

PHD-SURVEY VUB 2018

REPORT

Anaïs Glorieux, Petrus te Braak, Joeri Minnen, Bram Spruyt

INDEX

Preface	p. 3
<hr/>	
1. Introduction	p. 4
<hr/>	
1.1 Population	p. 4
1.2 Instrument	p. 4
1.3 Response	p. 5
1.4 Analysis	p. 6
2. Personal characteristics	p. 6
<hr/>	
2.1 Background information	p. 6
2.2 Affiliation with VUB	p. 10
2.3 Skills and motivation	p. 11
2.4 Turnover intention	p. 12
3. Entering the PhD process	p. 14
<hr/>	
3.1 Employment prior to enrolment	p. 14
3.2 PhD project development	p. 16
4. PhD project	p. 18
<hr/>	
4.1 Research plan	p. 18
4.2 Timing of the PhD project	p. 20
4.3 Workload	p. 22
4.4 Working hours	p. 24
4.5 PhD progression and finalization	p. 29
4.6 Future plans	p. 32
5. Support	p. 37
<hr/>	
5.1 Guidance network	p. 37
5.2 Support of the university	p. 40
5.3 Doctoral school	p. 41
6. Integrated approach: latent class analysis	p. 43
<hr/>	
6.1 Cluster determination	p. 45
6.2 Cluster identification	p. 48
7. Conclusion and recommendations	p. 56
<hr/>	

PREFACE

In 2017, the Central PhD office of the Vrije Universiteit Brussel (VUB) organised a pilot study at several faculties to measure the working conditions and overall satisfaction of the PhD candidates. Together with the participating Doctoral Schools and faculties, the Central PhD office aimed at gaining more insight into the needs of the PhD candidates and wanted to measure to what extent these needs were being met. An additional goal of this study is to identify the PhD candidates that potentially need some help to improve their work quality and to increase the probability to successfully complete their PhD.

In 2018, the same study was conducted. This time on a bigger scale: all faculties and Doctoral Schools were included in the survey. The main research goal remained the same. We wanted to learn more about what aspects of the PhD trajectory are already positively evaluated and what aspects need more support and attention. With this information, we can make sure more PhD candidates are satisfied during their trajectory and can complete the PhD process successfully. We also compared the results of this year with the results of the pilot study. Notable differences are discussed in the report.

The respondents were asked to fill in a survey with questions concerning their doctoral trajectory: the support of their supervisor and broader scientific guidance network, their perceived progress, their career plans and training needs.

In the first chapter, we will elaborate on the population, the instrument and the response rate. The second chapter discusses personal characteristics to get a better view on the composition of the group of respondents. We take a closer look at their affiliation with the VUB and their motivations for starting a PhD. In the third chapter, we take a closer look at the starting phase of the PhD: what is the prior experience of the PhD candidate and how did they develop their PhD proposal? The fourth chapter talks about the research process itself. We asked the candidates whether they are on the right track, how they experience the workload and the time pressure. We get a deeper insight in the doubts of the PhD candidates and their belief in successfully completing the PhD process. We also talk about their future plans. In the fifth chapter, we get to know more about the support and guidance network of the PhD candidates. In the last chapter, we look at how different candidates can be clustered together based on how they feel about the aspects discussed in the chapters above.

This study was conducted by Research Group TOR of the VUB, under supervision of Prof. Bram Spruyt. TOR is responsible for the data collection, the data cleaning, the data analysis and the writing up of the final report. Please consult the technical report for more technical details of more information on the questionnaire.

1. INTRODUCTION

1.1 Population

This research was conducted among a segment of PhD candidates at the VUB. All eight faculties of the university were included:

- the faculty of Arts and Philosophy
- the faculty of Economic & Social sciences & Business Solvay School
- the faculty of Engineering sciences
- the faculty of Law & Criminology
- the faculty of Medicine & Pharmacy
- the faculty of Psychology & Educational sciences
- the faculty of Sciences & Bio-science Engineering
- the faculty of Physical Education & Physiotherapy

In this study, also interdisciplinary doctorates were included. However, it is important to note that only six interdisciplinary candidates participated in this study. This is why percentages for this particular group can fluctuate easily and are not always representative.

Personal contact information was available through people's enrolment at one of the three VUB Doctoral Schools: the Doctoral School of Human Sciences (DSH), the Doctoral School of Natural Sciences & (bio-science) Engineering (NSE) and the Doctoral School of Life Sciences and Medicine (LSM). This personal data was handled with care and conform to the Belgian Privacy Act (1992) and the GDPR guidelines. All enrolled students were invited via e-mail to participate. In total, 1.594 PhD candidates were invited to participate.

1.2 Instrument

The research project consisted of a single questionnaire (see technical report). This questionnaire was available on the MOTUS-website (www.motusresearch.io). In the invitation mail, respondents were asked to visit the website where they could log in using their username and password. One's personal username and password was sent to the invitees in the same invitation mail.

After they logged in, respondents were directed to a page where they received some basic information about the research project. This information consisted of a few links to more specific pages about privacy concerns, contact details and a section with frequently asked questions. Except for the basic information, all information was only shown on demand. Respondents could also directly start responding to the questionnaire. After finishing the questionnaire, respondents were shown a thank you page. They were

also sent an email to confirm their successful participation. Printouts of this online information can be found in the technical report.

1.3 Response

In total, 1.594 students were invited to participate in this research project. 769 of them completed the survey. In table 1.3.1, we present the response rate. The total response rate tells us how many PhD candidates started filling in the survey. In total, 52,9% of the people that were invited to participate actually started the survey. 48,2% of the invited participants finished the study, 4,7% only filled it out partially.

Table 1.3.1 Partial, complete and total response

	N	In %
Total	843	52,8
Partial	74	4,6
Complete	769	48,2

When we compare the response rates in the different faculties, as shown in table 1.3.2, we see that the faculty of Sciences and Bio-science Engineering has the highest response rate (60%). The lowest response rate can be found in the faculty of Engineering Sciences (41,2%). This low response rate could be due to the fact that this faculty already participated in the pilot study of 2017. Because of this, it is possible that the PhD candidates were less motivated to fill in the questionnaire a second time. The Doctoral School with the highest response rate is the school of Life Sciences and Medicine (53,5%). The school of Human Sciences had the lowest response rate (44,5%).

Table 1.3.2 Total response by doctoral school and faculty

	N	%
Human Sciences (DSH)	284	44,5
Arts & philosophy	73	42,4
Economic & social sciences & business Solvay school	104	43,6
Law and criminology	35	41,7
Psychology & educational sciences	72	50,0
Natural Sciences & (bio-science) Engineering (NSE)	303	50,0
Sciences & bio-science engineering	170	60,0
Engineering sciences	133	41,2
Life Sciences and Medicine (LSM)	176	53,5
Medicine & Pharmacy	142	54,6
Physical education & physiotherapy	34	49,2
Interdisciplinary	6	50,0

In table 1.3.3 we can see that there is a higher response rate amongst women than amongst men. This is usually the case. 54,2% of the women who were asked to participate completed the survey entirely. This compared to 43,1% of the men.

Table 1.3.3 Total response rate by gender

	N	In %
Male	365	43,1
Female	404	54,2

1.4 Analysis

Most analyses are simple descriptive analyses, aimed at getting a first glance at what marks this PhD population in terms of background characteristics as well as in research related experiences. In this report, scales about time pressure, self-efficacy, doubts for finishing the PhD successfully, satisfaction with the supervisor(s) and satisfaction with the work environment are used. These scales were computed using Principal Component Analysis (with oblique rotation).

In the last part of the report we will use Latent Class Analysis (LCA). LCA identifies unobservable subgroups within a population, in this case the PhD candidates. The technique allows a better understanding of the impact of exposure to patterns of multiple risks, as well as antecedents of complex behaviour. We will use the technique to find patterns in the experience of the PhD population concerning the PhD process. We will use the cluster membership as a second, more descriptive analysis to determine background characteristics that mark these clusters.

2. PERSONAL CHARACTERISTICS

In this chapter, we will discuss the PhD student's background characteristics such as gender, age, stage of the PhD and the type of contract they have. We will also give more details about their affiliation with the VUB and take a deeper look into their motivation to do a PhD. The last part of this chapter says something about the turnover intention of the PhD candidates.

2.1 Background information

Table 2.1.1 shows that there are slightly more female participants than male participants. This is different from the study that was conducted in 2017, where there were 20% more male participants than female participants. When we look at the entire population of PhD candidates at the VUB, we see that there are more male candidates than female candidates. This is why we have to keep in mind that in this sample the balance between men and women does not represent the balance of the entire population.

The table also shows us that 39,4% of the respondents is from the school of Natural Sciences & (bio-science) Engineering, 36,9% is from the school of Human Sciences and 22,9% is from the school of Life Sciences and Medicine. 0,8% is doing an interdisciplinary doctorate.

Table 2.1.1 Respondents by gender and doctoral school

	N	In %
Gender		
Female	404	52,5
Male	365	47,5
Doctoral school		
DSH	284	36,9
NSE	303	39,4
LSM	176	22,9
Interdisciplinary	6	0,8

There are three phases that can be distinguished within the PhD process: a starting phase, an executing phase and a finalizing phase. In table 2.1.2, we see that the majority of the participants in this report are in the executing phase (51,9%). This is normal, considering that this is the core phase of the PhD process and takes up most of the time. 20,3% of the participants are in the starting phase. They are currently developing their research plan and research design, and are using their time to read and write the outline of their project. 27,8% of the participants are in the finalizing phase of their PhD, which covers the last months of the PhD process.

Table 2.1.2 Respondents by PhD phase

	N	In %
Starting phase (developing your research plan and design, reading)	154	20,3
Executing phase (working on experiments, data, executing research plan/method)	394	51,9
Finalization phase (writing up phase)	211	27,8
Missing	10	
Total	769	100

In this research, a little over one in four respondents is in their first year of the PhD process (26%). 19,3% of the respondents are working on their PhD for five years or more. 54,7% are in their second, third or fourth year.

Table 2.1.3: Start date of the PhD

	N	In %
Year 1 (started after May 2017)	197	26,0
Year 2 (started between May 2016 and May 2017)	140	18,5
Year 3 (started between May 2015 and May 2016)	139	18,3
Year 4 (started between May 2014 and May 2015)	136	17,9
Year 5 and above (started before May 2014)	146	19,3
Missing	11	
Total	769	100

Most PhD candidates are employed on a project assigned to their supervisor (32,3%). A smaller group is employed on a personal mandate (25,9%). 19,2% is employed as research/teaching assistant. 16,6% of the respondents doesn't have a contract and 6,1% has an 'other' type of contract.

Table 2.1.4 Respondents by contract type

	N	In %
Research/teaching assistant	142	19,2
Personal mandate	192	25,9
FWO	104	13,5
INNOVIRIS	8	1,0
VUB	14	1,8
ERC	1	0,1
CSC	32	4,2
Other	31	4,0
Project funding	239	32,3
FWO	74	9,6
INNOVIRIS	16	2,0
VUB	43	5,6
ERC	11	1,4
Other	72	9,4
I don't have a contract, I'm self-financed	123	16,6
Other	45	6,1
Missing	28	
Total	769	100

It is striking that more than one in five (22,7%) either doesn't have a contract or has an 'other' type of contract. The fact that they don't have a contract could be explained by the fact that they are related to a foreign university. In table 2.1.5, we see that the majority of the respondents without a contract has an 'other' nationality (52%). These students usually come from a foreign university and fund themselves. A big portion of the respondents with an 'other' type of contract also has an 'other' nationality (40%). These students often have a contract at a foreign university. Most respondents who are research or teaching assistants (79,6%), who have a personal mandate (54,7%) or project funding (51,9%) are Belgian.

Table 2.1.5 Type of contract by nationality

	Belgian		EU, non-Belgian		Other	
	N	In %	N	In %	N	In %
Research/teaching assistant	113	79,6	17	12,0	12	8,5
Personal mandate	105	54,7	27	14,1	60	31,3
Project funding	124	51,9	58	24,3	57	23,8
I don't have a contract, I'm self-financed	39	31,7	20	16,3	64	52,0
Other	21	46,7	6	13,3	18	40,0

$\chi^2=88,1$; $df=8$; $p<0,001$ ¹

The biggest portion of the respondents in the Doctoral School of Human Sciences doesn't have a contract and is self-financed (26,7%). In the school of Natural Sciences & (bio-science) Engineering the biggest group is the one with project funding (38,3%). The same counts for the school of Life Sciences and Medicine (37,3%).

