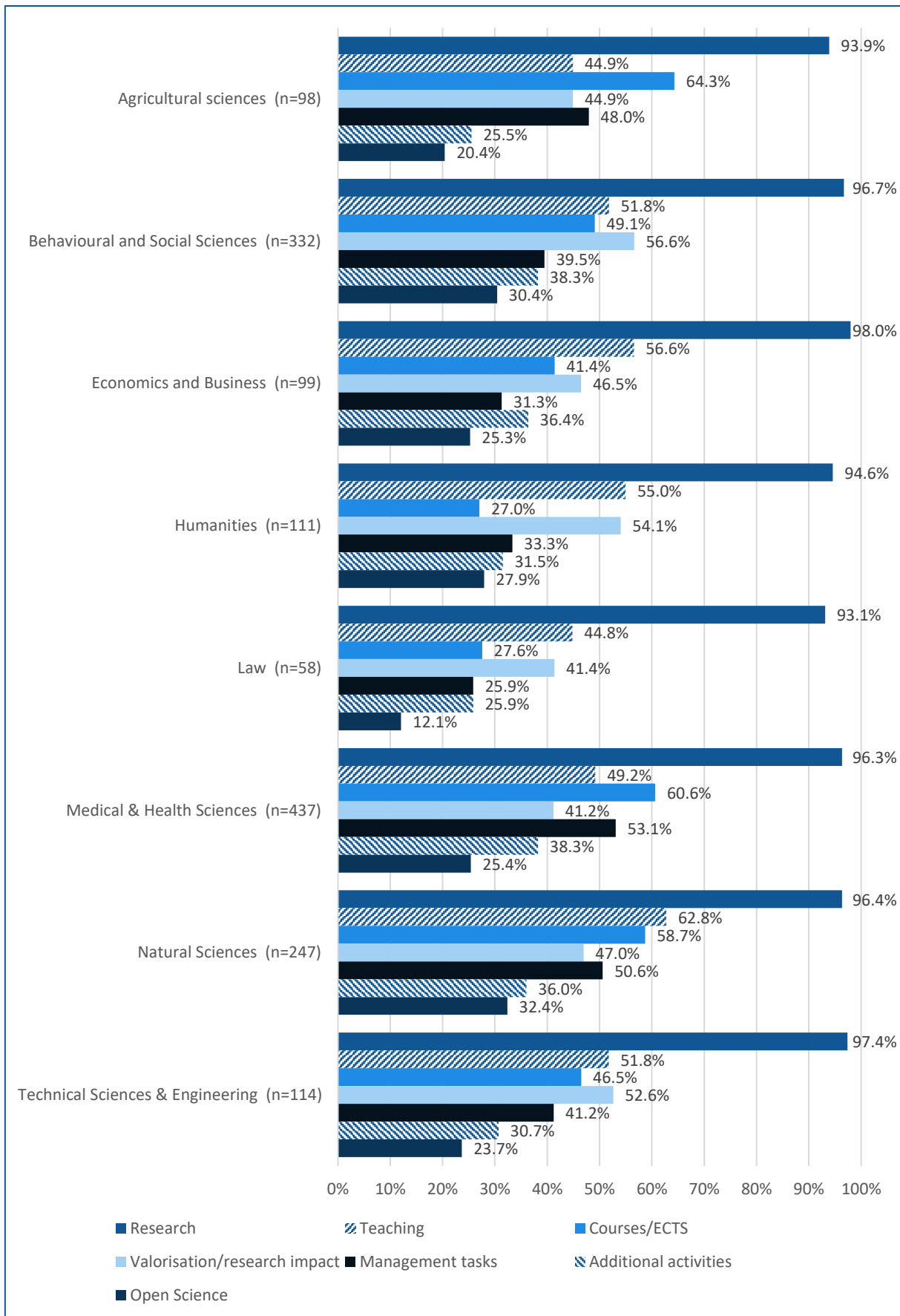


Figure 3.4: “Which of the following topics do you think should be taken into account in the overall assessment of you PhD project?”, per discipline.

Career

Doing a PhD mostly prepares you for a career in academia. However, in the Netherlands, the career opportunities in academia are limited: there are too many PhDs for all follow-up positions. Therefore, it is crucial that PhDs receive career guidance during their PhD trajectories, and to know what PhDs have in mind for their own careers.

Career guidance

Therefore, we asked all PhDs whether they receive career guidance from their institution (figure 4.1). 39.6% of the PhDs indicated that they receive career guidance. PhDs at universities relatively more often receive career guidance (43.3%) than PhDs at UMCs (28%) or other types of institutions (36.8%). Only 20.8% of the external PhDs indicate to get career guidance, while 40.4% of employee PhDs and 46.3% of the scholarship PhDs receive career guidance. PhDs in Economics and Business most often receive career guidance (52%), while PhDs in Medical and health sciences least often receive career guidance (34.7%).

