PNN PhD Survey

Asking the relevant questions

Supervision and freedom

Promovendi Netwerk Nederland

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Summary

Supervision

- On average, PhDs have 2.97 supervisors: 37.9% have two supervisors, 33.5% have three supervisors. 97.3% of the PhDs have at least two supervisors.
- The most common composition of a supervision team is a team of one promotor and one co-promotor (24.1%), followed by a team of one promotor and two co-promotors (11.4%).
- For 47.1% of the PhDs, the co-promotor is the daily supervisor. For 21.5% of the PhDs, the daily supervisor is a supervisor who is neither a promotor or co-promotor.
- PhDs most frequently meet with their daily supervisor, though in practice only 3.6% practice meet the daily supervisor on a daily basis. Most PhDs meet their daily supervisor at least weekly (41.5%). PhDs least often meet with their promotors, usually at least monthly (25.6%) or four times per year (23.7%). 5.3% of the PhDs meet their promotor less than yearly.
- External PhDs meet with all types of supervisors least frequently. 39.2% of them meet their daily supervisor less than monthly.
- PhDs rate the frequency of supervision a 7.39 on a scale from 0 to 10. The quality of supervision is rated a 7.29.
- The more often PhDs meet with their daily supervisor, the higher they rate both the frequency and quality of supervision. This relation can work both ways: it is possible that PhDs who have good supervisors want to meet their supervisors more often (quality → frequency), or meeting your supervisors more often improves the quality of supervision (frequency → quality).
- Supervisors mostly provide PhDs with autonomy, availability and personal support, but to a lesser extent with academic support. PhDs least often agree with the statements that their supervisors help them plan and manage research tasks and help them learn research skills.
- 42.9% of the PhDs indicate that their supervisor engages in questionable behaviour. Most commonly, not recognizing the pressure or playing down the workload (21.9%) is mentioned, followed by contacting PhDs during weekends or at night (16.7%). 13% of the PhDs are pressured by their supervisors to take on additional tasks.
- 12.9% of the PhDs have ever considered changing supervisors.
- The main reasons for changing supervisors are problems in the research process, such as supervisors placing too much pressure on them or undermining their confidence. A mismatch between PhD and supervisor in terms of the content of the project is also a common reason to consider changing supervisors.
- 18% of the PhDs who considered changing supervisors succeeded in doing so. 19.9% tried to change supervisors, but did not succeed. 44.7% did not take steps to change supervisors.
- The main reasons for not succeeding in changing supervisors is that the promotor or other supervisor did not allow it, of that they were hampered by bureaucracy.
- The main reasons for not taking steps to change supervisors are fear of not being able to finish the PhD project, fear of risking their future career and not wanting to be a troublemaker.

Freedom

- In general, PhDs have quite a lot of freedom in their PhD trajectories. PhDs score their freedom a 5.54 on a freedom scale ranging from 1 to 7.
- Concerning the design of their project, on a scale from 0 (project only designed by supervisors) via 50 (project designed equally by PhD and supervisors) to 100 (project only designed by PhD), PhDs on average score 59.6, indicating that they have relatively more input in their project compared to their supervisors.
- PhDs in Law and the Humanities experience most freedom, both on the freedom scale as in the design of their project, while PhDs in Medical and Health sciences and Natural sciences experience least freedom on both indicators.
- PhDs whose project is funded by institutions themselves (first flow of funding) have significantly more freedom than PhDs whose projects are funded via funding organisations and external organisations (second and third flow of funding). This holds for both the freedom scale and the design of the project.
- There are no significant differences between types of PhD arrangements in the freedom they have in their project. Only external PhDs can on average give more input on their PhD project design than the other types of PhDs. Scholarship PhDs do not have significantly more freedom than employee PhDs. This holds for both indicators.
- In the context of the Experiment with scholarship PhDs at Rijksuniversiteit Groningen, scholarship PhDs do not have significantly more freedom than employee PhDs either. This holds for both indicators. At other universities, there are also no significant differences in freedom between employee PhDs and scholarship PhDs on both indicators.

Recommendations

Supervision

- Give daily supervisors who are not promotors or co-promotors proper recognition for their supervision of PhDs. In general, daily supervisors carry out most of the supervision work, and should be recognized accordingly. An extension of the Ius Promovendi for Associate and Assistant professors could contribute to the proper recognition of daily supervisors' contributions to PhD supervision.
- Although daily supervision does not necessarily have to take place on a daily basis, daily supervisors should at least have regular contact with their PhDs. We recommend daily supervisors to meet with PhDs once a month at the very least, but preferably more often. This should also be the case for external PhDs: even though they are often embedded within their universities, UMC's and research institutions to lesser extent than other types of PhDs, external PhDs should be able to count on regular supervision as well.
- Universities, UMCs and research institutions should be committed to preventing questionable supervisor behaviour. This can be achieved by training current and new supervisors. In addition, institutions should communicate explicitly that such behaviour is unacceptable and does not contribute to a healthy research environment, even though such behaviours were once (and unfortunately often still are) considered normal.
- Independent procedures via which PhDs (and other staff) can report questionable supervisor behaviours should be established. These procedures should allow not only for reporting instances of questionable behaviour, but also and especially for taking action against such behaviour. So-called "superstar status" of some academic staff should not be a license to cause harm to PhDs. PNN therefore encourages the implementation of an ombudsperson at all universities, UMCs and research institutions.
- Changing supervisors should always be an option. Considering many PhDs have supervisors engaging in questionable behaviour, it should be possible for them to change supervisors when the situation becomes unworkable. Too often, PhDs are hindered by bureaucracy, power relations and fear, preventing them from changing supervisors and forcing them to work with supervisors who are unfit to supervise PhDs. Funding should never be an obstacle to changing supervisors. Standard and accessible procedures should be in place to allow PhDs to change supervisors when necessary.
- Take away the Ius Promovendi from supervisors who have repeatedly shown themselves to be incompetent supervisors. The Ius Promovendi is now given to excellent researchers, but this, however, does not mean that they are also excellent supervisors. Negatively affecting PhDs should be sufficient ground to discharge the supervisor from their supervision duties. Again, "superstar status" does not justify mistreating subordinates.

Freedom

- Stop the experiment with scholarship PhDs. The one benefit of the scholarship system is that it is assumed to provide PhDs with more freedom. This, however, seems not to have materialized. As such, continuation of the experiment or implementing a scholarship system in the Netherlands will not benefit PhDs.

Samenvatting

Begeleiding

- Gemiddeld hebben promovendi 2,97 supervisors. 37,9% van de promovendi heeft twee supervisors, 33,5% heeft drie supervisors. 97.3% van de promovendi heeft minstens twee begeleiders.
- De meest voorkomende samenstelling van een begeleidingsteam is een team van één promotor en één copromotor (24,1%), gevolgd door een team van één promotor en twee copromotoren (11,4%).
- Voor 47,1% van de promotoren is de copromotor de dagelijkse begeleider. Voor 21,5% van de promovendi is de dagelijkse begeleider een begeleider die geen promotor of copromotor is.
- Promovendi komen het vaakst samen met hun dagelijkse begeleider, hoewel slechts 3,6% hun dagelijkse begeleider ook echt dagelijks ontmoet. De meeste promovendi ontmoeten hun dagelijkse begeleider minstens wekelijks (41,5%). Promovendi ontmoeten hun promotoren het minst vaak, meestal minstens maandelijks (25,6%) of vier keer per jaar (23,7%). 5,3% van de promovendi ontmoeten hun promotor minder dan jaarlijks.
- Buitenpromovendi komen het minst vaak samen met hun supervisors. 39,2% van hen ontmoet hun dagelijkse begeleider minder dan maandelijks.
- Promovendi beoordelen de frequentie van de begeleiding met een 7,39 op een schaal van 0 tot 10. De kwaliteit van de begeleiding wordt beoordeeld met een 7,29.
- Hoe vaker de promovendi hun dagelijkse begeleider ontmoeten, hoe hoger zij zowel de frequentie als de kwaliteit van de begeleiding beoordelen. Deze relatie kan twee kanten op werken: het is mogelijk dat promovendi met goede supervisors hun supervisors vaker willen zien (kwaliteit → frequentie), of het vaker ontmoeten van de begeleiders kan de kwaliteit van de begeleiding vergroten (frequentie → kwaliteit).
- Begeleiders ondersteunen promovendi met name middels het geven van autonomie, hun beschikbaarheid en persoonlijke ondersteuning, maar bieden in mindere mate academische ondersteuning: promovendi zijn het het minst vaak eens met de stelling dat hun supervisors hen helpen bij het plannen en beheren van onderzoekstaken en hen helpen bij het aanleren van onderzoeksvaardigheden.
- 42,9% van de promovendi geeft aan dat hun begeleider bedenkelijk gedrag vertoont. De meest voorkomende vorm van bedenkelijk gedrag is het niet erkennen of het bagatelliseren van de werkdruk (21,9%), gevolgd door het contacteren van promovendi in het weekend of 's nachts (16,7%). 13% van de promovendi wordt door hun begeleiders onder druk gezet om extra taken op zich te nemen.
- 12,9% van de promovendi heeft ooit overwogen om van supervisor te veranderen.
- De belangrijkste redenen om van supervisor te veranderen zijn problemen in het onderzoeksproces, zoals het te veel onder druk zetten door de supervisor of het ondermijnen van het zelfvertrouwen. Ook een inhoudelijke mismatch tussen promovendus en supervisor is een veelvoorkomende reden om te overwegen van supervisor te veranderen.
- 18% van de promovendi die overwoog van supervisor te veranderen, slaagde erin van supervisor te veranderen. 19,9% probeerde van supervisor te veranderen, maar slaagde daar niet in. 44,7% heeft geen stappen ondernomen om van supervisor te veranderen.
- De belangrijkste reden om niet van supervisor te veranderen is dat de promotor of supervisor dit niet toeliet, of dat zij werden gehinderd door bureaucratie.

- De belangrijkste redenen om geen stappen te ondernemen om van supervisor te veranderen zijn de angst om het promotietraject niet af te kunnen maken, de angst om hun toekomstige carrière te riskeren en geen problemen te willen veroorzaken.

Vrijheid

- Promovendi hebben in het algemeen relatief veel vrijheid in hun promotietraject. Op een vrijheidsschaal van 1 tot 7 beoordelen promovendi hun vrijheid met een 5,54.
- Voor wat betreft de opzet van hun project scoren promovendi op een schaal van 0 (project alleen ontworpen door begeleiders) via 50 (project evenveel ontworpen door promovendus als begeleiders) tot 100 (project alleen ontworpen door promovendus) gemiddeld 59,6, wat aangeeft dat ze relatief meer inbreng hebben in hun project dan hun begeleiders.
- Promovendi in Rechtsgeleerdheid en Geesteswetenschappen ervaren de meeste vrijheid, zowel op de vrijheidsschaal als in de vormgeving van hun project, terwijl promovendi in Medische en Gezondheidswetenschappen en Natuurwetenschappen de minste vrijheid ervaren op beide indicatoren.
- Promovendi wier het project wordt gefinancierd via de eigen instelling (eerste geldstroom) hebben aanzienlijk meer vrijheid dan promovendi waarvan het project wordt gefinancierd via financieringsorganisaties of externe organisaties (tweede en derde geldstroom). Dit geldt zowel voor de vrijheidsschaal als voor de opzet van het project.
- Er zijn geen significante verschillen tussen typen promotietrajecten in de vrijheid die ze hebben in hun project. Alleen buitenpromovendi kunnen gemiddeld meer input geven op de opzet van hun promotieproject dan de andere soorten promovendi. Beurspromovendi hebben niet significant meer vrijheid dan werknemerpromovendi. Dit geldt voor beide indicatoren.
- In de context van het Experiment Promotieonderwijs aan de Rijksuniversiteit Groningen hebben beurspromovendi ook niet significant meer vrijheid dan werknemerpromovendi. Dit geldt voor beide indicatoren. Ook bij andere universiteiten zijn er op beide indicatoren geen significante verschillen in vrijheid tussen werknemerpromovendi en beurspromovendi.

Aanbevelingen

Begeleiding

- Geef dagelijkse begeleiders die geen promotor of copromotor zijn gepaste erkenning voor de begeleiding van promovendi. Dagelijkse begeleiders voeren in het algemeen het meeste werk uit, en zouden hiervoor erkend moeten worden. Het uitbreiden van het Ius Promovendi naar Universitair Hoofddocenten en Universitair Docenten zou kunnen bijdragen aan het gepast erkennen van hun bijdrage aan de begeleiding van promovendi.
- Hoewel dagelijkse begeleiding niet letterlijk dagelijks hoeft plaats te vinden, zouden dagelijkse supervisors wel regelmatig contact moeten houden met hun promovendi. We bevelen aan dagelijkse supervisors om promovendi op zijn allerminst maandelijks te ontmoeten, maar bij voorkeur vaker. Dit zou ook moeten gelden voor buitenpromovendi: ondanks dat zij minder ingebed zijn in universiteiten, UMC's en onderzoeksinstellingen dan andere typen promovendi, zouden zij ook moeten kunnen rekenen op regelmatige begeleiding.
- Universiteiten, UMC's en onderzoeksinstellingen zouden bedenkelijk gedrag door supervisors moeten voorkomen. Dit kunnen zij doen door huidige en nieuwe begeleiders beter te trainen. Daarnaast zouden zij expliciet moeten uitdragen dat dergelijk gedrag niet acceptabel is en niet bijdraagt aan een gezonde onderzoeksomgeving, zelfs al werd (en soms helaas nog wordt) dit gedrag als normaal beschouwd.
- Creëer onafhankelijke procedures waarmee promovendi (en andere medewerkers) bedenkelijk gedrag door supervisors kunnen rapporteren. Deze procedures moeten niet alleen de mogelijkheid bieden om bedenkelijk gedrag te rapporteren, maar ook en bovendien de mogelijkheid bevatten om concrete actie te ondernemen. Een "supersterrenstatus" van sommige wetenschappers geen vrijbrief mogen bieden om promovendi slecht te behandelen. PNN moedigt daarom het instellen van een ombudspersoon aan alle universiteiten, UMC's en onderzoeksinstellingen aan.
- Het zou altijd mogelijk moeten zijn om van begeleider te wisselen. Aangezien veel promovendi supervisors hebben die zich bedenkelijk gedragen, zou het voor promovendi mogelijk moeten zijn om van supervisor te wisselen als de situatie onwerkbaar wordt. Te vaak nog worden promovendi hierin belemmerd door bureaucratie, machtsverhoudingen en angst, wat hen weerhoudt van het wisselen van begeleider en hen dwingt om door te werken met ongeschikte begeleiders. De procedures om van supervisor te wisselen zouden standaard en toegankelijk moeten zijn, om promovendi echt in staat te stellen van supervisor te wisselen als dat noodzakelijk is.
- Neem het Ius Promovendi af van begeleiders van wie structureel blijkt dat zij geen goede begeleiders zijn. Het Ius Promovendi wordt nu gegeven aan excellente onderzoekers, maar dat maakt diegene echter niet automatisch een goede begeleider. Wanneer promovendi negatieve gevolgen ondervinden van de begeleiding van een supervisor, zou dat voldoende grond moeten zijn om de supervisor te ontslaan van zijn of haar begeleidingstaken. Wederom geldt dat een "sterrenstatus" geen valide reden is om ondergeschikten slecht te behandelen.

Vrijheid

- Stop met het Experiment Promotieonderwijs. Het enige voordeel van het bursalenstelsel zou voor promovendi zijn dat zij meer vrijheid zouden hebben in hun project. Dit voordeel lijkt echter niet zijn gematerialiseerd. Daarom zal het doorzetten van het experiment of het invoeren van dit systeem in Nederland promovendi niet ten voordele van promovendi zijn.

Introduction

This report presents the results of the PNN PhD survey regarding supervision and freedom. Supervisors have long been found to have a significant influence on the wellbeing and progress of PhDs. In short, a supervisor can make or break a PhD trajectory. It is therefore crucial to get insights into who supervise PhDs, how often PhDs meet with their supervisors and how they rate the frequency and quality of supervision. Furthermore, supervisors play a large role in the freedom PhDs have in executing their PhD projects and becoming independent researchers.

Therefore, supervision and freedom were indispensable parts of the PNN PhD survey, that was collected from March 2nd to May 10th 2020. More information about this survey can be found in the PNN Survey report on Survey information, Demographics and COVID-19. In this report, we present the results from this survey on supervision and freedom. Next to traditional questions concerning the composition of the supervision team and the satisfaction with the frequency and quality of supervision, we also present results concerning questionable supervisor behaviour, such as contacting PhDs at unreasonable hours, and whether PhDs have ever considered changing supervisors. We also investigate the extent to which types of PhD arrangements differ in the freedom they offer.

Methodology

General 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.[1]

Source of funding

All employee PhDs were asked the question from what source their PhD project was funded. Their options were "My institution", "A funding organisation", "An external organisation" or "Other, namely". These options correspond with the first, second and third flow of funds. Respondents were allowed to choose more than one source of funding. 14.2% of the PhDs indicated more than once source of financing.

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

Supervision

Dimensions of supervision

As supervision is a multi-faceted task, we used the questionnaire developed by Overall, Deane and Peterson[2] to assess how PhDs are supervised in terms of:

1. The availability of the supervisor
2. The academic support offered by the supervisor
3. The personal support offered by the supervisor
4. The autonomy the PhD gets from the supervisor.

The original questionnaire consisted of 31 items in total. To include them all would make the already lengthy survey too long, likely resulting in low completion rates. We therefore decided to select three items per dimension to be included in our survey. Even with the shortened version of this questionnaire, relatively many of the respondents who did not complete the survey dropped out at this point in the survey.

The first dimension, availability, was measured using the following items:

1. My supervisor responds to my queries or requests for help within a reasonable time frame.
2. My supervisor provides me with prompt feedback whenever I submit written work to him/her.
3. My supervisor is available to answer any questions I have.

The second dimension, academic support, was measured using the following items:

1. My supervisor helps me to plan and manage the different research tasks I have to complete.
2. My supervisor offers suggestions about how to find resources I need.
3. My supervisor spends time helping me learn the skills I need to complete my research.

The third dimension, personal support, was measured using the following items:

1. My supervisor expresses understanding and empathy when I experience difficulties.
2. My supervisor compliments me and makes me feel good about myself and my work.
3. My supervisor reassures me that I will be able to successfully complete my research/thesis.

The fourth dimension, autonomy, was measured using the following items:

1. My supervisor welcomes my input in discussions and treats my ideas with respect.
2. My supervisor always presses his/her own point of view.[3]
3. My supervisor gives me the main responsibility for my project.

These items could be answered on a 7-level scale varying from strongly disagree to strongly agree.

For all subscales and the four subscales combined, we ran a principal axis factor analyses with oblique rotations (direct oblimin) and reliability analyses. The results of these analyses can be found in table 1. The analyses show that the availability, academic support and personal support scales all measure one factor and meet the reliability requirements. The autonomy scale however turned out to not be as reliable as hoped. This was caused by the second item of this scale. It is likely that this item performed worse due to the fact that it was the only item that was formulated negatively and was reverse coded for the analysis. When the item was removed from the analyses, the reliability improved to a mediocre, but acceptable level, but never reaching the reliability of the other three scales.

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[2] Overall, N. C., Deane, K. L., & Peterson, E. R. (2011). Promoting doctoral students' research self-efficacy: Combining academic guidance with autonomy support. Higher Education Research & Development, 30(6), 791-805.

[3] This item was reverse coded for the analysis.

The factor analysis of all items combined pointed towards to existence of three dimensions rather than four, with one dimension having a much higher Eigenvalue than the other two dimensions. The items of the personal support scale could be assigned to both the dimension with the autonomy items and the dimension with the academic support items, though the factor loadings for the personal support items were highest for the autonomy dimension. However, as these were existing scales with established dimensions, and the factor analysis pointing towards a one-dimension solution as well, we decided to keep both the existing subscales as well as to combine the subscales into one overall supervision scale. Item 2 from the autonomy scale was excluded from the overall scale as well, it was not included in the final autonomy scale and it slightly improved the reliability of the overall supervision scale.

Table 1: Results of factor analyses and reliability analyses of supervision scales

Scale	Analysis N	KMO	Factors (Eigenvalue)	Cronbach's *α*
Availability	1,580	0.717	1 (2.336)	0.857
Academic support	1,572	0.739	1 (2.337)	0.856
Personal support	1,566	0.738	1 (2.468)	0.892
Autonomy (original)	1,568	0.563	1 (1.688)	0.571
Autonomy (without item 2)	1,569	0.500	1 (1.477)	0.645
Total (original)	1,555	0.900	3 (5.892; 1.441; 1.054)	0.894
Total (without Autonomy item 2)	1,556	0.900	3 (5.751; 1.343; 1.051)	0.906

Questionable supervisor behaviour

As PNN sometimes receives messages from PhDs whose supervisors engage in behaviours that put strain on them, we included a question in the survey asking PhDs whether their supervisors engaged in one of the following behaviours, of which they could select multiple:

1. Does not recognize the pressure or plays down the workload
2. Does not create enough space for me to go on vacation
3. Does not create enough room for me to write
4. Contacts me in the weekend or at night
5. Pressures me to take on additional tasks
6. Blames me when I am overworked
7. Wants to be co-author on my work even though contribution is limited
8. Talks about the wish to start a family as something that is incompatible with an academic career
9. Says there is no room to start a family during my PhD project
10. Other, namely…

The PhDs could also select the option that their supervisors did not engage in any of these behaviours. This option automatically deselected the other options. Vice versa, this option was automatically deselected by selecting any of the other options. However, these settings had as a consequence that PhDs who indicated that their supervisor did none of these things got the same score as PhDs who did not respond to this question. However, as we already only included respondents who have completed the survey, we expect that our estimates will not be largely affected by this.