¹ Significance is either indicated below the table or within the table (with * if $p<0,05$ or with ** if $p<0,01$). When there is a significant difference between more than two categories of the same indicator, different symbols are used to indicate the significance between two specific categories (°, +, •)

Table 2.1.6 Type of contract by doctoral school

	DSH		NSE		LSM		Interdisc.	
	N	In %	N	In %	N	In %	N	In %
Research/teaching assistant	50	18,1	61	21,0	31	18,3	0	0,0
Personal mandate	67	24,2	88	30,3	34	20,1	3	60,0
Project funding	65	23,5	111	38,3	63	37,3	0	0,0
I don't have a contract, I'm self-financed	74	26,7	20	6,9	27	16,0	2	40,0
Other	21	7,6	10	3,4	14	8,3	0	0,0
Total	277	100	290	100	169	100	5	100

$\chi^2=66,4$; $df=15$; $p<0,05$

2.2 Affiliation with VUB

The majority of the respondents (78,9%) is not doing a joint PhD. The participants who do work together with another university usually do so with another Flemish university (10,1%). Two small groups of participants collaborate with a foreign university, 4% in Europe, 3,1% outside of Europe. An even smaller amount does a joint PhD with a Belgian, non-Flemish university (2,7%).

Table 2.2.1 Respondents by joint PhD

	N	In %
No Joint PhD	607	78,9
Joint PhD with Flemish university	78	10,1
Joint PhD with Belgian non-Flemish university	21	2,7
Joint PhD with foreign European university	31	4,0
Joint PhD with foreign non-European university	24	3,1
No answer + missing	8	1,0
Total	769	100

The majority of the PhD candidates is employed full-time (95,6%). A small group of 4,4% is employed part-time. There is no significant difference between the Doctoral Schools when it comes to the type of employment.

Table 2.2.2 Respondents by type of employment

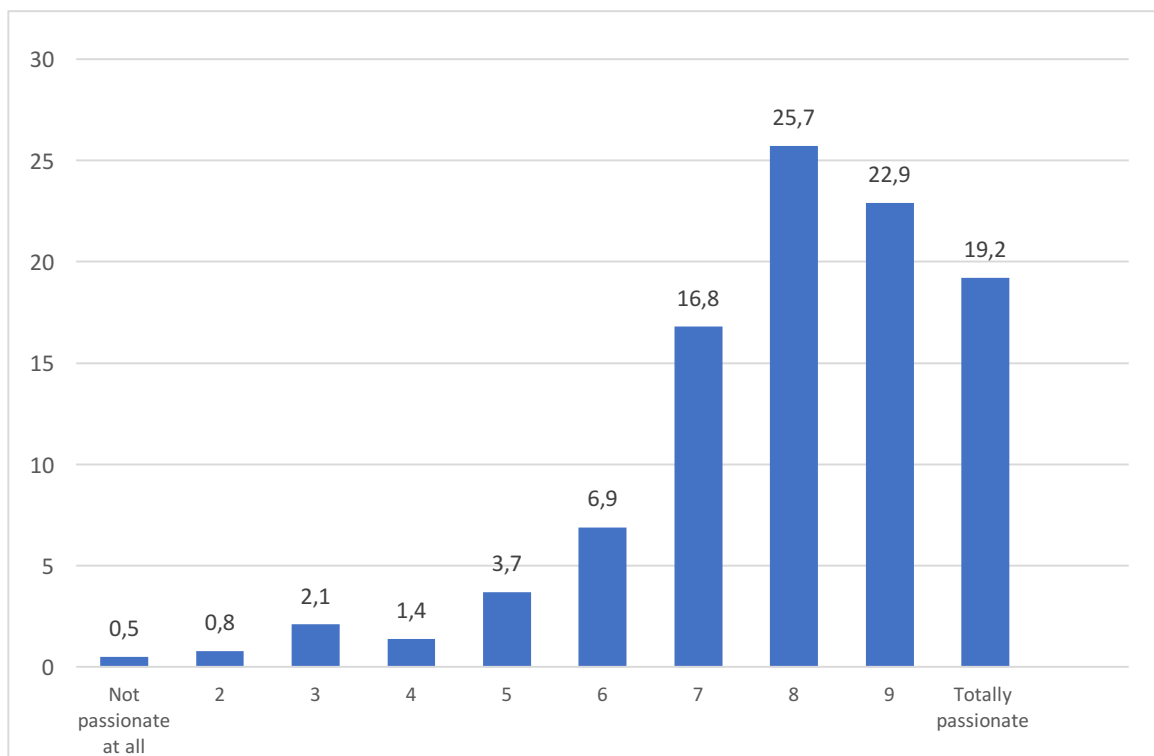
	N	In %
Part-time	26	4,4
Full-time	571	95,6
Missing	172	
Total	796	100

2.3 Skills and motivation

Motivation and skills are important in bringing the PhD process to a good end. Respondents were asked about their motivation and their level of self-efficacy.

On a scale from 1 to 10, with one being not passionate at all and 10 being totally passionate, the average score is 8,0. 67,8% of the PhD candidates gives a score of 8 or higher. Almost one in five (19,1%) is totally passionate about their PhD research. 8,4% says to be not that passionate about their research and gives a score of 5 or lower. This is more than double the amount compared to the research deducted in 2017. Overall, the respondents are less passionate about their research compared to the pilot study. There is no significant difference between the doctoral schools or faculties when it comes to the level of passion. From this we can derive that it is not due to the fact that more faculties were added to the analysis, that the level of passion is lower.

Figure 2.3.1 Level of passion of own research (in %)



Eight items measured the level of self-confidence amongst the respondents². These items, as listed below, were combined into one new variable: self-efficacy. Albert Bandura³ conceptualized self-efficacy as “the belief in one’s capabilities to organize and execute the courses of action required to manage prospective situations”. In other words, self-efficacy shows here to what extent PhD candidates are able to handle difficult situations, and are not easily being let down by setbacks. Self-efficacy is an important asset for a PhD candidate, as setbacks are a part of the learning process during a PhD.

Table 2.3.1 Items of self-efficacy scale

	% that rather/totally agrees
In general, I think I can obtain outcomes that are important to me	80,9
I will be able to successfully overcome many challenges	73,6
I am confident that I can perform many different tasks effectively	71,4
I will be able to achieve most of the goals that I have set for myself	71,0
I believe I can succeed at almost any endeavour to which I set my mind	64,6
When facing difficult tasks, I am certain that I will accomplish them	64,4
Even when things are tough, I can perform quite well	64,1
Compared to other people, I can do most tasks very well	43,7

On average, the students have a score of 27,2 out of 40 on self-efficacy. When we look at the different phases of the PhD process, there seems to be no significant difference between the phases when it comes to the level of self-efficacy. Men appear to have a higher level of self-efficacy than women. Belgians have a lower level of self-efficacy than people with another nationality.

Table 2.3.2 Self-efficacy by gender and nationality

		Self-efficacy
Gender	Male	28,2*
	Female	26,3*
Nationality	Belgian	25,9*/°
	EU, non-Belgian	27,8*
	Other	29,2°

² Chen, G., Gully, S. M., & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational research methods*, 4(1), 62-83.

³ Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*, 84(2), 191.

2.4 Turnover intention

In the questionnaire, different questions were asked about the motivation of the candidate to leave their job in the near future. The respondents were asked to rate several items concerning this topic from one (never) to five (always). In table 2.4.1 we listed the percentage of respondents that answered with score 4 or 5. The different items were computed to one scale of turnover intention. On average, the candidates have a score of 4,6 out of 10 when it comes to turnover intention.

Table 2.4.1 Items of the turnover intention scale

	% of respondents with score 4 or 5
During the past 9 months, how often did you look forward to another day at work?	43,4
In the near future, how likely are you to accept another job at the same compensation level should it be offered to you?	27,7
During the past 9 months, how often did you dream about getting another job that would better suit your personal needs?	25,0
During the past 9 months, how often were you frustrated when not given the opportunity at work to achieve your personal work-related goals?	20,8
During the past 9 months, how often have you considered leaving your job?	12,6

Female respondents have a significantly higher turnover intention compared to their male colleagues. We also see that respondents that progressed further in the trajectory have a higher turnover intention than the respondents in de starting phase. This could be due to the fact that the candidates who almost finished their PhD are already thinking more often about starting another job in the near future.

Table 2.4.2 Turnover intention by gender and PhD phase

	Sig.	Turnover intention
Gender	**	
Male		4,5
Female		4,8
Phase	**	
Beginning		4,1
Executing		4,6
Finalizing		5,1

3. ENTERING THE PHD PROCESS

This chapter discusses the prior and current working situations and project development (including the personal involvement and that of the supervisor).

3.1 Employment prior to enrolment

Over half of the PhD candidates (54,4%) did not have any other work experience before starting their PhD. 37,2% of the PhD candidates did have work experience before starting at the VUB, most of them for over one year (26,4%). A small group of respondents still has a job while working at the VUB (8,5%). Most of them are already working at this job for over three years.

Table 3.1.1 Previous or current employment

	N	In %
No	417	54,4
Yes	285	37,2
Less than 6 months	21	2,7
Between 6 months and 1 year	61	7,9
Between 1 year and 3 years	92	12
More than 3 years	111	14,4
I still have a job while working at the VUB	65	8,5
Less than 6 months	2	0,3
Between 6 months and 1 year	5	0,7
Between 1 year and 3 years	11	1,4
More than 3 years	47	6,1
Missing	2	
Total	769	100

When we compare the difference in skills and motivation between the respondents that have had a previous job and the ones that haven't, we see a striking difference. Respondents with previous work experience and the ones that still have another job are significantly more passionate about their research than the ones who don't. The same counts for the level of self-efficacy. People with previous or current work experience are more resilient than respondents with no other experience.

Table 3.1.2 Average level of passion and self-efficacy by having a current or previous job

	Level of passion (on 10)	Level of self-efficacy (on 40)
No previous job	7,7*°	26,4*°
Previous job	8,2*	27,9*
I still have another job while working at the VUB	8,5°	28,9°

*/° indicates significant difference between two different categories of one indicator ($p < 0,05$)

Respondents who had a job prior to starting their PhD usually worked at another university (29,5%) or in the private sector (25,3%). 15,8% used to work in the non-profit sector. 11,2% worked for the government, 12,6% used to work in an ‘other’ sector. The smallest group consists of people who used to work at another higher education institution (5,6%).

The three main sectors PhD candidates are currently working in are the non-profit sector (25%), at another university (20,3%) or in an ‘other’ sector (20,3%). A group of 17,2% is active in the private sector. Two smaller groups consist of PhD candidates working at another higher education institution (7,8%) or with the government (9,4%).

Table 3.1.3 Sector of previous and current employment

	Previous		Current	
	N	In %	N	In %
Other university	84	29,5	13	20,3
Other higher education institution (‘hogeschool’)	16	5,6	5	7,8
Government (federal, regional, local)	32	11,2	6	9,4
Non-profit sector (i.e. health & social services, cultural organizations, etc.)	45	15,8	16	25,0
Industry and private sector	72	25,3	11	17,2
Other	36	12,6	13	20,3
Total ⁴	285	100	64	100

Prior to their enrolment at the VUB, the majority of the PhD candidates with previous work experience worked in a (partly) research related area (56,3%). For those combining their current employment at the VUB with something else, this is in most cases also (partly) related to research (53,8%).

⁴ Only the 350 respondents who have a previous or current employment are included. One of them did not answer the question.

Table 3.1.4 Function in previous and current employment

	Previous		Current	
	N	In %	N	In %
Research-related function	83	29,2	13	20,0
Partly-research related function	77	27,1	22	33,8
No-research related function	124	43,7	30	46,2
Total ⁵	284	100	65	100

3.2 PHD project development

For 32% of the respondents someone else wrote the research proposal prior to their appointment and this is the research proposal they follow. The second biggest group (21,5%) was free to develop their own research proposal with no relation to another funded research project. 14,2% was free to develop their own proposal, but within a funded research project. 16,4% of the respondents applied with their own research proposal and this was funded afterwards. A small group doesn't have a research proposal, only a rough theme or idea (7,3%) and another small number of respondents is still defining the proposal (4,3%).

In the survey of 2017, almost half of the respondents said to be “involved” in the writing of the proposal. They wrote the proposal with help of someone else, without doing it completely on their own. However, this option was not included in the survey this year.

Table 3.2.1 The PhD proposal

	N	In %
Someone else wrote the research proposal prior to my appointment, and this I follow	246	32,0
I was free to develop my own research proposal, there is no relation with a funded research project	165	21,5
I applied with my own research proposal, which was approved and funded afterwards	126	16,4
I was free to develop my own research proposal, within a funded research project	109	14,2
I don't have a research proposal, only a research theme/idea	56	7,3
We are still defining the research proposal	33	4,3
Other	33	4,3
Missing	1	
Total	769	100

⁵ Only the 350 respondents who have a previous or current employment are included. One of them did not answer the question.