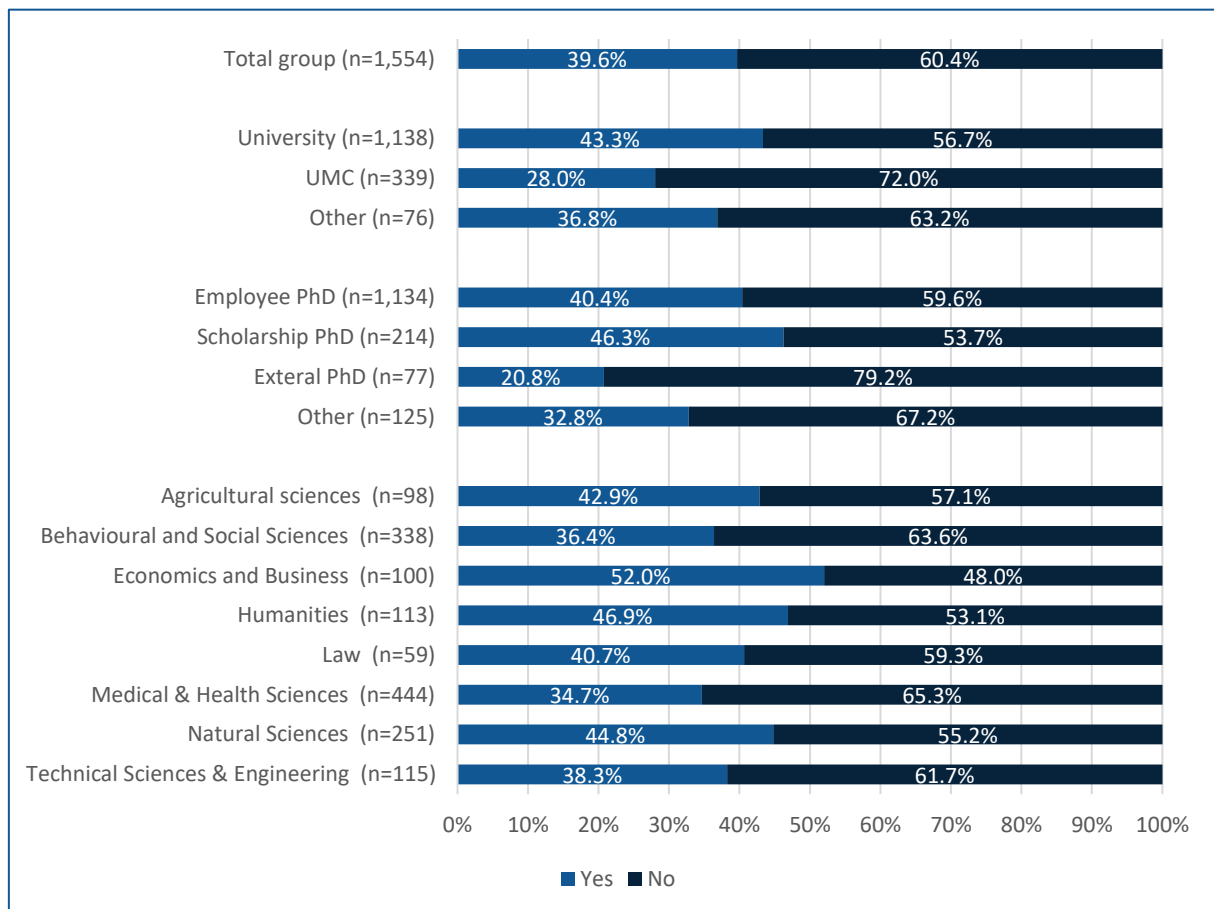


Figure 4.1: Responses to the question: "Do you receive career guidance from your institution?", in total and per type of institution, type of PhD arrangement and discipline.

The PhDs who did not receive career guidance were asked whether they would have liked to receive career guidance. The responses to that question can be found in figure 4.2. 54.4% of the PhDs who do not receive career guidance would have liked to get career guidance. Only 16.9% of the PhDs states not to want career guidance, and 28.7% is not sure about this.