Freedom

To measure the freedom that PhDs get in their PhD trajectories, we used two measures. The first measure is the 'freedom scale', which is used in the annual PhD Surveys of Rijksuniversiteit Groningen[4]. This scale consists of six items:

1. In my project, there is much room for my own ideas
2. I have the freedom to make my own choices about the direction of my project and the methods to be used
3. I have the freedom to choose where and when I work
4. I have the freedom to choose which conferences to attend
5. I have the freedom to choose which courses I take
6. I have the freedom to choose which journals I publish in

These items could be answered on a 7-point scale varying from strongly disagree to strongly agree. To confirm that this scale measured freedom in one dimension, we ran a principal axis factor analysis with an oblique rotation (direct oblimin). The Kaiser-Meyer-Olkin measure confirmed the sample size adequacy (KMO=0.794). The analysis further revealed that combined, these six items measure one dimension (Eigenvalue: 3,268). The factor loadings varied between 0.741 for item 3 and 0.562 for item 4. A reliability analysis indicated that the scale's reliability could be classified as good (Cronbach's = 0.831). These items were therefore combined into a scale by taking the mean score on these six items.

The second measure of freedom was the question: "Who designs your project?". This question could be answered by giving a score from 0 to 100, with 0 indicating that only the supervisor designs the project, 50 indicating that both the supervisor and the PhD equally design the project, and 100 indicating that the PhD fully designs the project.

For both supervision and freedom, results will only be presented for the 1,601 individuals who fully completed the survey. We will also present results for various subgroups to see whether differences exist between groups of PhDs, specifically discipline[5], funding source and type of PhD. All reported error bars show the 95% confidence intervals.

[4] Bouma, E. (2018). PhD Survey 2017. Experiences of PhD students at the University of Groningen. https://www.rug.nl/education/phd-programmes/about/phd-survey/2017.pdf
Van der Scheer, E.A. (2019). Experiences of PhD students at the University of Groningen. https://www.rug.nl/education/phd-programmes/about/phd-survey/2019.pdf

[5] More information about the construction of this variable can be found in the PNN Survey Report on Survey information, Demographics and COVID-19.

Supervision

Supervision team

Number of supervisors

To get an overview of the composition of a PhD supervision team, we asked all PhDs how many promotors, co-promotors and supervisors they had. They could choose a number between 0 and 5 for all three types of supervisors. We added up these numbers to get an overview of the average number of supervisors in a supervision team. These results are presented in figure 1.1.

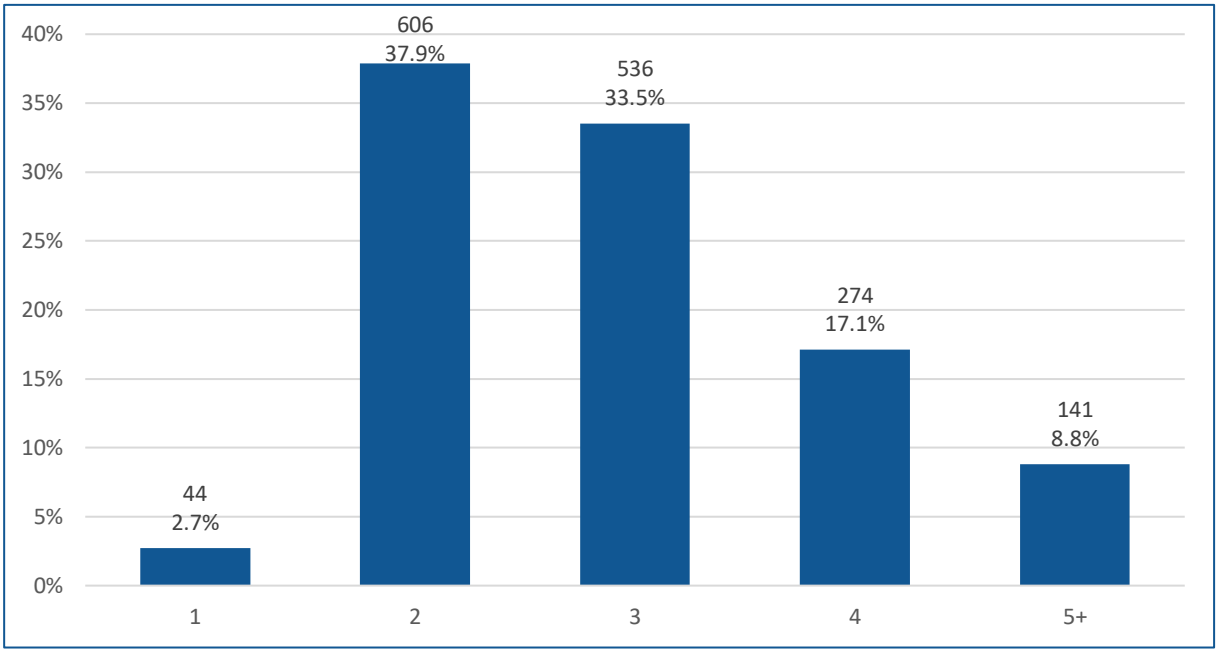

Figure 1.1: Number of supervisors (n=1,601).

On average, PhDs have 2.97 supervisors, with a standard deviation of 1.20. Only 2.7% of the PhDs have only one supervisor, indicating that the four-eye principle is in most cases applied. The most common number of supervisors is two (37.9%), followed by three (33.5%). 17.1% of the PhDs has four supervisors and 8.8% of the PhDs have five or more supervisors.

Figure 1.2 presents the average number of supervisors per type of institution, PhD arrangement and discipline. Here, we see that PhDs at UMCs on average have more supervisors (3.19) than PhDs at universities (2.92). At UMCs, the most common number of supervisors also is three, while it is two at universities. PhDs at other types of institutions on average have 2.93 supervisors.

On average, scholarship PhDs have the highest number of supervisors (3.17), while external PhDs have the lowest number of supervisors (2.19). Employee PhDs and other types of PhDs however only have a slightly higher average number of supervisors (2.94 and 2.98 respectively). Other types of PhDs most often have three supervisors, while employee PhDs, scholarship PhDs and external PhDs most often have two supervisors.

PhDs in Agricultural sciences on average have the highest number of supervisors (3.51), with PhDs most often having no less than four supervisors. They are followed at quite a large distance by PhDs in Medical and Health sciences, who have 3.18 supervisors on average, with three being the most common number of supervisors. PhDs in Law have the lowest average number of supervisors (2.48), and most often have two supervisors. In all other disciplines, the most common number of supervisors is two as well.

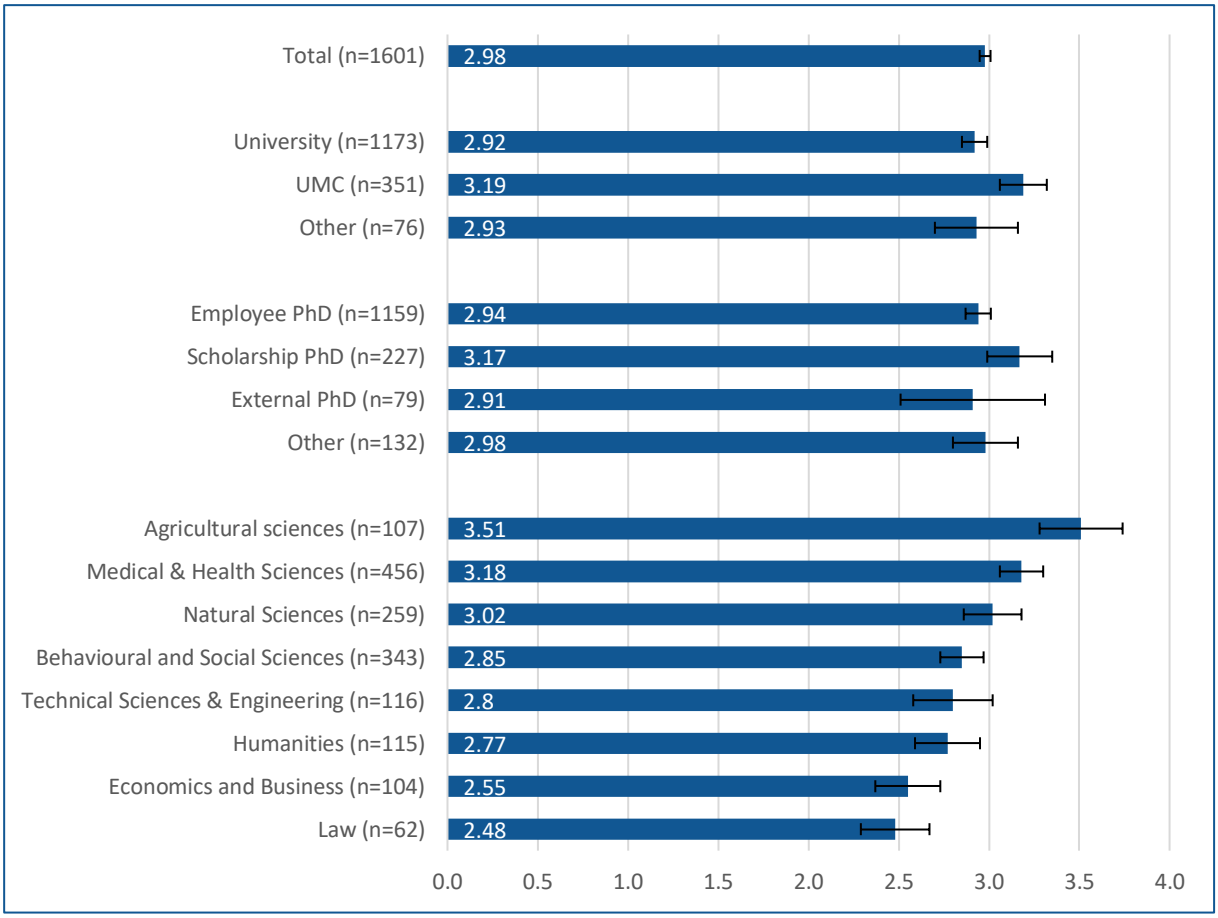

Figure 1.2: Number of supervisors, in total and per type of institution, PhD arrangement and discipline. Mean presented in graph. 95%-confidence intervals included.

Types of supervisors

If we look at the number of supervisors per type of supervisor (figure 1.3), we see that PhDs usually have one (75.6%) or two (20.4%) promotors, with an average of 1.22 promotor per PhD, with a standard deviation of 0.52. PhDs also usually have one (49.8%) or two (23%) co-promotors, but relatively many also indicate to have no co-promotor (24.7%). Regular supervisors (who are not promotors or co-promotors) are less common, with 54.8% not having such a supervisor. The PhDs who do have a regular supervisor have one (25.2%) or two (14.4%). On average, PhDs have 0.73 regular supervisors, with a standard deviation of 0.97.

Figure 1.4 presents the number of promotors, co-promotors and regular supervisors per type of institution, PhD arrangement and discipline. Looking at differences between types of institutions in the types of supervisors PhDs have, we see that PhDs in UMCs on average have more promotors (1.33) and co-promotors (1.26) than PhDs at universities (1.18 and 0.96 respectively). They however on average do have fewer regular supervisors (0.59) than PhDs in universities (0.78). In all categories, the most common number of promotors and co-promotors is one, and the most common number of supervisors is zero.

Scholarship PhDs on average have fewer promotors (1.09) and co-promotors (0.87) than employee PhDs (1.23 and 1.07 respectively), but do have more regular supervisors (1.12) than employee PhDs (0.65). In contrast to employee PhDs, the most common number of regular supervisors is one rather than zero for scholarship PhDs. External PhDs on average have the most supervisors (1.37), bur relatively few co-promotors (0.84) or regular supervisors (0.71). Other types of PhDs have the highest average number of co-promotors (1.15) and the lowest average number of regular supervisors (0.57). For all categories, the most common number of promotors is one and the most common number of co-promotors is one.

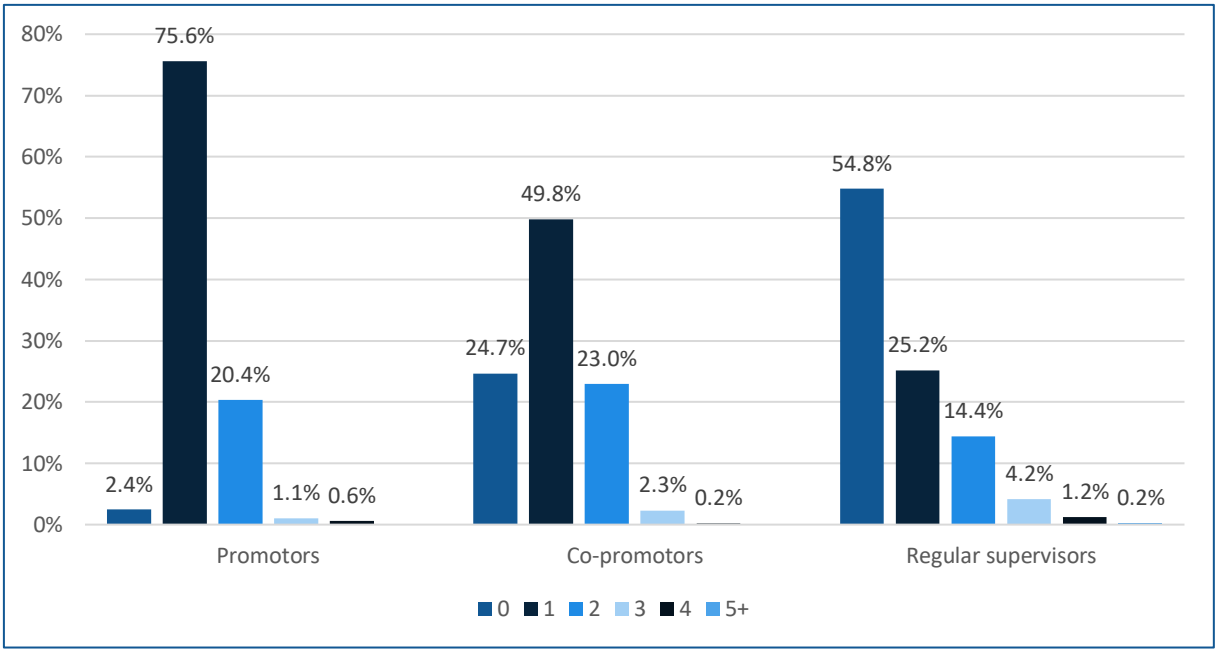

Figure 1.3: Number of promotors, co-promotors and regular supervisors (n=1,601).

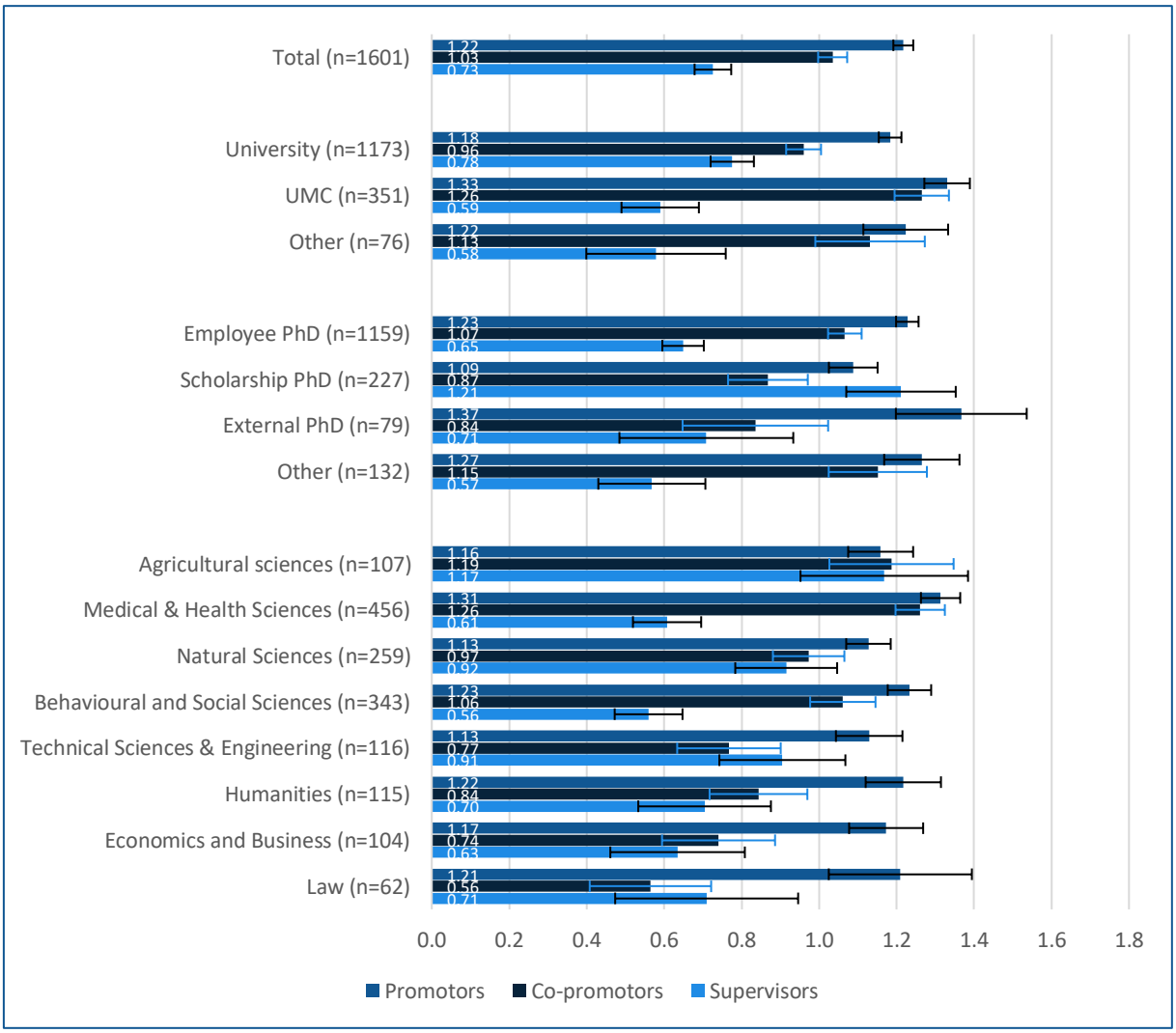

Figure 1.4: Average number of promotors, co-promotors and regular supervisors, in total and per type of institution, PhD arrangement and discipline.

The fact that Agricultural sciences has the highest average total number of supervisors is caused by the fact that they have the highest average number of regular supervisors (1.17) and a relatively high number of co-promotors (1.19). Only in Medical and Health sciences do PhDs have more co-promotors on average (1.26). They also have the highest average number of promotors (1.31). PhDs in Natural sciences and Technical sciences and engineering have the lowest average number of supervisors (both 1.13), while PhDs in Law and Economics and Business have the lowest average number of co-promotors (0.56 and 0.74 respectively). PhDs in Behavioural and Social sciences have the lowest average number of regular supervisors (0.56). In all disciplines, the most common number of promotors is one, while the most common number of regular supervisors is zero. In all disciplines except from Law, the most common number of co-promotors is one as well. In Law, the most common number of co-promotors is zero.

Composition of the supervision team

Separate averages of the number of types of supervisors only gives a limited view of the overall composition of the supervision team. We therefore computed a 3-digit indicator that numerically presents the composition of the team: the first digit indicates the number of promotors, the second digit indicates the number of co-promotors and the third digit indicates the number of regular supervisors. For example, the number 123 represents a supervision team consisting of 1 promotor, 2 co-promotors and 3 supervisors.

Figure 1.5 presents the top 10 most common team compositions. The most common team composition is one promotor and one co-promotor (24.1%). At quite some distance, the second most common team composition is one promotor and two co-promotors (11.4%) while third most common is a team consisting of one promotor, one co-promotor and one regular

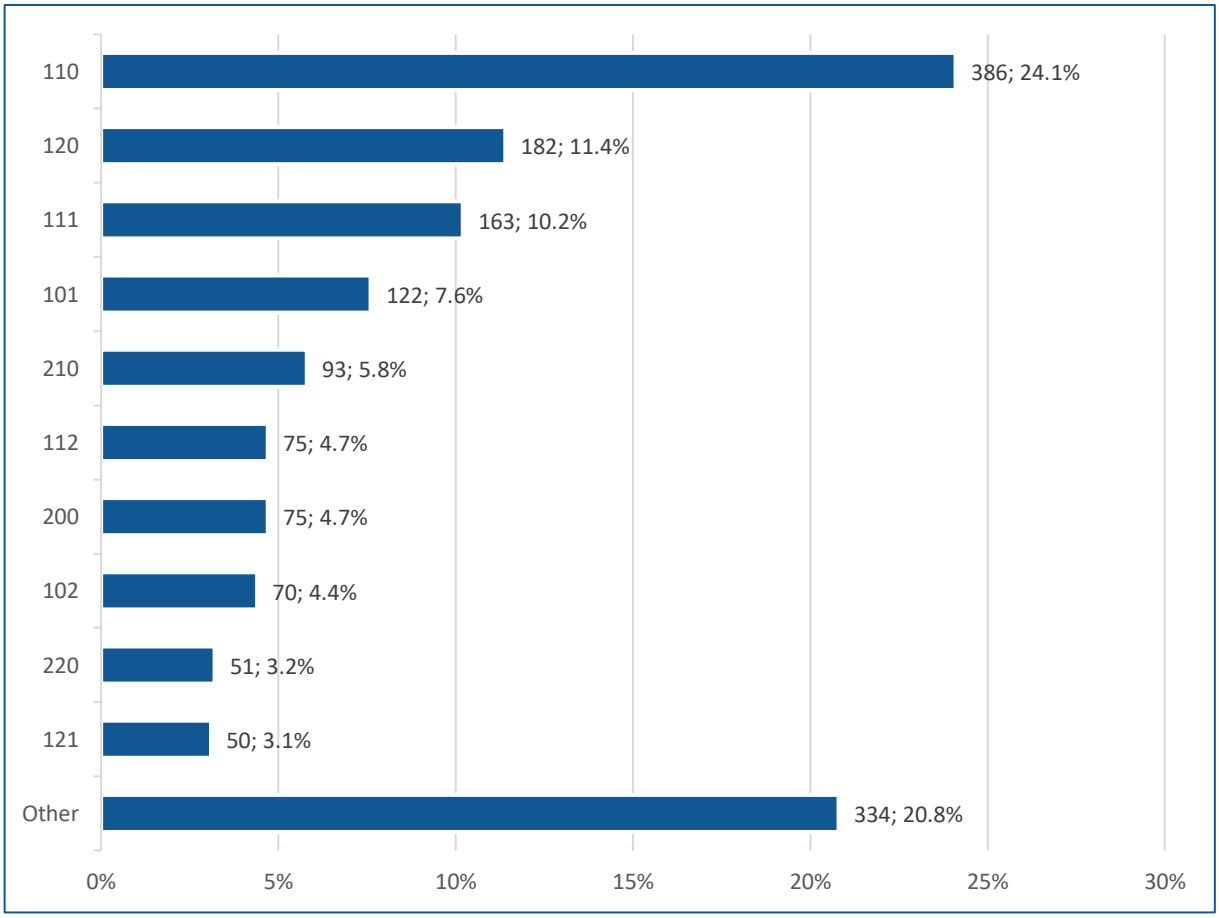

Figure 1.5: Most common supervision team compositions. First digit: number of promotors. Second digit: number of co-promotors. Third digit: number of regular supervisors. (n=1,601).

supervisor. 20.8% of the PhDs have a team composition other than the 10 most common types of team compositions.