In table 3.2.2 we can see who exactly was involved in the writing of the research proposal. In most cases, the writing was a cooperation between the PhD candidate and the supervisor (42,4%). In 31,6% of the cases, the supervisor wrote the proposal by himself/herself. More than one in five PhD candidates wrote the proposal all by themselves, without the help of supervisor or colleague (22,1%).

Table 3.2.2 Authors of the PhD proposal

	Total ⁶		DSH		NSE		LSM		Interdisc.	
	N	In %	N	In %	N	In %	N	In %	N	In %
My supervisor(s) and myself	286	42,4	87	34,4	130	49,6	66	43,1	3	50,0
My supervisor(s)	213	31,6	47	18,6	97	37,0	69	45,1	0	0,0
I wrote it without cooperation from others	149	22,1	110	43,5	27	10,3	9	5,9	3	50,0
My colleague(s) and myself	26	3,9	9	3,6	8	3,1	9	5,9	0	0,0
Total	674	100	253	100	262	100	153	100	6	100

$\chi^2 = 125,3$; $df=9$; $p < 0,001$

There is a significant difference in who wrote the research proposal between the doctoral schools. In the school of Human Sciences, the biggest group of PhD candidates wrote the proposal all by themselves without the cooperation of others (43,5%). In the school of Natural Sciences & (bio-science) Engineering, there was a cooperation between student and supervisor for 49,6% of the cases. In the school of Life Sciences and Medicine, the biggest portion of the proposals was written solely by the supervisor(s) (45,1%).

In table 3.2.3 we can see that 42,4% of the PhD candidates is rather satisfied with their research proposal. 40,4% is completely satisfied. There is no significant difference in satisfaction between the Doctoral Schools, nor between the different types of contract.

Table 3.2.3 Satisfaction of PhD proposal

	N	In %
Not satisfied	14	2,1
Rather not satisfied	25	3,7
Not satisfied nor dissatisfied	78	11,5
Rather satisfied	288	42,4
Satisfied	274	40,4
Total ⁷	679	100

⁶ 95 respondents are not included because they either don't have a research proposal (yet) or did not answer the question.

⁷ 89 respondents don't have a research proposal (yet), 1 person did not answer the question

4. PHD PROJECT

In this section, we take a closer look at the PhD project itself. The research plan, timing, progression and finalization will be discussed, as well as the workload and the working time habits.

4.1 Research plan

Of all the respondents, 81% has a research plan. In most cases, this is a research plan with long term (more than 6 months) as well as short term (a few months to 6 months) milestones (38,5%). Almost one in four (24,1%) has a research plan with only long term milestones. 19% does not have a research plan. Having a research plan or not does not vary between the Doctoral Schools.

Table 4.1.1 Research plan

	N	In %
Yes, with long term & short term milestones	296	38,5
Yes, with short term milestones	142	18,5
Yes, with long term milestones	185	24,1
No	146	19,0
Total	769	100

Having a certain kind of contract, however, does have an influence on having research plan or not. Most of the respondents who are a research/teaching assistant (33,8%), work on a personal mandate (43,8%) or candidates with project funding (43,5%) have a research plan with short term as well as long term milestones. For the respondents without a contract this is more diffuse. The group with a research plan with long term and short term milestones is for these respondents just as big as the group with a research plan with only long term milestones (29,3%). One in four amongst the self-financed candidates has a research plan with short term milestones (25,2%).

Table 4.1.2 Research plan by type of contract

	Yes, short and long-term		Yes, short-term		Yes, long-term		No	
	N	In %	N	In %	N	In %	N	In %
Research/teaching assistant	48	33,8	28	19,7	38	26,8	28	19,7
Personal mandate	84	43,8	25	13,0	50	26,0	33	17,2
Project funding	104	43,5	46	19,2	39	16,3	50	21,0
I don't have a contract	36	29,3	31	25,2	36	29,3	20	16,3

Other	16	35,6	6	13,3	13	28,9	10	22,2
Total ⁸	288	38,9	136	18,4	176	23,8	141	19,0

$\chi^2=25,2$; $df=15$; $p<0,05$

Table 4.1.3 shows us what elements are included in the research plans of our respondents. The three most included elements are the research goals (89,1%), the yearly milestones (64,7%) and the publication strategy (60,5%). What is less likely included are elements concerning skill development and training (specialist training schedule and transferable skills training schedule). It is striking that in the doctoral school of Life Sciences and Medicine significantly more attention is paid to the inclusion of a publication strategy (70%). Especially in the faculty of Physical Education and Physiotherapy this rate is high. This is because the faculty makes it obligatory to include a publication strategy in the research plan. In the school of Natural Sciences & (bio-science) Engineering, significantly more attention is given to the inclusion of research goals (94,1%).

Table 4.1.3 Elements included in research plan by doctoral school

	Sig.	DSH		NSE		LSM		Interdisc.		Total ⁹	
		N	In %	N	In %	N	In %	N	In %	N	In %
Research goals	**	202	83,8	225	94,1	123	89,8	5	83,3	555	89,1
Monthly milestones	*	92	38,2	63	26,4	41	30,0	3	50,0	199	31,9
Yearly milestones	n.s.	158	65,6	155	64,9	85	62,0	5	83,3	403	64,7
Publication strategy	**	127	52,7	151	63,2	96	70,0	3	50,0	377	60,5
Dissemination of research results to a larger audience	n.s.	60	24,9	70	29,3	44	32,1	0	0	174	27,9
Conferences to attend	n.s.	122	50,6	103	43,1	55	40,1	3	50,0	283	45,4
Specialist training schedule	n.s.	50	20,7	31	13,0	20	14,6	0	0	101	16,2
Transferable skills training schedule	n.s.	31	12,9	34	14,2	20	14,6	0	0	85	13,6
Other	n.s.	8	3,3	7	2,9	3	2,2	1	16,7	19	3

*/** indicates significant difference between the different categories of one indicator ($p<0,05$ or $p<0,001$)

⁸ 28 respondents did not answer the question

⁹ Only respondents with a research plan are included. 146 respondents are not included.

The majority of the respondents with a research plan tends to follow this research plan (78%). There is no difference between the doctoral schools when it comes to following the research plan.

Table 4.1.4 Following the research plan

	N¹⁰	In %
Not at all	6	1,0
Rather not	33	5,7
Undecided	89	15,3
Rather yes	396	68,0
Totally	58	10,0
Total	582	100

When it comes to evaluating the research plan, we can see that three in four (74,9%) regularly has an appointment with a supervisor or other advisor to evaluate the plan. There is no significant difference between the doctoral schools.

Table 4.1.5 Evaluating the research plan

	N¹¹	In %
Yes	466	74,9
No	156	25,1
Total	622	100

4.2 Timing of the PhD project

When we asked the respondents whether they believe they are on the right track, a little over half of the participants (52,2%) said to be ‘rather on track’. 17,8% is completely convinced that they are and 29,9% still has some doubts about it. Respondents of different schools don’t have significantly different feelings about being on track or not. The number of candidates that feel like they are rather or totally on track is slightly lower than in the survey of last year, whereas the group of respondents that is undecided or rather not on track is slightly bigger.

¹⁰ 146 respondents without a research plan are excluded, 41 respondents did not answer the question

¹¹ 146 respondents without a research plan are excluded, 1 respondent did not answer the question

Table 4.2.1 Being on the right track

	N ¹²	In %
Not at all	21	2,7
Rather not	76	9,9
Undecided	132	17,3
Rather yes	399	52,2
Totally	136	17,8
Total	764	100

We asked the respondents which of the following reasons might influence their PhD progress and the possibility to finish their PhD in time. The biggest concern of the PhD candidates is the lack of results or the failing of experiments (27,9%). The second most mentioned reason is the doubt of their own capabilities (27,7%). Also, the imbalance between work and family is mentioned as an important reason of concern (25,5%). Other often-mentioned reasons are the lack of guidance by the supervisors (20%), the lack of a stimulating environment (19,9%) and personal reasons (18,7%). A lack of ambition (5%) or interest in the topic (5,1%) do not seem to be reasons for doubts amongst the candidates.

Table 4.2.2 Doubts concerning the successful writing of the PhD

	Reason for doubts	
	N	In %
Lack of results/failed experiments	213	27,9
I doubt my own capabilities	212	27,7
The unbalanced combination of work and family	195	25,5
Lack of guidance by my supervisors	153	20,0
Lack of stimulating environment	152	19,9
Personal reasons	143	18,7
Uncertainty concerning funding	140	18,3
The research topic is not that interesting after all	39	5,1
I didn't have the ambition to start a PhD in the first place	38	5,0

The different items as listed above were used to compute two different scales using Principal Component Analysis. The first scale, **personal doubts**, consists of the following items: ‘personal reasons’, ‘the unbalanced combination of work and family’, ‘I doubt my own capabilities’ and ‘I didn't have the ambition to do a PhD in the first place’. The second scale is about **doubts about the research** and

¹² 5 respondents did not answer the question

contains the items ‘lack of stimulating research environment’, ‘lack of guidance by my supervisors’, ‘the research topic is not that interesting after all’ and ‘lack of results/failed experiments’. ‘uncertainty concerning funding’ was not included in the scales.

Overall, we can see that the average scores on doubts are fairly low. The levels of personal doubts (2,9/10) and doubts about the research (2,6/10) are rather equal. When we compare the difference between the Doctoral Schools, there is no significant difference when it comes to doubts about the research itself. In terms of personal doubts, there is a significant difference between the school of Human Sciences and the school of Natural sciences and (Bio-science) Engineering. The respondents in the school of Human Sciences have more doubts about their own capabilities and their ambitions than the NSE PhD candidates.

Table 4.2.3 Personal doubts and doubts about research by doctoral school

	Personal doubts (Average on 10)	Doubts about research (Average on 10)
DSH	3,4**	2,5
NSE	2,5**	2,7
LSM	2,9	2,8
Interdisciplinary	2,0	0,6
Total	2,9	2,6

** indicates significant difference between two different categories of one indicator

4.3 Workload

Respondents were asked in which activities they were involved during the current academic year. Almost half of the respondents indicated that they assisted in teaching (47,8%). Another big portion said to be involved in the supervision of bachelor or master theses (42,6%). Keep in mind that some of these respondents are teaching/research assistants and these jobs are part of their contract. 39,6% is assisting in other projects. 35,1% took part in scoring papers and assisting during an exam. Another 35% was involved in administrative tasks.

The right column shows us what portion of all the respondents thinks a certain task took up too much time. Respondents rated ‘teaching’ (15,1%) and ‘assisting in other projects’ (12,7%) as the most time consuming with regard to their own research.

Table 4.3.1 Additional tasks during this academic year

	Involved in		Took up too much time: Yes ¹³
	N	In %	In %
Teaching	366	47,8	15,1
Supervision of bachelor/master thesis	326	42,6	11,2
Assisting in other projects	303	39,6	12,8
Taking exams and scoring papers	269	35,1	8,4
Administrative tasks	268	35,0	10,1
Third party services that cannot be used for your research	120	15,7	3,4
Cooperation with industry/other sectors	102	13,3	2,7
Other tasks	86	11,2	1,2

Table 4.3.2 shows the same analysis as table 4.3.1, but now compared by PhD phase. In the report of 2017, the respondents in the executing phase were most involved in all of these tasks. In this report, this is not the case. When it comes to teaching, people in the executing phase are significantly more involved compared to the other phases (51,8%). Respondents in the finalizing phase are more often involved in third party services (21,3%), the supervision of bachelor/master theses (50,7%) and administrative tasks (40,3%) compared to the other phases.

Table 4.3.2 Additional tasks during this academic year by PhD phase

	Sig.	Starting phase		Executing phase		Final phase	
		N	In %	N	In %	N	In %
Teaching	*	59	38,8	204	51,8	101	47,9
Taking exams and score papers	n.s.	52	34,2	142	36,0	70	33,2
Assisting in other projects	n.s.	61	40,1	152	38,6	86	40,8
Third party services that cannot be used for your research	*	23	15,1	49	12,4	45	21,3
Cooperation with industry/other sector	n.s.	19	12,5	50	12,7	32	15,2
Supervision of bachelor/master thesis	**	44	28,9	172	43,7	107	50,7
Administrative tasks	*	40	26,3	139	35,3	85	40,3
Other tasks	n.s.	21	13,8	42	10,7	22	10,4

¹³ Percentage of entire population

In table 4.3.3 we take a closer look into the tasks that take up too much time and compare them by the different kinds of contract. When it comes to teaching, especially teaching and research assistants think this task takes up too much time (46,5%). The same counts for taking exams and scoring papers (24,6%). For the other tasks, there is no significant difference in feeling as if they took up too much time between the different types of contract.