The differences between types of institutions are limited: PhDs at universities most often indicate to want career guidance (55.5%), while PhDs at other types of institutions least often want career guidance (47.9%). While employee PhDs and scholarship PhDs both in majority indicate to want to receive career guidance (56.4% and 65.2%), external PhDs and other types of PhDs much less often indicate to want to receive career guidance (38.3% and 33.3%). They relatively more often indicate not to want career guidance. PhDs in Law most often indicate to

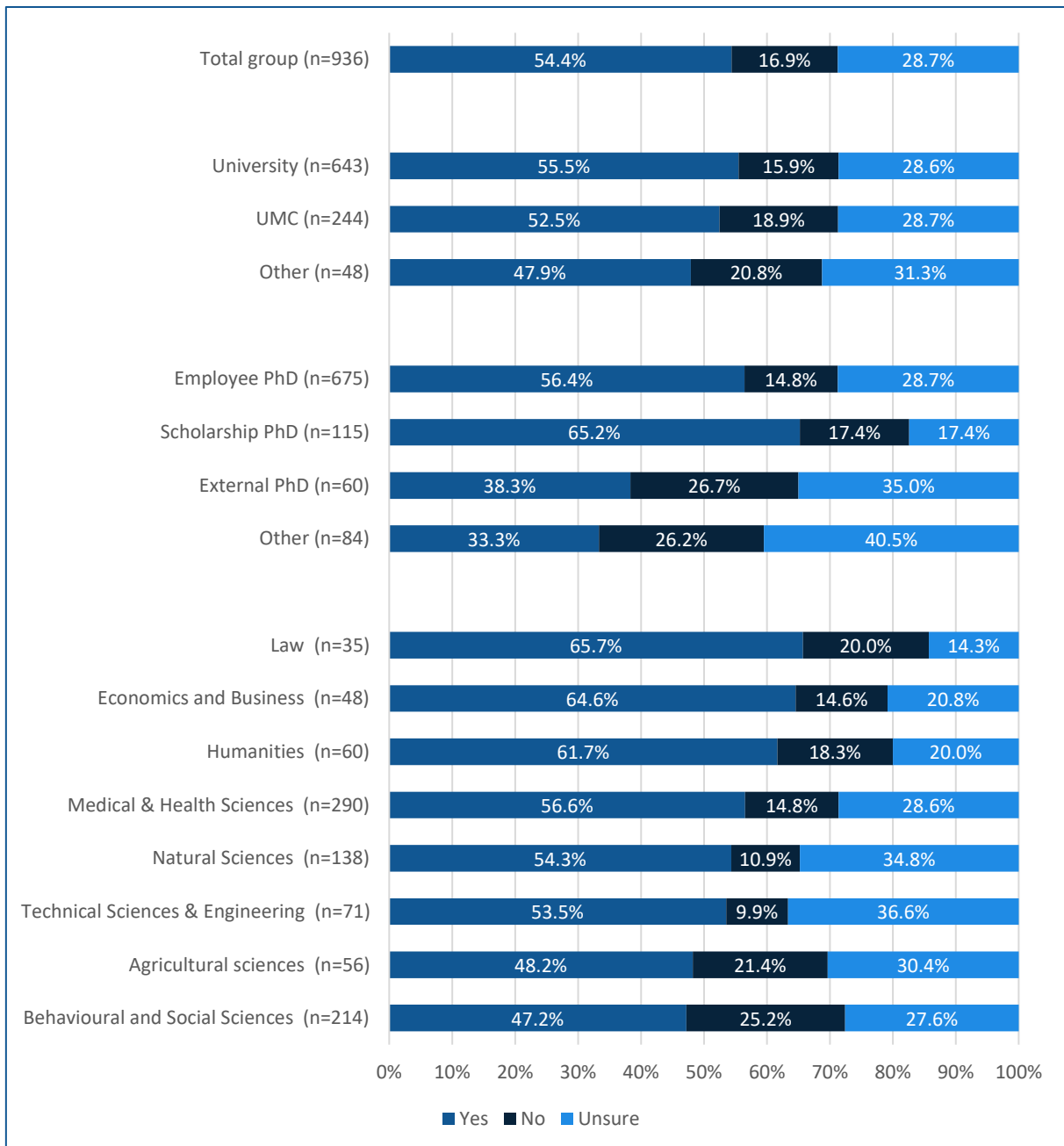


Figure 4.2: Responses to the question: "Do you want to receive career guidance?", in total and per type of institution, type of PhD arrangement and discipline.

want to receive career guidance (65.7%), while PhDs in Behavioural and social sciences least often need career guidance (47.2%). However, PhDs in Law also relatively often indicate that they do not want career guidance (20%), while PhDs in Natural Sciences and Technical sciences relatively often are not sure whether they would like to receive career guidance.

The PhDs who did receive career guidance were asked how satisfied they are with the career guidance offered by their institutions. The mean scores of the responses to this question can be found in figure 4.3. On average, PhD rate their career guidance a 3.5 on a scale of 1 (very dissatisfied) to 5 (very satisfied), with a standard deviation of 0.76. The differences in satisfaction between institutions are negligible. Scholarship PhDs are slightly less satisfied with the career guidance offered by their institution (3.36), while external PhDs and other types of PhDs are slightly more positive (3.88 and 3.73). PhDs in Agricultural sciences are most satisfied with their career guidance (3.85), while PhDs in Humanities are least satisfied with their career guidance (3.08).