Which types of supervision team compositions PhDs have also depends on the type of institution, PhD arrangement and discipline. As the large number of categories would make graphical presentations of these results unreadable, we present the results in table A1 in the appendix.

Though a team consisting of one promotor and one co-promotor is most common at all types of institutions, PhDs at UMCs for instance rarely have one promotor combined with one regular supervisor (1.4%) or a promotor and two regular supervisors (0.9%). PhDs at universities on the other hand relatively least often have two promotors and one co-promotor (4.3%), while this is the third most common team composition at UMCs and other types of institutions. PhDs at universities relatively most often have a team composition other than the top 10 most common team compositions (21.4%).

When it comes to PhD arrangements, again, the combination of one promotor with one co-promotor is most common amongst all categories, but it is relatively less common for scholarship PhDs and other types of PhDs. Scholarship PhDs relatively often have a team with one promotor, one co-promotor and one regular supervisor (14.1%) or with one promotor and one regular supervisor (14.1%). Other types of PhDs relatively often have either one supervisor and two co-promotors (20.5%) or two promotors and one co-promotor (8.3%). External PhDs also relatively often have only two promotors in their supervision team. Scholarship PhDs relatively most often have another type of team composition than the top ten most common team compositions (28.6%).

Disciplines also seem to use different team compositions for the supervision of their PhDs. The combination of one promotor and one co-promotor is, again, most common in all disciplines, but not equally common: 31.7% of the PhDs in Economics and business have such a supervision team composition, while this is only the case for 11.2% of the PhDs in Agricultural sciences. There, relatively many PhDs have one promotor, one co-promotor and two supervisors (10.3%) or another type of team composition outside the top 10 most common team compositions (29.9%). PhDs in Law relatively most often have only two promotors, and relatively least often one promotor combined with two co-promotors (3.2%). This latter type of team composition is in contrast relatively most common in Medical and Health sciences (15.8%), as well as a team consisting of two promotors and two co-promotors. They then however relatively least often have a team consisting of only one promotor and one regular supervisor (2.2%).

Daily supervisor

In a team of supervisors, usually one is assigned to be the daily supervisor. We therefore asked the PhDs which of their supervisors is their daily supervisor. The responses to this question can be found in figure 1.6. For most PhDs, their co-promotor is their daily supervisor (47.1%). 29.9% of the PhDs have their promotor as daily supervisor, while 21.5% have a regular supervisor as daily supervisor.

Figure 1.6 also shows the variation in who takes on the role of daily supervisor per type of institution, PhD arrangement and discipline. PhDs in UMCs relatively often have their co-promotor as their daily supervisor (66.3%), while employee PhDs relatively often have their promotor (32.2%) or regular supervisor (25.5%) as their daily supervisor.

External PhDs relatively often have a promotor as their daily supervisor (38.5%), while scholarship PhDs relatively often have a regular supervisor as their daily supervisor (37.6%). Employee PhDs and other types of PhDs relatively most often have their co-promotor as their daily supervisor (49.1% and 55.4% respectively), and least often have a regular supervisor as their daily supervisor (18.4% and 20% respectively).

PhDs in Law relatively most often have a promotor as their daily supervisor (50%), while this is relatively rare amongst PhDs in Agricultural sciences (21.7%). However, both PhDs in Law

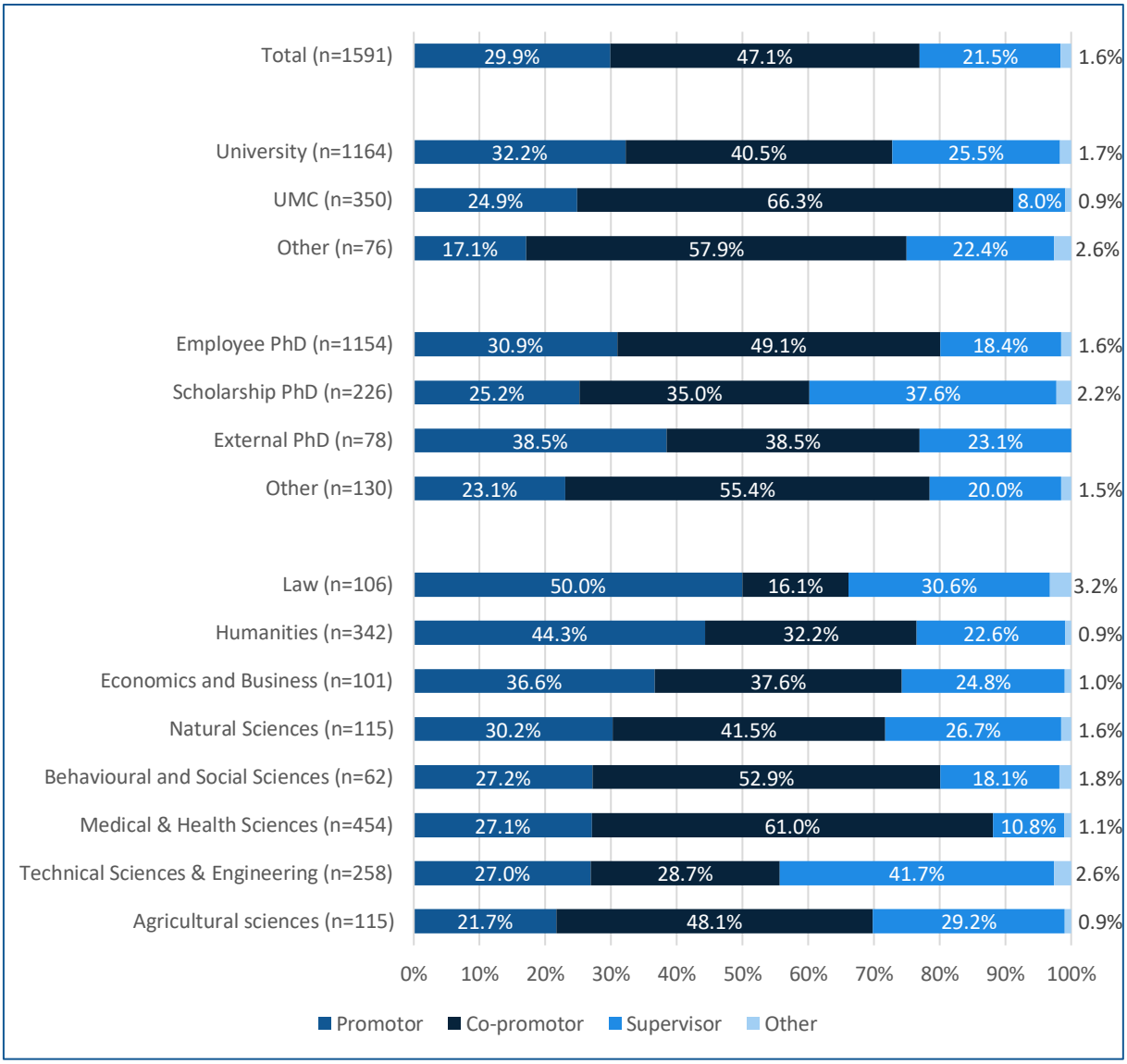

Figure 1.6: Responses to the question: "Who is your daily supervisor?", in total and per type of institution, PhD arrangement and discipline.

and Agricultural sciences relatively most often have a regular supervisor as their daily supervisor (30.6% and 29.2% respectively). However, PhDs in Technical sciences and engineering most often have a regular supervisor as their daily supervisor. PhDs in Medical and Health sciences most often have a co-promotor as their daily supervisor.

Frequency of meetings with supervisors

We were also interested in how often PhDs had meetings with their supervisors. We therefore asked the PhDs how often they meet with their daily supervisor, promotor, co-promotor and/or regular supervisor to discuss their PhD project. Of course, we only asked this for the types of supervisors the PhDs had indicated to have. Relatively many PhDs (n=154) did not answer the question about the frequency of meeting their daily supervisor, while they had answered the question on who was their daily supervisor, which was asked directly before. To get a better image of how often PhDs meet with their daily supervisor, we imputed the frequency of meeting the type of supervisor they had indicated before as their daily supervisor as their score on the question on how often they meet with their daily supervisor. For instance, if someone indicated that their promotor was their daily supervisor, and they meet their promotor weekly, this score was imputed as the frequency of meeting the daily supervisor. With this method, we could impute a value on this indicator for 146 PhDs. The results for all PhDs per type of supervisor can be found in figure 1.7.

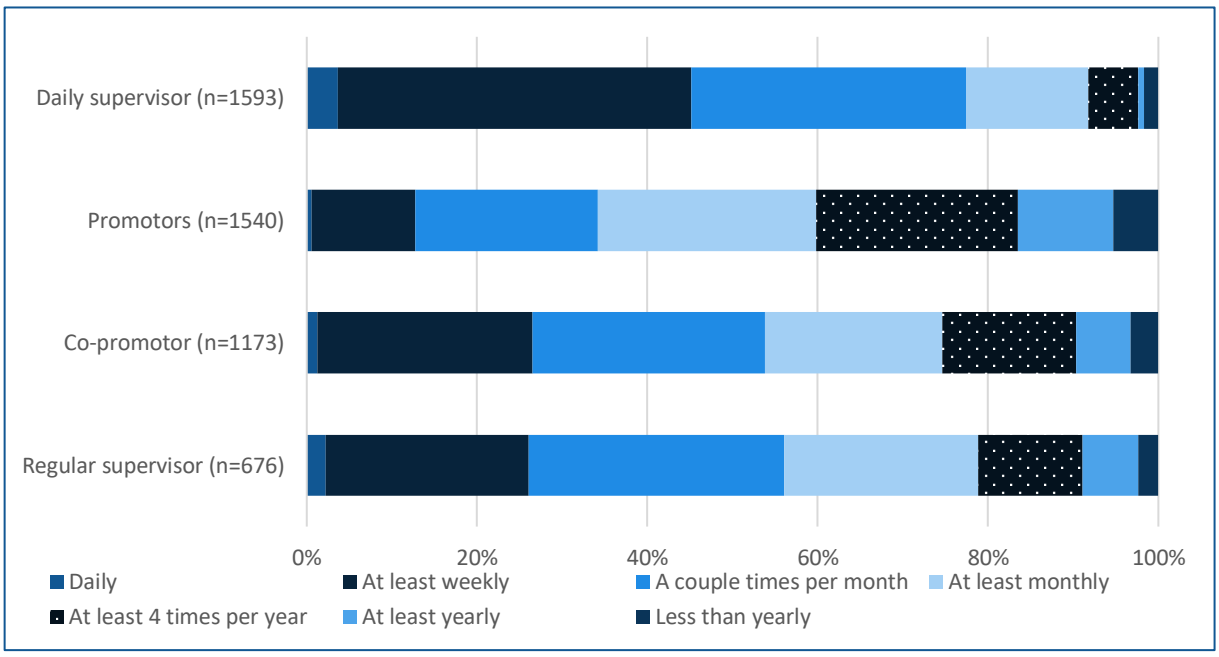

Figure 1.7: Frequency of meeting the daily supervisor, promotor, co-promotor and regular supervisor. Percentages omitted for readability.

PhDs most frequently meet with their daily supervisor, though only 3.6% discusses their project with their daily supervisor on a daily basis. 41.5% of the PhDs meet their daily supervisor at least weekly, and 32.5% a couple of times per month. However, 14.4% of the PhDs indicate to only meet their daily supervisor at least monthly, while 8.2% meets their daily supervisor less than that.

PhDs meet least often with their promotors, with most PhDs stating that they meet with their promotor(s) to discuss the PhD project at least monthly (25.6%) or at least four times per year (23.7%). Another 11.2% indicate meeting their promotor at least yearly, while 5.3% indicates to discuss their project with their promotor less than yearly. 59.8% of the PhDs meet their promotor at least monthly or more frequently.

The differences in the frequency of meeting co-promotors and regular supervisors are quite small. Both types of supervisors are met usually a couple times per month (27.3% and 30% respectively) or at least weekly (25.2% and 23.8% respectively). 78.8% of the PhDs meet their regular supervisor at least monthly or more frequently, while 74.6% of the PhDs meet their co-promotor at least monthly or more frequently.

Type of institution

How often PhDs meet their supervisors varies per type of institution (figure 1.8). PhDs at UMCs meet their daily supervisors more often than PhDs at universities and other types of institutions. 57.3% of the UMC PhDs meet their daily supervisor at least weekly, compared to 37% of the university PhDs and 37.3% of the PhDs at other types of institutions. Only 3.1% of the UMC PhDs meet with their daily supervisor less than monthly, while this is the case for 9.8% of the university PhDs and 8% of the PhDs at other types of institutions.

For promotors, the differences between types of institutions are less striking. Between 39.1% (universities) and 46.1% (other types of institutions) of PhDs meet their promotors less than monthly. UMC PhDs relatively often meet their promotor at least weekly (16.9%), while PhDs at universities relatively often meet their promotors at least monthly (25.8%), at least four times per year (24.1%) or a couple of times per month (23.4%). PhDs at other types of institutions meet their promotors most often at least monthly (31.6%) or at least four times per year (27.6%). PhDs at UMCs, however, most often indicate seeing their promotor less than yearly (7.3%).

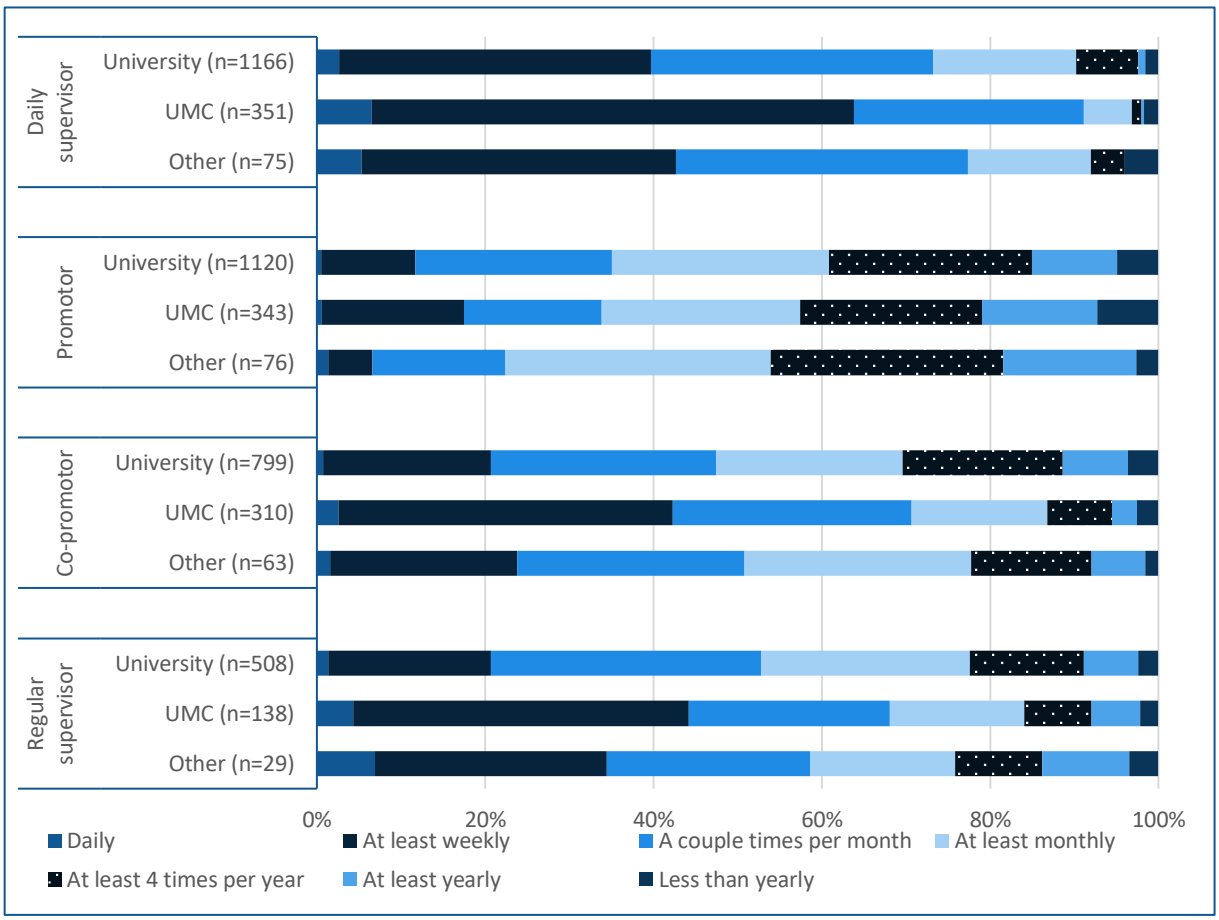

Figure 1.8: Frequency of meeting with daily supervisor, promotor, co-promotor and regular supervisor, per type of institution. Percentages omitted for readability.

For co-promotors, we see that UMC PhDs meet them most frequently, usually at least weekly (39.7%). PhDs at universities usually meet their co-promotors a couple times a month (26.8%) or at least monthly (22.2%), as do PhDs at other types of institutions (27% and 27% respectively). While only 13.2% of the UMC PhDs only meet their co-promotors less than monthly, this is 30.4% for university PhDs and 22.2% for PhDs at other types of institutions.

The results for regular supervisors are similar to the results for co-promotors. Also here, UMC PhDs meet their regular supervisors more frequently, with 39.9% meeting them at least weekly. PhDs at other types of institutions also meet their regular supervisors quite frequently, with 6.9% meeting them on a daily basis and 27.6% meeting them at least weekly. PhDs at universities meet their regular supervisors usually a couple times per month (32.1%) or at least monthly (24.8%). 24.1% of the PhDs at other types of institutions meet their regular supervisor less than at least monthly, while this is the case for 22.4% of the PhDs at universities and 15.9% of the PhDs at UMCs.

Type of PhD arrangement

The frequency of meeting supervisors also differs per type of PhD arrangement (figure 1.9). With regards to the daily supervisor, employee PhDs meet them most frequently, usually at least weekly (45.5%) or a couple times per month (33.7%). In contrast, external PhDs meet their daily supervisors least often, usually at least monthly (31.6%). Furthermore, 39.2% of the external PhDs indicate to see their daily supervisor less than monthly, while this is only the case for 5.3% of the employee PhDs. Scholarship PhDs also most often meet their daily supervisors at least weekly (38.9%) or a couple times per month (29.9%), but their supervisors only at least monthly (19.9%) or less than that (8.8%) more often than employee PhDs. The same holds for other types of PhDs, who in 14.6% of the cases meet their daily supervisor less than monthly.

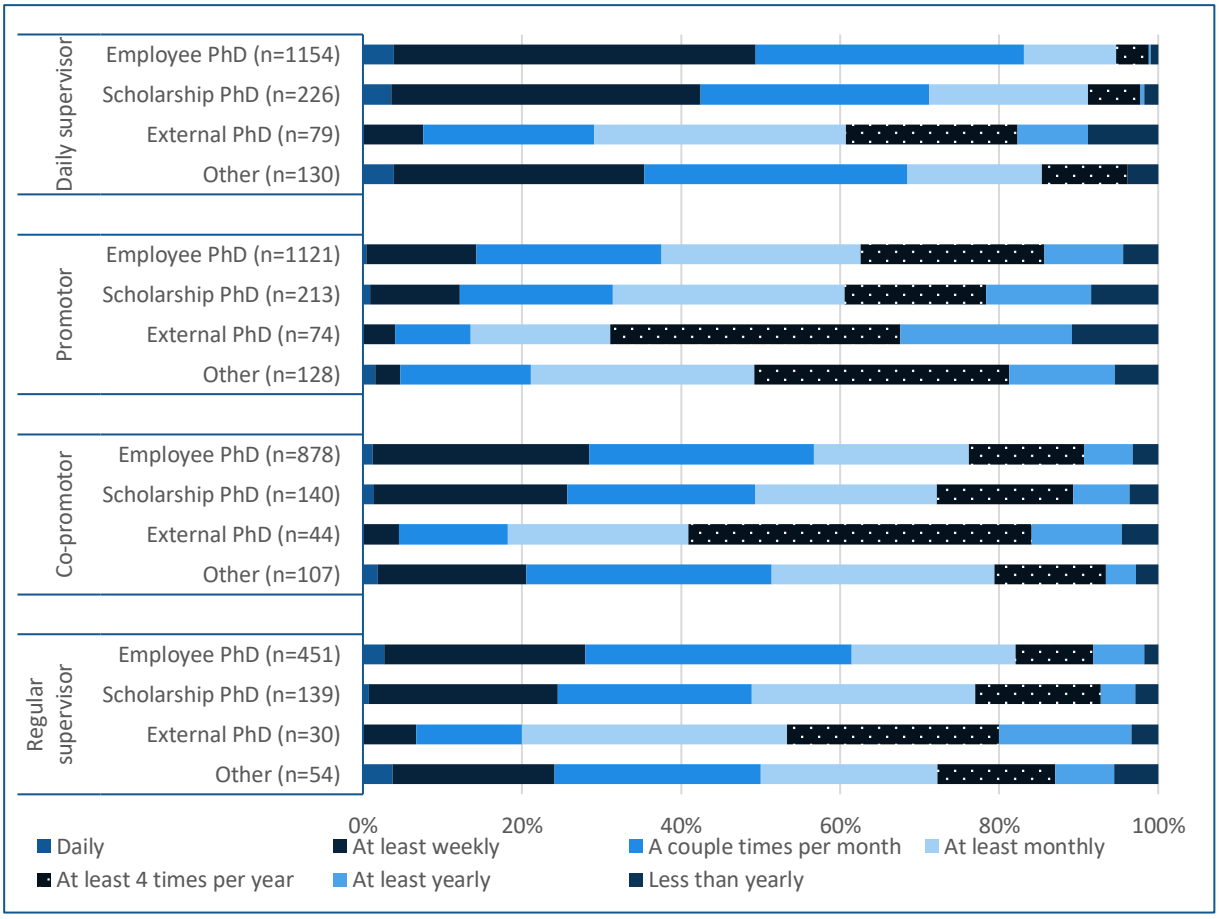

Figure 1.9: Frequency of meeting with daily supervisor, promotor, co-promotor and regular supervisor, per type of PhD arrangement. Percentages omitted for readability.