Table 4.3.3 Additional tasks that take up too much time this academic year by type of contract¹⁴

	Sig.	Teaching/ research assistant		Pers. mandate		Project funding		I don't have a contract		other	
		N	In %	N	In %	N	In %	N	In %	N	In %
Teaching	**	66	46,5	12	6,3	17	7,1	7	5,7	8	17,7
Taking exams and score papers	*	35	24,6	10	5,2	10	4,2	7	5,7	2	4,4
Assisting in other projects	n.s.	19	13,4	21	10,9	43	18,0	8	6,5	5	11,1
Third party services that cannot be used for your research	n.s.	8	5,6	5	2,6	4	1,7	4	3,3	4	8,9
Cooperation with industry/other sector	n.s.	4	2,8	4	2,1	7	2,9	4	3,3	2	4,4
Supervision of bachelor/master thesis	n.s.	24	16,9	23	12,0	25	10,5	6	4,9	6	13,3
Administrative tasks	n.s.	25	17,6	19	9,9	17	7,1	6	4,9	6	13,3
Other tasks	n.s.	3	2,1	1	0,5	4	1,7	0	0,0	1	2,2

4.4 Working hours

Respondents were asked about how much time they spend on average a week on their work at the university. On average, this was 33h41. Not all of their time at the university is devoted to their own research. On average, PhD candidates averagely spend 29h18 working on their own research each week.

When it comes to time spent on their work at the university, the respondents without a contract spend significantly less time on their work than all the other groups (16h33).

¹⁴ Percentage of the entire population

When we look at the time spent at their own research, we see that assistants spend significantly less time on this than people with a personal mandate or respondents with project funding. This is not surprising, given the fact that assistants combine their research with teaching tasks. Respondents with no contract also spend significantly less time on their own research than people on a personal mandate or respondents with project funding.

Table 4.4.1 Time per week spent on research and work at the university by type of contract

	Time spent on average a week working at your own research		Time spent on average a week on your work at the university	
	Av.	St. Dev.	Av.	St. Dev.
Total	29:18	15:52	33:41	19:21
Research/teaching assistant	24:55	18:03	36:46	19:04
Personal mandate	33:25	11:46	38:16	15:18
Project funding	31:59	15:00	37:50	16:22
No contract, self-financed	21:30	14:59	16:33	19:12
Other	30:29	19:35	30:30	21:05
Don't know	32:33	16:47	31:41	24:22

Table 4.4.2 Significant differences between the categories ($p < 0,01$)

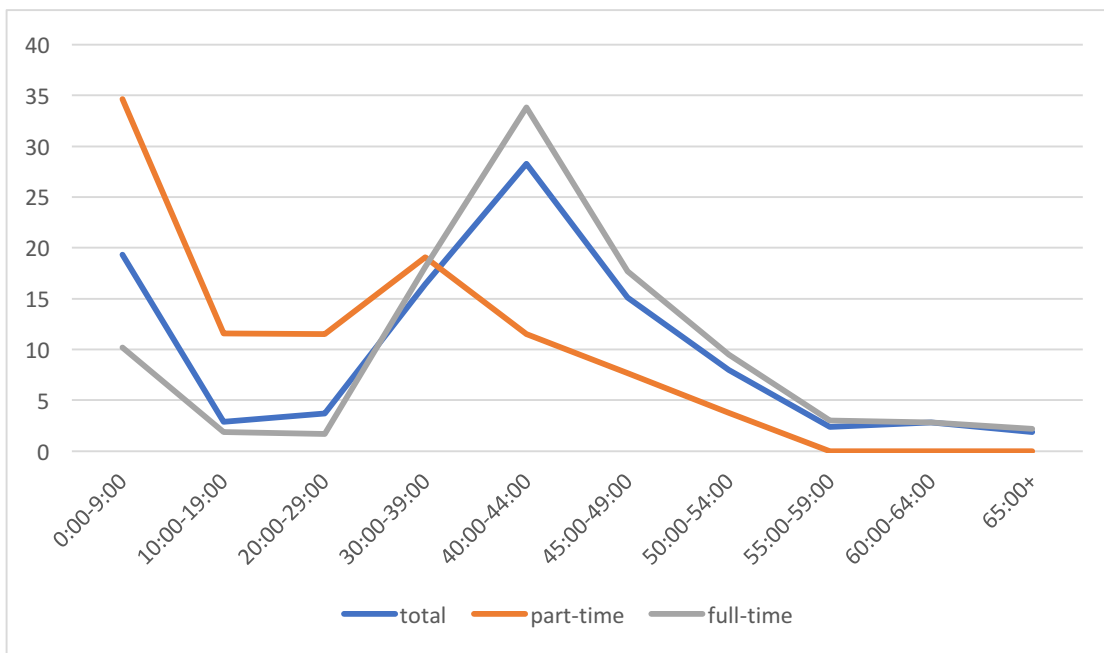
		Sig. ¹⁵
Time spent on average a week on your work at the university		
No contract, self-financed	Research/teaching assistant	**
	Personal mandate	**
	Project funding	**
	Other	**
	Don't know	**
Time spent on average a week working at your own research		
Research/teaching assistant	Personal mandate	**
	Project funding	**
No contract, self-financed	Personal mandate	**
	Project funding	**

¹⁵ Only significant differences are shown

In figure 4.4.1, the distribution of the duration of the working week is plotted and this for the total population as well as for those with a full-time and part-time contract. The majority of the part-time assigned PhD candidates works 30 hours a week or less at the university (65,4%). 33,7% of the full-time assigned PhD candidates work between 40 and 45 hours a week. 35,2% of the full-time PhD candidates work more than 45 hours a week. It is striking that 10% of the full-timers and 35% of the part-timers says to work only nine hours or less. However, these results run parallel with the findings of 2017.

When we look at the background of the respondents that work 30 hours or less, we see that the majority works fulltime (85,2%). More than half (51,3%) comes from the doctoral school of Human Sciences and the majority (52,2%) is female. 40,6%, the biggest portion, does not have a contract and finances themselves. 43,9% of them has an ‘other’ nationality that does not belong to the European Union. 40% is Belgian.

Figure 4.4.1 Time spent on average a week working for the university



As shown in figure 4.4.2, PhD candidates were asked about the timing of their work during the day and the week. We made the distinction between the three different PhD phases: the starting phase, the executing phase and the finalizing phase.

Working during regular office hours is the most common. More than 90% of all respondents say to ‘usually’ or ‘always’ work during this timeslot. Working during office hours is popular amongst all phases, but we can see that the respondents in the final phase work slightly less during working hours

than the other groups. The majority of the respondents does not work regularly on weekends, in the evening, at night, before 8 AM or at home.

When we look at the different phases, we see that the respondents in the finalizing phase work more often at night (after midnight) and during the weekend than the respondents in the two other phases. When we combine this with the finding that they also work less during regular office hours, we could say that PhD candidates in the finalizing phase have a more irregular schedule than the two other groups. However, for the other timeslots there is no significant different between the three phases.

47% of all respondents say to occasionally work at home. 34,6% usually or always works at home. More that 25% usually or always works during the weekends. There is no significant difference between the phases for this matter.

Figure 4.4.2 Working time habits by PhD phase

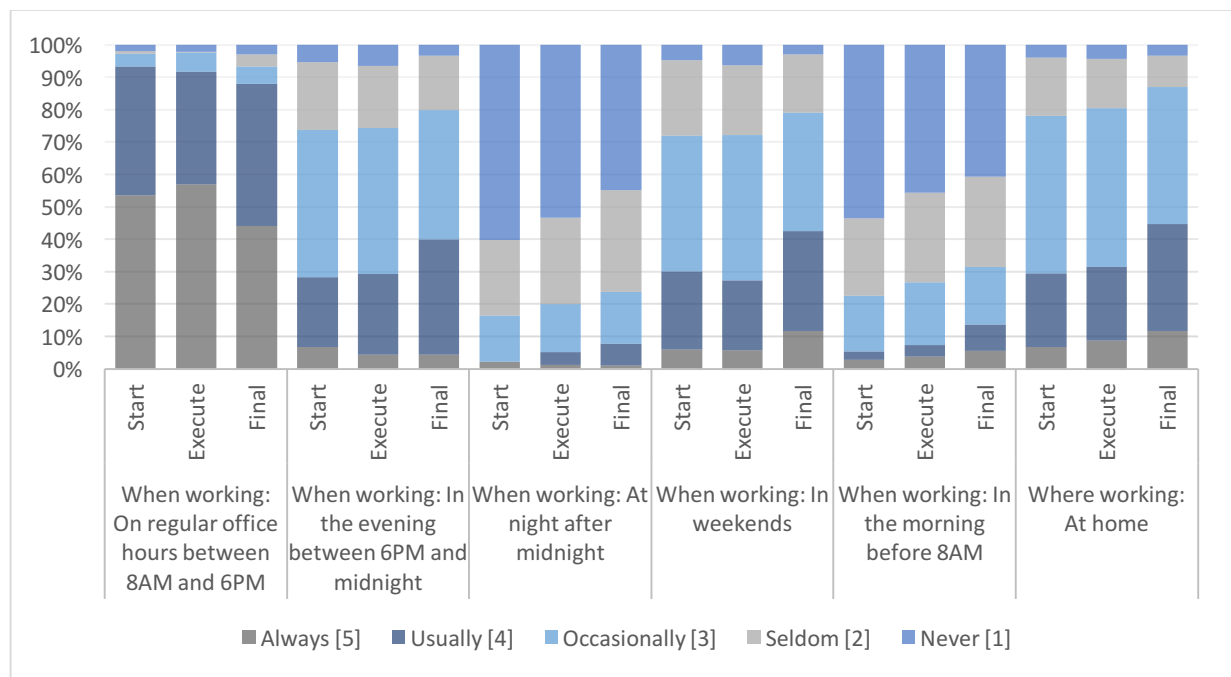


Table 4.4.3 Categories with significant differences between the phases

Category	Sig
On regular office hours between 8AM and 6PM	**
At night after midnight	*
In the weekends	*

Apart from looking at the objective working time habits, it is also interesting to take a look at how the PhD candidates perceive their working time. In the questionnaire, eight items were included that gauged at different aspects of feeling pressured by a lack of time. These eight items, as listed below, were transformed into the variable ‘time pressure’.

Table 4.4.4 Items of time pressure scale

	% of respondents that rather/totally agrees
There are not enough hours in a day for me	47,1
I never catch up with my work	30,3
I have no time to do the things I have to do	23,5
I have to do more than what I want to do	21,6
I never have time for myself	21,2
Too much is expected of me	20,5
I frequently have to cancel arrangements I have made	12,7
More is expected from me that I can handle	12,3

The different aspects of time pressure were computed in a scale with a score from 1 to 10. The average score is 4,1.

The female PhD candidates tend to feel more time pressure than their male colleagues, which is a tendency we can find throughout the whole Flemish population. The PhD candidates in the doctoral school of Natural Sciences & (bio-science) Engineering have a significantly lower sense of time pressure than the participants in the two other doctoral schools. The Belgian PhD candidates feel more time pressure than their colleagues with an ‘other’ nationality outside of the European Union. The respondents with project funding feel less time pressure than the candidates with an ‘other’ type of contract. The respondents without a contract and the respondents with an ‘other’ contract experience the same amount of time pressure. There seems to be no significant difference in time pressure between the respondents in different phases or with different research plans.

Table 4.4.5 Time pressure by gender, doctoral school, nationality and type of contract

	Sig.	Average sense of time pressure (on 10)
Total		4,1
Gender		
Male	**	3,9
Female	**	4,3

	Sig.	Average sense of time pressure (on 10)
DS		
DSh	*	4,3
NSE	*°	3,8
LSM	°	4,3
Interdisciplinary		3,3
Nationality		
Belgian	*	4,2
EU, non-Belgian		3,9
Other	*	3,8
Type of contract		
Research/teaching assistant		4,3
Personal mandate		4,1
Project funding	**	3,8
I don't have a contract, I'm self-financed	*	4,0
Other	**/*	4,0

**/*/° indicates significant difference between two different categories of one indicator

4.5 PhD progression and finalization

When we asked the participants how likely it was that they would successfully finish their PhD, the candidates gave an average score of 7,9 out of 10.