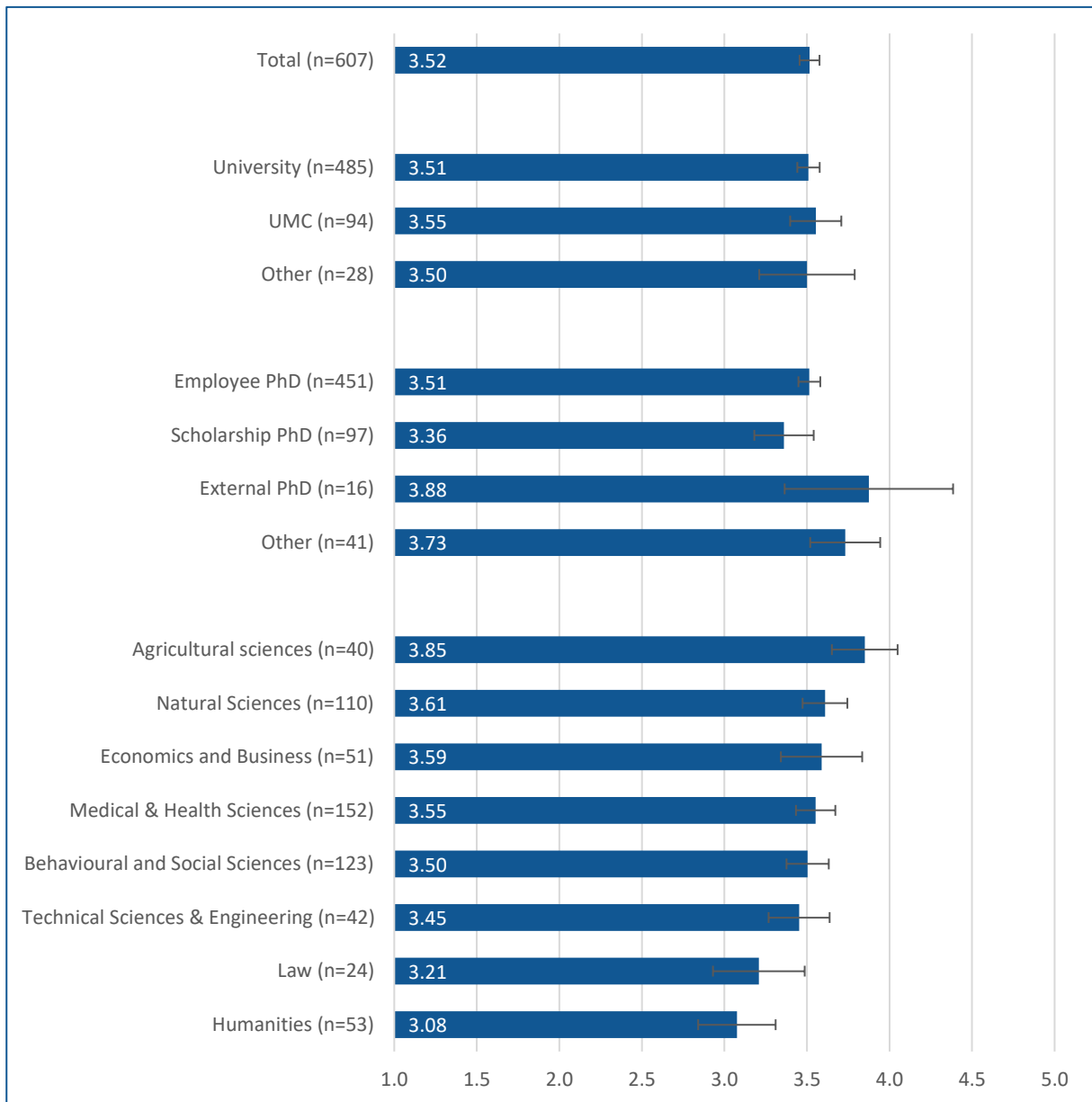


Figure 4.3: Mean responses to the question: “How satisfied are you with the career guidance offered by your institution?”, in total and per type of institution, type of PhD arrangement and discipline. 95% confidence intervals reported in graph.

Career aspirations

All PhDs were asked one of two questions concerning where they want to work after they completed their PhD. We catered one question to the situation of PhDs outside (University) Medical Centers, and one question to the situation of PhDs in (University) Medical Centers. These respective results can be found in figure 4.4 and figure 4.5.

PhDs outside medical centers generally aspire a research position, either outside or inside academia (66.6% and 61.1%). 32.4% aspires a non-research position, and 13% has a different type of job in mind, such as teaching, working as a policy maker, or working at an NGO or non-profit organisation. Relatively many also hope to combine research with something else.

