Outcome of the GENERA interview series

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8. Institutional aspects of gender equality in physics

Among the themes raised in the interviews, institutional aspects of gender equality in physics were thoroughly discussed, including opinions about the desired role of research institutions in fostering gender equality, attitudes towards actions and measures taken by own institutions to enhance gender equality as well as stance on introducing special measures in research organizations. While these problems were included in the scenarios of both semi-structured and expert interviews, in 10 particular interviews (8 from Spain and 2 from Switzerland) they were not discussed. Therefore the following analyses are based on the results of overall 73 interviews. The findings concerning these issues are discussed in three consecutive chapters.

Roles of institutions in fostering gender equality

One of the aims of the conducted interviews was to recognize the physicists' understanding of their role and the role of their institutions in enabling gender equality in science. The respondents were asked whether there are any solutions to raise women's participation in physics and whether research institutions should support women by implementing them.

From the narratives of female and male physicists and leaders it comes out that most emphasis is put on changing the wider cultural environment of science through interventions in the school curricula and fostering recognition of gender differences and gender inequalities among scientists.

Modifying the wider cultural environment of science

While the need to act towards fostering gender equality is quite widely recognized, it does not automatically mean support for introducing gender equality measures within the research institutions. As inequality in physics is mainly perceived by the respondents as a result of wide social processes, including socialization (see the chapter on “Reasons of dominance men in physics and barriers to women's success”), the respondents emphasize the need for changing the wider cultural environment of science. The dominant attitude is that transformations have to start somewhere there, including the whole society and its' particular institutions such as families, schools and governments. The way many physicists talk about these transformations may suggest that they themselves do not clearly see own role in initiating and developing these changes. Either “the others” are responsible for changes or this responsibility seems undefined. Most generally, the interviewees argue that to change the situation in physics institutes, **social mentality has to be somehow modified** to make women's career in science more acceptable and, therefore, more accessible. This should start early with the social practices of upbringing children, mainly by teaching both boys and girls to trust in themselves and ensure that both believe in themselves, with no fields in which they feel ill-suited:

- *None of action taken at the University will be as effective and powerful as change of social mentality and the way girls are treated, and boys, because it works both ways.* 55_F
- *You have to change the society at this point where little boys and little girls separate themselves from each other and the girls are cooking with the mother and boys go fishing with their fathers.* 20_M_L
- *I think that one should change that you somehow, well, provide girls and boys with the same belief regarding what they believe they can do.* 06_F
- *There should be a change in the society, that make women able to emerge in this field. The problem is not just about physics, you should be able to choose the physics without feeling the need to be helped as a woman.* 36_F

The change of social mentality and everyday practices together with an active role of educational system may result in raising the number of female physics students, which for some respondents is a precondition of any efforts towards gender equality in physics:

- *Everything starts somewhere there at the phase of primary school, right. So if one would like to ...., it's simply necessary to have better physics teachers, who can encourage wider circles. I think that generally in this moment there is a tendency, that not only in Xxx* [interviewee's home country] *the youth reluctantly engage in science, right?* 73_M
- *First and foremost, it is necessary to raise the number of female students, this is the first thing (...) and this is the key. (...) I have no doubts, that this is the role of schools, maybe there is also something to be changed in academia (...), but if I have two females within a group of 40 undergraduate students, what on earth can I terribly change? So, I don't think that there is something we could have changed here, to change the proportions [*of female physicists*], they won't change.* 54_M_L

Power relations in families and traditional division of gender roles are other aspects of cultural environment of physics that - according to our interviewees - need to be transformed. Given that child care is perceived as one of the factors challenging women's professional advancement (see the paragraph on “Reconciliation of private life and work engagement” in the chapter “Reasons for domination of men in physics and barriers to women's success”), changing social norms concerning parents' engagement in upbringing children seems especially inevitable:

- *Culturally, the idea should be provided that both a man and a woman have the same rights within the family; it should be foreseen that also the father, and not only the mother, take time off.* 46_F
- *At least males must take the parental leave. Only if males are obliged to take the parental leave, then the way of counting publications and success will be done with the same measure and then equality can be reached much faster. But if you go on in having even males or your partner that does not take the parental leave, because this is something for women, then you don't, you don't move on. So, you really have to, not giving more opportunity to females, but try to remove the differences.* 12_F_L

One of the female physicists directly expressed a belief that to understand current gender inequalities in physics it is necessary to look at wide cultural - and institutional - factors which are determined by deep historical processes. According to her factors seemingly unrelated to physics sustain the prevalence of patriarchal culture which is unsupportive for women pursuing career in science:

- *Culturally it is a big problem in Xxx [interviewee's home country]. Women here got the vote not*

so long ago and the culture of school which is closed on Wednesday is predicated on someone looking after the children. If both members of a child bearing couple work they have to find alternative child care. This is not how to encourage women to have active careers. You really see that it is a country that hasn't dealt with many equality issues properly. For example if a man and a woman marry and want to keep their own names there is a lot more paperwork and the default option which requires no paper work is when the woman takes the husband's name... So I recommend: don't make such assumptions about women staying at home looking after the children...there are many ideas left over which reflect a culture where women were second class citizens. 04_F_L

In this context the decisive role of public authority and especially - legal regulations - in changing both mentality and social practices is discussed by some of the respondents. They indirectly express a conviction that social transformation towards gender equality is not possible without adapting law, which - together with financial incentives - makes changes obligatory and, therefore, effective:

- *In my opinion in order to balance the participation of women and men in physics it is necessary to introduce some measures, some legal regulations. Surely much depends on an individual person, but if there are some regulations, the mindset of many people might have changed and they would have respect competent individuals. Because for example my female colleagues from my grade were clever and skilled, but still they dropped out. It is also necessary for these regulations to be followed by concrete material resources for the realization of given tasks. This is an important choice - either we want to live in an egalitarian society or in a primitive one.* 74_F
- *(...) make mandatory that men have to take the parental leave in order to have some financial support. And so from one side it should be the government that makes this obliged - obliging people to do it.* 12_F_L

While many interviewees concentrate on others actors' impact on changing cultural environment of physics, others clearly recognize their role as scientists and the role of their institutions in facilitating gender equality in science. For some of them public research institutions are the ones that have a vocation for initiating gender equality changes in social mentality and practices:

- *We work in a public institution, so if the state really wants things to change at the level of society, we have to start with us. It is by being exemplary that we can bring about a collective change.* 33_M

According to the respondents the function of research institutes in bringing general social change should manifest in making interventions in the education of young generations as well as in fostering recognition of gender differences and inequalities among the scientists. **Scientists' interventions in schools** should be firstly and most importantly aimed at counteracting gender stereotypes, demonstrating role models to girls and, through these actions, attracting young women to physics. Visiting schools and giving talks to pupils by physicists, especially by female physicists, should challenge the prevailing idea that it is rather men who is suited to be a scientist:

- *Xxx [*the name of the research organization*] should point girls in high school to tell them it's possible to have a career in physics, whatever is your gender. This is not only a men's career. But it's not only for physics: it should be made for scientific area in general: mathematics, chemistry, engineering, all this jobs which have the reputation to be for men only.* 33_M
- *I don't know if we can change some teachers' mentality but we can do our own actions as university, e.g. by inviting students from schools, and showing them that physics is not only for men.* 61_F

- *My goal is to show the girls that doing physics is normal for a woman. I want to destroy stereotypes that science is not made for women. This communication is really important.* 36_F

For our respondents the female physicists, including these who have reached high positions in science, evidently should act as role models for girls and young women. In correspondence with the findings on the role models and mentors in reaching gender equality in science (see e.g. Bonetta 2010), the interviewees see it inevitable to actively eradicate a well-established stereotype that career in physics is not a realistic option for females. In this context it is argued that interventions in high schools - and in universities - are crucial to target young women who are about to take decisions regarding continuation of education, the choice of the subject of studies and whether to take up a career in science:

- *So one of the initiatives that I would personally like is to have our females to give more talks at schools about our job, in order to make children from school having us as models.* 12_F_L
- *I think it's very important that for example women in high school or university can see or talk to women in top positions. Because communication with us could help them to understand that they can make it because eh, if they see there are a lot of males in top positions eh, maybe they see the professors are all male or they use to talk with males they don't see a future (...). Either in high school or the university they say okay, I would rather go for something else, I would rather go for teaching at the high school or whatever because there are no opportunities for me at the university or in the research field. So, if they do talk with women in top positions they are encouraged for sure to, because they can see models, so they can see that somebody managed it. So, I think for them it's important to have this, let say, this encouraging point of view in the discussion. So, this could be another, another thing, I believe it's important. It's something we should keep in mind to try to have meetings with them. (...) we have to keep them on track somehow to balance the numbers.* 21_F_L

The ultimate goal of the discussed interventions in schools is to raise the numbers of women deciding to pursue careers in physics, which would be a necessary condition for further enhancing gender equality:

- *That's I think that we should really have an effort in having us going to schools to speak. Because then you even enlarge the pot from which new generations come up. Because at the end what you want to have is really a large quantity of females, because the more they are, statistically, more good people you will have and statistically would be easier to compete with males. If there are not many, then it is difficult to justify that among the few they are all super cool, super great.* 12_F_L