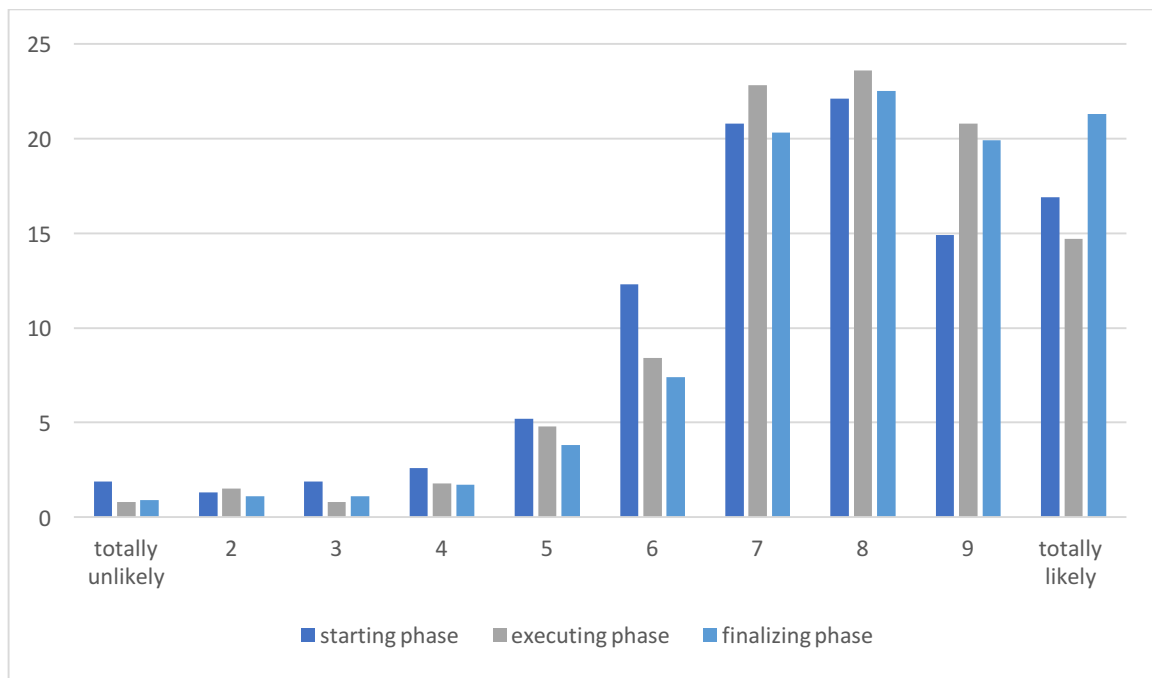
Table 4.5.1 shows us that there is a significant difference between the different phases when it comes to believing they will successfully complete their PhD. The further the candidates proceed in the process, the higher they reckon their chances to complete it successfully. Almost 80% of the respondents in the finalizing phase believes in a successful completion and gives a score of 8 or higher. This compared to 53,9% in the starting phase. Also in the starting phase, 7,8% thinks it is unlikely they will finish their PhD successfully. In the finalizing phase this is only 2,4%. The executing phase always lies somewhere in the middle

Table 4.5.1 Belief in successfully completing the PhD by phase

	Average score on believing to submit the PhD successfully (1-10)
Starting phase	7,5°
Executing phase	7,7*
Finalizing phase	8,6*°
Total	7,9

*/° indicates significant difference between two different categories of one indicator

Figure 4.5.1 Belief in successfully completing the PhD by phase



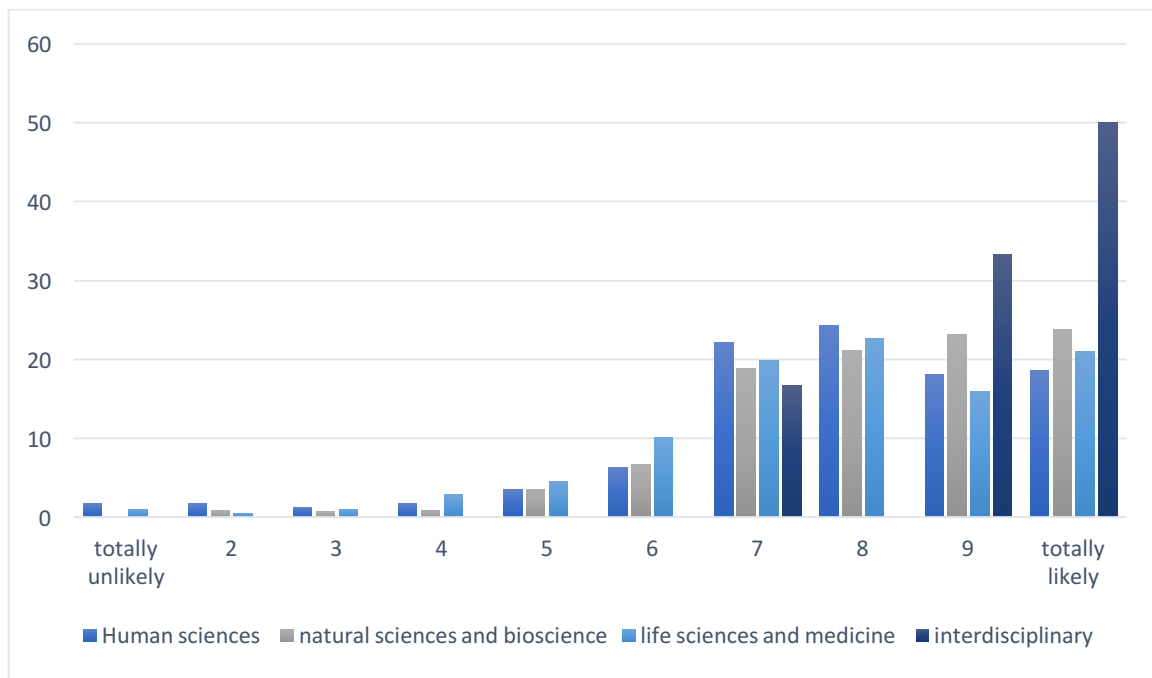
When we compare the candidates of the different schools in terms of believing in a successful completion, we can see a significant difference between the school of Human Sciences and the school of Natural Sciences & (bio-science) Engineering. The latter estimates their chance to complete successfully higher than the former.

Table 4.5.2 Belief in successfully completing the PhD by DS

	Average score on believing to submit the PhD successfully (1-10)
Human science	7,7*
Natural Sciences & (bio-science) Engineering	8,2*
Life Sciences and Medicine	7,8
Interdisciplinary	9,2

* indicates significant difference between two different categories of one indicator

Figure 4.5.2 Belief in successfully completing the PhD by DS



When we compare the belief respondents have in successfully completing the PhD between the different types of contract, we can conclude that the candidates without a contract have significantly more belief in successfully finishing the trajectory compared to the candidates with project funding and the research/teaching assistants. Also, Belgians have significantly less belief in completing the PhD successfully compared to respondents with another nationality.

Table 4.5.3 Belief in successfully completing the PhD by type of contract and nationality

		Average score on believing to submit the PhD successfully (1-10)
Type of contract		
	Research/teaching assistant	7,5**
	Personal mandate	7,9
	Project funding	7,9*
	I don't have a contract, I'm self-financed	8,5**/*
	Other	7,6
Nationality		
	Belgian	7,6*/°
	EU, non-Belgian	8,1°
	Other	8,4*

**/*/° indicates significant difference between two different categories of one indicator

4.6 Future plans

In this section, we asked the respondents about their plans for the future. The three main sectors where the participants would prefer to end up in, are the VUB or another Belgian university (52,2%), the private sector (50,9%) and a foreign university (45,4%). These answers correspond with the sectors the respondents expect to effectively end up in, albeit in a different order: 51,9% in the private industry, 38,9% at the VUB or another Belgian university and 35,7% at a foreign university.

When we look at gender differences, we see that men tend to prefer to end up at the VUB or another Belgian university or in the private sector more than women do. The female respondents on the other hand would prefer to work in the non-profit sector more than men. We see that these preferences are also reflected in the expectations. In addition to that, women expect to end up working at another higher education institution more than men do.

Table 4.6.1 Preference and expectancy of work field after finishing PhD by gender

	Sig.	Male		Female		Total	
		N	In %	N	In %	N	In %
Preference							
VUB or other Belgian university	*	205	56,5	190	48,2	395	52,2
Foreign university	n.s.	172	47,4	172	43,7	344	45,4
Other higher education institution ("Hogeschool")	n.s.	71	19,6	105	26,6	176	23,2
Private sector/industry	**	203	55,9	182	46,2	385	50,9
Government (Local, regional, national)	n.s.	112	30,9	141	35,8	253	33,4
Non-profit sector (health or social services)	**	84	23,1	134	34,0	218	28,8
Other	n.s.	53	14,6	43	10,9	96	12,7
Expected							
VUB or other Belgian university	n.s.	138	38,4	155	39,3	293	38,9
Foreign university	n.s.	134	37,3	135	34,3	269	35,7
Other higher education institution ("Hogeschool")	*	49	13,6	78	19,8	127	16,9
Private sector/industry	**	207	57,7	184	46,7	391	51,9
Government (Local, regional, national)	n.s.	102	28,4	103	16,1	205	27,2
Non-profit sector (health or social services)	**	65	18,1	118	29,9	183	24,3
Other	*	54	15,0	36	9,1	90	12,0

Table 4.6.2 shows us there are also significant differences between the doctoral schools when it comes to expectations about the future. Respondents with an interdisciplinary doctorate and PhD candidates from the doctoral school of Human Sciences have a higher preference to be working at the VUB or another Belgian university or for the government than the two other schools. The respondents from the doctoral school of Human Sciences are also more willing to work for another higher education institution compared to all the other groups. Respondents in the doctoral school of Natural Sciences & (bio-science) Engineering say to want to work in the private sector more than the other respondents. The non-profit sector is the most popular amongst the respondents of the school of Life Sciences & Medicine. These findings correspond with the sector the respondents expect to end up working in.

Table 4.6.2 Preference and expectancy of work field after finishing PhD by Doctoral school

	Sig	DSh		NSE		LSM		Interdisc.	
		N	In %	N	In %	N	In %	N	In %
Preferred									
VUB or other Belgian university	**	172	61,6	136	45,6	83	47,7	4	66,7
Foreign university	n.s.	138	49,5	139	46,6	65	37,4	2	33,3
Other higher education institution ("Hogeschool")	**	94	33,7	39	13,1	42	24,1	1	16,7
Private sector/industry	**	80	28,7	204	68,5	99	56,9	2	33,3
Government (Local, regional, national)	**	116	41,6	72	24,2	60	34,5	5	83,3
Non-profit sector (health or social services)	**	96	34,4	49	16,4	71	40,8	2	33,3
Other	n.s.	47	16,8	31	10,4	16	9,2	2	33,3
Expected									
VUB or other Belgian university	*	125	45,0	97	32,9	68	39,1	3	50
Foreign university	**	111	39,9	117	39,7	40	23	1	16,7
Other higher education institution ("Hogeschool")	**	74	26,6	28	9,5	24	13,8	1	16,7
Private sector/industry	*	85	30,6	208	70,5	96	55,2	2	33,3
Government (Local, regional, national)	**	103	37,1	58	19,7	42	24,1	2	33,3
Non-profit sector (health or social services)	**	82	29,5	37	12,5	62	35,6	2	33,3
Other	**	48	17,3	25	8,5	16	9,2	1	16,7

When we compare the different phases, as shown in table 4.6.3, there is only one significant difference and that is in the private sector. Respondents in the executing phase are more likely to be willing to work in the private sector. They also expect to end up working there more than their peers.

Table 4.6.3 Preference and expectancy of work field after finishing PhD by PhD phase

	Sig.	Starting phase		Executing phase		Finalizing phase	
		N	In %	N	In %	N	In %
Preferred							
VUB or other Belgian university	n.s.	85	55,6	208	53,6	99	46,9
Foreign university	n.s.	73	47,7	184	47,4	85	40,3
Other higher education institution (“Hogeschool”)	n.s.	34	22,2	93	24,0	48	22,7
Private sector/industry	**	66	43,1	226	58,2	90	42,7
Government (Local, regional, national)	n.s.	56	36,6	135	34,8	60	28,4
Non-profit sector (health or social services)	n.s.	42	27,5	118	30,4	56	26,5
Other	n.s.	20	13,1	52	13,4	22	10,4
Expected							
VUB or other Belgian university	n.s.	66	43,1	147	38,1	77	36,8
Foreign university	n.s.	62	40,5	134	34,7	71	34,0
Other higher education institution (“Hogeschool”)	n.s.	26	17,0	66	17,1	33	15,8
Private sector/industry	**	73	47,7	223	57,8	92	44,0
Government (Local, regional, national)	n.s.	48	31,4	103	26,7	51	24,4
Non-profit sector (health or social services)	n.s.	42	27,5	89	23,1	50	23,9
Other	n.s.	17	11,1	49	12,7	22	10,5

In table 4.6.4 we look at how the respondents perceive their PhD as an added value in the different sectors. Almost 70% thinks it will be an added value at another higher education institution. The respondents think their PhD would serve the least added value should they become self-employed (28,8%). Men think their PhD will function as an added value in the private sector and when becoming self-employed more than women do. This corresponds with the finding that men expect to end up in the private sector after obtaining their PhD, more than women do.