PhDs in medical centers most often indicate they want to work in a research position in a UMC (44%), followed by research outside academia (35.8%) and non-research positions in UMCs (35.2%). 31.1% aim to do research in academia, while 20.1% wants a non-research position outside academia and medical centers. Working in a non-University Medical Center is much less popular amongst PhDs than working in a UMC(18.8%).

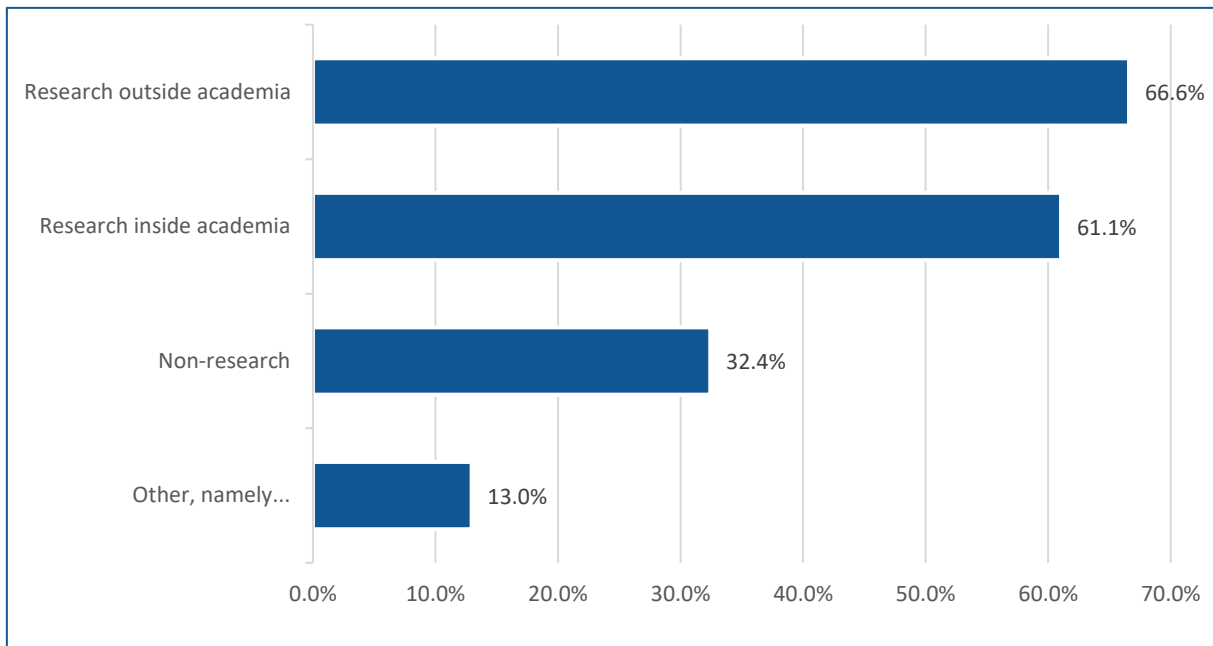


Figure 4.4: Responses to the question: “In what sector would you like to work after obtaining your PhD?” for PhDs outside medical centers (n=1,027).

