CHAPTER 5

Experiences in Academia: A New Survey Study

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Abstract: The chapter provides a summarizing review of the main findings of the FRONT project with respect to gender and gender equality on different career levels. The review is based on two surveys, an employee survey with 190 variables and 843 respondents, and a student survey with 79 variables and 213 respondents. Among students, negative experiences are significantly more common for women than men, particularly when it comes to social treatment. Among employees, women experience markedly more challenges involving factors such as negative scrutiny, unwanted sexual attention or partners whose careers were given priority. The data also reveal differences in several other factors, but these were often moderate. Thus, it is typically a complex process with many components, resulting in an "accumulated disadvantage" for women. The differences were found on all career levels but with a clear tendency towards more challenges for women on higher levels. The observations from FRONT are discussed in light of other studies, a main conclusion being that the situation is surprisingly similar in different countries.

Keywords: gendered differences, academia, experiences, career, culture, work environment

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Introduction

Do women and men experience that they have roughly the same opportunities and challenges during their careers or are there major differences? Is there a gender gap in basic experiences within academia? Previous chapters have described gender differences in specific areas, such as views on gender equality, experiences of harassment or opportunities to publish. Is it only in some particular areas that women's and men's experiences of the work environment and organizational culture differ, or is there a general tendency, a pattern? If so, what does this pattern look like? In this summarizing chapter, we take an overall look at differences and similarities in women's and men's experiences, and review results from different areas.

The chapter builds on various types of material from the FRONT project, but primarily on two quantitative surveys, an employee survey with 190 variables and 843 respondents, and a student survey with 79 variables and 213 respondents.[1] These surveys were developed in order to identify challenges and problems with regard to career development, gender balance and gender equality. They included a wide range of questions concerning choice of career, supervision, social environment, academic culture and collaboration with colleagues, in addition to questions on topics such as unwanted sexual attention and harassment. The data material should therefore provide an opportunity for a very comprehensive mapping of gender differences, gender balance and gender equality in a broader sense.

In this chapter, we present a systematic review of the results from the FRONT project relating to gender and gender equality on different levels in a career. We begin by describing women's and men's experiences on the lower, middle, and higher levels. We then compare our results with two similar questionnaire surveys, one from Ireland and one from the United Kingdom. Finally, we discuss the results in light of other research.

The Gender Gap on the Student Level

The student survey was limited to master's students within a few disciplines in the natural sciences (48 per cent from the master's programme in information technology, 33 per cent from biological disciplines, 7 per cent

from physics, and the rest from other disciplines). It is not strictly representative, but it provides a feasible picture of the conditions among students at the faculty.[2]

Responses to questions about gender and gender equality were, in some cases, relatively similar among female and male students (as mentioned in Chapter 1). The large majority *agreed* with the statement that work and caregiving should be equally divided within the family, and most of the respondents *disagreed* with the statement that gender equality has come far enough.

The biggest gender difference emerges in the experience of having been poorly treated in the degree programme, either socially or academically. The survey posed the question, "Have you experienced negative academic treatment from peers/fellow students in your Master programme/group?" and a similar question on negative social treatment.

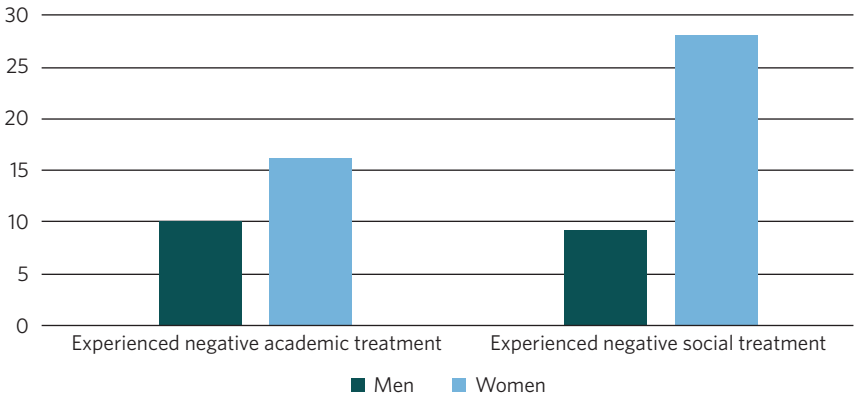

Figure 5.1. Experience of negative academic and social treatment, by gender. The questions asked were: "Have you experienced negative academic treatment from your peers/fellow students in your Master programme/group" and a similar question concerning social treatment. The figures are given as percentages. Source: FRONT Student Survey (N = 213).

Figure 5.1 shows the proportion (in percentages) of those who have experienced negative academic and social treatment. We see how such negative experiences are considerably more common among female than male students, and that the gender difference is quite substantial in relation to social treatment. Women report having experienced negative social

treatment from fellow students three times as often as men. This result indicates that problems or obstacles affecting women in particular are more "social" than "academic" on the student level.[3] The results reveal an overwhelming majority of women among those who experience negative treatment. More detailed questions, as described below, show that most of the problems stem from fellow students, but also from other groups. Generally, questions about academic well-being achieve a higher positive score from students than questions about social well-being.

The students report academic and social downgrading not only by fellow students, but also by lecturers and others. Negative attention, social or academic, was connected to both lecturers and supervisors (14 per cent), and to fellow students (18 per cent). However, only a small proportion (3 per cent) answered yes to a more direct question of whether they had "experienced that lecturers or advisors have treated male and female students differently", in the sense that one gender was treated better than the other.

On questions about whether they feel at home in the degree programme, 56 per cent responded that they feel at home socially, compared to 65 per cent who felt at home academically. In addition, 63 per cent of the women felt at home academically, compared to 67 per cent of the men. We also found a tendency for students who do not feel at home in the degree programme to have mothers with lower educational levels (see Chapter 6).

A similar gender difference in men's favour emerged for other questions in the survey. Often, the tendency is not that strong, and it does not always constitute a "gender gap", but it is nevertheless clearly visible. This is apparent, for instance, when we look at experiences of gender balance in student groups and learning environments. On questions about what types of student groups the students prefer in terms of gender balance, 24 per cent responded that they prefer a relatively gender-balanced group, 6 per cent responded that they prefer a group numerically dominated by their own gender, and 4 per cent said that they prefer a group dominated by the opposite gender. However, as many as 66 per cent dismissed the question, and ticked off the alternative that gender does not matter. This is in contrast to responses to some of the other questions in the survey

(about gender difference), to which we will return. For now, we observe that two in three students say that gender does not matter.

The survey also addressed the connection between gender and academic hierarchies, with questions on whether the students had experienced certain topics or courses as being gendered (masculine or feminine) and, if so, how this was related to the topic's status. Here, many responded that the topics and courses they followed were neither feminine nor masculine (see more in Chapter 2). At the same time, they said that masculine areas enjoyed higher prestige. Hardly anyone said that feminine areas had higher prestige. The results may be interpreted to imply that the master's students have great faith in meritocracy and gender equality – gender *should* not matter, even though it does statistically speaking – already on the master's level. At the same time, there is a clear interest among students to shed more light on this topic. On questions about whether the master's programme *should* have more focus on gender balance, approximately half of the students said yes, and the rest responded no.

The male students were more positive about the learning environment and the classroom situation than the females. 22 per cent of the women experienced the social environment as not inclusive, compared to only 10 per cent of the men. Also 12 per cent of the women think there is too much focus on competition, compared to 3 per cent of the men.[4]

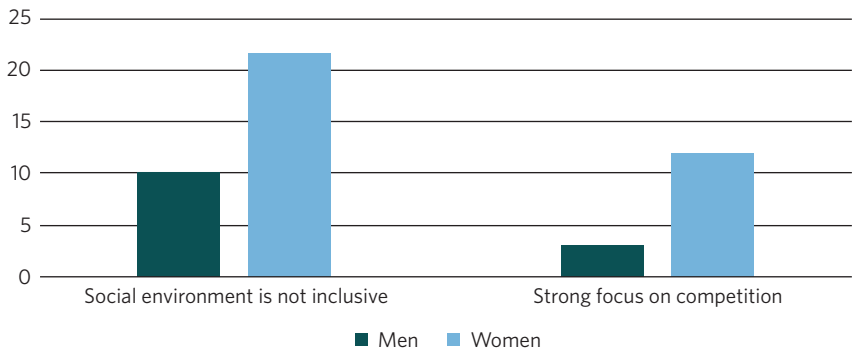

Figure 5.2. The students' assessment of the social environment at the unit/department, according to gender. The figures represent percentages. Source: FRONT Student Survey (N = 213).