When comparing the doctoral schools, the majority of respondents that thinks their PhD will serve as an added value when working at another higher education institution comes from the school of Human Sciences. We can also conclude that the mainly the respondents from the school of Human Sciences think their PhD will be an added value when working in the government. When it comes to the private

sector, especially respondents from the school of Life sciences & Medicine and the school of Natural Sciences & (bio-science) Engineering think their PhD will be an added value. In the non-profit sector, students from the school of Life sciences & Medicine think their PhD will be an added value the most.

When we look at the different phases, we see that the respondents in the executing phase think their PhD will be an added value in the private sector, more so than the participants in the two other phases do. This runs parallel with the finding that these respondents also expect and are willing to end up working in this sector.

Table 4.6.4 PhD as added value in sector by gender, DS and PhD phase

	Other higher education institution		Private sector/indus.		Government		Non-profit sector		Self-employment	
	N	In %	N	In %	N	In %	N	In %	N	In %
Total	518	69,6	354	47,5	367	49,3	292	39,3	214	28,8
Gender	n.s.		**		n.s.		n.s.		**	
Male	259	73,2	195	54,8	171	47,9	141	39,7	116	32,7
Female	259	66,4	159	40,8	196	50,5	151	38,9	98	25,3
DS	**		**		*		**		n.s.	
DSh	213	78,0	75	27,7	149	55,0	109	40,2	78	28,8
NSE	190	64,6	185	62,1	122	41,4	86	29,3	96	32,7
LSM	114	66,3	92	58,8	91	52,6	93	53,8	38	22,2
Interdisciplinary	1	20,0	2	33,3	5	83,3	4	80,0	2	33,3
Phase	n.s.		**		n.s.		n.s.		n.s.	
Starting phase	105	71,4	61	41,2	80	53,7	58	38,7	39	26,4
Executing phase	261	68,0	206	53,5	183	47,8	148	38,7	118	30,8
Final phase	149	71,6	85	40,9	102	49,0	85	40,8	55	26,7

We asked the respondents about certain actions they would be willing to take in the near future. Overall, we see that the majority of the respondents is unlikely to pass by the VUB career centre for career advice (53,1%), follow a course on technology transfer (66,5%), follow a career coaching course (51,6%) or start their own company (72,8%).

When we compare the different doctoral schools, we see that the respondents in the school of Human Sciences (25,2%) and the school of Natural sciences & Bioscience (26,9%) are more likely to pass by the VUB Career Centre for career advice compared to the other school. The same counts for following

a course on technology transfer. The overall number of respondents who is planning to start their own company is fairly low.

Table 4.6.5 Plans for the near future

	DSH		NSE		LSM		Inter-disciplinary		Total		Sig.
	N	In %	N	In %	N	In %	N	In %	N	In %	
Pass by the VUB Career Centre for career advice											*
Unlikely	134	48,9	150	51,7	108	62,8	2	33,3	194	53,1	
Equally probable	71	25,9	62	21,4	31	18	3	50,0	167	22,5	
Likely	69	25,2	78	26,9	33	19,2	1	16,7	181	24,4	
Follow a course on technology transfer											**
Unlikely	186	68,6	168	58,1	132	77,2	4	66,7	490	66,5	
Equally probable	51	18,8	64	22,1	28	16,4	2	33,3	145	19,7	
Likely	34	12,5	57	19,7	11	6,4	0	0,0	102	13,8	
Follow a career coaching course											n.s.
Unlikely	130	47,4	162	55,7	87	50,9	4	66,7	383	51,6	
Equally probable	72	26,3	72	24,7	40	23,4	1	16,7	185	24,9	
Likely	72	26,3	57	19,6	44	25,7	1	16,7	174	23,5	
Start my own company											*
Unlikely	186	68,4	210	72,7	137	81,1	3	50,0	536	72,8	
Equally probable	55	20,2	41	14,2	19	11,2	2	33,3	117	15,9	
Likely	31	11,4	38	13,1	13	7,7	1	16,7	83	11,3	

5. SUPPORT

The support PhD candidates get is a very important part of the PhD process. In this part, we take a closer look into the guidance network, the support the candidates get from the university and the extent to which the students make use of the courses provided by the doctoral schools.

5.1 Guidance network

When asked how many supervisors they have, most of the respondents indicate they have more than one. At the school of Human Sciences, the majority of the respondents either has no more than two supervisors (89,8%). At the other two schools, the biggest portion has two supervisors.

Table 5.1.1 Number of supervisors by DS

	DSH		NSE		LSM		Interdisc.		Total ¹⁶	
	N	In %	N	In %	N	In %	N	In %	N	In %
One	128	45,1	109	36,3	54	30,9	1	16,7	292	38,2
Two	127	44,7	146	48,7	74	42,3	2	33,3	349	45,6
More than 2	29	10,2	45	15,0	47	26,9	3	50	124	16,2
									765	100

$\chi^2=31,3$; $df=6$; $p<0,05$

The respondents were asked to indicate how involved their supervisor(s) are in their PhD research. Overall, the PhD candidates think their supervisor(s) are involved. 42% says their supervisor is rather involved, 37,2% says their supervisor is totally involved. 11,7% thinks their supervisor is rather not or totally not involved in their PhD research. There seems to be no significant difference between the doctoral schools.

Table 5.1.2 Involvement of the supervisor(s) in the PhD research

	N	In %
Not at all	24	3,1
Rather not	66	8,6
Undecided	70	9,1
Rather yes	323	42
Totally	286	37,2
	769	100

¹⁶ 4 respondents did not answer the question

To gain insight in the satisfaction with the supervisor, the respondents were asked to answer ten questions about this matter and an additional question about how satisfied they are with their supervisor in general. The average score for this general question is 7,6/10.

These eleven items were transformed into two new variables using Principal Component Analysis (see appendix table a.16). One variable tells us more about the satisfaction about the **support** the respondents get from their supervisor. This variable consists of the first eight items as listed below, plus the question about the general satisfaction with the supervisor. The second variable says something about the satisfaction with the **freedom** they get from their supervisor and consists of the last three items. In the table below, we see the percentage of PhD candidates that are (rather) satisfied with the different aspects of their supervisor.

Table 5.1.3 Items about satisfaction with supervisor

	% of respondents that answered (rather) yes
The quality of the meetings	71,5
Stimulation/inspiration to solve research problems/issues	67,9
The frequency of the meetings	65,0
The support you receive writing articles	62,9
The expertise she/he has on the research subject	76,6
Is your supervisor involved in your research?	79,2
The introduction to other prominent researchers in your field of interest by your supervisor(s)	51,5
The possibility to attend conferences/specialist training courses	75,1
The possibility to attend transferable skills training courses	65,2
The freedom you get to develop your own research ideas	82,4

Overall, the respondents are rather satisfied with the support and freedom they get from their supervisor(s). The support of the supervisor gets an average score of 6,9/10. The freedom they get scores a little higher, 7,5/10 on average. When it comes to the freedom, there seems to be no difference in satisfaction between different background variables. However, for the support, we see that men (7,1/10) are slightly more satisfied than women (6,8/10). Also, the respondents in the starting phase are more satisfied with the support they get from the supervisor (7,2/10) than the candidates in the finalizing phase (6,6/10). Between the different doctoral schools, there is no significant difference when it comes to satisfaction with the supervisor.

Table 5.1.4 Satisfaction with supervisor by gender, doctoral school and phase

	Support of the supervisor	Freedom of the supervisor
Total	6,9	7,5
Gender		
Male	7,1*	7,7
Female	6,8*	7,4
DS		
Human science	7,0	7,6
Natural Sciences & (bio-science)	7,0	7,6
Engineering		
Life Sciences and Medicine	6,8	7,2
Interdisciplinary	7,8	8,5
PhD phase		
Starting phase	7,2*	7,6
Executing phase	7,0	7,6
Finalizing phase	6,6*	7,4

* indicates significant difference between two different categories of one indicator

Table 5.1.5 shows us that, amongst the PhD candidates that have an advisory commission, the majority is satisfied with it (62,6%). One in four respondents (25,1%) is undecided about the matter. There is no significant difference in satisfaction among the different doctoral schools.

Table 5.1.5 Satisfaction with advisory commission

	N	In %
Not satisfied	55	12,3
Undecided	112	25,1
Satisfied	279	62,6
Total	446 ¹⁷	100

¹⁷ Only 451 respondents (58,6%) have an advisory commission, 5 respondents did not answer the question

5.2 Support of the university

In this section, we asked the respondents how satisfied they are with the conditions they have to work in. In total, ten questions were asked concerning different aspects of the working environment. Through Principal Component Analysis, we reduced these nine items to three new variables: ‘**warmth of the working environment**’, ‘**labour conditions**’ and ‘**structural issues with the working space**’ (see appendix table a.19).

Table 5.2.1 Items of scale on working conditions

	% of respondents that are rather/very satisfied/sufficient
Income	79,2
The available space in the office	78,1
The possibility to go on vacation/take some time off	77,5
Introduction to the research group/department	72,3
The available expertise in the department	69,7
The training opportunities offered within the university	66,9
Opportunities to present results to the department	65,8
The available funding to go to conferences/summer schools	63,1
The infrastructure (lab, materials, programs) to perform your research in a suitable manner	62,0
Is the overall support you receive within the university sufficient to develop your research?	57,8

When we look at the satisfaction about the different aspects of working environment, we see that people are overall satisfied. They are the least satisfied with the warmth of the working environment (eg. support, training opportunities etc.) and the most about the labour conditions (eg. income, vacation days etc.). We see that women are significantly less satisfied with the warmth of the working environment and the structural aspects of the workspace. Respondents in the school of Natural Sciences & (bio-science) Engineering are significantly more satisfied about the warmth of the working environment than all the other schools. They are also more satisfied about the labour conditions. Between the different phases, there is no significant difference.

Table 5.2.2 Satisfaction of working conditions by doctoral school and gender

	Warmth working environment (on 10)	Labour conditions (on 10)	Structural issues workspace (on 10)
Total	6,4	7,3	7,0
Gender			
Male	6,6*	7,5	7,2*
Female	6,3*	7,2	6,7*
DS			
DSh	6,0*	7,0*	6,8
NSE	6,8*°	7,8*°	7,2
LSM	6,3°	6,9°	6,9
Interdisciplinary	5,6	8,3	4,4

*/°/+• indicates significant effect between two different categories of one indicator

5.3 Doctoral school

Respondents were asked whether or not they would be interested in following one of the listed courses at one of the doctoral schools of the VUB. There seems to be great interest in following the courses: over half of the respondents indicates being interested in following one of them. The most popular class is a course on academic writing/grant writing. 72,9% would be interested in following this. Following are the course on science communication (65,7%) and the course on giving presentations (61,5%). Of all courses already being followed, giving presentations was the most popular one (11,2% of the PhD candidates already followed it). These three courses were also in last year's survey the most popular ones in terms of interest or already been followed. The management course seems to be the least popular: almost one in three (32,8%) says not be interested in this course.

Table 5.3.1 Interest in doctoral school courses

	Not interested	Undecided	Interested	Followed it already
	In %	In %	In %	In %
Course on academic writing/grant writing	10,9	7,7	72,9	8,5
Course on science communication	15,2	13,8	65,7	5,3
Course on giving presentations	18,7	8,6	61,5	11,2
Teaching course	19,3	19,4	57,9	3,4
Course on writing of non-specialist audience or press release	22,1	16,8	57,8	3,3
Management course	32,8	14,4	49,6	3,2

When comparing the different phases in terms of being interested in the Doctoral School courses, we see there's only a difference of interest in the course on academic writing or grant writing. The respondents in the starting phase are significantly more interested in taking this course than the other two groups (88,2%).