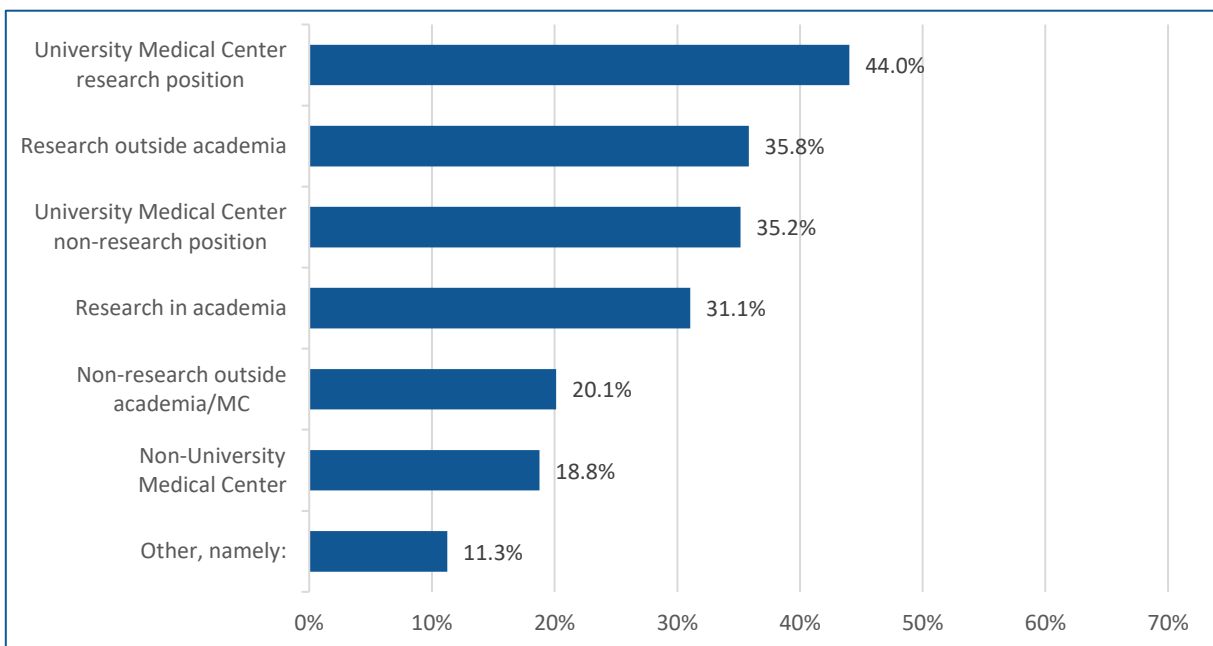


Figure 4.5: Responses to the question: “Where do you want to work after obtaining your PhD?” for PhDs in medical centers (n=293).

Gender

In this case, we also investigated the extent to which men and women differ in their career aspirations, both outside (figure 4.6) and inside medical centers (figure 4.7). Outside medical centers, the main difference is that women are less likely to indicate to aspire a career in academia than men (57% versus 66.4%) and a bit more often indicate to aspire a non-research position (33.6% versus 30.5%). In medical centers, male PhDs aspire almost all types of career options more often than women, indicating that they on average have selected more options than women. Women less often aspire careers in research in academia than men (29.4% versus 37.1%). Women only more often aspire non-research positions in UMCs than men, while men more often aspire research positions in UMCs.

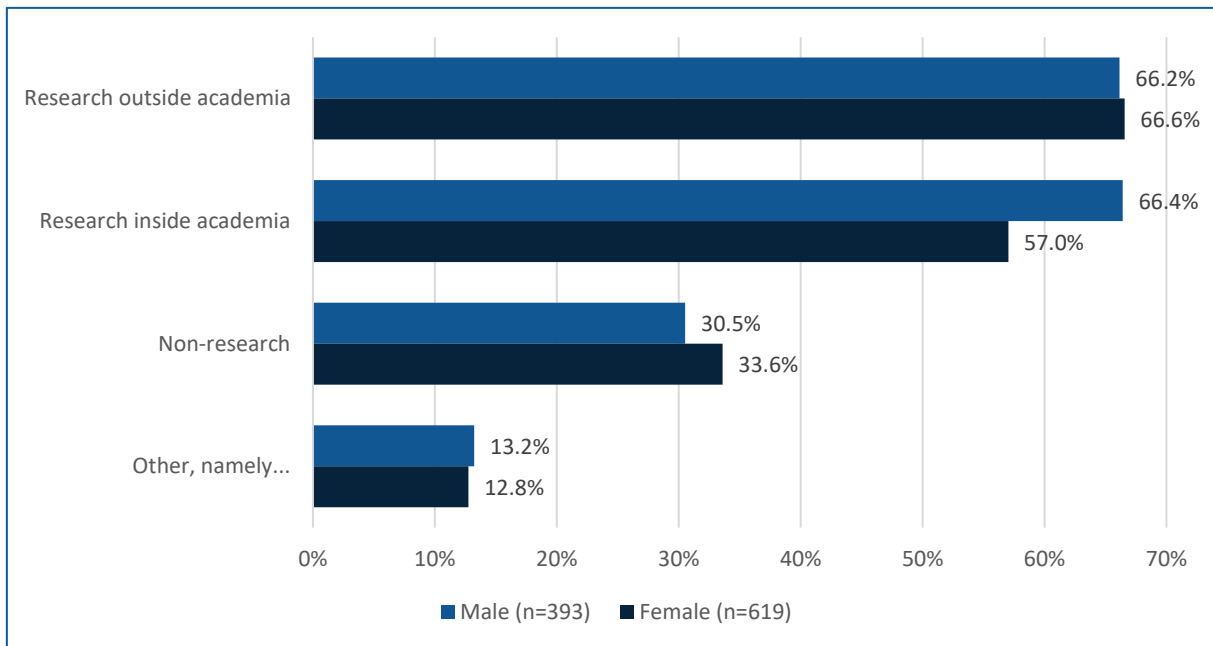


Figure 4.6: Responses to the question: “In what sector would you like to work after obtaining your PhD?” for PhDs outside medical centers, per gender.