Some of the variables relating to the culture in the unit/department show little gender difference, and the same applies to learning outcomes. But on a summarizing question about whether they had achieved academic confidence in the programme, 48 per cent of the male students said yes, compared to 40 per cent of the females. The women also experienced, less often than men, that disagreement is assessed positively (51 per cent compared to 58 per cent).

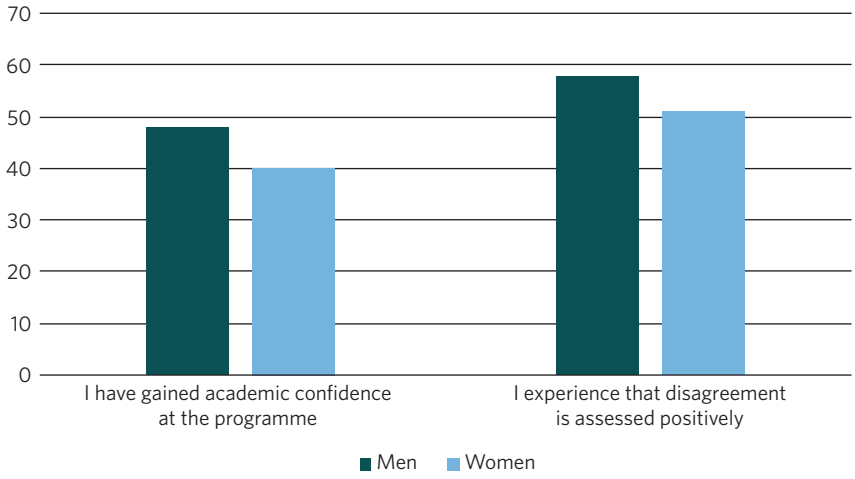

Figure 5.3. Students' assessment of whether they have gained academic confidence in the Master's programme and whether disagreement is assessed positively, according to gender. The figures represent percentages. Source: FRONT Student Survey (N = 213).

Briefly summarized, we can say that the material shows an overall gender difference. Sometimes the pattern is both extensive (many have experienced this) and clearly visible (the gender difference is substantial). One already mentioned example is that 16 per cent of the women have experienced negative academic treatment (often or a few times), compared to 10 per cent of the men. The corresponding figures for negative social treatment are 28 per cent for women and 9 per cent for men. The gender difference is not as big for other variables, but it is visible as a broad and overall statistical tendency across variables. The results provide a basis for using the term "gender gap".

Attitudes Among Students

When female students report greater problems or obstacles than the males, particularly regarding "social" negative treatment, and indicate that this often comes from fellow students, there is reason to ask whether attitudes among fellow students contribute to the problem. We do not have material to elucidate this in detail, but the survey contained variables addressing attitudes to gender and gender equality. In this section, we will take a closer look at how this turned out.

Figure 5.4 shows a common perception among the students, both women and men, that the genders are fundamentally different. There is nevertheless a slight gender difference. Among men, four in ten agree with the statement.

The question was deliberately exaggerated in order to reveal an ideological view, in other words, not just whether men and women are two different genders, but whether this is something "fundamental" that must also be "acknowledged". However, some of the students might have interpreted this in a more straightforward way, simply whether the genders are different or not. As stated in a commentary to this question: "If this were a sociology assignment, I probably would have said no, but in a biology assignment, yes". The distribution of answers may be influenced

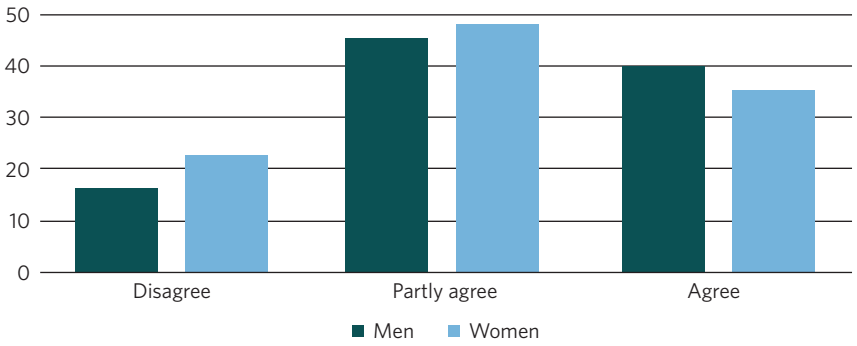

Figure 5.4. The students' assessment of the difference between men and women. The columns show whether the students disagreed, partly agreed or agreed with the statement, "It is important to acknowledge that men and women are fundamentally different". The figures represent percentages. Source: FRONT Student Survey (N = 213).

just as much by such a "literal" natural sciences understanding of the question as by a specific conviction or ideology concerning what gender is or means. Probably, it is a bit of both.

Talent for Research? Experiences of PhD Students

We will now take one step up the career ladder and look at conditions on the middle-level, focusing on PhD students and postdoctoral fellows. The analyses are based on the employee survey, which included the PhD students (N = 623 academic employees). Here, we asked about reasons for choosing a PhD/doctoral career (see Figure 5.5 below). 69 per cent of the men and 63 per cent of the women responded that a "passion for science" was an important reason for choosing to do a PhD. Also, 43 per cent of the men and 31 per cent of the women ticked off that they have "talent" (it was possible to tick off several options on this list).

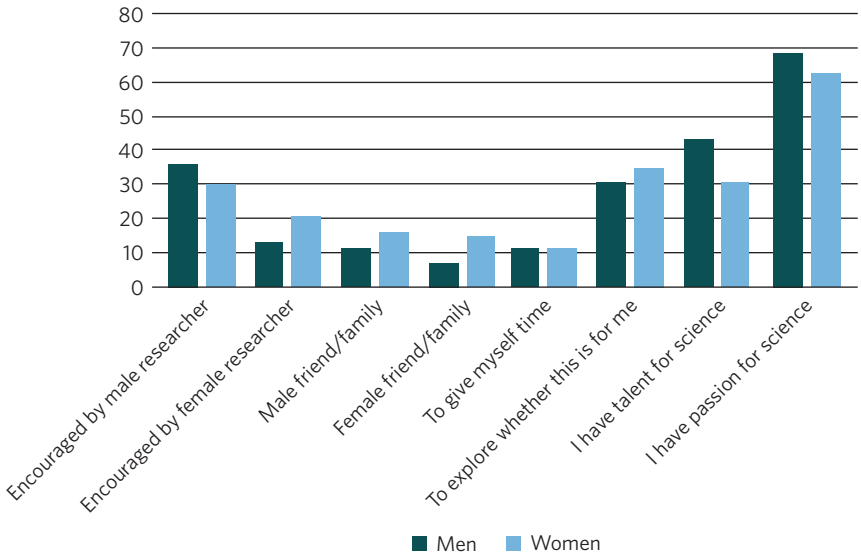

Figure 5.5. Reasons for choosing a PhD/doctoral career, according to gender. The figures represent percentages. Source: FRONT Employee Survey (N = 623 academic employees).

Men indicate approximately 1.4 times more often than women that they have "talent" for research. They also more often respond positively to their degree of "passion" than women. Also men, more often than women, respond that they have been encouraged by men in the academic community. Women have more often been encouraged by female researchers. The fact that more men have male supervisors probably comes into play here (see below, Figure 5.6). When it comes to friends and family, however, women have been encouraged at least as often as men, especially by women close to them. Again, we see a finding that does not correspond to the hypothesis that fathers or other men are particularly important for women in the natural sciences.[5] What becomes clear is that friends/family (of both genders, the same among women) are somewhat more important for women's choices than for men's. The alternative "give myself time" is equal and assessed as low among both genders.[6] The more active formulation "explore whether a career in science was something for me" is more popular, slightly more among women, but again fairly gender-balanced. The pattern thus shows certain similarities across the genders; at the same time, some differences emerge, such as belief in one's own talent.

The PhD students assess their supervision somewhat differently based on gender. The results show that 13 per cent of the women and 9 per cent of the men feel that they were not encouraged by their PhD supervisor to continue and do a postdoctoral fellowship. Also 19 per cent of the women compared to 12 per cent of the men were not introduced to international research networks by their supervisor. In relation to Norwegian research networks, the differences between the genders were somewhat smaller. Here 19 per cent of the men and 16 per cent of the women report having received clear support from their supervisor to apply for a position. There is little gender difference in terms of experiences of academic support and encouragement from their supervisor to publish and present their own work, as well as general academic support from the supervisor. Here, men's and women's assessments are approximately the same. Although we do see a "gender gap" in experiences, this does not apply to all areas, as one would

expect if women were generally more inclined to report problems compared to men.[7] Instead, the gender gap varies based on the questions (described in more detail below).