Table 5.3.2 Interest in doctoral school courses by phase

	Sig.	Starting phase		Executing phase		Final phase	
		Fol- lowed	Inter- ested	Fol- lowed	Inter- ested	Fol- lowed	Inter- ested
Management course	n.s.	2,7	43,5	3,7	49,6	2,9	54,3
Course on giving presentations	n.s.	6	67,5	11,9	62	13,9	56,7
Course on academic writing/grant writing	**	4,6	88,2	6,7	73,1	14,3	62,9
Course on writing of non-specialist audience or press release	n.s.	1,3	65,8	3,7	57,7	3,8	53,6
Course on science communication	n.s.	1,3	66,4	5,9	66,8	7,2	63,6
Teaching course	n.s.	2,6	62,7	2,8	58,1	4,8	54,3

6. INTEGRATED APPROACH: LATENT CLASS ANALYSIS

This section will bring together various parts that were discussed earlier in this report. The initial idea is to find groups of PhD candidates that differ in their job satisfaction. Based on a Latent Class Analysis (LCA), we single out groups within the population of respondents with regard to their supervision, PhD progression and their experienced troubles in finishing in time. We distinguished four clusters which will be discussed one by one. It is important to keep in mind that not all respondents are included in this latent class analysis. Since labour conditions and working space were used as variables that determine to which cluster a respondent belongs, the respondents without a physical workplace at the university were excluded. In total, these are 148 respondents. Another 7 respondents are not divided in any cluster, because they didn't answer one (or more) of the questions that determines in which cluster they would be divided.

The classification of respondents based on their job satisfaction is based on 11 constructs (see figure 6.1).

Figure 6.1: Graphic representation of concepts underlying the job satisfaction of PhD students



Submitting a PhD successfully was already discussed in section 4.5. It is based on a question in which respondents were asked to score the likelihood of finishing their PhD successfully on a scale from 1 to 10. This 10-point scale was reduced to a 3-point scale where values 1 to 4 were combined in one category called "unlikely", 5 to 7 combined under the label "undecided" and 8 to 10 were renamed as "likely".

The construct 'PhD right on track' was discussed in section 4.2. In the LCA presented below, the scale is reduced to a 3-point scale, in which the values "not on track" and "rather not on track" were combined into "(rather) not on track", undecided remains unchanged and "rather on track" and "on track" becomes "(rather) on track. These broader categories consist more respondents and are therefore more practical to use in a LCA without altering the meaning of the original answers too much.

Self-efficacy is discussed in detail in section 2.3. For the LCA, all items concerning Self-efficacy were used to form a Principal Component Analysis. These items form one component measuring the self-efficacy of PhD students rather well. See appendix a.2 for the full details about the scale construction.

In section 4.2 doubts related to the PhD were examined. It became clear that there are two different latent constructs related to doubts. On the one hand form doubts related to the research one construct, on the other do personal doubts form a construct. Appendix a.8 shows the factor loadings, lambda's and Cronbach's α for both constructs.

Satisfaction with one's supervisor (debated in section 5.1) also showed two different constructs. Students seem to make a distinction in their satisfaction between the support a supervisor offers and the freedom they receive from their supervisor. Both constructs are used in order to identify the different clusters. More information about the used scales can be found in appendix a.16.

The last constructs that will be used for the LCA stem from the same questions. These questions try to identify the satisfaction with the working environment. The working environment was discussed in section 5.2. The analysis showed that students do not perceive their working environment unidimensional. In total, there were three different latent constructs identified. The "warmth" or the subjective evaluation of the atmosphere is one of them. The working environment, however, is also evaluated in terms of more tangible conditions, such as the available infrastructure and space in the office. Also related, for PhD candidates, are the working conditions, such as income and available funding to go to conferences. These items form three different scales all related to the working environment. More information can be found in appendix a.19.

6.1 Cluster determination

The LCA shows support for a four-cluster solution (see table 6.1.1)

Table 6.1.1 Fit statistics per model

3-cluster solution	13373,54
4-cluster solution	13325,63
5-cluster solution	13327,45

The 4-cluster solution will therefore further be discussed below.

Table 6.1.2 Latent Class Analysis

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	R²
Cluster size	0,2914	0,2823	0,226	0,2003	
Indicators					
Doubts concerning the research itself					0,41
Low	0,2503	0,2866	0,0117	0,8125	
Medium	0,4468	0,4477	0,1595	0,1735	
High	0,3029	0,2657	0,8289	0,0141	
Mean	2,0526	1,9791	2,8172	1,2016	
Personal doubts					0,33
Low	0,0741	0,4772	0,1476	0,6711	
Medium	0,3015	0,3738	0,3729	0,2725	
High	0,6244	0,149	0,4794	0,0563	
Mean	2,5503	1,6718	2,3318	1,3852	
Level of self-efficacy					0,30
Low	0,6023	0,1532	0,5375	0,0821	
Medium	0,294	0,3307	0,3225	0,271	
High	0,1037	0,5161	0,1399	0,647	
Mean	1,5015	2,3619	1,6024	2,5649	
Time pressure					0,14
Low	0,1882	0,4091	0,2055	0,6008	
Medium	0,3513	0,3638	0,3576	0,2965	
High	0,4604	0,2271	0,4369	0,1027	
Mean	2,2722	1,8179	2,2314	1,502	
Satisfaction with support supervisor					0,54
Low	0,1594	0,3500	0,8903	0,0022	

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	R²
Medium	0,4904	0,4905	0,1068	0,0929	
High	0,3502	0,1595	0,003	0,9049	
Mean	2,1907	1,8095	1,1127	2,9027	
Satisfaction with freedom received from supervisor					0,29
Low	0,2384	0,4118	0,5932	0,0216	
Medium	0,3956	0,3862	0,3141	0,1764	
High	0,3661	0,2020	0,0927	0,8019	
Mean	2,1277	1,7902	1,4995	2,7803	
Satisfaction warmth working environment					0,30
Low	0,3018	0,3837	0,6035	0,0143	
Medium	0,4083	0,3988	0,3119	0,1507	
High	0,2899	0,2175	0,0846	0,835	
Mean	1,9881	1,8338	1,4811	2,8207	
Structural issues working space					0,12
Low	0,3662	0,3675	0,4733	0,0903	
Medium	0,351	0,3508	0,3315	0,2635	
High	0,2829	0,2817	0,1952	0,6462	
Mean	1,9167	1,9142	1,7219	2,5559	
Labour conditions					0,09
Low	0,2937	0,4335	0,4389	0,1334	
Medium	0,3481	0,3379	0,3368	0,2961	
High	0,3581	0,2286	0,2243	0,5706	
Mean	2,0644	1,7951	1,7855	2,4372	
PhD right on track					0,35
(rather) not on track	0,1342	0,0066	0,4015	0,0011	
Undecided	0,2719	0,0747	0,3213	0,031	
(rather) on track	0,5939	0,9187	0,2773	0,9679	
Mean	2,4596	2,9121	1,8758	2,9668	
Successfully submitting PhD					0,38
Unlikely	0,0519	0,0006	0,1626	0,0005	
Undecided	0,52	0,0806	0,6343	0,073	
Likely	0,4281	0,9189	0,2032	0,9265	
Mean	2,3762	2,9183	2,0406	2,9261	

Cluster 1: the doubtful cluster

A significant portion of the respondents can be found in the doubtful cluster (29,1%). The PhD candidates in this cluster have a lot of doubts about their personal motivation and capabilities. They have a low level of self-efficacy and experience a rather high amount of time pressure. They take in a fairly positive position when it comes to satisfaction about their supervisor and their working conditions. The candidates in this cluster have the feeling they are on the right track with their PhD and estimate the chances to complete the process successfully as average. Overall, these are people with healthy doubts about their own capabilities who think their supervisor and working conditions are fine, without being lyrical about it.

Cluster 2: the moderate cluster

28,2% of all respondents are situated in cluster 2, the moderate cluster. They have a high level of self-efficacy and less doubts than average. They don't experience a lot of time pressure and think fairly neutral about their supervisor. The working conditions are perceived as alright, although the salary, vacation days and amount of conferences they attend could be better. All in all, they think they're on the right track with their PhD and assume they will be able to submit it successfully. In this cluster, the participants have less doubts about their own capabilities. The supervisor and working conditions are fine, without a very high satisfaction.

Cluster 3: the unsupported and uncertain cluster

22,6% of the respondents are situated in the unsupported and uncertain cluster. They have a fairly high level of personal doubts and an even higher level of research-related doubts. Their self-efficacy is low, yet it's higher than the respondents in the doubtful cluster. They experience a lot of time-pressure and aren't satisfied at all with the support of their supervisor. On top of this, they are negative about the working conditions, the salary and the vacation days they get. Because of all this, they don't think they're on the right track with their PhD and estimate their chances to complete their PhD successfully as rather average.

Cluster 4: the lyrical cluster

20% of the respondents can be found in the most positive cluster, cluster 4. They don't have any doubts, have a high level of self-efficacy and hardly feel any time pressure. They are satisfied with their supervisor and their working conditions. Respondents in this cluster are convinced that they're right on track with their PhD and think they have a big chance of completing the process successfully. This is the lyrical cluster.

The clusters in this report differ from the clusters used in the study of 2017, where only three clusters were used. The doubtful and the moderate cluster correspond with previous cluster 1. The unsupported and uncertain cluster is what used to be cluster 3, and previous cluster 2 is now the lyrical cluster.

6.2 Cluster identification

Table 6.2.1 shows us background variables that indicate cluster membership. Many variables were tested, but only the relevant ones are included in the table. The following variables were tested, but showed *no* significant effect:

- who wrote the research proposal
- the phase of the PhD
- the type of contract
- the financing body
- having a second job
- having previous work experience
- doing a joint PhD
- the number of supervisors

Gender:

When it comes to gender, we see that in the doubtful cluster and the unsupported and uncertain cluster the majority of the candidates is female, whereas in the moderate and the lyrical cluster the majority is male. Of all the respondents, the highest number of male candidates is situated in the moderate cluster (32,2%), the least in the unsupported and uncertain cluster (18,7%). The biggest group of female respondents can be found in the doubtful cluster (30,5%). The unsupported and uncertain cluster takes second place (27,7%).

Nationality:

When we look at nationality, we see that in de doubtful cluster (65,9%), the moderate cluster (51,1%) and the unsupported and uncertain cluster (62,5%), the majority of the candidates are Belgian. In the doubtful cluster (20,0%) and the moderate cluster (28,9%), the second biggest group are the candidates with an ‘other’ nationality, whereas in the unsupported and uncertain cluster the second biggest group is part of the European Union (21,5%). It is striking that in the lyrical cluster, the biggest group of the candidates has an ‘other’ nationality (43,3%) percent. The second biggest group in this cluster are the Belgians (40,8%).

Most of the Belgian candidates are situated in the doubtful cluster (32,7%). Of the respondents that are not Belgian but are part of the European Union, most are situated in the moderate cluster (32,7%). The

candidates with an 'other' nationality are most represented in the two most positive clusters: 32,3% in the moderate cluster and 32,3% in the lyrical cluster.

Doctoral School:

In terms of doctoral school, the majority of respondents in the doubtful cluster is from the doctoral school of Human Sciences (45,3%). In the moderate cluster and the lyrical cluster, the majority is from the school of Natural Sciences & (bio-science) Engineering (47,2% and 53,3%). When it comes to the unsupported and uncertain cluster the respondents are more equally divided over all three Doctoral Schools, but the majority is from the school of Natural Sciences & (bio-science) Engineering (38,4%). In the school of Human Science, the majority of the candidates are situated in the doubtful cluster (35%). Most of the candidates from the school of Natural Sciences & (bio-science) Engineering can be found in the moderate cluster (32,7%). The majority of the candidates from the school of Life Sciences and Medicine is located in the unsupported and uncertain cluster (31%).

Original research proposal:

The original research proposal is in line with the current research proposal for the majority of all candidates in all clusters. However, we see that in the unsupported and uncertain cluster, for one in five students (20,3%) the current proposal and the original proposal are not in line with each other. This is a higher percentage than in all the other clusters and might be an indicator as for why the people in this cluster have a lot of doubt about their research and are rather negative about their PhD progress.

Research plan development:

When we look at the research plan development, we can tell that more than 30% of the candidates in the unsupported and uncertain cluster developed their research plan only recently (31,5%). This number is fairly high compared to the other clusters. In cluster 4, the most positive cluster, 90% developed their research plan within the first year.

Employment:

The majority of the PhD candidates in all clusters is full-time employed. We see that part-time employees are more likely to be situated in the doubtful cluster (38,9%) or the lyrical cluster (38,9%) compared to the other two clusters.

Research plan:

In all the clusters except for the unsupported and uncertain cluster, the majority of the respondents has a research plan with long term and short term milestones. In the unsupported and uncertain cluster, more than one in three (38,2%) says to not have a research plan. Again, the lack of a research plan can add to

the negative view on the PhD progress, which is dominant in this cluster. In the lyrical cluster, only 8,3% does not have a research plan.