With regards to the promotor, we see the same pattern: employee PhDs meet with their promotor more frequently than the other three types of PhDs, usually at least weekly (25.3%) or a couple times per month (33.5%). Scholarship PhDs most often see their promotor at least monthly (28.1%) or a couple times per month (24.5%). External PhDs meet their promotor even less often, usually at least four times per year (36.5%) or at least yearly (21.6%). Other types of PhDs meet with their promotor at least four times per year (32%) or at least monthly (28.1%). 68.9% of the external PhDs meet their promotor less than monthly, of which 10.8%-point meet their promotor less than yearly. Scholarship PhDs also relatively often indicate to only meet their promotor less than yearly (8.5%). For employee PhDs, 37.4% meet their promotor less than monthly, with 4.4% only meeting their promotor less than yearly.

A similar picture emerges when looking at the frequency of meeting the co-promotor. Employee PhDs meet their co-promotor relatively more frequently, usually at least weekly (27.2%) or a couple times per month (28.2%). Scholarship PhDs also often meet their co-promotors at least weekly or a couple times per month, but relatively more often indicate to meet their co-promotor at least monthly (22.9%), or a couple times per year (17.1%). External PhDs again meet least frequently with their co-promotor, usually at least monthly (22.7%) a couple times per year (43.2%) or at least yearly (11.7%). Other types of PhDs meet their co-promotors usually a couple times per month (30.8%) or at least monthly (28%). 59.1% of the external PhDs indicate meeting their co-promotors less than monthly, while this is only the case for 27.9% of the scholarship PhDs, 23.8% of the employee PhDs and 20.6% of the other types of PhDs.

Unsurprisingly, the results for regular supervisors are very much similar. Employee PhDs most often meet with their regular supervisors at least weekly (25.3%) or a couple times per month (33.5%), while scholarship PhDs meet their regular supervisors mostly a couple times per month (24.5%) or at least monthly (28.1%). External PhDs meet their regular supervisors least

frequently, usually at least monthly (33.3%), at least four times per year (26.7%) or at least yearly (16.7%). Other types of PhDs meet their regular supervisors most often a couple times per month (25.9%). They also relatively often meet their regular supervisors less than yearly (5.6%) but contrastingly also relatively often on a daily basis (3.7%).

Discipline

Disciplines also differ in the frequency of supervisor meetings (figure 1.10). PhDs in Medical and Health sciences, Technical sciences and Engineering and Natural sciences meet their daily supervisors most frequently, with around 52% of them meeting them at least weekly, followed by meetings at least a couple times per month (29.5%, 27.6% and 33% respectively). PhDs in Law and the Humanities meet their daily supervisors least frequently, with only 11.3% and 23.5% of them meeting their daily supervisor at least weekly. They relatively more often meet their supervisor at least monthly (30.6% and 32.2%). 30.6% of the PhDs in Law indicate meeting their daily supervisor less than monthly, of which 8.1%-point state that the frequency of meetings is less than yearly. In contrast, only 1.7% of the PhDs in Technical sciences and engineering meet their daily supervisor less than monthly, and only 0.4% of the PhDs in Natural sciences meet their daily supervisor less than yearly.

PhDs in Economics and business most often meet with their promotors, usually a couple times per month (38.8%) or at least four times per year (24.5%). PhDs in Law least often meet with their promotor, usually at least monthly (36.7%) or at least four times per year (30.6%). 49% of the PhDs in Law indicate meeting their promotor less than monthly, of which 6.2%-point meets their promotor less than yearly. PhDs in Agricultural sciences also relatively often indicate to meet their promotor less than yearly (6.9%). PhDs in Natural sciences, Medical and Health sciences and Technical sciences relatively often meet their promotor at least weekly (17.7%, 16.2% and 14.2% respectively).

In Medical and Health sciences and Natural sciences, PhDs meet with their co-promotors most frequently, usually at least weekly (35% and 31.9% respectively) or a couple times per month (31% and 22.2% respectively). Again, PhDs in Law least often meet with their co-promotor, usually only at least four times per year (42.4%). 63.6% of the PhDs in Law only meet their co-promotor less than monthly, though none of them meet their co-promotor less than yearly. This most often occurs for PhDs in the Humanities (6.9%), Technical sciences and engineering (6%) and Natural sciences (5.9%).

A similar pattern emerges with regards to the meetings with the regular supervisor. PhDs in Medical and Health sciences, Natural sciences and Technical science and Engineering meet with their regular supervisors most often, usually at least weekly (37.3%, 28.9% and 23.3% respectively) or a couple times per month (24.9%, 30.5% and 46.7% respectively). Also, PhDs in Law meet their regular supervisor least frequently, usually at least monthly (42.3%), but much less often at least a couple times per month or more often (19.2%). 38.5% of the PhDs in Law meet their regular supervisor less than monthly, with 3.8%-point of them meeting their regular supervisor less than yearly. PhDs in the Humanities also relatively often indicate to meet their regular supervisors less than yearly (4.5%).

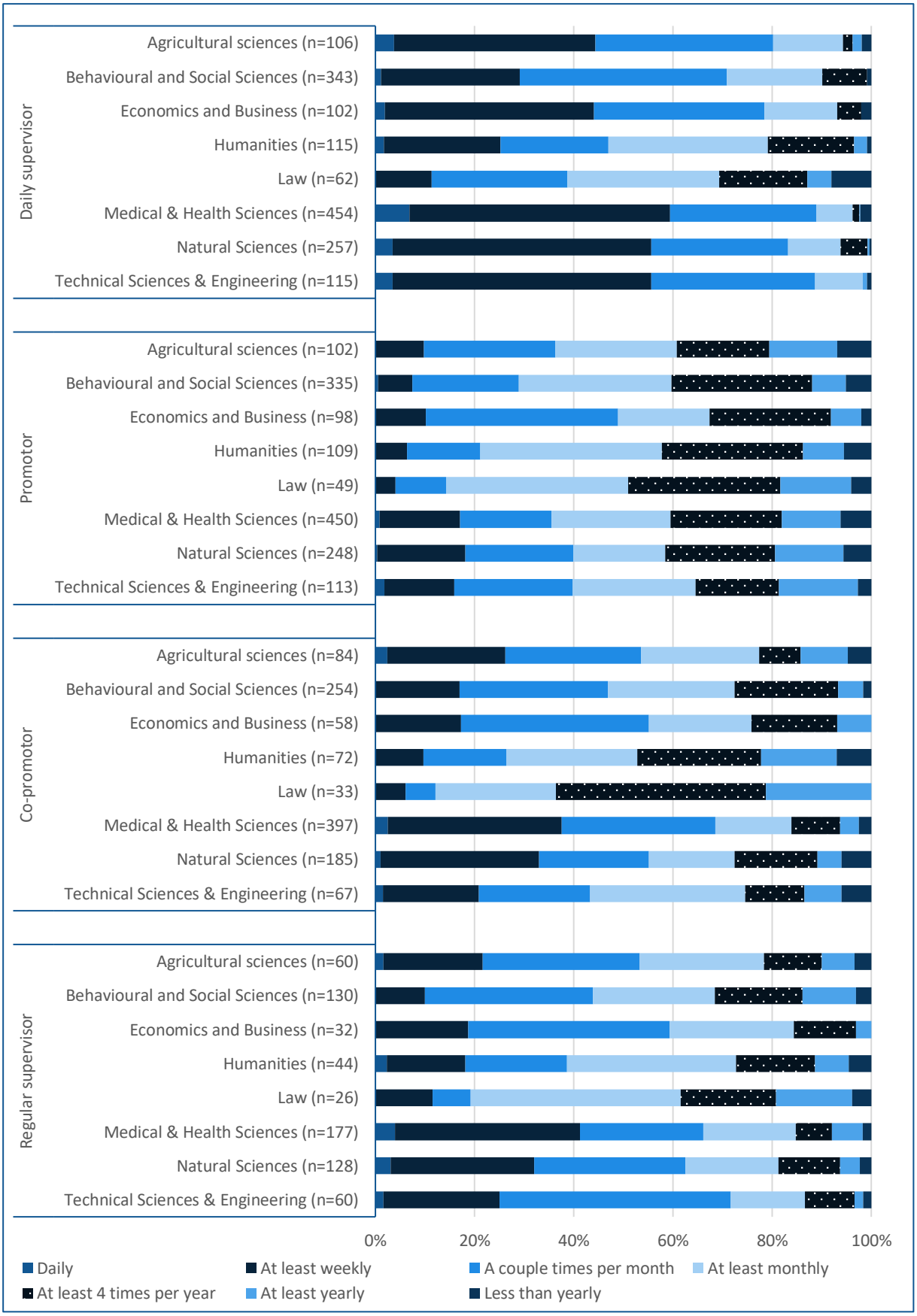

Figure 1.10: Frequency of meeting with daily supervisor, promotor, co-promotor and regular supervisor, per discipline. Percentages omitted for readability.

Satisfaction with supervision

PhDs were asked to rate their satisfaction with the frequency and quality of their supervision. They could rate both the frequency and the quality of their supervision on a scale of 0 to 10. The responses to these questions can be found in figure 1.11. On average, PhDs rate their satisfaction with the frequency of supervision with a 7.39 with a standard deviation of 1.93. They give the quality of supervision a score of 7.29 with a standard deviation of 2.01 As the means already indicated, the figure shows that the responses to not differ greatly: the frequency of supervision is relatively more often rated with a 7.51-8 or 9.51-10 than the quality of supervision.

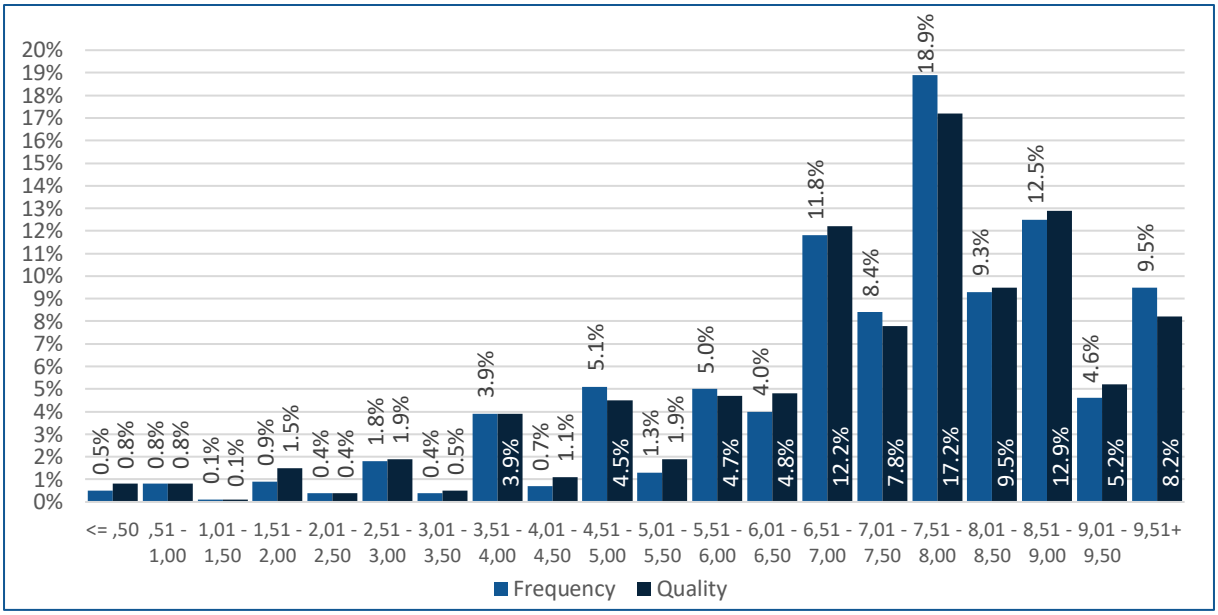

Figure 1.11: Satisfaction with the frequency (n=1,595, mean=7.39, SD=1.93) and quality (n=1,592, mean=7.29, SD=2.01) of supervision.

It makes sense for the satisfaction with the frequency of supervision to be related to the frequency of the supervision. Figure 1.12 therefore shows the scores for satisfaction with the frequency of supervision, and the satisfaction with the quality of supervision, per category of meeting frequency with the daily supervisor. Here, we clearly see that the more often PhDs

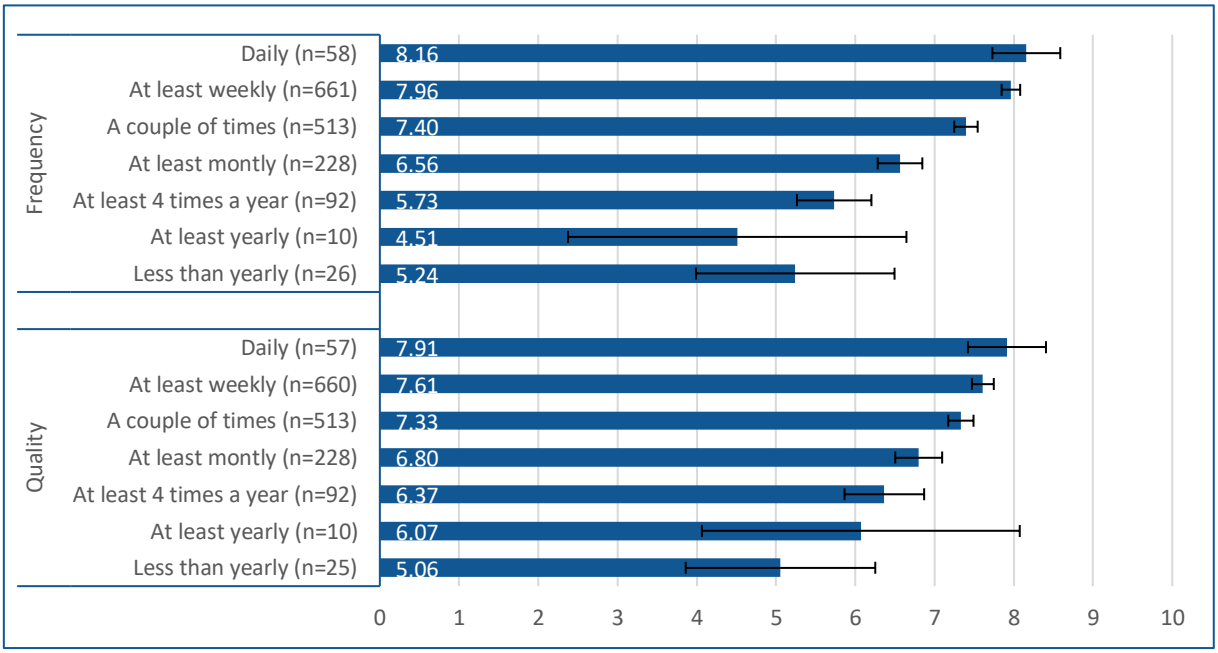

Figure 1.12: Mean scores on satisfaction with supervision frequency and supervision quality, per category of daily supervisor meeting frequency. Mean reported in graph. 95%-confidence intervals included.

meet with their supervisors, the more satisfied they are with both the frequency and quality of supervision. We must note, however, here that this may be a reciprocal effect. On the one hand, PhDs may be more satisfied with the frequency and quality of supervision due to a higher frequency of meetings. On the other hand, PhDs who get along well with their supervisors may meet their supervisors more often.

The differences between types of institutions in the satisfaction with the frequency and quality of supervision can be found in figure 1.13. PhDs at other types of institutions are on average slightly more satisfied with both the frequency (7.78) and quality (7.59) of supervision than PhDs at universities and UMCs. Between PhDs at universities and PhDs at UMCs, the differences are very small (less than 0.1).

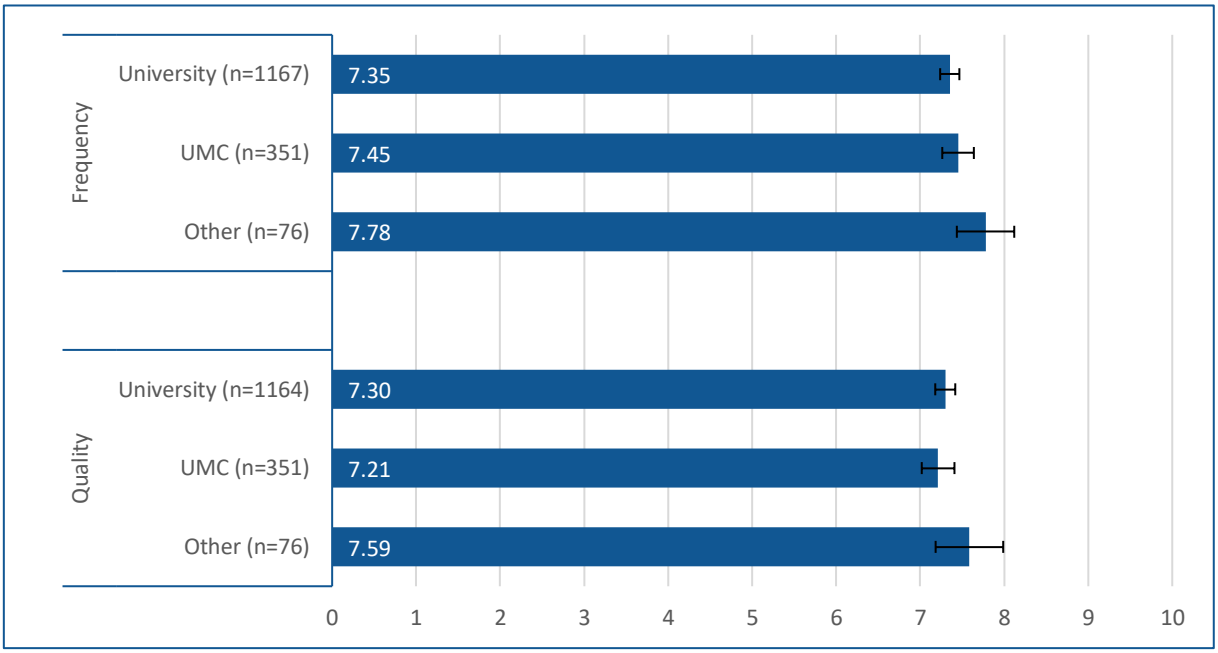

Figure 1.13: Mean scores on satisfaction with supervision frequency and supervision quality, per type of institution. Mean reported in graph. 95%-confidence intervals included.

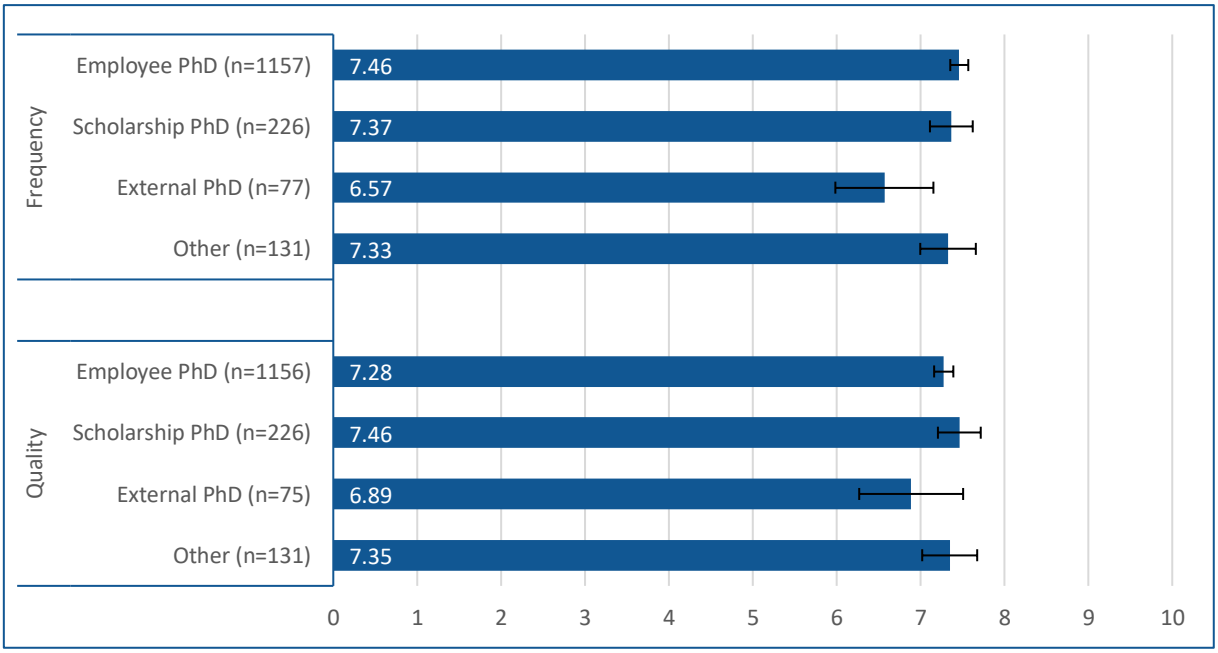

Figure 1.14: Mean scores on satisfaction with supervision frequency and supervision quality, per type of PhD arrangement. Mean reported in graph. 95%-confidence intervals included.