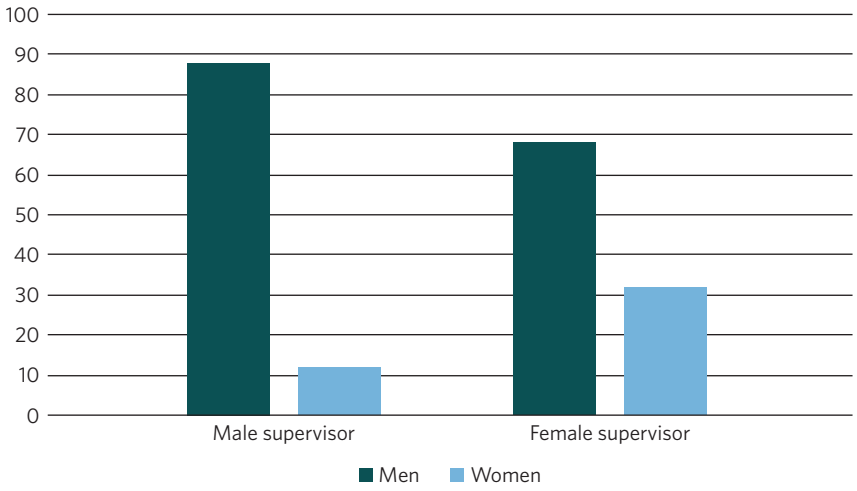

Figure 5.6. Choice of PhD supervisor, according to gender. Source: FRONT Employee Survey (N = 623 academic employees).

As shown in Figure 5.6, the majority of both male and female PhD students have male supervisors, but a substantially higher fraction of women than men have female supervisors. The figure must be seen in relation to the fact that female supervisors are a minority in the faculty. Moreover, it is important to take into account that female PhD students are often in research groups with a high proportion of women. Thus, relatively speaking, many women will get a female supervisor, and men will get a male supervisor even if there is no gender preference for supervisors among the PhD students. We do not know what is most important in this picture, discipline or gender. But we do see a clear gender-divided pattern.

Thus, it is even more interesting that the evaluation of supervision is fairly gender-equal in the material. One might expect the women to be more satisfied if they had female supervisors, and men if they had male supervisors, but instead, supervisors of both genders came out relatively

equally. Female supervisors were assessed as "very good" by 52 per cent (of all the respondents). Similarly, male supervisors were assessed as "very good" by 56 per cent. Finally, 85 per cent responded "very good" or "good", with little gender difference. In fact, the male respondents were slightly more positive towards female supervisors than the female respondents. Of the men with a female supervisor 61 per cent gave a "very good" assessment, compared to 46 per cent of the women with a female supervisor. The assessment of male supervisors was more equal, with 57 per cent of the men and 54 per cent of the women responding that the supervision was "very good".[8]

The PhD level is characterized by many as being a phase of life in which they start a family, and many have children. PhD students, postdoctoral fellows and researchers, who have children and take parental leave, often experience problems returning to work. This pattern affects women more than men. There is a major gender difference on this point. Of the women who had been on leave 30 per cent experienced difficulties when they returned to work, compared to 5 per cent of the men. This was confirmed by qualitative research in the project, where women often talk about problems following parental leave (Thun, 2019). A new study of young academics also shows that it is mostly women who experience such problems (Akademiet for yngre forskere, 2019, p. 22).

We see few signs of women "dropping out" in this phase, for example that the ambition level decreases. On the other hand, we see clear signs that competitive pressure is becoming tougher. For instance, problems with a long hours working culture, and the experience of having to work harder than colleagues in order to be recognized, are most frequent on the PhD level (especially among men). This coincides with an increasing proportion of researchers who start a family and have increased caregiving responsibilities to take into consideration, which still affects women to a greater extent than men. We see a tendency for young researchers – even though they want gender equality – to make adjustments, in practice, that give the man's career first priority (see Chapter 1).

Altogether, the results demonstrate that differences in experiences of the work environment between women and men that we saw at the master student level continue during their time as PhD students. For example, men are more often than women encouraged to do a PhD by a male researcher, whereas women are more often encouraged by a female researcher, and by men or women in their family or circle of friends, although these patterns are not highly gender-divided. Also, men more often than women say that they have "talent" and "passion" for their discipline – and they score higher on self-esteem. When it comes to supervision, the differences are relatively small, but men nevertheless come out slightly better. Gender difference is substantial at one point. Women much more often experience problems returning to work after parental leave than men.

Employees in a Gender-Divided Work Environment

What happens, then, when women and men enter research communities as academic employees, such as postdoctoral fellows, researchers, associate professors or full professors? In this section, we will first look at assessments of the work environment among all employees. Assessments and experiences often have very unequal distributions linked to gender.

Figure 5.7 shows how women and men report some important work environment problems differently. Women experience approximately twice as often as men that they are negatively assessed or scrutinized. They more often have problems with a long hours working culture (it has hindered their career). Moreover, women far more often experience unwanted sexual attention, and somewhat more often bullying or harassment (described in more detail in Chapter 3). Based on all this, it is not surprising that women also more often report problems with their work-life balance.

The women reported twice as often as men that their partner's or spouse's career has been given priority in the past year and were almost twice as often as men dissatisfied with their work-life balance.

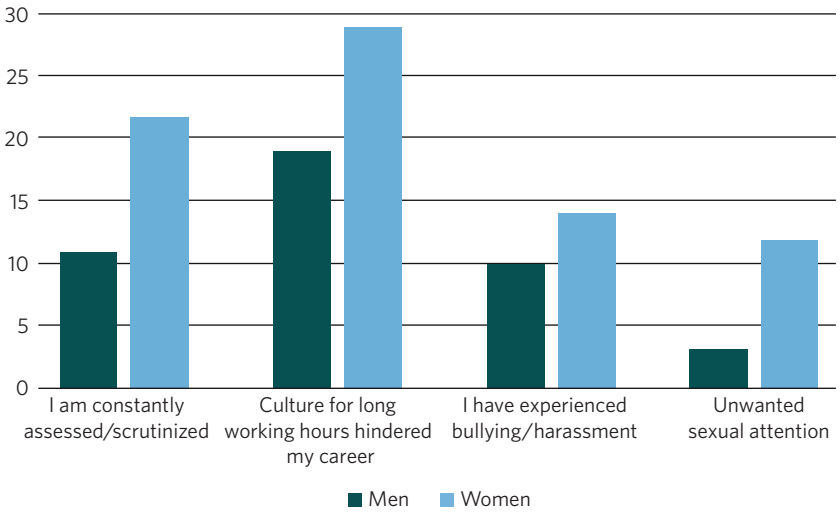

Figure 5.7. Experience of problems in the work environment among women and men. The figures represent percentages and show the proportion of women and men who agrees with the statements. Source: FRONT Employee Survey (N = 843).

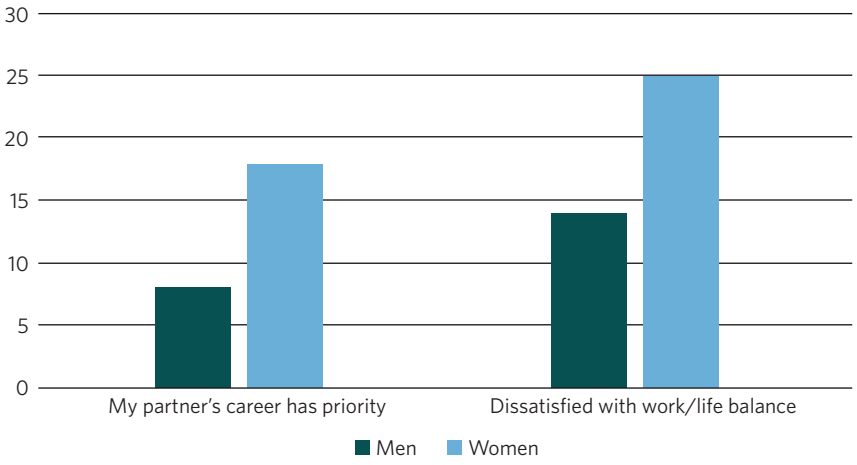

Figure 5.8. Experience of the relationship between family and private life, according to gender. The columns show the percentages of women and men who report that their partner's career was given priority in the past year, and the percentages who were dissatisfied with their work-life balance. Source: FRONT Employee Survey (N = 843).

There is a substantial gender difference in many variables related to problems that have hindered careers (see Figure 5.15). Variables with major gender differences that stand out include: "long hours working

culture" and "absence of role models". In terms of the culture in the department or unit, there are also major gender differences in important variables, including "negative academic attention", in other words, the experience of being constantly scrutinized or judged by colleagues. As many as 24 per cent of the women, compared to 12 per cent of the men, say yes to this (agree and partly agree), as shown in Figure 5.12. One might assume that the proportion of negative academic attention would, to a greater degree, change with position level (decrease towards the top), but figures from the survey show an even distribution across all position levels.