Working hours:

When we look at the timeslots the respondents work in, we see a significant difference between the clusters when it comes to working in the evening (between 6PM and midnight) and working after midnight. We see that 37,2% of the people in the lyrical cluster say to 'usually' or 'always' work in the evening. This is more than the other clusters. The respondents in the moderate cluster work the least in the evening. Also after midnight, the lyrical cluster is the most active. 8,1% says to 'usually' or 'always' work at this time. The fact that the lyrical cluster significantly works later often during these unusual timeslots could be explained by the fact that they are motivated and positive about their research. There is no significant difference between the clusters when it comes to other timeslots. It is striking that of all the people who say to never work at night (between 6PM and midnight), the majority is situated in the unsupported and uncertain cluster (37,9%).

We find the same tendency when we look at the amount of time respondents spend at their own research. We can tell that the doubtful cluster spends significantly less time on their research than the moderate and the lyrical clusters. The lyrical cluster also spends significantly more time on their research than the unsupported and uncertain cluster. Overall, we could say that the clusters who are the most confident about themselves and their research spend the most time on it. Although, we could of course also put it the other way around and say that they are more self-confident because they spend more time on their research.

Future plans:

There seems to be some significant difference between the clusters when it comes to the future plans, more specifically when it comes to the expectation of working at the VUB, another Belgian or a foreign university. The majority of the lyrical cluster (57,6%) expects to find work at the VUB or another Belgian university. 40,8% of the moderate cluster thinks they will. The doubtful cluster (37,3%) and the unsupported and uncertain cluster (31,7%) are less expecting to work at the VUB or another Belgian university. We can find the same tendency when it comes to the expectation of working at a foreign university. Especially the moderate (47,5%) and the lyrical cluster (42,4%) think they will end up working there. Only 29,5% of the doubtful cluster expects this. In the unsupported and uncertain cluster, only 28,9% thinks they will end up working at a foreign university.

Passion for research:

When it comes to the level of passion about the research, we also can see that the different clusters differ significantly on this aspect. The lyrical cluster is the most passionate (9,0/10). After this comes the

moderate cluster with an average of 8,3/10 and the doubtful cluster with a score of 7,5/10. The unsupported and uncertain cluster is the least passionate about their research (6,7/10). These findings are not surprising since they correspond with the characteristics of each cluster.

Advisory board:

The doubtful cluster has the highest percentage of respondents with an advisory board (68,5%). Also in the moderate cluster (55,9%) and the lyrical cluster (61,3%), the majority of the respondents has an advisory board. In the unsupported and uncertain cluster half of the respondents does have an advisory board, half of the respondents do not.

Table 6.2.1 Determining clusters by background variables (column percentage)

	Total		Sig	Cluster 1		Cluster 2		Cluster 3		Cluster 4	
	N	%		N	In %	N	In %	N	In %	N	In %
Gender			**								
Male	289	47,1		71	41,8	93	51,7	54	37,5	71	59,2
Female	325	52,9		99	58,2	87	48,3	90	62,5	49	40,8
Total	614	100		170	100	180	100	144	100	120	100
Nationality			**								
Belgian	343	55,9		112	65,9	92	51,1	90	62,5	49	40,8
EU, non-Belgian	110	17,9		24	14,1	36	20,0	31	21,5	19	15,8
Other	161	26,2		34	20,0	52	28,9	23	16,0	52	43,3
Total	614	100		170	100	180	100	144	100	120	100
DS			*								
Human Sciences	220	35,8		77	45,3	58	32,2	49	34,0	36	30,0
Natural Sciences & (bio-science) Engineering	266	43,3		62	36,5	85	47,2	55	38,2	64	53,3
Life Sciences and Medicine	126	20,5		31	18,2	37	20,6	39	27,1	19	15,8
Interdisciplinary	2	0,3		0	0,0	0	0,0	1	0,70	1	0,80
Total	614	100		170	100	180	100	144	100	120	100
Original proposal			**								
I don't have a proposal	75	12,3		22	12,9	14	7,8	25	17,5	14	11,8
Not in line	60	9,8		16	9,4	15	8,4	24	16,8	5	4,2
Undecided	37	6,1		14	8,2	5	2,8	15	10,5	3	2,5
In line	439	71,8		118	69,4	145	81,0	79	55,2	97	81,5
Total	611	100		170	100	179	100	143	100	119	100

	Total		Sig	Cluster 1		Cluster 2		Cluster 3		Cluster 4	
Research plan development			**								
I don't have a research plan	122	19,9		29	17,1	28	15,6	55	38,2	10	8,3
From the start	205	41,7		65	38,2	66	36,7	30	20,8	44	36,7
In the first year	199	40,4		52	30,6	61	33,9	31	21,5	55	45,8
Only recently	88	17,9		24	14,1	25	13,9	28	19,4	11	9,2
Total	614	100		170	100	180	100	144	100	120	100
Are you employed			*								
Part-time	18	3,4		7	4,7	2	1,3	2	1,6	7	7,1
Full time	505	96,6		143	95,3	149	98,7	121	98,4	92	92,9
Total	523	100		150	100	151	100	123	100	99	100
Having a research plan			**								
Yes with short and long term milestones	245	39,9		71	41,8	70	38,9	36	25	68	56,7
Yes with short term milestones	107	17,4		35	20,6	34	18,9	21	14,6	17	14,2
Yes with long term milestones	140	22,8		35	20,6	48	26,7	32	22,2	25	20,8
No	122	19,9		29	17,1	28	15,6	55	38,2	10	8,3
Total	614	100		170	100	180	100	144	100	120	100
Working in the evening (between 6PM and midnight)			*								
Never	29	4,9		7	4,2	5	2,8	11	7,9	6	5,3
Seldom	123	20,6		22	13,3	42	23,7	32	22,9	27	23,9
Occasionally	268	45,0		88	53,0	85	48,0	57	40,7	38	33,6
Usually/Always	176	29,5		49	29,5	45	25,4	40	28,6	42	37,2
Working at night (after midnight)			**								
Never	314	54,3		79	49,1	92	53,8	82	61,2	61	54,5
Seldom	152	26,3		47	29,2	48	28,1	38	28,4	19	17,0
Occasionally	91	15,7		33	20,5	23	13,5	12	9,0	23	20,5
Usually/Always	21	3,6		2	1,2	8	4,7	2	1,5	9	8,0

	Total		Sig	Cluster 1		Cluster 2		Cluster 3		Cluster 4	
After finishing my PhD I expect to work at the VUB/other Belgian university: yes	248	41,0	**	62	37,3	73	40,8	45	31,7	68	57,6
After finishing my PhD I expect to work at a foreign university: yes	225	37,2	**	49	29,5	85	47,5	41	28,9	50	42,4
Advisory commission			**								
No	250	41,0		53	31,5	79	44,1	72	50,0	46	38,7
Yes	360	59,0		115	68,5	100	55,9	72	50,0	73	61,3
				Average		Average		Average		Average	
Level of passion	614	100	**	7,5		8,3		6,7		9,0	
Av. time spent on own research	614	100		28:20*°		32:06*		28:43•		32:38°•	

* indicates significant difference between two different categories of one indicator

Table 6.2.2 Determining clusters by background variables (row percentage)

	Total		Sig	Cluster 1		Cluster 2		Cluster 3		Cluster 4	
	N	%		N	In %	N	In %	N	In %	N	In %
Gender			**								
Male	289	100		71	24,6	93	32,2	54	18,7	71	24,6
Female	325	100		99	30,5	87	26,8	90	27,7	49	15,1
Nationality			**								
Belgian	343	100		112	32,7	92	26,8	90	26,2	49	14,3
EU, non-Belgian	110	100		24	21,8	36	32,7	31	28,2	19	17,3
Other	161	100		34	21,1	52	32,3	23	14,3	52	32,3
DS			*								
Human Sciences	220	100		77	35,0	58	26,4	49	22,3	36	16,4
Natural Sciences & (bio-science) Engineering	266	100		62	23,3	85	32,0	55	20,7	64	24,1
Life Sciences and Medicine	126	100		31	24,6	37	29,4	39	31,0	19	15,1
Interdisciplinary	2	100		0	0,0	0	0,0	1	50,0	1	50,0
Original proposal			**								
I don't have a research proposal	75	100		22	29,3	14	18,7	25	33,3	14	18,7
Not in line	60	100		16	26,7	15	25,0	24	40,0	5	8,3
Undecided	37	100		14	37,8	5	13,5	15	40,5	3	8,1
In line	439	100		118	26,9	145	33,0	79	18,0	97	22,1
Research plan development			**								
I don't have a research plan	122	100		29	23,8	28	23,0	55	45,1	10	8,2
From the start	205	100		65	31,7	66	32,2	30	14,6	44	21,5
In the first year	199	100		52	26,1	61	30,7	31	15,6	55	27,6
Only recently	88	100		24	27,3	25	28,4	28	31,8	11	12,5
Are you employed			*								
Part-time	18	100		7	38,9	2	11,1	2	11,1	7	38,9
Full time	505	100		143	28,3	149	29,5	121	24,0	92	18,2
Having a research plan			**								
Yes with short and long term milestones	245	100		71	29,0	70	28,6	36	14,7	68	27,8

	Total		Sig	Cluster 1		Cluster 2		Cluster 3		Cluster 4	
Yes with short term milestones	107	100		35	32,7	34	31,8	21	19,6	17	15,9
Yes with long term milestones	140	100		35	25,0	48	34,3	32	22,9	25	17,9
No	122	100		29	23,8	28	23,0	55	45,1	10	8,2
Working in the evening (between 6PM and midnight)			*								
Never	29	100		7	24,1	5	17,2	11	37,9	6	20,7
Seldom	123	100		22	17,9	42	34,1	32	26,0	27	22,0
Occasionally	268	100		88	32,8	85	31,7	57	21,3	38	14,2
Usually/Always	176	100		46	27,8	40	25,6	35	22,7	34	23,9
Working at night (after midnight)			**								
Never	314	100		79	25,2	92	29,3	82	26,1	61	19,4
Seldom	152	100		47	30,9	48	31,6	38	25,0	19	12,5
Occasionally	91	100		33	36,3	23	25,3	12	13,2	23	25,3
Usually/Always	21	100		2	9,5	8	38,1	2	9,5	9	42,9
After finishing my PhD I expect to work at the VUB/other Belgian university: yes	248	100	**	62	25,0	73	29,4	45	18,1	68	27,4
After finishing my PhD I expect to work at a foreign university: yes	225	100	**	49	21,8	85	37,8	41	18,2	50	22,2
Advisory commission			**								
No	250	100		53	21,2	79	31,6	72	28,8	46	18,4
Yes	360	100		115	31,9	100	27,8	72	20,0	73	20,3

* indicates significant difference between two different categories of one indicators

7. CONCLUSION AND RECOMMENDATIONS

In conclusion, we could say that the majority of the PhD candidates perceives their PhD trajectory as a positive experience. The biggest group of PhD candidates is confident that they will finish the process successfully. Some of them do have some remarks on the labour conditions, others experience time pressure and have doubts about their own capacities and their research, but overall, the biggest portion of PhD candidates does not have any major problems with the way the PhD trajectory is organized.

22,6% of the PhD candidates, however, does experience problems with their PhD trajectory. These candidates are not satisfied with the support they get from their supervisor nor with the conditions they have to work in. They are not satisfied with their salary and the vacation days they get. They experience a lot of time pressure and have a lot of doubts about themselves and their research. Because of all this, they do not feel like they are on the right track with their PhD and as a result don't have a lot of confidence in finishing the trajectory successfully.

To enhance the situation of these PhD candidates, more support and freedom from the supervisor could be provided. More specifically, these candidates would benefit from more frequent and more qualitative meetings with their supervisor. They also indicated that they would like to work in a more stimulating environment where the supervisor inspires them to find solutions for problems they have with their research. In addition, they also expect from their supervisor that they bring them in contact with other relevant researchers in their field of interest. More stimulation to write a research proposal, preferably as early as possible in the trajectory, could help these PhD candidates to become more self-confident.

When it comes to the working conditions, these PhD candidates indicate to want more opportunities to present their results to the faculty. They also would like an amelioration of the infrastructure and to get a better introduction in the department or research group.

Lastly, the PhD candidates in this group experience a lot of time pressure. Especially teaching, assisting in other projects and the supervision of theses are considered as tasks that take up too much of their time.

A focus on improving the satisfaction of this small group of PhD candidates would improve the overall satisfaction PhD candidates have with their trajectory. However, it has to be noted that satisfaction is relative and subjective. Even though measures can be taken to improve the satisfaction of PhD candidates, there will always be differences in the level of satisfaction between certain groups.