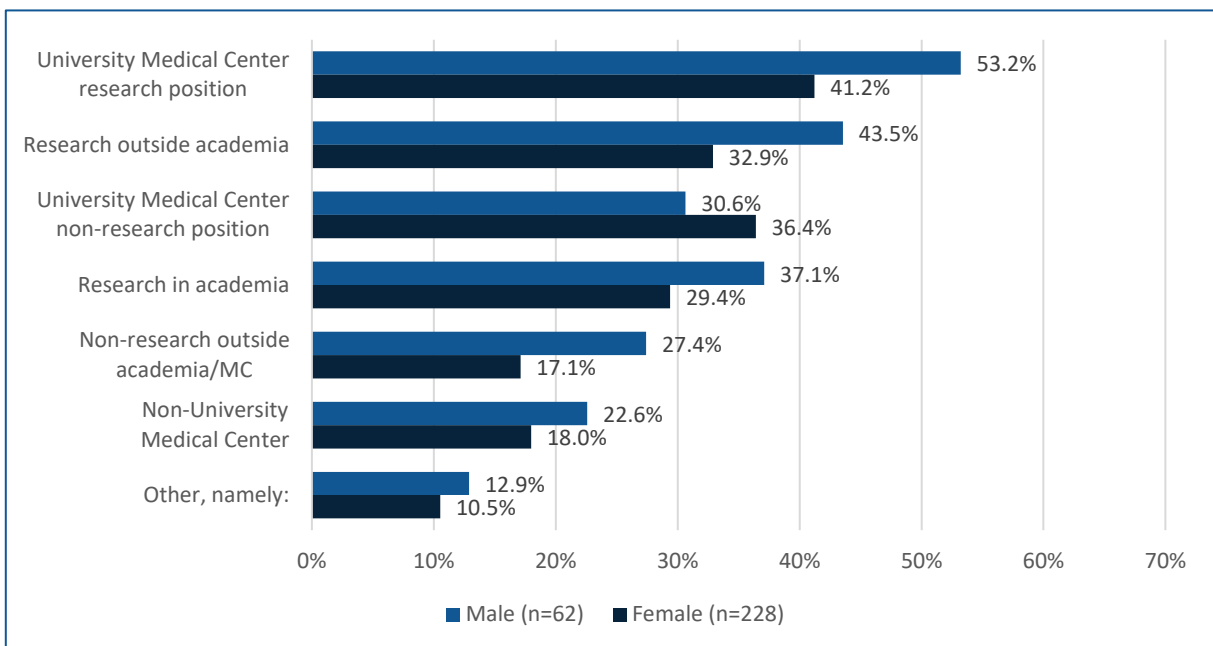


Figure 4.7: Responses to the question: “Where do you want to work after obtaining your PhD?” for PhDs in medical centers, per gender.

Type of PhD arrangement

For PhDs outside medical centers, we also investigated differences between types of PhD arrangements in career aspirations. For PhDs in medical centers, the number of PhDs in some categories of PhD arrangements was too low to present results. Figure 4.8 shows that a career in research outside academia is aspired most by employee PhDs (69.4%), external PhDs (63.1%) and other types of PhDs (65.4%). Scholarship PhDs in contrast most often aspire a career in research inside academia (65.7%). Research inside academia is least popular amongst other types of PhDs (52.6%). External PhDs and other types of PhDs relatively more often have other career aspirations (26.2% and 25.6%).