The connection to gender is clear across levels. Women experience negative academic attention more often than men, regardless of level. When it comes to whether you have to work harder than your colleagues in order to be assessed as a legitimate researcher, 24 per cent of the women said yes compared to 15 per cent of the men. The gender difference is significant. And in terms of whether the culture in the department/unit is supportive, only 10 per cent of the women strongly agree, compared to 16 per cent of the men.

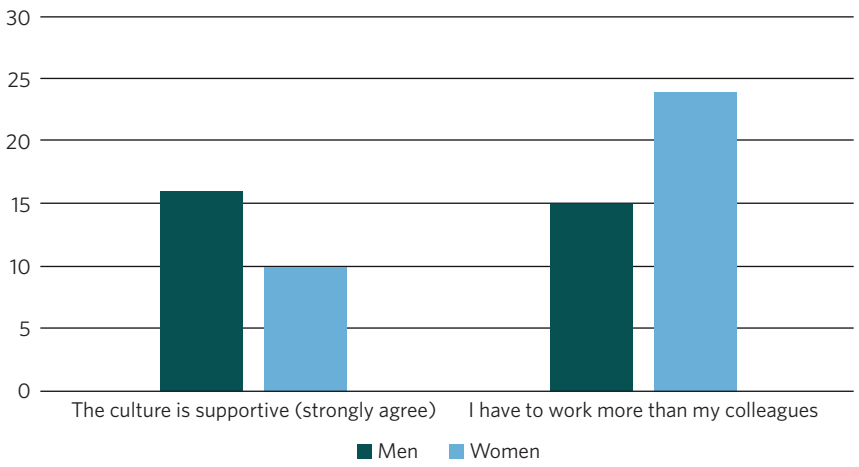

Figure 5.9. Percentage of women and men reporting that they strongly agree with the statement that the culture in their unit/department is supportive and that they have to work harder than their colleagues in order to be assessed as a legitimate researcher. Source: FRONT Employee Survey (N = 623 academic employees).

In the survey, we asked whether the respondents experienced the culture in their department as non-sexist and non-racist. Approximately 80 per cent responded yes (agree or strongly agree) to these questions. If we look only at those who strongly agree, the gender difference is substantial, especially for questions about sexist culture. Of the men, 47 per cent, compared to only 28 per cent of the women, strongly agreed with the statement that the culture in their unit was non-sexist. The women were also more sceptical to the idea that the culture was non-racist. Also 44 per cent of the men and 31 per cent of the women strongly agreed with this statement. Ethnicity and racism are discussed further in Chapter 6.

As we can see, gender differences vary in strength across the different variables, but a general trend is noticeable and becomes particularly clear when looking at the overall picture and the variables combined. 22 per cent of the women compared to 16 per cent of the men think that professional isolation has negatively affected their careers (Figure 5.10). Also 29 per cent of the women, compared to 19 per cent of the men, have had problems with a long hours working culture (Figure 5.7). Finally, 22 per cent of the women and 16 per cent of the men have had problems with colleagues' attitudes (Figure 5.11). The graphs below show excerpts from the pattern of additional burdens for women. Individually, the factors may not seem very strong, but together they are likely to have a strong impact.

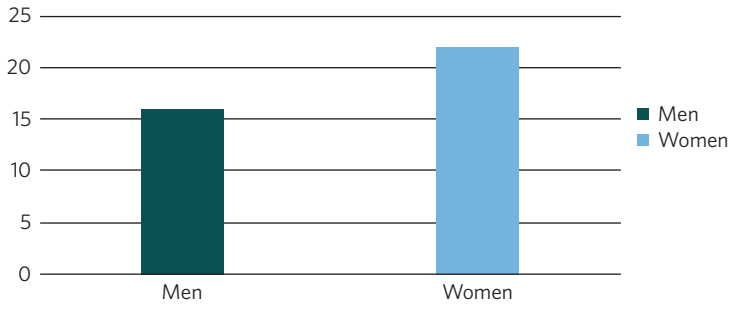

Figure 5.10. Percentage of women and men who agree with the statement "Professional isolation has negatively affected my career". Source: FRONT Employee Survey (N = 623 academic employees).

The same pattern emerges in relation to colleagues' attitudes.

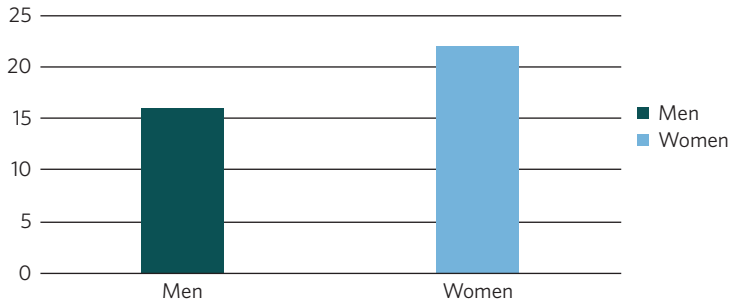

Figure 5.11. Percentage of women and men who say that they have problems with their colleagues' attitudes. Source: FRONT Employee Survey (N = 623 academic employees).

Problems on Different Levels

In this chapter, we have presented the results on three main levels of the career ladder – master students, doctoral students and employees. In this section, we will take a closer look at the position levels among employees.

Figure 5.12 (below) shows the extent of six important work environment problems in the employee survey, broken down by position level and gender. It shows the proportions of men and women experiencing the problem on each level.

The columns in the figure represent percentages of men and women, divided into four position levels, relating to six work environment problems (they "strongly agree" or "agree"). The material should be interpreted with some caution due to low numbers in some categories.[9] However, the figure nevertheless says something about various burdens and problems, based on position level and gender, as they appear in our material.

The most common problem among the participants in this analysis is the problem of a long hours working culture that has hindered their careers. The figure shows that the problem of a long hours working culture is relatively substantial, meaning frequently reported, compared to the other problems. Furthermore, we can look at the gender distribution on each level and see how great the distance is between

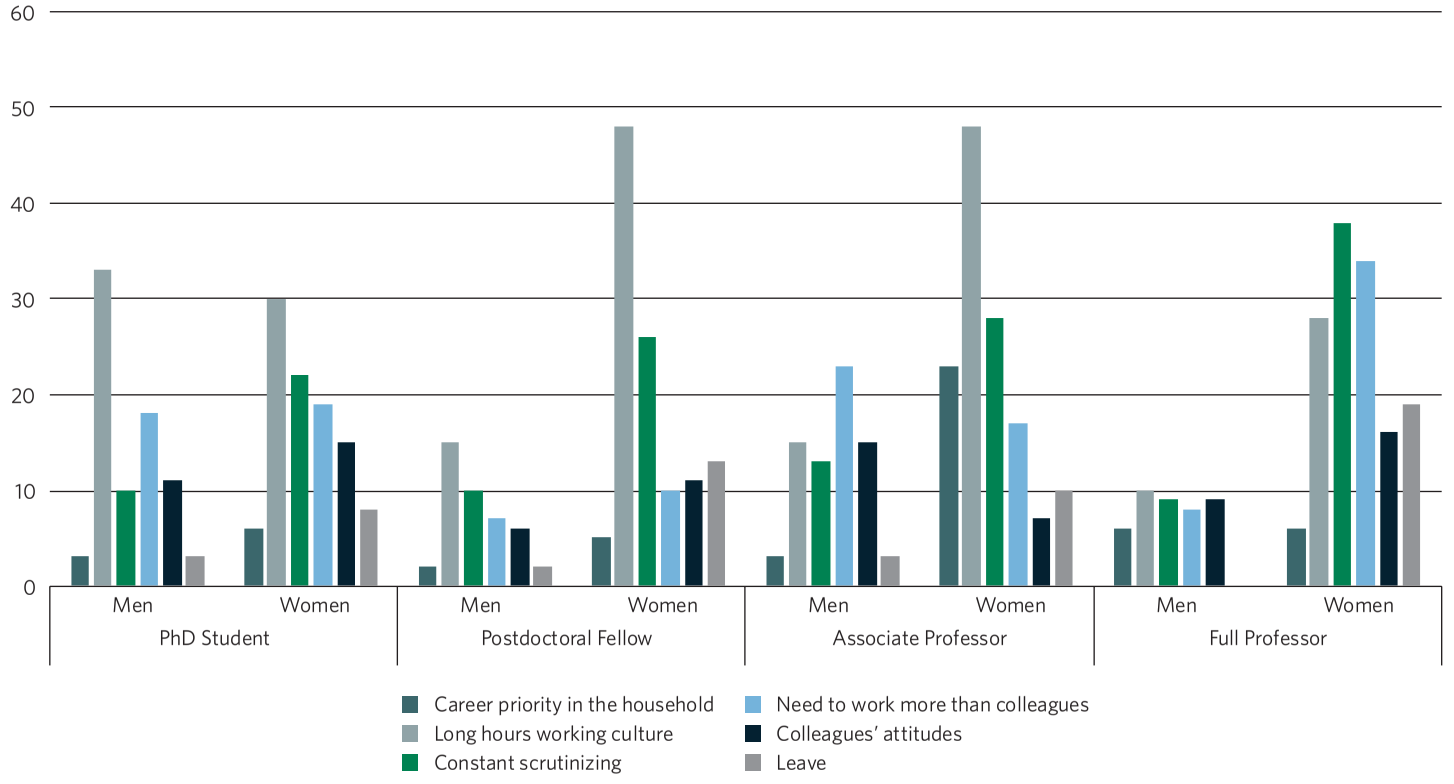

Figure 5.12. The extent of work environment problems, according to position level and gender. The columns refer to the percentage among men and women, divided between four position levels, who "strongly agree" or "agree" with six work environment problems. Source: FRONT Employee Survey (N = 623 academic employees).