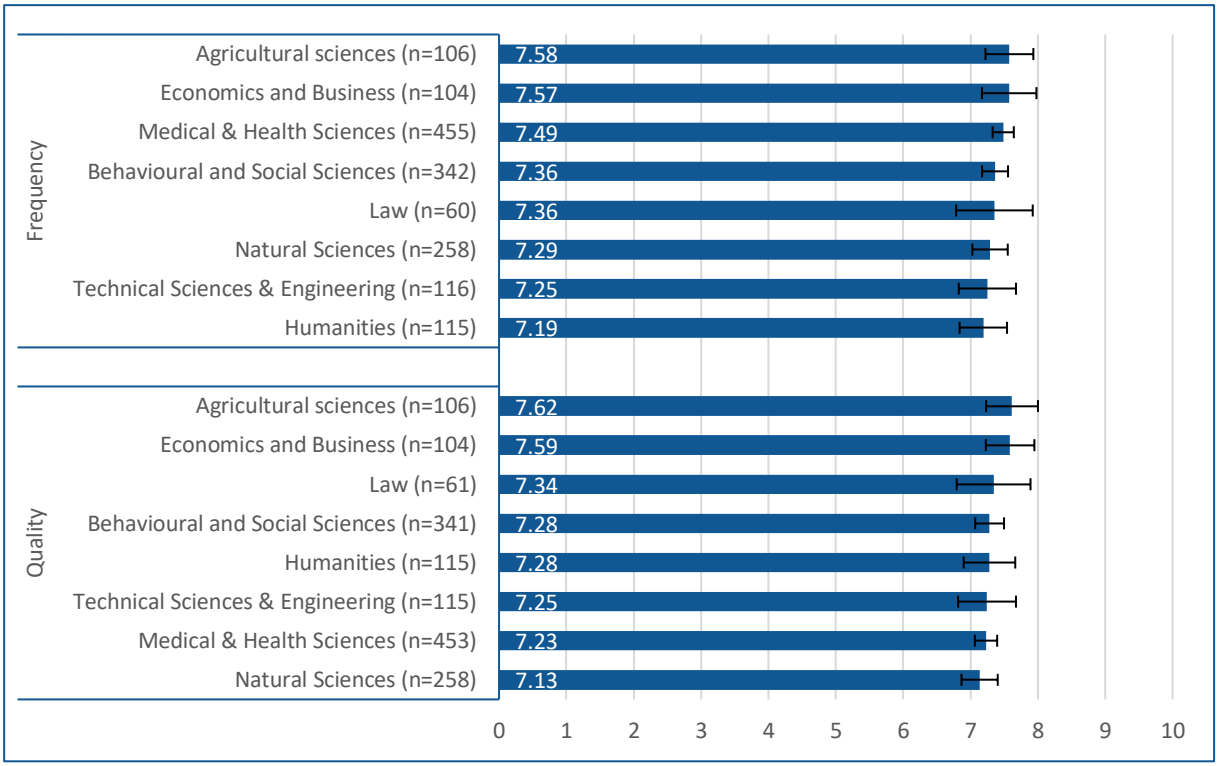

Figure 1.15: Mean scores on satisfaction with supervision frequency and supervision quality, per discipline. Mean reported in graph. 95%-confidence intervals included.

The satisfaction with both the frequency and quality of supervision does not differ much between types of PhD arrangements (figure 1.14). The main exception to this is external PhDs. On average, they score significantly lower on satisfaction with frequency of supervision. We had already seen in figure 1.10 that external PhDs meet less frequently with their supervisors than the other three types of PhDs, therefore this likely explains their lower scores on this indicator. External PhDs however are not significantly less satisfied with the quality of supervision. The other three types of PhD arrangements do not differ in their satisfaction with both the frequency and quality of supervision.

Figure 1.15 finally shows that there are no major differences between disciplines in their satisfaction with both the frequency and quality of supervision. In both cases, PhDs in Agricultural sciences are most satisfied, but not substantially more so than the disciplines that score lowest on these indicators (Humanities and Natural sciences respectively).

Dimensions of supervision

As supervision is a multi-dimensional task, we used scales developed by Overall et al. (2011) to measure supervision in terms of availability, academic support, personal support and autonomy. The scores on the twelve items that were used to measure these concepts on 7-point scales are presented in figure 1.16. PhDs most often agreed with the statements that their supervisor gives them the main responsibility of the project (6), welcomes and respects their input and ideas (5.9) and responds to requests for help within a reasonable time frame (5.82). In contrast, they least often agree that their supervisor helps them plan and manage research tasks (4.55) and helps them learn research skills (4.39).

These items were combined into four subscales measuring the four dimensions of supervision, as well as in one overall scale of supervision. The average scores on these five scales can be found in figure 1.17. PhDs on average score highest on the autonomy scale (5.95), indicating that PhDs in general are given a lot of autonomy by their supervisors. Interestingly, PhDs on average score lowest on the academic support indicator (4.7), which means that they least

often receive help from their supervisors in learning the skills necessary to do their research. The average score on the overall supervision indicator is 5.36 with a standard deviation of 1.10.

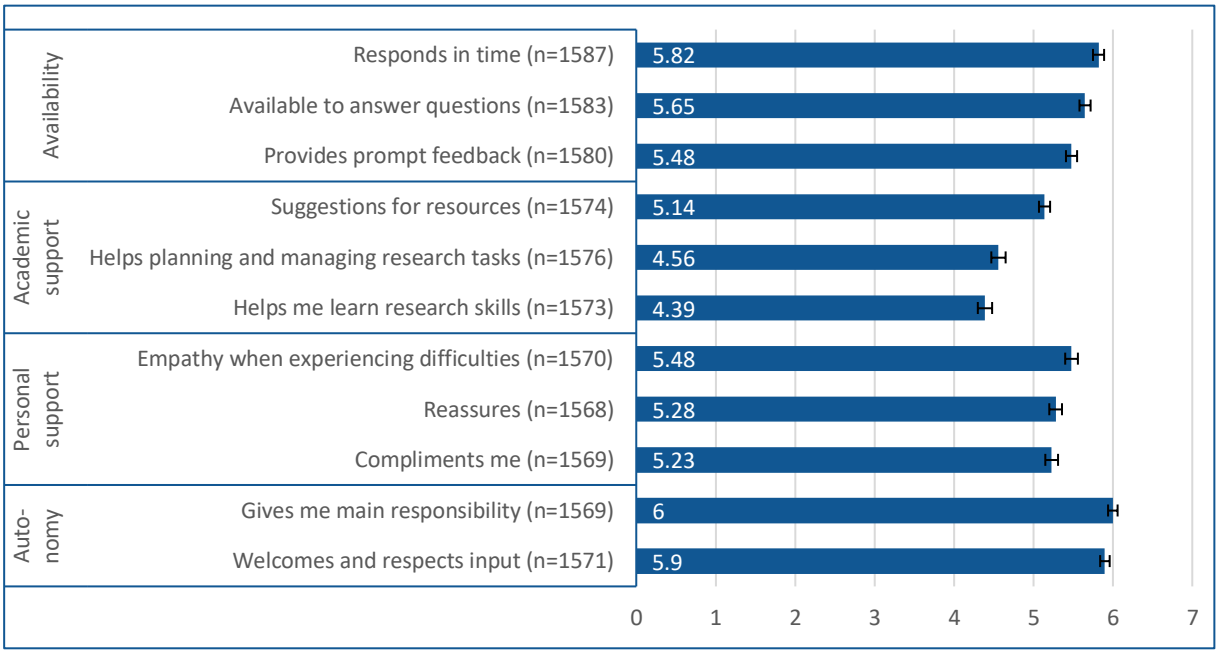

Figure 1.16: Scores on the items that measured the four dimensions of supervision: availability, academic support, personal support and autonomy. Mean reported in graph. 95%-confidence intervals included.

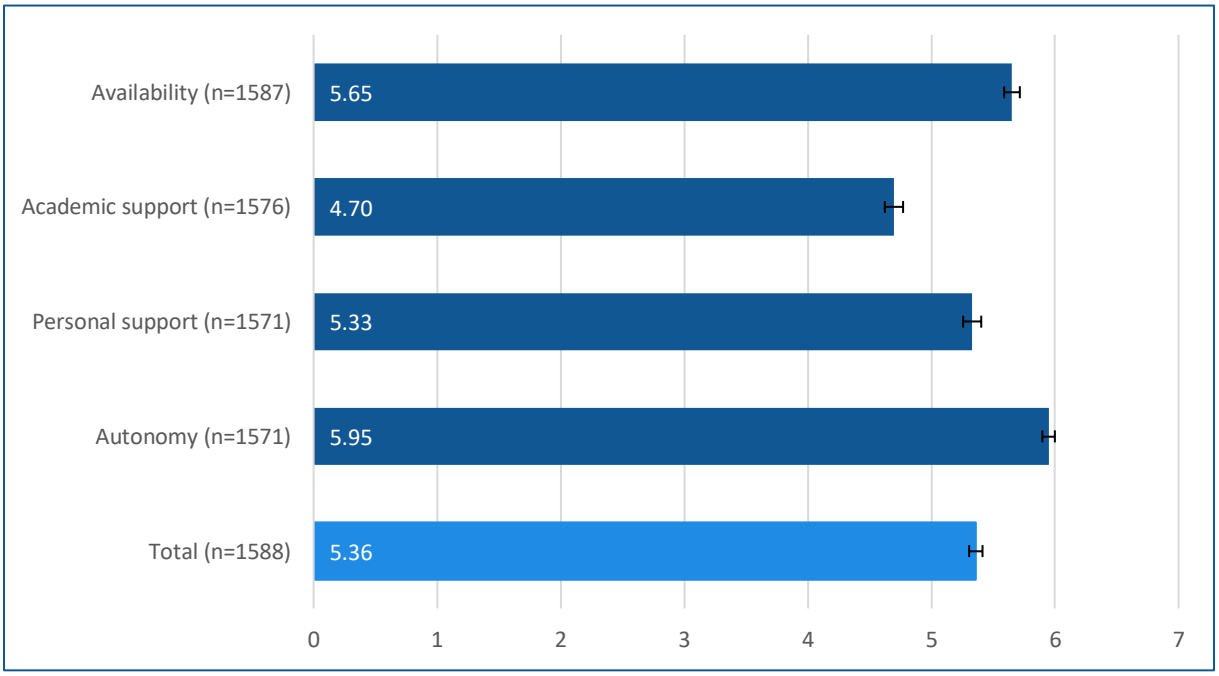

Figure 1.17: Overall mean scores on the four dimensions of supervision, and the overall supervision scale. Mean reported in graph. 95%-confidence intervals included.

Between institutions, there are minor differences on these indicators (figure 1.18). PhDs at other types of institutions generally have supervisors that are slightly more available, offer a bit more academic support and give a little bit more autonomy than the supervisors of PhDs at universities of UMCs, but these differences are negligible. UMC PhDs do receive significantly less personal support than PhDs at universities (5.16 versus 5.38 respectively).

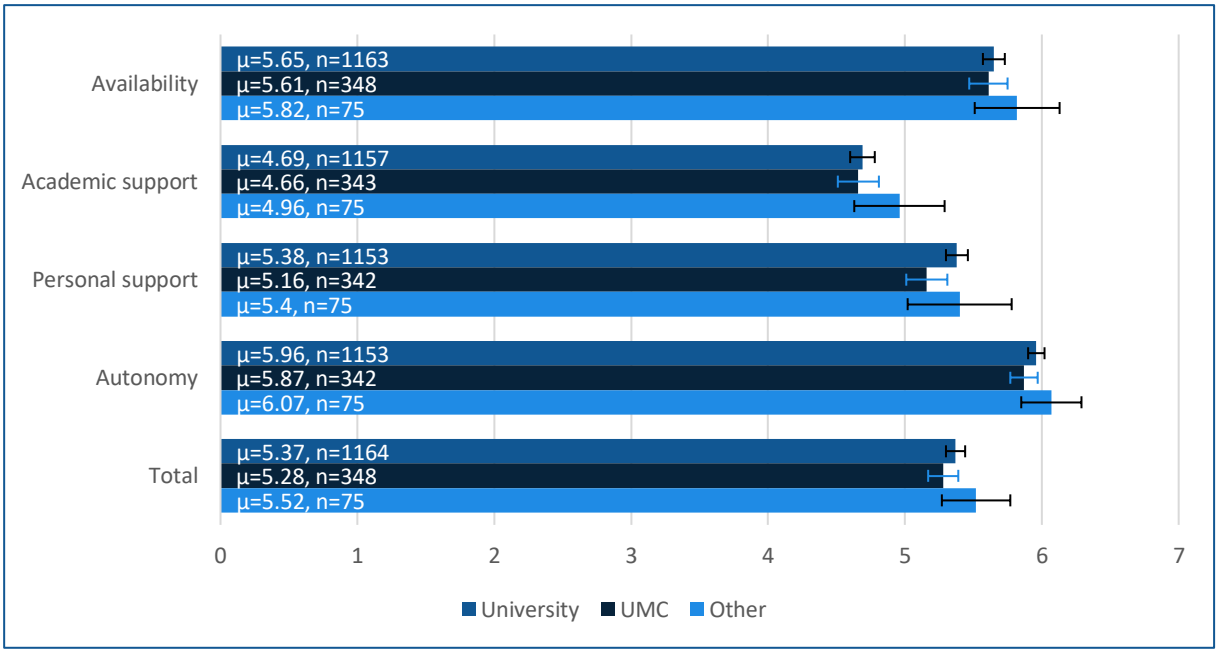

Figure 1.18: Scores on the four dimensions of supervision and the overall supervision scale, per type of institution. Mean reported in graph. 95%-confidence intervals included.

Figure 1.19 shows the differences between types of PhD arrangements with regards to the dimensions of supervision. In most cases, the differences are small. External PhDs score lowest on all indicators, but only significantly lower than employee PhDs on the availability indicator. This large difference has as a consequence that external PhDs also score significantly lower on the overall supervision scale. In addition, scholarship PhDs receive significantly more academic support than employee PhDs, but do not score significantly higher on the overall supervision indicator.

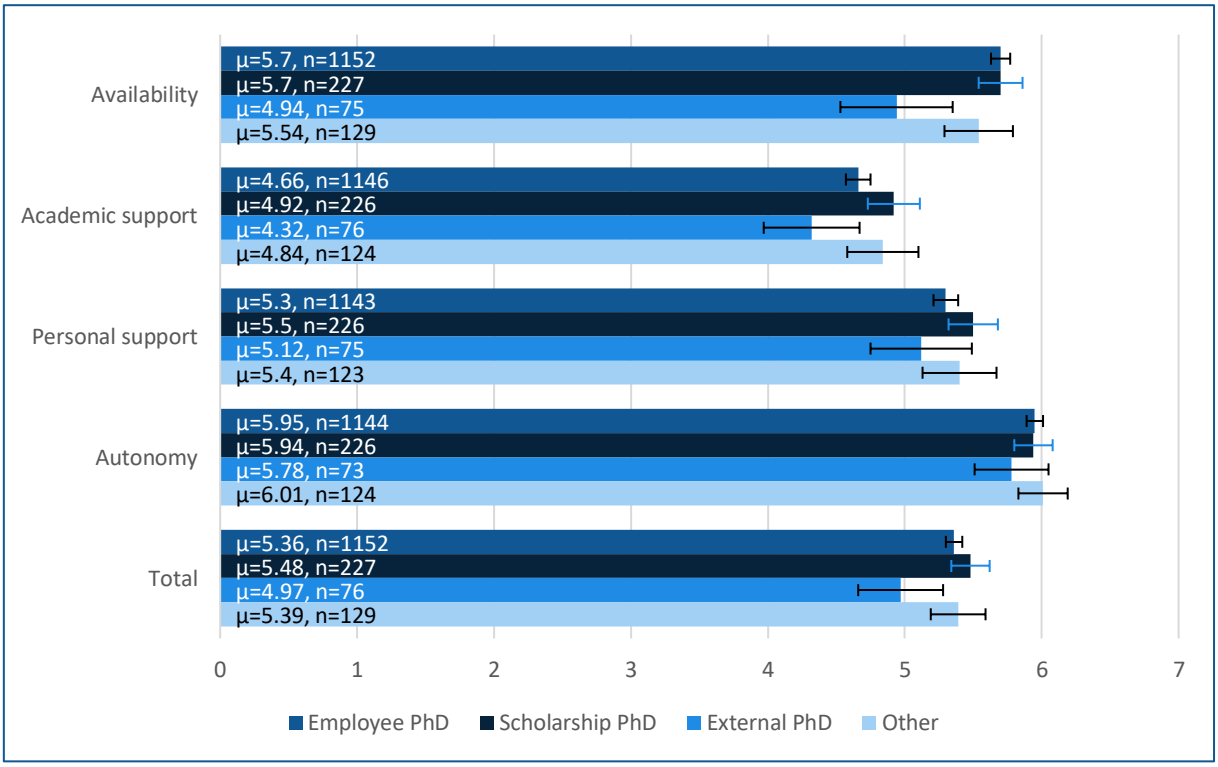

Figure 1.19: Scores on the four dimensions of supervision and the overall supervision scale, per type of PhD arrangement. Mean reported in graph. 95%-confidence intervals included.

Between disciplines, the differences on the supervision indicators are also limited (figure 1.20). Disciplines do not differ in terms of availability of supervisors. PhDs in Agricultural sciences receive relatively more academic support from their supervisors (5.05), while PhDs in Law receive relatively little academic support (4.39). PhDs in Agricultural sciences also receive relatively more personal support (5.63), while PhDs in Medical and Health sciences and Economics and Business receive relatively little personal support 5.13 and 5.28 respectively). Autonomy is also lowest for PhDs in Medical and Health sciences (5.79), while PhDs in Technical sciences and Engineering and Agricultural sciences get most autonomy from their supervisors (both 6.09). Overall, PhDs in Agricultural sciences score highest on the supervision indicators (5.58), while PhDs in Medical and Health sciences score lowest (5.25), followed by Law (5.29).

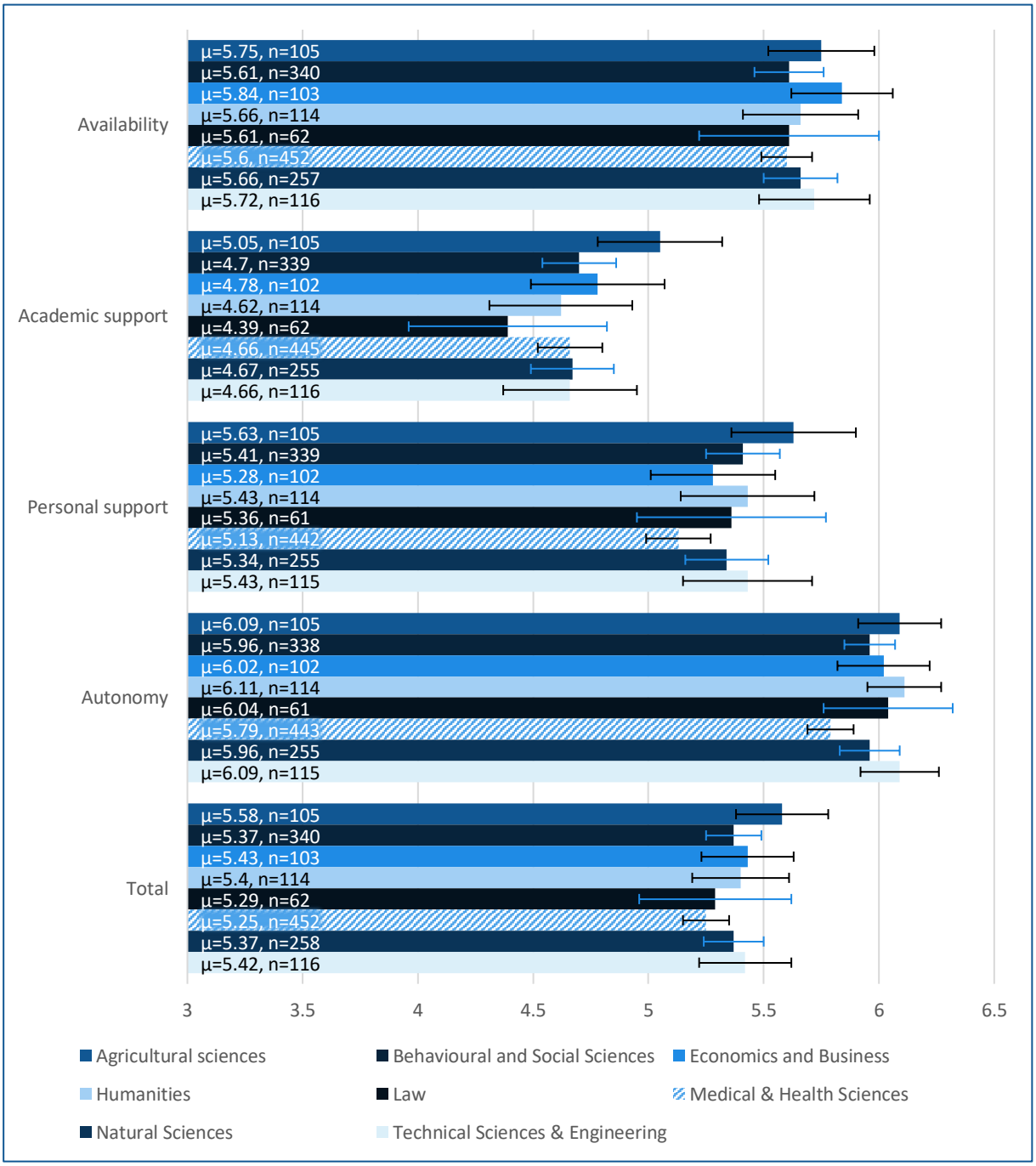

Figure 1.20: Scores on the four dimensions of supervision and the overall supervision scale, per discipline. Mean and n per subgroup reported in graph. 95%-confidence intervals included. Note: x-axis ranges from 3 to 6.5 to improve readability.

Questionable supervisor behaviour

Though most PhDs seem to be quite satisfied with their supervisors, we also asked them whether their supervisors engaged in “questionable behaviour”: behaviours or attitudes that put (additional) strain on PhDs. 57.1% of the PhDs indicate that their supervisor does not engage in any form of questionable behaviour, meaning that 42.9% of the PhDs experience that their supervisor(s) engage(s) in one or more forms of questionable behaviour. A ranking of the frequency of types of questionable behaviours can be found in figure 1.21.