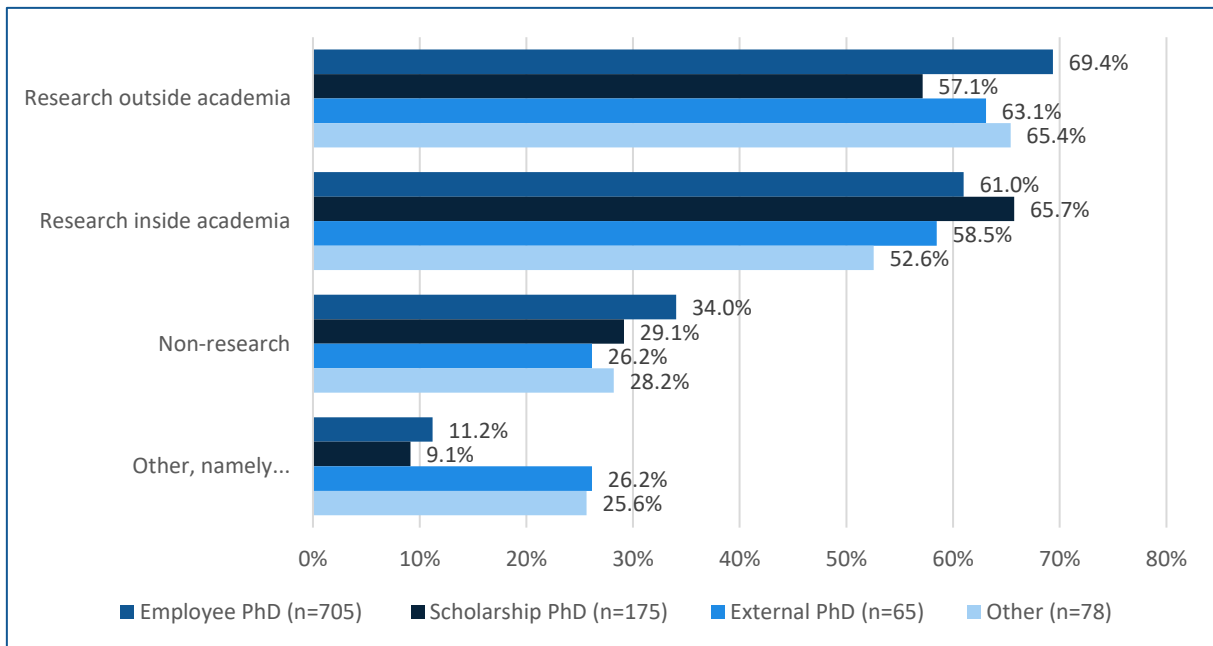


Figure 4.8: Responses to the question: “In what sector would you like to work after obtaining your PhD?” for PhDs outside medical centers, per type of PhD arrangement.

Discipline

Between disciplines, there are also quite some differences in career aspirations for PhDs outside medical centers. PhDs in Economics and business and Technical sciences and Engineering most often aspire a career in research outside academia, while PhDs in Humanities, Behavioural and social sciences and Law most often aspire a career in research inside academia. PhDs in Technical sciences and Engineering relatively least often aspire a career in research in academia. PhDs in Law also relatively often aspire non-research careers or other types of careers.

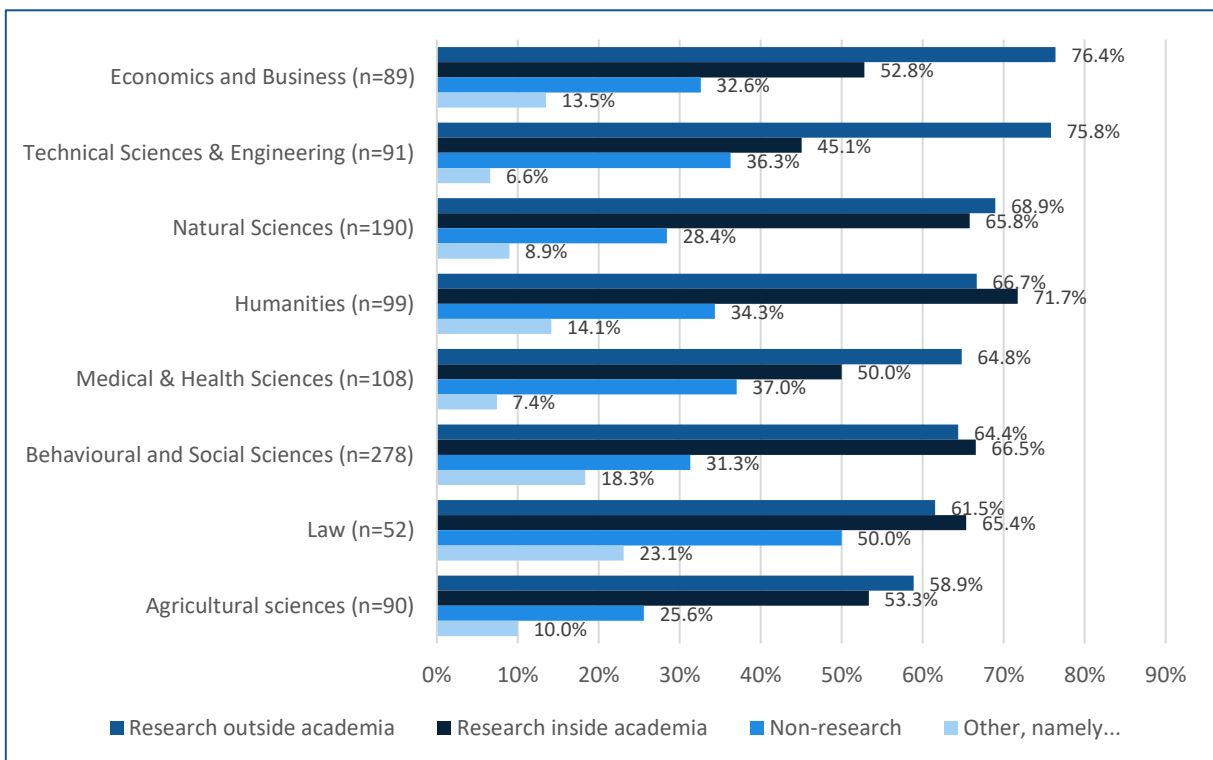


Figure 4.9: Responses to the question: “In what sector would you like to work after obtaining your PhD?” for PhDs outside medical centers, per discipline.