the columns for men and women. The figure shows that the problem of a long hours working culture is relatively gender-equal (small gender difference in reporting) on the PhD level, but it becomes more unbalanced on the postdoctoral level and the associate professor level. The extent of the problem increases, and the gender gap also increases.

The second most common problem is constant scrutiny. This problem is also fairly consistent across levels, but the gender difference increases at the full professor level.

The third most common problem is having to work more than colleagues in order to be recognized. Here, gender differences in the responses are small on the PhD level, and somewhat mixed on the next levels, while they are considerable on the professor level. On the associate professor level, men report this problem more often than women – one of the relatively rare cases of "inverted" gender gap in our material (gaps to the detriment of men, see also Chapter 6).

The problem of colleagues' attitudes also shows greater gender differences on the professor level. Overall, the gender gap is larger towards the upper levels.

Figure 5.13 (below) shows the gender gap in terms of women's problem reports compared to men's reports, in percent. The men's problem counts as 100 per cent, so 200 per cent means that women report the problem twice as often as men. It thus indicates how "gender specific" these problems are, but not the extent of the problem for the two groups. A larger gender gap means a more gender-specific problem.

The figure shows that the problem of career priorities in the household applies particularly to women on the associate professor level. This is where gender differences in problem reporting are greatest for this specific variable. The analysis *indicates* patterns, but as mentioned, small samples for some position levels may come into play. The figure shows how gender differences relating to problems with parental leave increase up to the postdoctoral level before they decrease slightly. Gender differences in relation to constant scrutiny, which is a clear

component of academic devaluation in our material, are substantial on all position levels and increase towards the professor level (where one might perhaps expect both genders to feel more comfortable once they achieve this position – but this does not seem to be the case). Nor does the competition factor, "have to work harder than my colleagues" end up more gender-equal at the top level – instead, the gender gap is largest here.

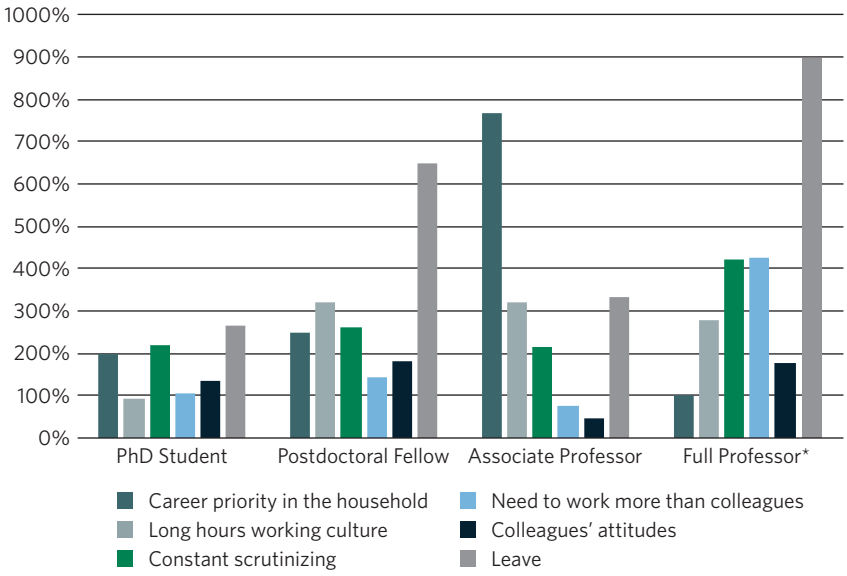

Figure 5.13. Gender difference in reporting work environment problems, according to position level. The figure shows women's problem rate in relation to men's rate (set at 100 per cent). Two hundred per cent indicates that women report the problem twice as often as men.
Source: FRONT Employee Survey (N = 623 academic employees).
*The column for problems with leave is not precise at the professor's level due to limitations in the data material (19 women but no men reported this).

Figure 5.14 (below) presents the same information as a line graph. Here we see even more clearly how the gender gap changes towards top position levels.

The gender gap in problem reporting is seen for all position levels. Moreover, when averaging out the fluctuations caused by moderate group sizes, a clear trend towards a larger gender gap is seen for the top levels. [10]

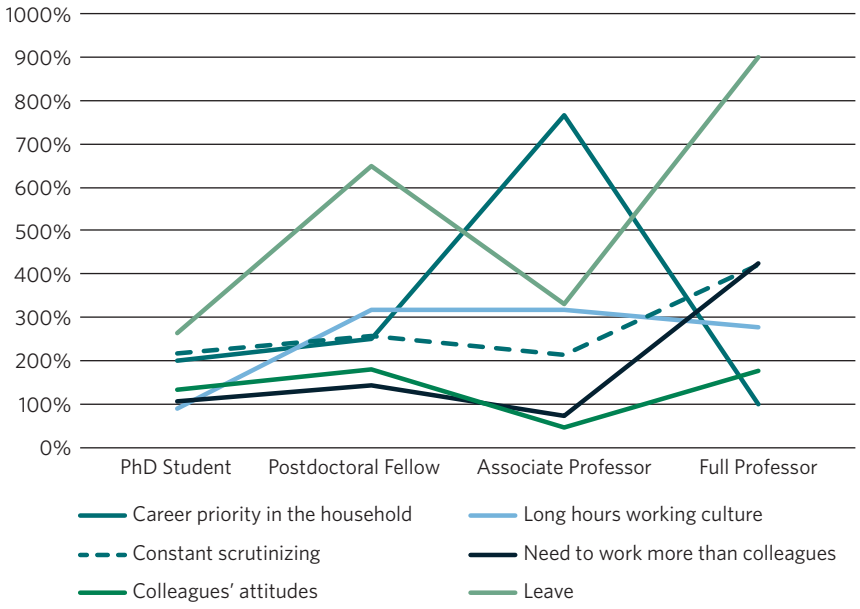

Figure 5.14. Gender differences in reporting work environment problems, presented as a line graph. The lines show women's rate of problems in relation to men's, according to position level. The figures are calculated to be the relationship between the frequency of the problem among women as a percentage of the frequency among men. Source: FRONT Employee Survey (N = 623 academic employees).

The Gender Gap: An Overall Analysis

Figure 5.15 summarizes differences between women and men among academic employees in terms of career problems related to environment and culture.

The list is ordered according to importance, with variables having a large gender gap at the top. Here we see how gender difference is very large for some variables on top and smaller down the list. The list does not show the extent of the problem, but it shows women's reporting relative to men's. A problem having more than 200 per cent on the list indicates that women experience the problems more than twice as often as men.