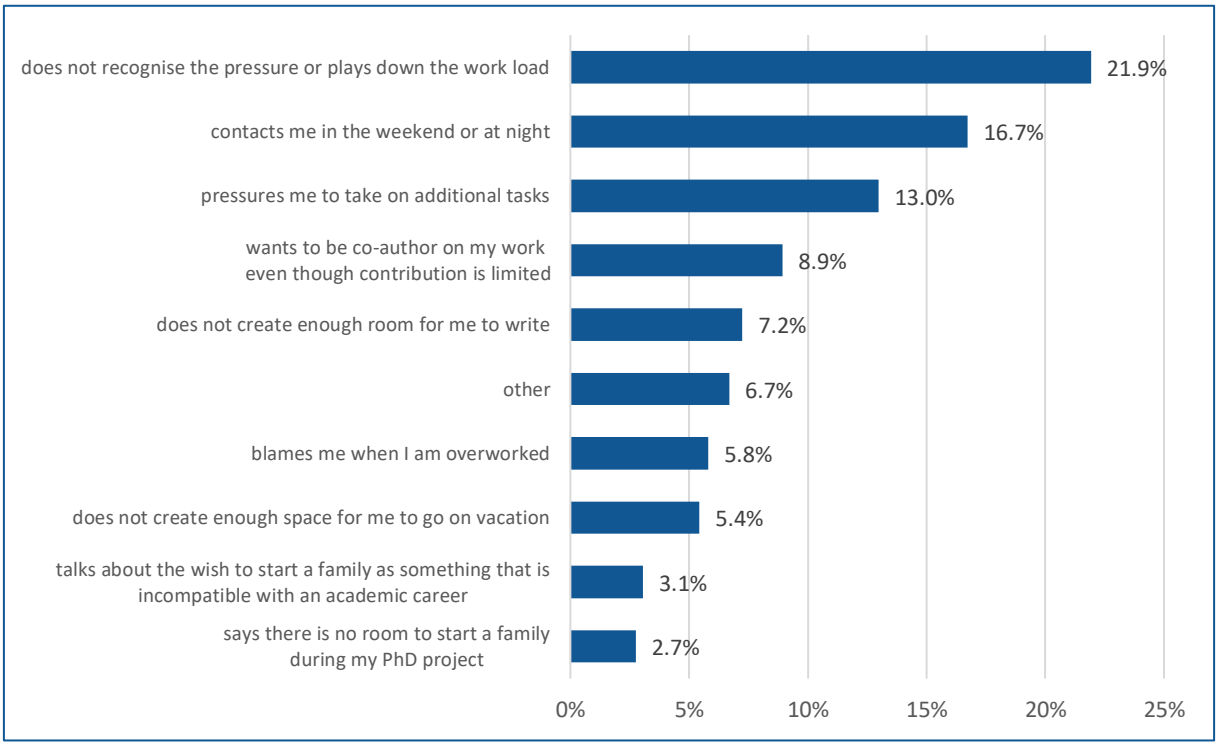

Figure 1.21: Responses to the question: “Sometimes, supervisors engage in behaviour that puts strain on PhDs. Does any of your supervisors engage in the following behaviours?” (n=1,601).

The most common questionable behaviour is supervisors not recognizing the pressure or playing down the workload (21.9%). 16.7% of the PhDs furthermore indicate that their supervisors contact them during the weekends or at night, and 13% of the PhDs experience pressure from their supervisor to take on additional tasks. PhDs also relatively often struggle with supervisors who want to be co-authors on papers even though their contribution is limited (8.9%), or with supervisors who do not create enough room for the PhD to write (7.2%). 5.8% of the PhDs have a supervisor who blames them when they are overworked, and 5.4% of the PhDs do not get enough room from their supervisor to go on vacation. Finally, though occurring least frequently of all these types of behaviours, 3.1% of the PhDs indicate that their supervisor tells them that a wish to start a family is incompatible with a career in academia, and 2.7% have supervisors that there is no room to start a family during the PhD project.

The extent to which PhD experience these questionable behaviours from supervisors varies per type of institution, PhD arrangement and discipline. With the large number of categories, visualising these results in graphs is unfeasible. We therefore present these results in table A2 in the appendix, and briefly discuss the most important results here.

PhDs in UMCs most often experience questionable supervisor behaviour, with only 44.7% stating that their supervisor does not engage in any form of questionable behaviour. In universities, 60.9% of the PhDs indicate that their supervisor does not engage in questionable behaviour, as do 55.3% of the PhDs in other types of institutions. PhDs in UMCs are relatively often contacted in weekends or at night (23.6%) or pressured to take on additional tasks (18.5%). PhDs at other types of institutions relatively often have supervisors who want to be co-authors even though their contribution is limited (15.8%).

Employee PhDs most often experience questionable behaviour from supervisors, with only 53.8% indicating that their supervisor does not engage in any questionable behaviours. External PhDs least often experience questionable behaviours from supervisors, as 70.9% indicate that their supervisor does none of these things. Employee and scholarship PhDs often state that their supervisor does not recognize the workload (23.7% and 20.3%), while external PhDs often have supervisors who want to be co-authors without contributing much to the research (10.1%).

Finally, PhDs in Medical and Health sciences most often experience questionable behaviour from supervisors, with only 47.1% of the PhDs indicating that their supervisor does not engage in questionable behaviour. PhDs in Agricultural sciences and Behavioural and Social sciences least often experience questionable supervisor behaviour, with 72% and 69.2% of their supervisors not engaging in any questionable behaviours. Supervisors not recognizing the workload is most common amongst all disciplines, though it more often occurs in Medical and Health sciences (28.3%) than in Law (12.9%). PhDs in the Humanities and Medical and Health sciences are relatively most often contacted during the weekend or at night by their supervisors (19.1% and 23% respectively), and PhDs in Law relatively often have supervisors who state that there is no room to start a family during a PhD project (6.5%).

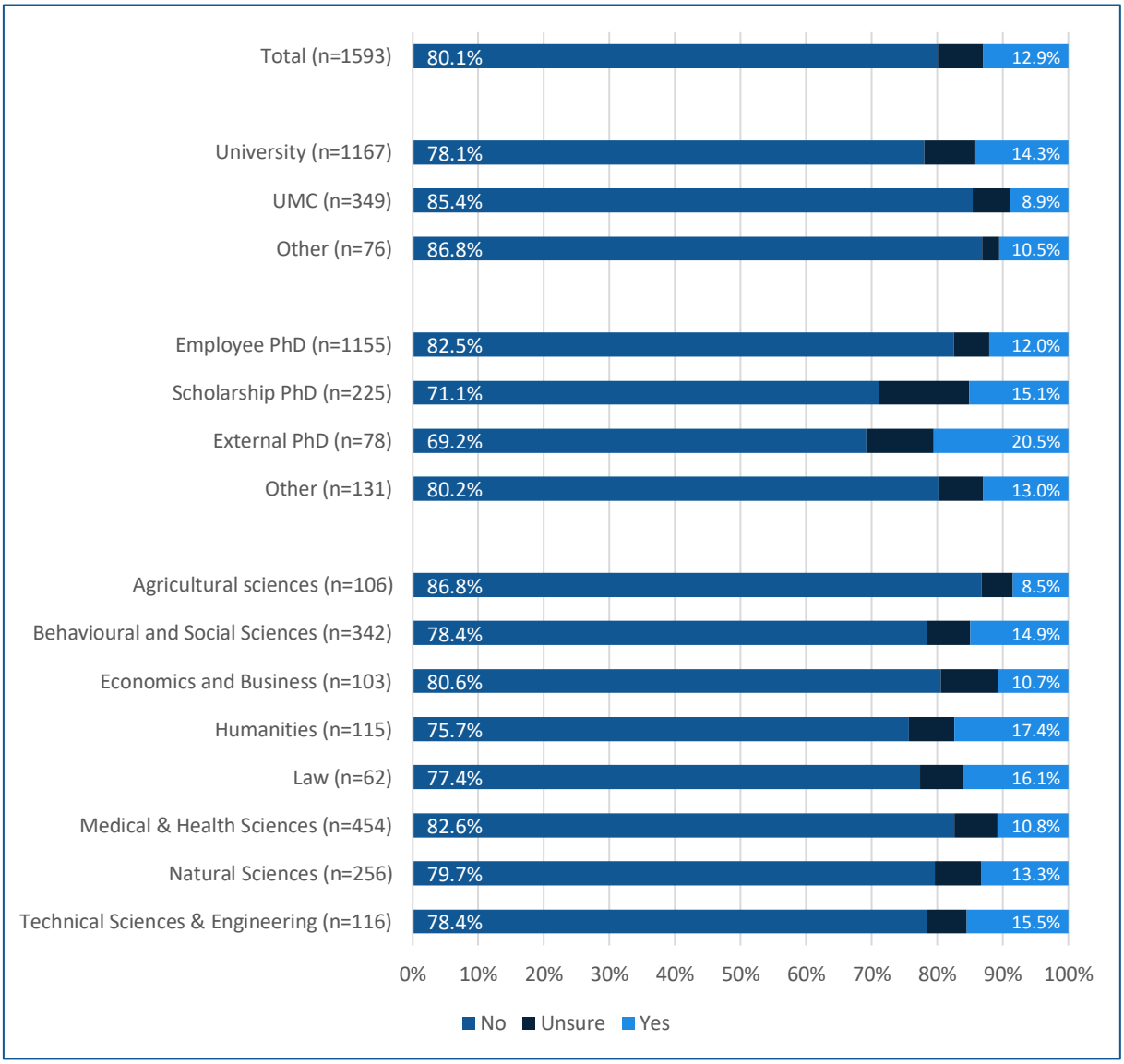

Figure 1.22: Responses to the question: "Have you ever considered to change your supervisor(s)?", in total and per type of institution, PhD arrangement and discipline.

Changing supervisors

If there is a bad relationship between the PhD and their supervisor, this can negatively affect the PhD and the progress of their PhD project. However, changing supervisors is often not easily done. We therefore asked PhDs whether they have ever considered changing their supervisor, and if so, whether and how they achieved this.

The large majority of PhDs (80.1%) has never considered changing supervisors (figure 1.22). 12.9% of the PhDs have ever considered changing supervisors, and 7% was not sure about this. PhDs in universities relatively more often considered changing supervisors (14.3%) while PhDs in UMCs less frequently consider to change supervisors (8.9%). External PhDs and scholarship PhDs also relatively often want to change supervisors (20.5% and 15.1% respectively). The desire to change supervisors is also more common for PhDs in the Humanities (17.4%) and Law (16.1%), while PhDs in Agricultural sciences and Medical and Health sciences most often indicate that they have not considered changing supervisors (86.8% and 82.6%).

Reasons for wanting to change supervisors

The PhDs who ever considered changing supervisors were subsequently asked why they considered changing supervisors in an open question. 154 respondents elaborated. The answers were coded qualitatively to identify common topics. Three main reasons for wanting to change were identified this way:

- The research process (n=77)
- The content of the research project (n=32)
- The mismatch between the personality of the supervisors and the PhD candidate (n=13)

With regards to the research process, 14 of the 77 respondents indicated that their supervisors put too much pressure on them, were undermining their confidence and made them feel insecure, which added to their stress.

> *"Push too much to get work done. They give feedback but all different. Also they give feedback but very high level. It is never 100% good enough. Especially at the beginning I felt very alone and even worthless at times... Now I just created a very thick skin and confidence to say NO. It has been a process though..."* (R.49).

> *"She is getting under my skin, I'm always doing it wrong, rewrites all my papers because my style is different."* (R. 92).

An additional seven respondents mentioned that they felt that their supervisor was disrespectful, rude or even abusive.

> "*[…] My former supervisor was verbally abusive, showed narcissistic tendencies (responded aggressively to feedback on supervision style, for example), and completely unable to understand the power dynamics of a supervisor-supervisee relationship."* (R.12).

Others felt that they were simply used to carry out various tasks for their supervisors (n=2) or had issues about the co-authorship of their supervisors to their publications (n=3).

> "*My promotor, because I didn't feel she was contributing much to the project while being a co-author on all articles*." (R.60).

Fifteen respondents state that they felt a lack of support from their supervisor, who showed no interest or commitment in their project. Difficulties mentioned include quite harsh feedback, no commitment or the lack of structure.

> "*My promotor is an asshole and my daily supervisor is a wet noodle. He's nice, but the difference in power means that asking him for feedback is similar to not asking it at all; it is my promotor that makes the final and only decisions. I had to add a third person to my supervision team midway through to prevent the situation from escalating beyond*

repair, and still the majority of my delay is due to almost burning out because of the toxic relationships at work." (R.119).

"One was overly critical at the cost of being extremely demotivating. Instead of helping me it was bringing me down. Together with the PhD I also had to fight that. I think the other one was having a hard time in his/her life and made mine impossible. The feedback became non constructive and personal "this is not English, this does not make sense". Now it's been a complete shift. They are much better now. I am not sure how we managed. But, it did work. However, in this survey I have to consider the full picture. It was very horrible for 1,5 years." (R.99).

Five respondents explained that their supervisor did not have or provide sufficient time to guide them in their research project.

"PhD project got different from the initial [project] I was hired for. Main supervisor [was] too busy with other projects so did not provide proper supervision and support/interest for me. Not nice group/lab environment and social life/collaboration. Main supervisor focuses more on publishing rather than teaching me skills. I think my personal/work mentality does not fit well with my current research group." (R.107).

With regards to the actual content of the research (n=32), respondents explained that they felt that their supervisor was not contributing to their research, mainly due to a mismatch between the supervisor's expertise and their own PhD project. Others explained that their supervisors were usually unprepared for their meetings and complained about the lack of feedback.

"*Because they have no time, they do not seem interested in the topic, do not have enough knowledge about the topic, and they seem to 'use' their PhD-students to do their tasks (e.g. teach their courses, supervise their students), instead of supervise their PhD-students."* (R.16).

Sixteen respondents indicated that they do not get along with their supervisors for personal reasons, since they felt that their personalities or approaches to doing research differed too much.

"*I felt that I was not good enough for him. He was always complaining about me."* (R.46).

Taking steps to change supervisors

All PhDs who indicated that they had considered changing supervisors were asked whether they had taken steps to change supervisors. The responses to this question can be found in figure 1.23. The largest group of PhDs (44.7%) did not take steps to change supervisors. 18% did take steps and succeeded in changing supervisors. 19.9% had taken steps to change supervisors, but did not succeed. 17.5% of the PhDs furthermore indicate that they no longer wanted to change supervisors.

PhDs at universities relatively often succeed in changing supervisors (18%), but also relatively often try and fail to change supervisors (21.6%). PhDs at UMCs relatively often do not take steps to change supervisors (54.8%). Results for other institutions are omitted due to a small number of respondents. Employee PhDs relatively most often succeed in changing supervisors (21.6%), while scholarship PhDs often do not take steps to change supervisors (52.9%). External PhDs relatively often no longer want to change supervisors (31.3%) and other types of PhDs relatively often try to change supervisors, but do not succeed (35.3%). We refrain from presenting results per discipline, as several disciplines only had a low number of respondents.

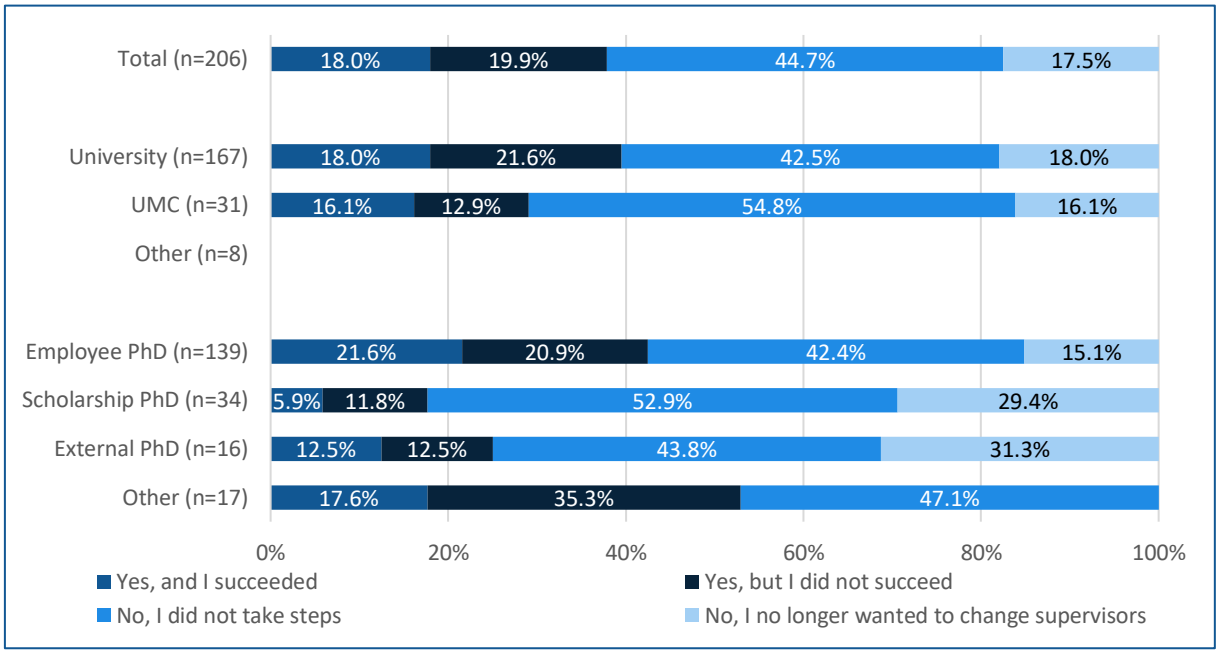

Figure 1.23: Responses to the question: "Did you take steps to change your supervisor(s)?", in total, per type of institution and per type of PhD arrangement.

Succeeding in changing supervisors

We asked all PhDs who succeeded in changing supervisors to elaborate on how they succeeded in an open question. 34 respondents elaborated. 10 of them indicated that they had arranged to change supervisors via their Graduate Schools or institution.

> "*The research school mediated. The PhD coordinator and me were in close contact about my issues and he together with the research director contacted the promotor to discuss solutions. It was mutually decided that it would be better for me to continue with another supervisory team (although one supervisor continued to supervise me).*" (R.34).

Ten also indicated that they themselves contacted or found a new supervisor who either replaced the original supervisor or was added to the team to improve the situation.

> *"I added a second supervisor who plays the role of the first one. I did everything with the agreement of my first supervisor. Officially I still have both and this movement involved the first one more in my supervision."* (R.7).

Five PhDs furthermore mentioned that they set an ultimatum, saying they would quit their projects if things would not change.

> *"I contacted the ombudsperson and faculty graduate school. And I just left my old supervisor. For a while I was without supervising committee. I started writing my dissertation on my own and told the boss of my supervisor that I was willing to fail my PhD. With too many papers published, failing my PhD would have cost the university €77.000."* (R.10).

Not succeeding in changing supervisors

The PhDs who indicated that they had taken steps to change supervisors, but did not succeed in doing so, were asked to elaborate on why they did not succeed to change supervisors. 31 PhDs elaborated on their experiences.

The most common reason that PhDs did not succeed in changing supervisors was that their (co-)promotor did not allow it (n=10).

"We ended up trying to replace one of the supervisors, but the present co-supervisor said they would fully retreat their participation if we did so. I therefore now have 1 supervisor who does a lot of work but who is not officially my co-promotor." (R.31).

Ten PhDs furthermore indicated that their process was hampered by bureaucracy or by a lack of time.

"All personnel is already fully booked, and do not have time. The one person I asked and took it into consideration fell ill the week after with burn out-related issues." (R.2).

Two PhDs furthermore mentioned that they did not succeed because the interests of the supervisor were prioritized

"Head of department advised that would only delay my PhD trajectory and did not want to be held accountable for 'ultimately ending the supervisors career'." (R.7).

Not taking steps to change supervisors

The PhDs who did not take steps to change supervisors were asked why they did not do so. 73 PhDs elaborated on this.

The most common reason for not taking steps was that PhDs feared they would lose their PhD position or would not be able to finish their projects (n=17). Eight additionally mentioned to fear for risks for their future career, and eight also indicated that they did not want to be a troublemaker. In several cases, the supervisor in question was also their superior, making it difficult to take steps to change supervisors.

"Changing would most likely set me back in time. I already know I do not want to continue in academia, I just want to finish my contract and leave." (R.13).

"I didn't want to create a difficult situation for myself and my colleagues." (R.25).

"Changing supervisors is an absolute no go. It would mean academic suicide. It is a very small field. And my prof is considered one of the gods…" (R.12).

"She is also my boss so it doesn't solve my problems." (R.57).

Seven PhDs indicated that this would lead to problems with their supervisors. Six PhDs also indicated that it would be too much of a hassle to arrange it. Six others indicated that they had few other options.

"[…] Changing supervisors seemed like a very difficult process requiring a 'fight' with my old supervisor." (R.33).

"[…] I did not know who else could be my supervisor as there was not really a plan B." (R.46).

"It was too difficult of a process and depended on people whom I didn't trust." (R.49).

In three cases, PhDs could not switch supervisors as the funding for the project was related to the supervisor.

"Not sure I could be able to change supervisor because funding for the PhD was coming from this certain supervisor. I thought it would be better to try to stick with my supervisor since I was already half through in my PhD and things could get better eventually. Not sure if I would have the chance to change projects or supervisors without this negatively affecting my career prospects." (R.54).

Freedom

Freedom in general

First, we will give an indication of the scores on the six separate items that together measure freedom. These scores, and their 95% confidence intervals, can be found in figure 2.1.