Approximately two-thirds of the environment and culture variables in the survey have clearly visible gender differences. Some of these are major differences, where women are involved more than 150 per cent more often, whereas some are smaller, down to 110 per cent. The strong

connections at the top of the figure confirm the image of a "gender gap" at the same time as we see the breadth and variation in gender differences, with increasingly gender-balanced reporting down the list.[11]

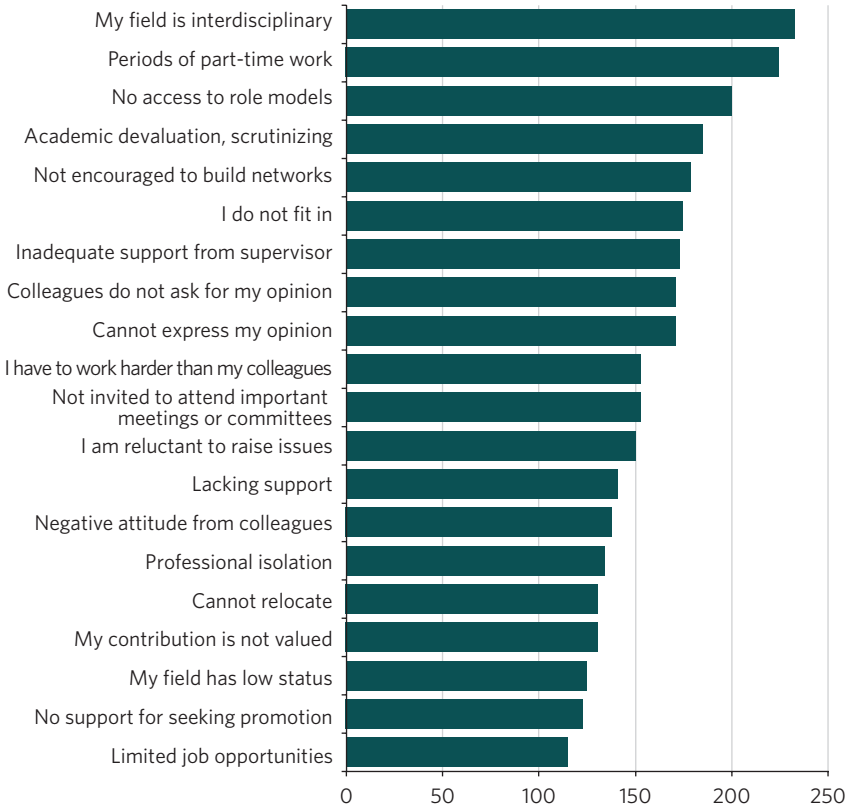

Figure 5.15. Women's reporting of problems with environment and culture, calculated in relation to men's reporting, in percentages (men's reporting = 100 per cent). Source: FRONT Employee Survey (N = 623 academic employees).

Figure 5.15 presents an overall picture of the gender gap in the material. Other variables could be added, some of them with a large gap, like problems after a leave from work. The figure illustrates the gender gap as a wide tendency across variables from many areas, differing in strength.

Overall, the questionnaire surveys among students and employees show that women and men have different experiences, and that women report greater problems with regard to environment and culture than men do.

Could this result be spurious or misleading? Could the question formulations and the survey angle have contributed to a predominance of "critical women" among the respondents? That is possible, but we do not see any clear signs of this – we have only a weak overrepresentation of women (the employee survey). The problems in the questions are formulated in a gender-neutral way, and do not imply or require any particular connection to gender or gender equality. Moreover, we see that women are *not* more critical than men in a number of important areas (such as supervision), and in variables where they probably could have reason to be, such as satisfaction with salary level. Based on our results, women and men respond mainly "realistically". The gender gap we see in the figures in this chapter is, by all accounts, real and not a "reporting problem". Other crucial variables strengthen this picture through the fact that we see major gender differences in the answers. For instance, this applies to social and academic discrimination among students, sexual and other types of harassment, problems following parental leave, and the experience of academic devaluation (among employees).[12] Questions concerning material and method are further discussed in the appendix, "Method".

How Typical Is the Gender Gap?

The material we have presented offers a detailed empirical picture of women's and men's different experiences of the work environment and culture. The picture rectifies the idealized image of a purely meritocratic university. In the project's research group, we were surprised by the breadth and extent of the gender gap in the results from the two surveys compared to the official Norwegian image of gender equality.

Yet the material comes from one faculty – the Faculty of Mathematics and Natural Sciences at the University of Oslo. How typical is this for academia in general? Is the situation at the MN Faculty special or representative for UiO? Are the patterns similar or different at other faculties? Is the situation special or representative compared to other European universities? Does other recent international research support this new picture? In this section, we begin by looking at similarities and differences between the faculties at UiO before moving on to a European comparison.

The figure below shows the proportion of women in different position levels at five faculties at UiO. The graphs are somewhat different for the faculties, but the main pattern is the same.

Based on our analyses of gender balance and position levels, the situation at the MN Faculty is relatively representative of UiO. All the faculties have a clear underrepresentation of women on the top level. What separates them is differences on the lower level (PhDs) and where on the career ladder we find the reduction in female percentages, as shown in Figure 5.16.

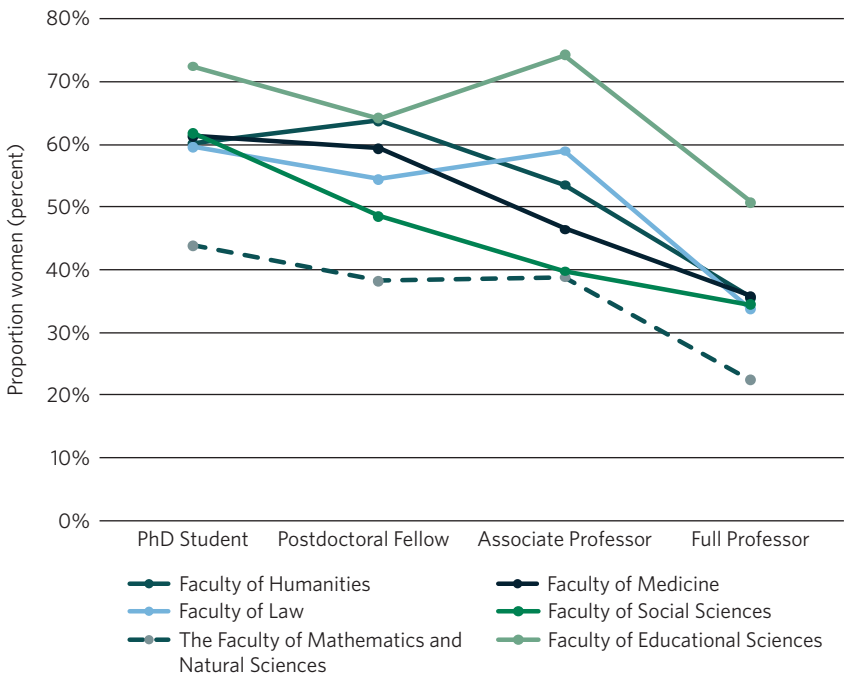

Figure 5.16. Percentage of women in different position levels at five faculties at UiO (the dotted line shows the MN Faculty). Source: Database for statistics on higher education (DBH): work-year at UiO 2020.

We do not have systematic gender-divided data relating to experiences of the work environment and culture across the faculties. The material we have indicates some common main features, such as increasing imbalance (numerical male dominance) towards the top,

whereas other features vary. The extent of sexual harassment among students is lower at the MN Faculty compared to other faculties at UiO, according to figures from the large national student survey SHoT, which focuses on students' health and well-being (SHoT, 2018). These figures are not divided by gender, and it is conceivable that different gender proportions within the different faculties' student groups come into play.[13] A survey among students at the MN, SV and UV faculties showed many common features with regard to gender and gender equality (Thun & Holter, 2013). International research on the natural sciences is also characterized by common features that apply to academia in general, and some features that are distinctive to the natural sciences.

Although the natural sciences have often been represented as relatively gender traditional and male-dominated, it is not a given that this is the situation at a Norwegian university today. The natural sciences are relatively male-dominated, but this is not tantamount to poor gender equality – perhaps the realists are simply "boring but peaceful" (as stated by one of their own). In light of the development of gender equality, it is possible to formulate two hypotheses: (1) the natural sciences are more traditional; but also that (2) they can be more aware and innovative when traditional problems are put under a critical spotlight through increased demands for balance and gender equality.

How typical is the gender gap within the natural sciences at the MN Faculty compared to universities in other places? Here we have solid data, particularly from two larger surveys similar to ours from Ireland and the United Kingdom. The questionnaire in the employee survey in FRONT is based partly on the questionnaires used in these studies, and the surveys can therefore be compared more precisely. The first study, Integer, was carried out in Ireland in 2012, and the second, Asset,[14] was carried out in the United Kingdom in 2016.

Many of the Irish results correspond to ours. They provide an almost surprisingly identical picture. A similar list of "problem variables" is selected from the analyses.

> … women staff were less likely than their male counterparts to believe that their colleagues always sought their opinions on research ideas and problems and were more likely to feel that they were under scrutiny by colleagues in their Schools. Though most survey respondents, male and female, reported positive aspects about the culture prevailing in their Schools, there were some characteristics that were less evident than others: transparency, inclusivity, collaboration and support. Significantly fewer women than men surveyed believed that the culture prevailing in their School was non-sexist or respectful. Similarly, male respondents felt more valued than their female counterparts, for their teaching, research, scholarship and/or creativity. (Drew, 2013, p. 21)

Some differences also emerge. In the Irish study, men and women are about equally satisfied with their work-life balance. In our employee survey, on the other hand, women are dissatisfied approximately twice as often as men. This may be interpreted in relation to different social traditions and notions of gender equality in the two countries. Women are more gender-equal and set higher standards in Norway than in Ireland. Differences between the institutions also come into play. The university in the Irish study (Trinity) has an even lower proportion of women among the academic staff, and at the top, than UiO (Drew, 2013, p. 33), but conditions in the natural sciences are probably quite similar.

Results from the study in the United Kingdom also correspond to ours (Aldercotte et al., 2017). Women reported less support and encouragement, less positive feedback and recognition, and were encouraged to apply for positions less often than men. In the same way as in our study, a culture with long working hours and little flexibility is more of a problem for women than it is for men. The British study also showed a "work displacement" in which women spent more time on teaching and administration while men spent more time on research (Aldercotte et al., 2017). The FRONT study shows the same pattern. Gender difference is small on the lower position levels, but work displacement becomes clearly visible on the associate professor level, where women spend an average of 24 per cent of their work hours on research, whereas men spend 39 per cent.

In the British study, the researchers found that the gender gap with additional disadvantages for women, which was visible in many areas, varied according to age. They concluded that the size of the gender gap

was age-dependent, since the gap was often missing (or at least much smaller) among respondents 30 years old and younger (Aldercotte et al., 2017). This is an important finding, which is supported by the FRONT material. That the pressure on women increases with age is in accordance with our results. Female master's students experience more negative attention than male students, but this applies especially to negative social attention, whereas gender difference is smaller when it comes to negative academic attention. This may be interpreted to mean that academic gender ranking becomes greater higher up on the career ladder. This is in line with the Janus model described in the second part of this book (Chapter 9).

A study of the mentor system for women at UiO (Løvbak & Holter, 2012) illustrates the significance of age in order to understand various forms of gender balance and based on, for example family research, we see that "payback time" may be a factor. After a period during which the man lets the woman's career come first (typically early in the relationship, she works on a master's degree or a PhD), there follows a period when the man's career is prioritized. This is connected to research on changes in career priorities during the life course of young adults, and the debate on the "retraditionalization" of the family following the infant phase (Lyng, 2017; Oechsle et al., 2012).

Conditions in Norway are different from Ireland and the United Kingdom, and one should be cautious about transferring results from one country – or one organization – to another without further ado. Nevertheless, it is obvious that the FRONT material, to a great extent, corresponds to the results from similar surveys in Ireland and the United Kingdom. In fact, the tendency is overwhelmingly similar, with approximately the same patterns. This comparison supports a hypothesis of relatively common socio-cultural mechanisms in academia across countries.

Discussion

Both employees and students often think that gender should not matter. For instance, two in three master's students respond, as mentioned, that gender balance has no significance in the group's work. A possible

interpretation is that it *should not* matter. Gender should not hinder collaboration. The idea that "gender-neutral is best" is known from, among other things, research on gender equality in organizations.[15] The distribution of answers to this question was approximately the same as in a previous student survey at UiO (Thun & Holter, 2013, p. 132), but the proportions of "agree" and "partly agree" are somewhat higher in our study, perhaps because the sample is limited to students in the natural sciences.

Gender equality research shows that many people want gender equality, while many also emphasize the importance of gender difference (see e.g., Ø. Holter et al., 2009). It is nevertheless somewhat surprising that this thinking in terms of differences is still so strong among master's students at a university in the "gender equality country". Almost four in ten students in the natural sciences agree that it is important to recognize fundamental gender differences, which contrasts with the students' responses to other questions. The vast majority want gender equality, including equal distribution of caregiving work and paid work within their own family. One could imagine that the idea of fundamental gender difference would be strongest among students of biology, but based on the students' responses, that is not the case. Biology students are no more "difference oriented" than students of physics or informatics in our (limited) material.[16]

Among the master students in our material, the women are slightly more gender equality oriented than the men. Unfortunately, we did not have the opportunity to ask the same gender equality questions in the employee survey, but the tendency is similar and known from previous studies. On the "attitude level", the differences are often small. Most people want gender equality. This is in contrast to questions that apply more directly to the "practice level", in other words, questions about experience and practice. It is especially here that women's and men's responses differ (see e.g., Ø. Holter, 2017; Ø. Holter et al., 2009; Mæland, 2015; Oechsle et al., 2012).

On the PhD level, we see that answers to a broad question about reasons for choosing to do a PhD, including influences from family, friends and researchers, do not differ very much by gender, although some tendencies are clear. The biggest gender difference that emerges relates to an

experience of having "talent" for a doctoral career, which men experienced almost one and a half times as often as women.

Generally, the results must be seen in light of both career development and life phases. The notion that the genders are fundamentally different, and other results, may be interpreted in light of *traditional gender roles*. It is a common way of thinking that gender-related ideas and stereotypes are something that students "bring with them" – from upbringing/family, school and the social environment – and not something created by the university. It thus becomes important to emphasize that gender roles not only have to do with already existing attitudes. The students have entered a gender-divided system. At the MN Faculty in 2020, only approximately one in six students are in a gender-balanced master's degree programme (within 40/60 male and female students), whereas the other five are in degree programmes with weak gender balance. If we look at all the master's degree programmes at the University of Oslo, a study from 2012 shows a similar pattern – only one in five master's degree programmes was gender-balanced (Thun & Holter, 2013).

That gender difference is important is, therefore, not just a question of attitudes, but also something that reflects many students' and researchers' *actual situation* on their way up through gender-divided educational pathways. It is not a given that traditional ideas about gender are just something students bring with them from home or their childhood environment. Nor is it a given that students, more than the university itself, create this situation of considerable gender division[17] (see more in Chapter 8). Regardless of the reason – students learn gender roles during their career path, and what they bring with them "from home" is moderated and adjusted. Gender roles can thus be important. Nothing in our results contradicts that, but these roles are not only determined by childhood and adolescence. If that were the case, we would see other patterns, for instance, in regard to support for a career in the natural sciences.

Across genders, we see that the parents' educational level is important in terms of who is admitted to a master's degree programme. Thus 66 per cent of the students said they had a father with higher education, and 64 per cent had a mother with higher education (fairly evenly distributed by gender). Students with parents with higher education are strongly

overrepresented, here as well as in other studies (see Chapter 6). This can be interpreted to mean that students are already selected. They bring with them different social experiences, in which social class, gender roles and socialization mean a lot, although this is no longer quite so firmly connected to a "traditional" forming of gender roles and a traditional male breadwinner logic (see Chapter 2).

Attitudes and practice must be viewed in light of life situations. Gender equality research shows that attitudes often change from the young adult phase to the toddler phase. Women especially tend to become more critical of the existing (im)balance when they have children. The students in our sample have usually not yet started a family, and few have children. Students who said they were single totalled 57 per cent, while 34 per cent were cohabiting partners, and 9 per cent were married. Only 4 per cent had children. Many of the master's students were also in a phase of life where they were in the process of becoming established as cohabiting partners, though few had children at this point.[18]

The student survey shows a mixed picture on the attitude level, relating to both gender equality and the emphasis on gender difference. On the practice level, we see a different and less gender-balanced picture. Here, female students have one and a half to three times as great a chance of encountering obstacles in their careers, in the form of academic or social downgrading, as do the male students. Most of this downgrading comes from fellow students, some from lecturers, supervisors and others. Only a minority of the students say that this happens "often". However, it happens "sometimes".

In the employee survey, there is a clear element of gender-skewed selection. The comparison with studies from Ireland and the United Kingdom shows mainly the same trends across countries, position levels, culture, work environment, and other conditions. Gender appears as an independent dimension, usually in women's disfavour. The main tendency is that women are still worse off than men. This applies statistically, although more gender equality has been achieved in some areas. The material shows that there are still considerable additional costs for women who pursue an academic career. This is evident, for instance, from the experiences of imbalance between work and private life, and dissatisfaction

with the work culture. It is reinforced by a skewed work balance in some of the employees' households, where often, the man's career still takes precedence over the woman's. As mentioned, women have a much bigger chance, after parental leave, of experiencing difficulties returning to work compared to men. Among other things, this may have to do with men working more after a couple have children, whereas women work less (see e.g., Halrynjo, 2017). These results may be reminiscent of the idea of "punishment" for motherhood (for instance, that mothers are assessed as less competent and less suitable for management positions than women without children, and men with or without children), which has been found in American studies (Correll et al., 2007). This can also be seen in light of previous studies of UiO (Løvbak & Holter, 2012, p. 47; Orning, 2016). Both the questionnaire surveys and the interviews in the FRONT project show that the balance between research and family is particularly challenging for women (see Chapter 1, and Thun, 2019).