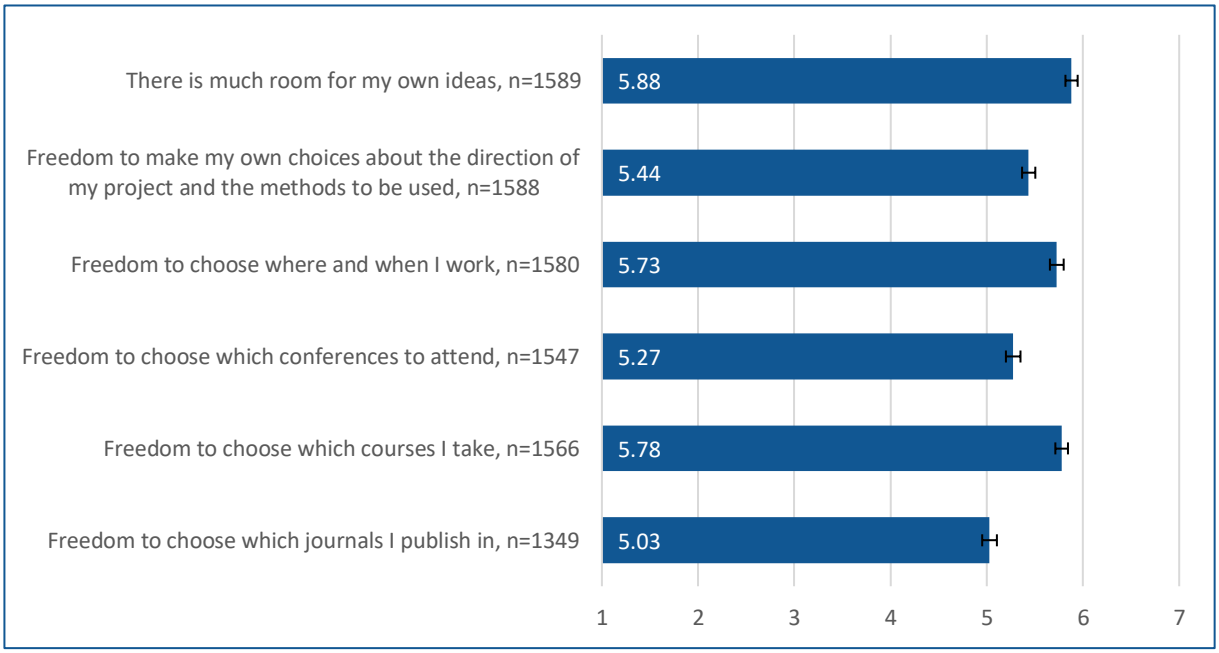

Figure 2.1: Scores on the six items that are included in the freedom scale. Mean reported in graph. 95%-confidence interval included.

In general, PhDs experience quite a lot of freedom, with the scores on all six items being higher than 5. The highest score is given to the item that indicates that there is room for the PhD's own ideas, with a mean of 5.88, followed closely by freedom to choose which courses to take (5.78) and freedom of work location (5.73). Relatively lower freedom scores can be found for the freedom to choose the direction and methods of the project (5.44), which conferences to attend (5.27) and which journals to publish in (5.03). This latter question was also quite often left unanswered by the respondents (15.7%), which is likely due to the fact that some have not reached the stage of selecting journals yet.

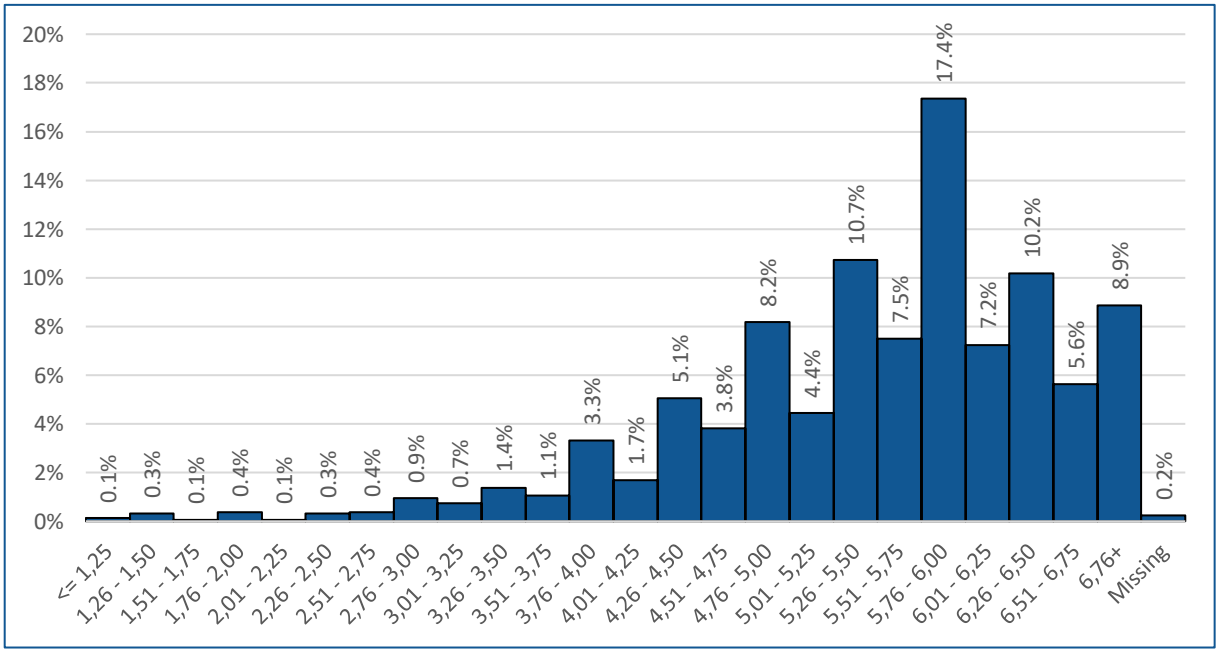

Figure 2.2: Histogram of the scores on the freedom scale (mean=5.54, standard deviation=1.02, n=1,601).

When those six items are combined into one freedom scale, the mean score is 5.54, with a standard deviation of 1.02 and a standard error of 0.026. A histogram of the scores on the freedom scale can be found in figure 2.2.

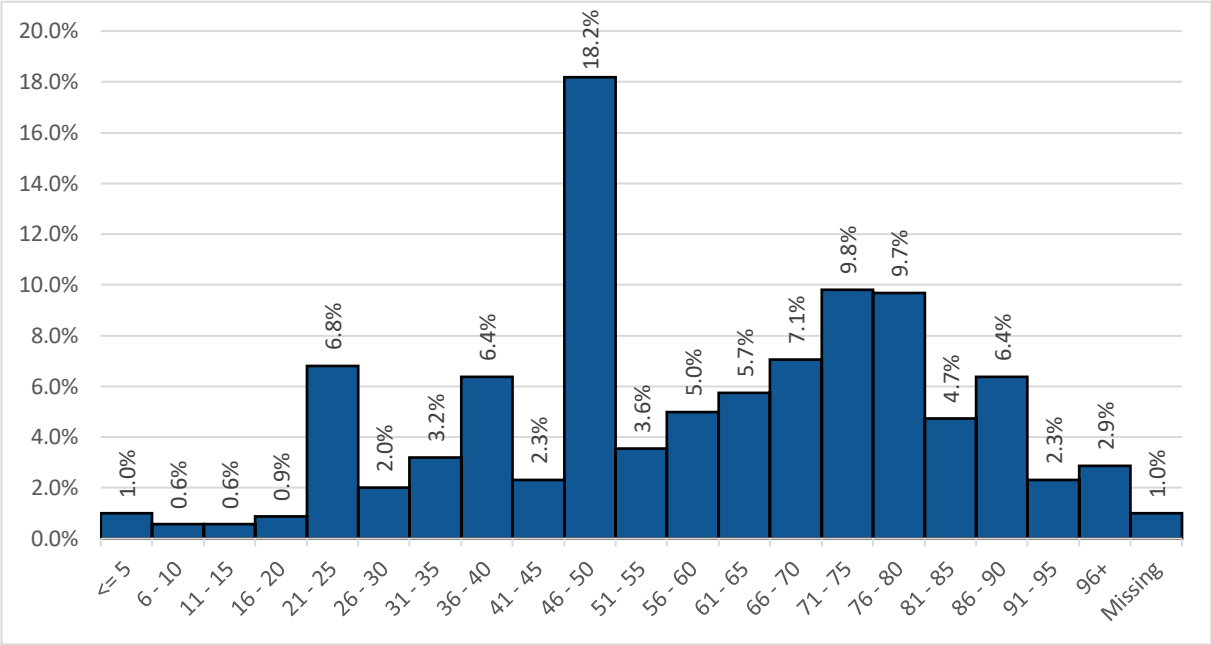

Figure 2.3: Scores on the question "Who designs your project?" (mean=59.7, standard deviation=21.8, n=1,601). A score of 0 indicates that the supervisor is fully responsible for the design of the project, a score of 100 indicates that the PhD is fully responsible for the design of the project, a score of 50 indicates that the supervisor and PhD are equally responsible for the design of the project.

The responses to the question “Who designs your project?” can be found in figure 2.3. On average, PhDs give a score of 59.7 out of 100 on this variable, with a standard deviation of 21.8, indicating that they on average play a somewhat larger role in designing their project than their supervisors. 17.4% of the PhDs indicate that their supervisors and themselves contribute to the project design exactly equally (score=50). 2.7% state that they completely design their project themselves (score=100), while 0.7% indicate that their supervisors are fully responsible for the design of the project (score=0). It is more common for PhDs than supervisors to have a higher share in the design of their project.

Freedom per discipline

When we look at the scores on the freedom scale, we observe that though all disciplines score on average higher than 5, there are significant differences between disciplines (figure 2.4). The highest freedom scores can be found in Law and the Humanities, while the lowest scores on freedom can be found in Medical and Health sciences. The freedom scores for Natural sciences and Medical and Health sciences are significantly lower than the scores for Law and the Humanities.

Looking at the question of who designs the project (figure 2.5), we again find the highest scores for Law and the Humanities, while the lower scores are again found at Medical and Health sciences and Natural Sciences. Interestingly, the score for Medical and Health sciences is here also significantly lower than for Natural sciences, that scores second lowest. The scores of Law and the Humanities do not differ significantly from each other, but are significantly higher than the scores for all other disciplines. The order of the disciplines in the middle has shifted around slightly, but none of these disciplines differ significantly on this variable.

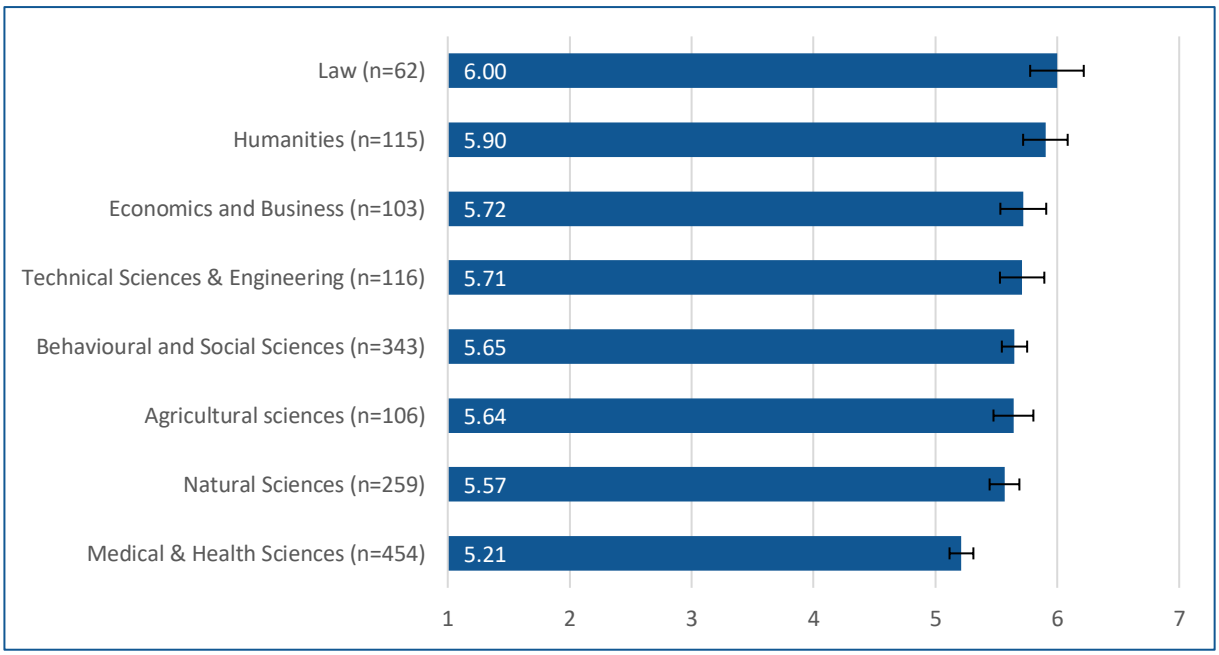

Figure 2.4: Scores on the freedom scale, per discipline. Mean reported in graph. 95%-confidence intervals included.

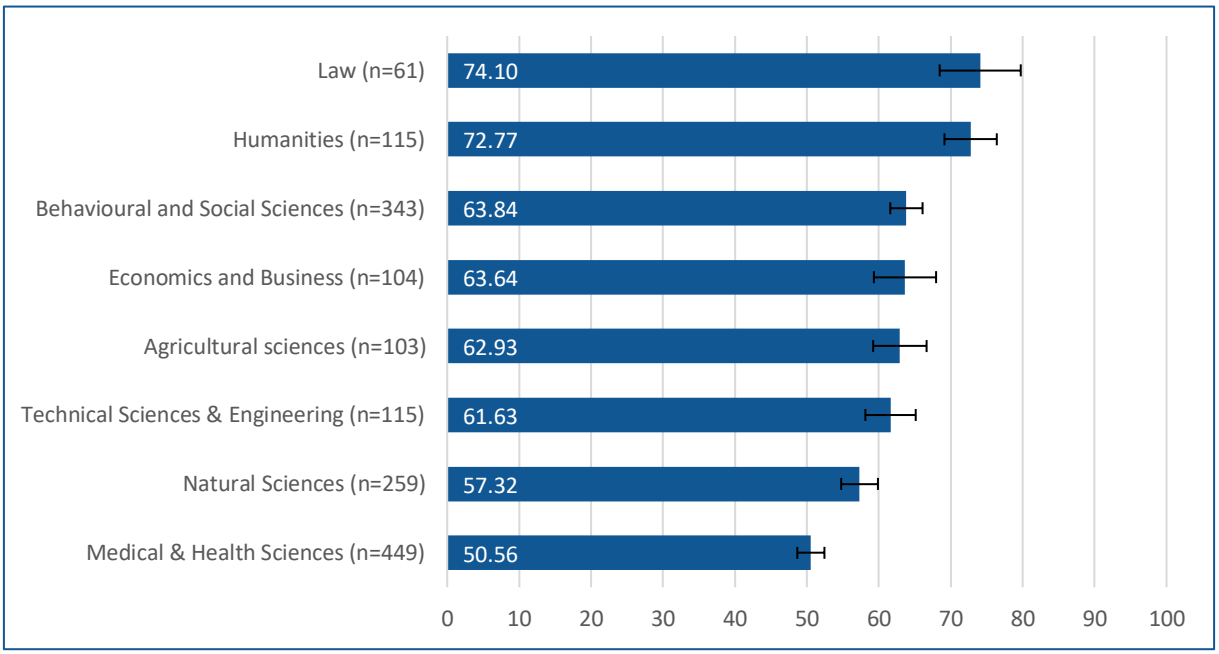

Figure 2.5: Scores on the question "Who designs your project?", per discipline. Mean reported in graph. 95%-confidence intervals included.

Freedom per source of funding

The source of financing can play a large role in the freedom PhDs have as well. Many projects of employee PhDs are funded by funding organisations such as NWO, ZonMw or ERC (second flow of funds), as well as projects funded by other organisations and companies (third flow of funds) that usually have a predetermined project plan. Such project plans only allow for some wiggle room in the contents of the project. In contrast, projects financed by the university, UMC or research institute itself often allow PhDs to come up with their own project, though often with some guidance from their supervisors. We therefore investigated to what extent the source of funding created differences in the freedom experienced by employee PhDs.

The freedom scale confirms that PhDs whose projects are funded from the first flow of funds experience more freedom than PhDs who are funded from the second or third flow of funds

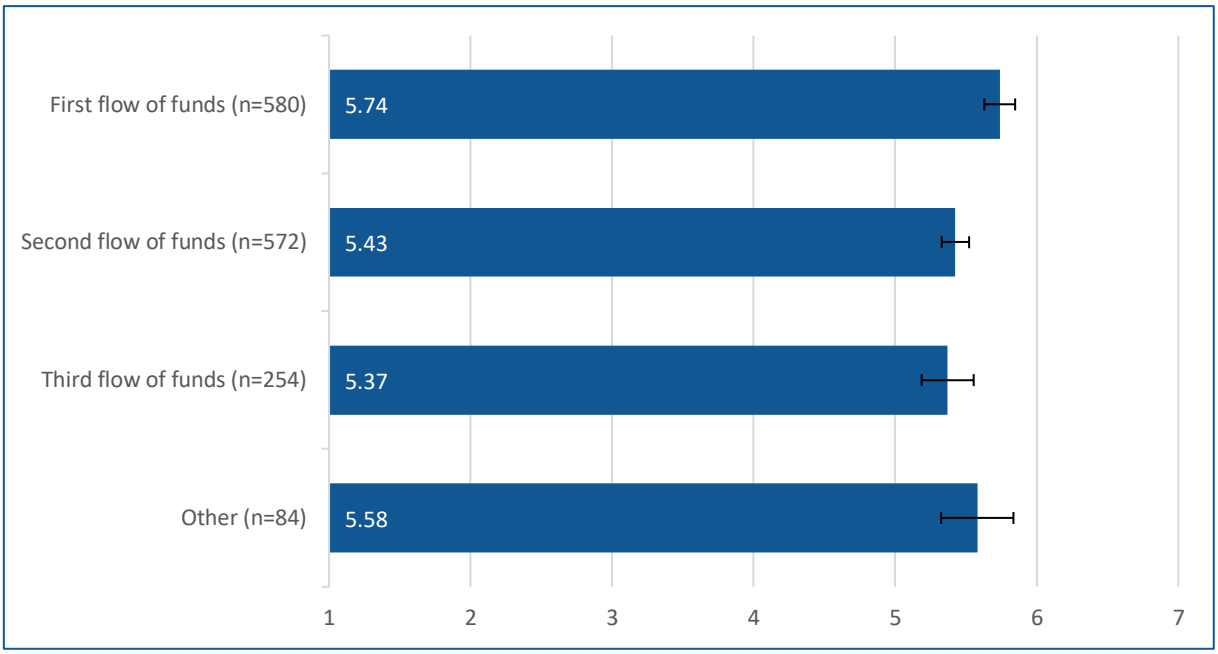

Figure 2.6: Score on the freedom scale, per funding source. Mean reported in graph. 95%-confidence intervals included.

(figure 2.6). The absolute differences are relatively small (0.31 and 0.37 respectively), but significant. There is no significant difference in freedom between the second and third flow of funds.

The results for the question “Who designs your project?” come to the same conclusion (figure 2.7). Here, the absolute differences between the first flow of funds and the second and third flow of funds are relatively larger (7 and 8.2 respectively), and they are significant as well. Similarly, there are no significant differences on this score between the second and third flow of funds.

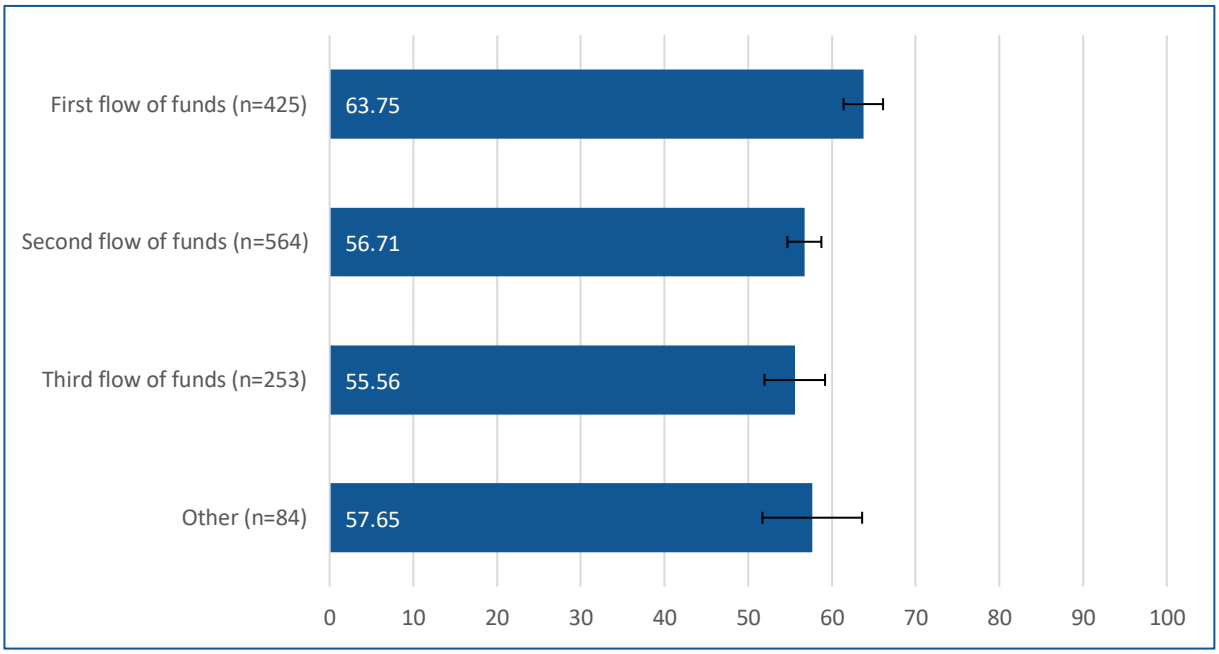

Figure 2.7: Scores on the question "Who designs your project?", per funding source. Mean reported in graph. 95%-confidence intervals included.

Freedom per type of PhD arrangement

Another factor causing differences in freedom may be the type of PhD arrangement. External PhDs, who do their PhD in their own time, are expected to have more freedom than employee PhDs. Next to that, proponents of the introduction of scholarship PhDs in the Netherlands (who are not employees, but get a scholarship to write their dissertations) often mention that increased freedom for the PhDs is a big advantage of this type of PhD arrangement.[6]

The results for the freedom scale, however, show that there are no significant differences between the types of PhDs in the freedom they have in their project (figure 2.8). On average, external PhDs score a little higher on the freedom scale, but this difference is not significant. Additional analyses (figure A1 in the Appendix) show that the only item included in the freedom scale on which external PhDs score significantly higher is the item "freedom to decide where and when I work", a characteristic inherent to external PhDs.

With regards to the question "Who designs your project?", external PhDs do score significantly higher than employee PhDs and scholarship PhDs (figure 2.9). Also in absolute terms, this difference is substantial (13.5 and 10.8 respectively). Though scholarship PhDs score 2.77 higher on this question than employee PhDs, this difference is not significant.

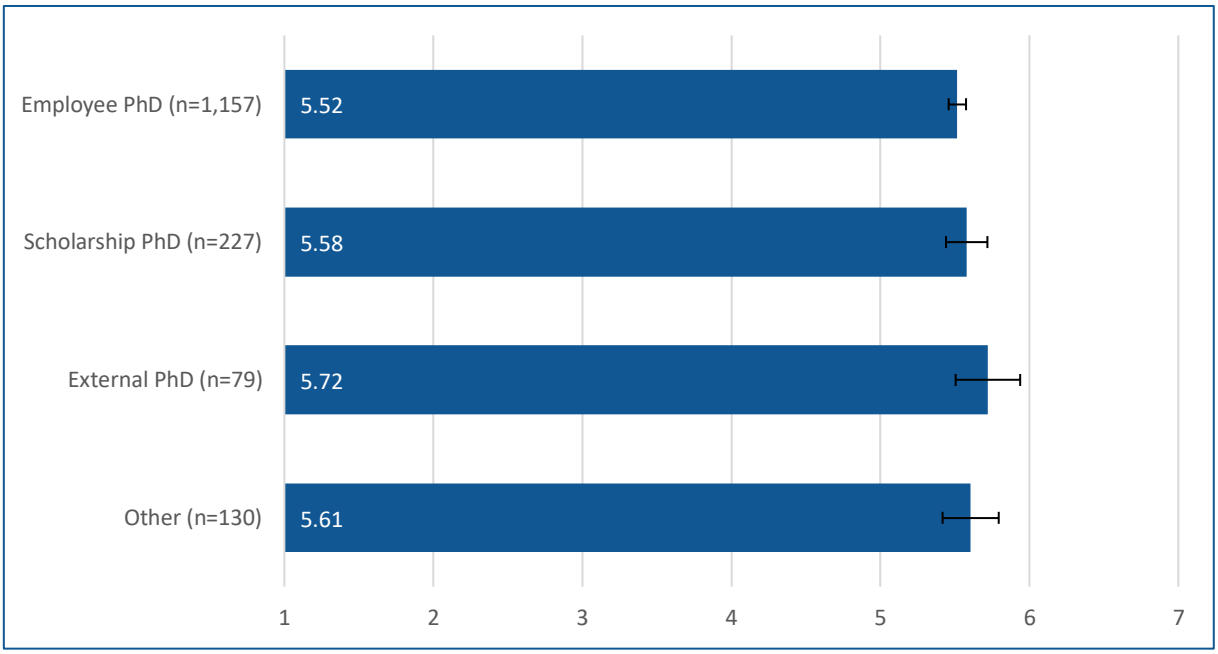

Figure 2.8: Scores on the freedom scale, per type of PhD arrangement. Mean reported in graph. 95%-confidence intervals included.

However, not all scholarship PhDs are the same. In this group, PhDs from the Rijksuniversiteit Groningen (RUG) are overrepresented due to the Experiment with PhD scholarship students. This experiment has the purpose of investigating whether such a system could lead to an increase in the number of PhDs, increase the opportunity for PhDs to design and put into practice their own research proposals, improve the position of PhDs on the labour market and stimulating the further development of the knowledge society.[7]

Given that this goal explicitly states that the scholarship system should increase the opportunity for PhDs to design and execute their own project, it is interesting to see whether the difference in freedom between employee PhDs and scholarship PhDs is larger at the RUG compared to other universities.

[6] NRC (August 16th 2018). Promoveren op een studentenbeurs. [Doing your PhD on a student scholarship.]
[7] Authors' paraphrased translation of Besluit Experiment Promotieonderwijs, Artikel 2.

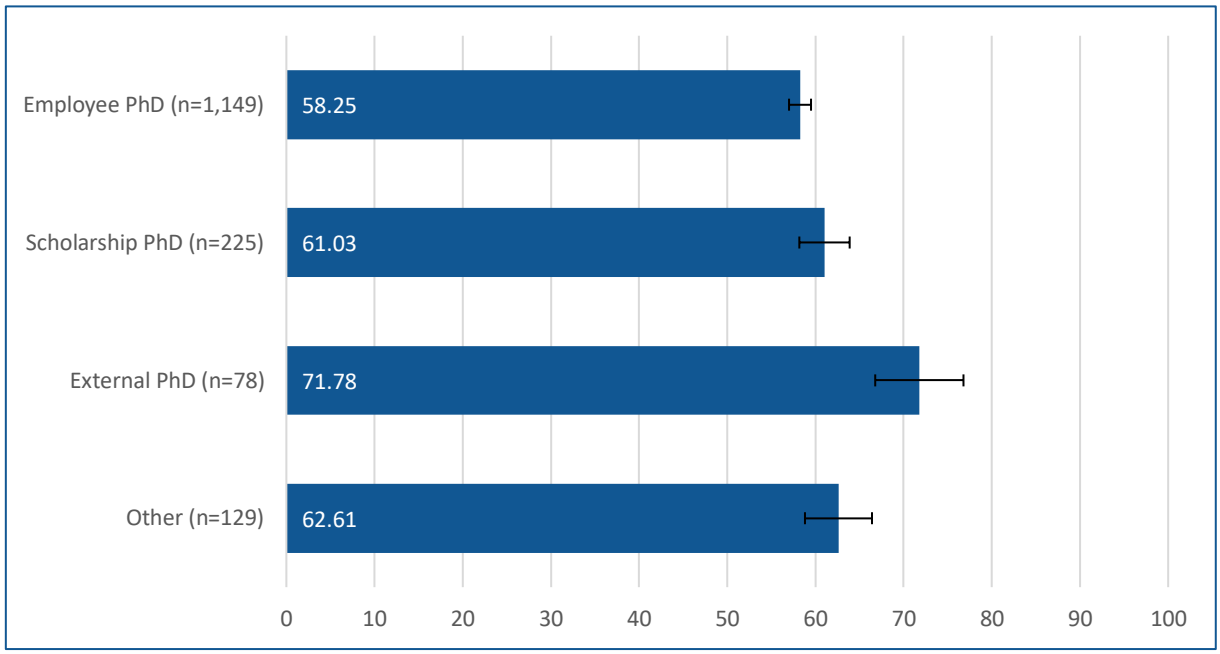

Figure 2.9: Scores on the question "Who designs your project?" per type of PhD arrangement. Mean reported in graph. 95%-confidence intervals included.

These comparisons for the freedom scale can be found in figure 2.10. The results show, again, that neither outside the RUG nor inside the RUG, are there significant differences between employee PhDs and scholarship PhDs on the freedom scale. This confirms the results of the RUG PhD survey 2019[8]. The results for the question "Who designs your project?" show a similar image (figure 2.11): there are no significant differences in who designs the project between employee PhDs and scholarship PhDs both inside and outside RUG. Here however, employee PhDs from the RUG do score significantly higher than employee PhDs from outside RUG.

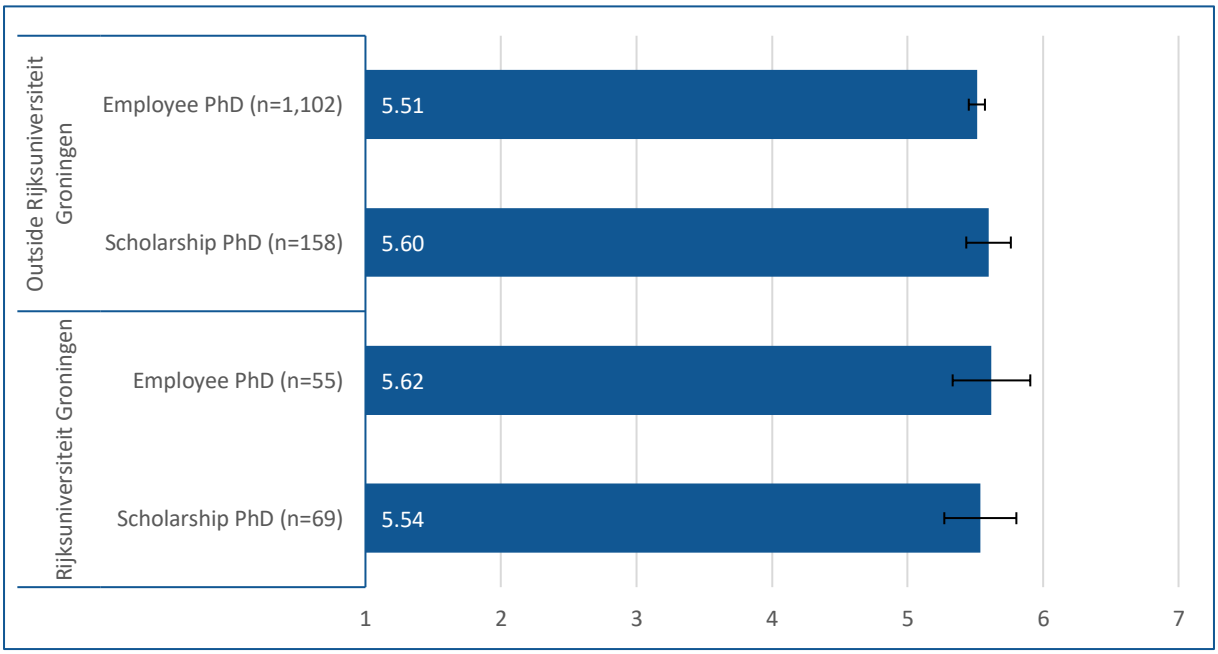

Figure 2.10: Scores on the freedom scale for employee PhDs and scholarship PhDs, separate for non-Rijksuniversiteit Groningen PhDs and PhDs from Rijksuniversiteit Groningen. Mean reported in graph. 95%-confidence intervals included.

[8] Van der Scheer, E.A. (2019). Experiences of PhD students at the University of Groningen, page 25-26. https://www.rug.nl/education/phd-programmes/about/phd-survey/2019.pdf

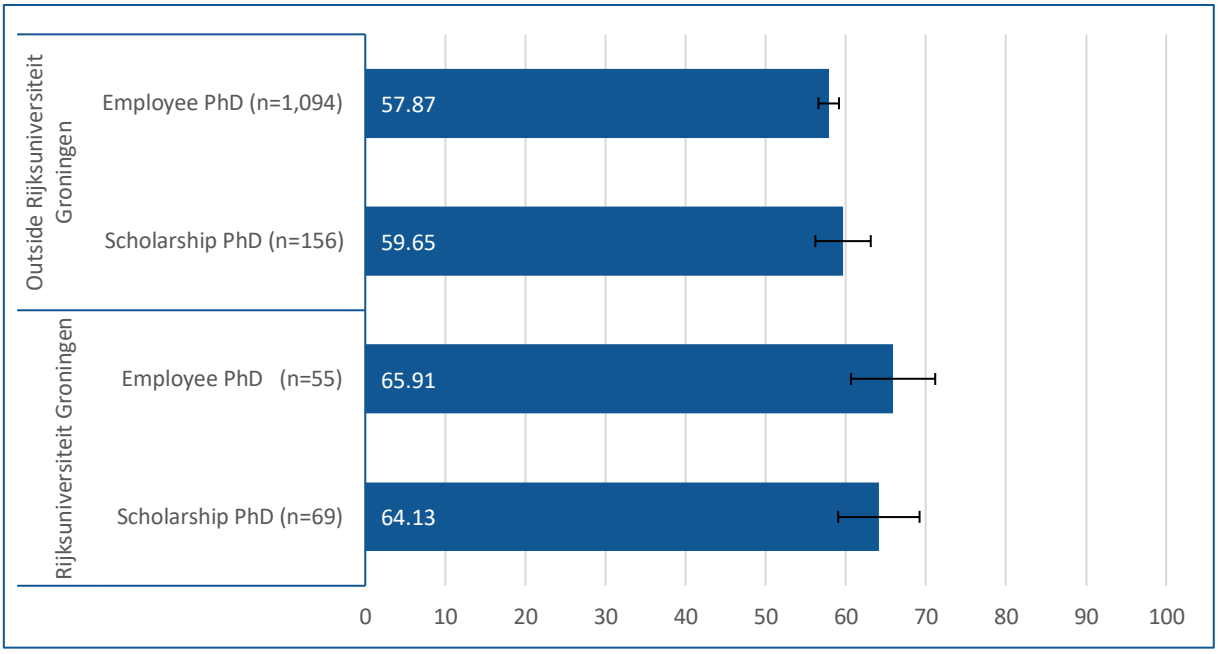

Figure 2.11: Scores on the question "Who designs your project?" for employee PhDs and scholarship PhDs, separately for non-Rijksuniversiteit Groningen PhDs and PhDs from Rijksuniversiteit Groningen. Mean reported in graph. 95%-confidence intervals included.

Appendix

Table A1: Occurrence of supervision team composition, per type of institution, PhD arrangement and discipline

Team composition	110[1]	120	111	101	210	112	200	102	220	121	Other
Total (n=1,601)	24.1%	11.4%	10.2%	7.6%	5.8%	4.7%	4.7%	4.4%	3.2%	3.1%	20.9%
University (n=1,173)	23.3%	10.0%	10.7%	9.5%	4.3%	4.9%	5.4%	5.5%	2.3%	2.7%	21.4%
UMC (n=351)	26.2%	15.4%	8.5%	1.4%	9.4%	4.0%	3.4%	0.9%	6.0%	4.8%	19.9%
Other (n=76)	27.6%	14.5%	9.2%	6.6%	11.8%	3.9%	0.0%	3.9%	3.9%	1.3%	17.1%
Employee PhD (n=1,159)	25.7%	12.0%	9.7%	6.6%	6.6%	4.1%	4.7%	3.9%	3.8%	3.5%	19.6%
Scholarship PhD (n=227)	15.0%	5.3%	14.1%	14.1%	0.9%	8.8%	3.1%	7.0%	1.3%	1.8%	28.6%
External PhD (n=79)	32.9%	3.8%	6.3%	7.6%	5.1%	2.5%	12.7%	5.1%	1.3%	2.5%	20.3%
Other (n=132)	21.2%	20.5%	9.8%	6.1%	8.3%	3.0%	3.0%	3.8%	2.3%	2.3%	19.7%
Agricultural sciences (n=107)	11.2%	11.2%	10.3%	7.5%	2.8%	10.3%	0.9%	4.7%	4.7%	6.5%	29.9%
Medical & Health Sciences (n=456)	24.6%	15.8%	8.1%	2.2%	8.8%	3.9%	3.1%	1.3%	6.4%	4.2%	21.7%
Natural Sciences (n=259)	26.3%	5.4%	12.0%	8.5%	2.7%	8.1%	1.9%	6.2%	2.7%	1.9%	24.3%
Behavioural and Social Sciences (n=343)	25.1%	14.6%	11.1%	8.7%	7.9%	1.2%	5.5%	3.5%	1.7%	4.1%	16.6%
Technical Sciences & Engineering (n=116)	19.0%	7.8%	13.8%	16.4%	0.9%	6.0%	4.3%	9.5%	1.7%	0.9%	19.8%
Humanities (n=115)	25.2%	11.3%	11.3%	8.7%	6.1%	5.2%	7.8%	7.8%	0.9%	0.9%	14.8%
Economics and Business (n=104)	31.7%	5.8%	5.8%	13.5%	2.9%	3.8%	9.6%	7.7%	0.0%	1.0%	18.3%
Law (n=62)	22.6%	3.2%	8.1%	9.7%	8.1%	3.2%	17.7%	1.6%	0.0%	0.0%	25.8%

[1] First digit: number of promotors. Second digit: number of co-promotors. Third digit: number of regular supervisors. 110 = 1 promotor, 1 co-promotor, 0 regular supervisors.

Table A2: Questionable supervisor behaviour, per type of institution, PhD arrangement and discipline

	does not recognise the pressure or plays down the work load	contacts me in the weekend or at night	pressures me to take on additional tasks	wants to be co-author on my work even though contribution is limited	does not create enough room for me to write	other	blames me when I am overworked	does not create enough space for me to go on vacation	talks about the wish to start a family as something that is incompatible with an academic career	says there is no room to start a family during my PhD project	Does none of these things
Total (n=1,601)	21.9%	16.7%	13.0%	8.9%	7.2%	6.7%	5.8%	5.4%	3.1%	2.7%	57.1%
University (n=1,173)	19.8%	14.7%	11.4%	8.6%	6.4%	6.4%	5.9%	5.0%	2.7%	2.1%	60.9%
UMC (n=351)	28.5%	23.6%	18.5%	8.5%	10.8%	7.4%	6.3%	6.8%	4.6%	5.1%	44.7%
Other (n=76)	25.0%	17.1%	11.8%	15.8%	3.9%	7.9%	2.6%	5.3%	1.3%	1.3%	55.3%
Employee PhD (n=1,159)	23.7%	18.6%	14.1%	9.1%	8.0%	6.7%	6.0%	5.9%	3.7%	3.2%	53.8%
Scholarship PhD (n=227)	20.3%	12.3%	9.3%	7.5%	6.2%	5.7%	5.3%	5.7%	0.9%	1.3%	65.6%
External PhD (n=79)	11.4%	3.8%	3.8%	10.1%	2.5%	7.6%	5.1%	3.8%	0.0%	1.3%	70.9%
Other (n=132)	15.2%	14.4%	15.9%	9.8%	5.3%	7.6%	5.3%	2.3%	3.0%	2.3%	63.6%
Agricultural sciences (n=107)	17.8%	12.1%	8.4%	4.7%	4.7%	2.8%	2.8%	1.9%	0.0%	0.0%	72.0%
Behavioural and Social Sciences (n=343)	18.7%	14.0%	12.2%	11.1%	7.3%	7.3%	5.0%	5.0%	3.2%	2.6%	58.0%
Economics and Business (n=104)	16.3%	12.5%	5.8%	6.7%	1.9%	3.8%	5.8%	5.8%	3.8%	0.0%	69.2%
Humanities (n=115)	23.5%	19.1%	8.7%	10.4%	6.1%	11.3%	7.0%	3.5%	1.7%	0.9%	54.8%
Law (n=62)	12.9%	12.9%	12.9%	6.5%	9.7%	8.1%	6.5%	4.8%	4.8%	6.5%	58.1%
Medical & Health Sciences (n=456)	28.3%	23.0%	18.4%	8.8%	11.2%	6.8%	6.4%	6.8%	4.4%	4.2%	47.1%
Natural Sciences (n=259)	22.8%	14.7%	12.0%	7.7%	5.0%	6.9%	6.9%	6.9%	1.9%	2.3%	59.5%
Technical Sciences & Engineering (n=116)	22.4%	12.1%	12.1%	12.9%	1.7%	6.0%	5.2%	3.4%	1.7%	2.6%	60.3%

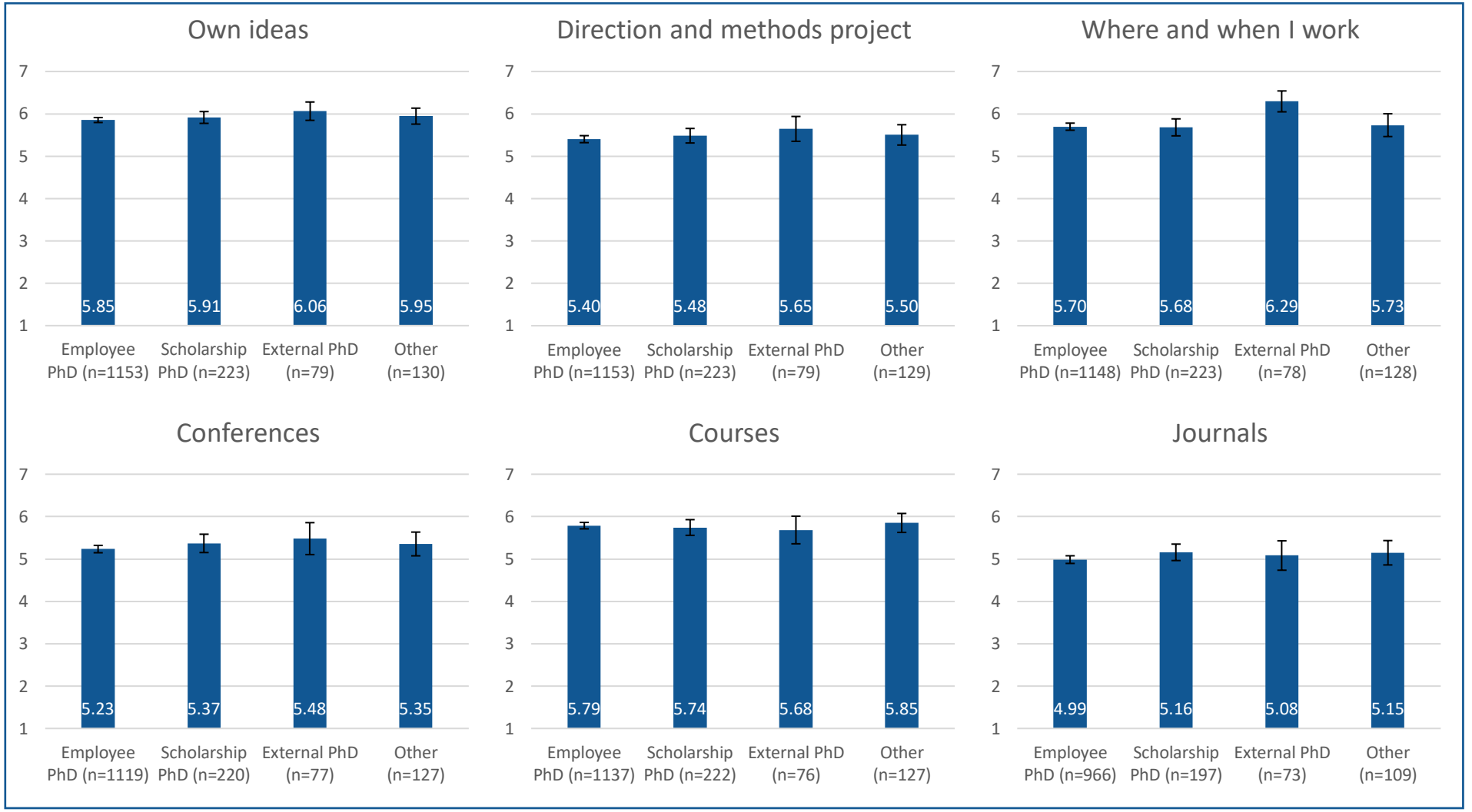

Figure A1: Scores on the six items of the freedom scale, per type of PhD arrangement.