Gender roles and gender stereotypes are a part of this picture. Stereotypes have gendered consequences in women's – and mothers' – disfavour. The interviews showed different expectations of women and men when it came to, for example, collecting children in kindergarten, and the possibility of attending arrangements in the evening. Thun (2019) describes this and brings the matter to the fore in an interview: "If a male colleague collects in kindergarten two days a week, he is a gender-equal hero, but if a woman does the same, our commitment to research is questioned, was a common comment from the informants" (Sandum, 2019).

When looking at this pattern as a whole, and taking into account that it was probably even stronger in earlier days, it is not surprising that a lack of gender balance is seen at the top, or that it has been changing slowly. The relative absence of women in top positions, for instance in the natural sciences, is connected to women experiencing more obstacles and less support than men. The most important pattern, within a somewhat more gender-equal academia today, may be a lack of support in the sense of "non-events", such as not being referred to or invited (Husu, 2005), instead of direct counteraction. More active resistance is also an issue – if you want to move up you must have support. Lack of support may also be interpreted as an example of "passive" opposition to gender balance

and gender equality, or what has been termed a "defence mechanism" (H. Holter, 1992). But also more "active" resistance emerges in parts of the FRONT material – for example, relating to harassment (Chapter 3).[19]

The work displacement, in the sense that women spend more of their work hours on teaching and administration while men spend more time on research, found in our material is strengthened not only by the British study, Asset, but also by other studies. (see e.g., Vabø et al., 2012; Vetenskapsrådet, 2021). In a study from the Swedish Research Council, work displacement is emphasized as a main reason for a lack of gender balance in higher academic positions. The explanation is that women are often in research fields characterized by a high proportion of teaching, and they – in all disciplines – report having less time for research than their male colleagues (Vetenskapsrådet, 2021).

The comparison with the Irish study, Integer, and the British study, Asset, provides support for a hypothesis of relatively common socio-cultural mechanisms within the natural sciences across countries. Some features are also similar to conditions in male-dominated prestige disciplines and elite jobs in general (Aarseth, 2014; Halrynjo, 2017). For instance, we see that the gender gap in experiences of the work environment and culture has a psychological side. Accumulated negative experiences, in the long run, increase the chance of "self-chosen" withdrawal or devaluation. You lose self-confidence and faith in yourself. This affects organizational sensemaking, and what is considered meaningful in the organization (Dockweiler et al., 2018; Snickare & Holter, 2018; see also Chapters 7 and 12).

The empirical picture presented here reveals gender differences seen separately, independent of other variables in the data, regardless of whether the differences are perhaps *also* connected to other conditions or grounds for discrimination, such as ethnicity or social class (parents' level of education). The background for this is the need to understand gender differences as a pattern in and of itself, before connecting them too quickly to ethnicity, class or other variables. The variables that stand out form a coherent and persistent pattern. The challenge is to expose it and interpret what it means.

Such a strategy, where gender and gender equality are seen separately in order to achieve the best possible elaboration of the picture, would

perhaps have been unacceptable if it turned out to be the case that gender largely covaried with other factors – ethnicity, class, position level, age and so on. But that is not the case. Instead, gender is a very strong, independent factor across a number of other background variables in the material (see Chapter 6, and Appendix "Method").

Conclusion

In the introduction to this chapter, we asked whether there is a gender gap in experiences within academia. The material we have reviewed confirms this. In this chapter, we document some of the most important differences. For example, we show that female students experience the environment as not very inclusive approximately twice as often as male students, and that they experience negative academic treatment approximately one and a half times as often. Female academic employees experience twice as often as men that they are under constant scrutiny, and one and a half times as often that they have to work more than their colleagues to be recognized. This pattern also includes a number of variables where the gap is smaller, such as problems with colleagues' attitudes where women have "only" a 140 per cent greater frequency than men. As many as two-thirds of the environment and culture variables show clear differences with regard to gender.[20]

The chapter presents material based on three important career stages: master's student, PhD student, and academic employee in higher position levels. Analyses show major gender differences in all stages. Moreover, we see that the gender gap appears across units at the faculty. The gender gap forms a clear pattern, although the problem picture varies somewhat, depending on for example, position level and discipline.

We then compare the FRONT material to international research. Two European surveys similar to our own employee survey reveal a similar gender gap within the natural sciences. We then discuss these results in light of gender role theory and gender-divided career paths. The significance of gender differences in relation to other types of social inequality – ethnicity in particular – is further elucidated in Chapter 6. Chapter 7 presents a model for interpreting the gender gap documented in this chapter.

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Notes

1 First, a smaller questionnaire survey among master's students (N = 213) and then a larger survey among employees including PhD students at the Faculty of Mathematics and Natural Sciences, the University of Oslo (N = 843). See also Appendix "Method".

2 The questionnaire was answered by students from randomly chosen lectures and reading rooms. See also Appendix "Method".

3 The proportion who responded "often" + "sometimes" is presented in the figure. Most of these responded "sometimes". Negative social and academic treatment was not defined any further in the questionnaire. We do not know specifically what the students had in mind when responding to these questions, but we see no sign of them being particularly "difficult" to answer, based on the response rate or the comments in the questionnaire form.

4 The figures are too small to be able to say this for certain, but the difference in the level of competition between departments may be significant.

5 This was a common hypothesis in early studies of women's careers in male-dominated occupations (see e.g., Wahl et al., 2018).

6 Hedonism or pleasure orientation does not gain much support, neither here nor elsewhere in the study.

7 The hypothesis that the questionnaire surveys are characterized by "more critical" or problem-reporting women compared to men is discussed in Chapter 1 and Appendix "Method" in this book.

8 It may seem that the choice of a male supervisor increases the publication rate a bit, but we do not know for sure – see also Chapter 4.

9 Some of the position categories, divided by gender, are a bit too small – coincidences may come into play, especially in relation to less common problems. The sample consists of PhD student N = 156; postdoctoral fellow 86; associate professor 69; full professor 111. Moreover, the gender differences presented here are not controlled for other background variables. The material is too limited. However, we do not believe this would have made much of a difference. Gender is largely an independent dimension in the material, as shown in Chapter 6. Note that the problems were not time-limited in the survey. They may include previous experiences, not just experiences at the current position level, although we have reason to believe that they mostly concern experiences here and now (see Appendix "Method").

10 The figure also shows some cases of "reverse gender gap", i.e., more widespread problems among men than among women (i.e., having to work harder than colleagues, and problems with colleagues' attitudes, on the associate professor level). This appears only sporadically in the FRONT material (see Chapters 2 and 6).

11 The analysis here is simple and descriptive. We show what gender is associated with. We take a closer look at other background variables that may be important when interpreting gender differences in Chapter 6, and at possible causes of the problem patterns in Chapters 7, 8 and 9.

12 Detailed analyses confirm this picture. For example, we see that the proportion on the professor level who experience academic devaluation in the sense of constant scrutiny is 9 per cent among men and as much as 38 per cent among women.

13 For example, in that a larger proportion of female students means a greater chance of reporting sexual harassment, based on the fact that it is generally mainly women who report this problem. On the other hand, it is conceivable that faculties with a larger proportion of men will also have a larger proportion who harass others. In Chapter 3, we discuss the material on sexual harassment in more detail.

14 N = 4,871 researchers in the natural sciences/STEM disciplines.

15 Gender neutralization was described as part of "domination techniques" or "master suppression techniques" already in early women's research (H. Holter, 1976; Ås, 1981) and as part of "organizational defence or avoidance mechanisms" in relation to gender equality (H. Holter, 1992). The tendency has been identified in much later research (see e.g., Ø. Holter et al., 2009; Madsen et al., 2005; Skjeie & Teigen, 2003).

16 Subject to the fact that biology students had a higher proportion of women in relation to the other student groups in the survey.

17 It may seem a bit striking that a university that otherwise strives for a very active role in recruiting students and researchers here can be presented almost as an innocent "victim" of gender traditionalism in society in general and in the family in particular.

18 Some previous research indicates that teenagers and young adults can be more "gender traditional" than adults in the phase with small children (Teigen, 2006). Particularly the youngest emerge (somewhat unexpectedly) as gender conservative. This can probably be linked more to life phase than to age as such. The problems of a lack of gender equality are experienced more clearly as young people get a job, have children, and must combine this.

19 In Chapter 2, we further address men and masculinities in relation to gender equality and demonstrate how gender equality varies somewhat across genders (Ø. Holter et al., 2009, see also e.g., Barker et al., 2011, Warat et al., 2017).

20 Statistically significant difference from bivariate analysis (SPSS). As mentioned, some of these are relatively weak correlations (for example that women have 110–120 per cent frequency compared to men), whereas other parts are stronger (usually 130–200 per cent, sometimes even more).