In the context of scientists' interventions in the educational system some of the interviewees refer to initiatives taking place in their institutions as examples of projects aiming at changing the social image of physics as difficult, unpractical, male dominated and not suiting women. These are Girls Days in the German context or PhysiScope in Switzerland, which bring practicalities of being a (female) physicist closer to the outsiders:

- *Something like 'Girls day', actions like 'Open Day', to see real people who are female scientists, who are female physicists.* 17_F
- *Get more [girls] in by going to school and try to recruit in a subtle way. For example half the PhysiScope presenters are young women.(...) Some students have no idea what science looks like so suddenly they see people like them and they believe they can do it too. Otherwise the image of a physicist is someone not like them at all*. 04_F_L

Another way of influencing the change of social mentality and social practices that has been recognized by the interviewees is to **foster recognition of gender differences and gender inequalities among the scientists** themselves. It has been noticed that recognizing gendered aspects of a scientific career and gender inequalities in science is not universal, as it means contesting the existing social order that is posited as natural. It can be especially difficult from the perspective of the members of the dominant - and privileged - group in physics, the men:

- *It is the role of the institution to encourage a change in professional practices, and in mentalities. Changing mentality is not natural. You do not question an idea that has always been obvious.* 38_F_L
- *This is very important, that the community itself has to understand and except that there are differences and it does affect the career of the woman and this is very important to be accepted and of course if the community is mostly composed by men that's less probably because they don't understand, I mean it's difficult to understand for them.* 21_F_L

Recognizing gendered aspects of being a physicist demands a social skill acquired through deliberate, systematic, and sustained effort. Therefore, the interviewees recognize the role of their institutions - including their specialist bodies - in acquiring this ability by the scientists. Especially the usefulness of gender trainings, including compulsory training for people in leading positions and in scientific committees, workshops, thematic talks and conferences is discussed:

- *If there are gender specific elements in career development it would help if Xxx* [gender equality office in respondents' institution] *does something there but also for us to be aware that there are elements that are not the same for men and women.* 18_M_L
- *Xxx* [respondent's institution] *should raise awareness on researchers, because the problem exists and women struggle to be considered as men.* 45_M_L
- *Trainings and conferences might raise the local awareness on this topic.* 81_M_L

While the need to raise gender awareness of both rank-and-file scientists and leaders is recognized, the details of such activities need to be well thought out as at the same time some of the physicists who already underwent gender trainings perceive them ineffective and wasting their time (see the next chapter on the Evaluation of institutions in fostering gender equality).

Necessary measures in reconciliation of work and private life

Apart from direct and deliberate influencing social mentality outside and inside research institutes, the interviewees see the need of taking measures for better reconciliation of work and private life, which is predominantly understood as enabling female (and male) physicists to balance their professional duties with the role of a mother (and a father):

- *Women professional and personal challenges should be reflected in the support the institution gave for all employees.* 82_M
- *One of the worst problem women can encounter is having no support when they have children, and have to stop their work for childcare. I hope I will have support of my employer if I have children one day.* 36_F

In this context it is worth reminding that some respondents suggest that parental leaves for fathers should be obligatory in order to modify the social perception of and social practices in gendered

division of child care. Moreover, according to the respondents, the physicists who are parents should be entitled to **additional time for advancement.** While it is acknowledged that this measure could be available to both male and female physicists, it is women who are believed to benefit from it most:

- *At all stages where it comes to evaluation, this would be a very good thing, just give parents more time, target parents, but women will use it because they need it.* 13_F_L
- *It's really considered for example that if you had a pregnancy or something that you get additional years. That you can use to try for example to achieve some grants or, or somehow to give more time to women to achieve the same CV of men. So maybe when you compare the CV of a man to the woman's one you don't really compare that they are at the same age, you compare them by giving the woman more time because she needs more time. She will have the same results. This way would be a little bit more relaxed. So, this doesn't mean that you are up to create fix quota or to advantage the women, but it sights just to give her more time to consider that she would require maybe three, four years more compared to man to achieve the same CV or the same level. Maybe it won't fix completely the issue but sometime, I mean, maybe somehow to relax the parameters in the evaluation in case you are a woman and (...) for example you have children or you are pregnant or whatever.* 21_F_L

Another measure for life-work reconciliation, this time explicitly dedicated to female scientists, would be **easing their return to science after maternity leave,** which sometimes might be problematic. According to the interviewees special programmes dedicated to returning scientists as well as enabling work flexibility would facilitate the decision to continue scientific career after a woman becomes encumbered with new caring responsibilities:

- *When a child appears in a family then it is a woman who takes most of it on herself. Women very often choose here to stay at home with a child instead of continuing the career, because - let's face it - scientific career do not foster stabilization and having life outside the lab. (...) I think it would help women a lot if there was a facilitation of the return after a maternal leave, some kind of measure would be needed. Possibly, there are already some in place, I heard about grants called 'Returns'.* 55_F
- *Probably, measures for family can always be improved. There's the obvious things that you can do like home office* 18_M_L

However, the most often recognized measure of work-private life reconciliation is **providing facilities for children,** including nurseries and kindergartens**.** Available child care facilitates reconciliation of work and private life of both females and males, however it is mainly understood as a direct way of fostering women's retention in science, as "*it is typically the woman who will stay at home*" (02_M_L) in case of inaccessibility of day care. In this context few respondents talk about the necessity of resolving the general problem of the availability of nurseries stemming from the shortage, expensiveness and lack of compatibility between opening hours of these child care facilities and physicists' working hours, as in the case of *crèches* in Switzerland. However, most of the interviewees discuss the advantages of setting up child-care facilities within research institutes. Thanks to them, female (and male) scientists can better manage their time and therefore work more effectively:

- *If there was some kind of institute's kindergarten, for sure mothers would be encouraged to stay longer in the workplace for instance, because when I come to work and I know that my child is two buildings away then I know I can go and see it for an hour, it is not a problem, right? This would be a good solution but I don't know if it's possible to formalize it.* 55_F
- *The ideal solution would be to have a nursery integrated in the laboratory, such as some big*

companies have integrated nursery. This would make possible to drop the children the morning just before to go in your office, and to be present if there is any worry. I guess it must be very expensive and we cannot afford it, but it would relieve the parents of an enormous weight. 35_M

Apart from nurseries and kindergartens in the workplace - or in cases when the respondents do not see the possibility of setting up these institutions (a returning theme is the expensiveness of such an endeavor) - they talk about part-time solutions, such as after school care or ad hoc care when a parent takes measures at a laboratory or goes for a business trip:

- *(...) and also for older children - sometimes they finish school at 1 pm and you have to do something with them, so maybe a day-room for children could be useful, so I could go back to work and children could play with each other. Such solutions will be amazing, because now when we go home it's hard to do anything with children. 61_F*

A solution alternative to establishing a nursery or a kindergarten in the place of work, would be subsidizing by the employer the outside child care, which sometimes is unaffordable for young scientists or granting financial support for employees' self-help groups:

- *(...) strengthening of self-organization of women who, for example, live near the university, all have children of certain age and would like to have, I do not know, a social kindergarten.* 58_F_L

Solutions in hiring, retention and promotion

Another field of gender equality interventions recognized by our respondents concerns measures in hiring, retention and promotion. On one hand, the interviewees emphasize the role of merit, qualifications and productivity as the necessary sole and gender-neutral criteria for employment or advancement of the scientists. On the other hand, they notice that if these parameters were really in force, it was "*a little odd that there are so few women*" among successful physicists (08_F). Therefore they infer that recruitment and promotion processes are burdened with gender bias and unclear selection criteria and need intervention:

- *The local recruitment process need to be very much improved, also the leaders mentality.* 83_F

According to the respondents, the **criteria and processes of evaluation** of candidates to positions, grants and awards should be genuinely made **objective** and **transparent,** so that there would be no doubts about the verdicts of various decisive bodies:

- *(...) my observation shows that it would be good if it was an **impartial person**, who would] for example set the conditions of employment. So there must be an objective look, because the issues of the interests of various individuals play a very important role.* 74_F
- *I would like to see more transparency for **who** has what position **and why** they have that position. Why some people get long-term positions, other people don't. All sorts of things.* 10_F

Moreover, the selection and evaluation criteria should be made universal and long-lasting, which would make them predictable and would enable scientists to accommodate to them:

- *During the competition they should select objective standards valid **everywhere** and **every time** when evaluating competence.* 39_F
- *Obviously there should be transparent selection criteria. I would like that there are clear*

*guidelines for the evaluation process and that they remain **the same for long period** because researchers can adapt their work to what is requested as evaluation criteria.* 40_F

Interestingly, only one respondent, and moreover a male senior physicist, talked about the necessity of eliminating considerations of private matters of the candidates in the selection processes. It might suggest that either this practice is rare in the scientific community due to legal constraints, or its' inappropriateness is not well recognized:

- *During the selection process I'd like to eliminate all these questions referring to the intimate sphere of the person, such as 'what do you want to do with your family' and so on. Those are really tendentious questions.* 45_M_L

Another important way of intervening in the selection and promotion processes in physics is **acting against precariousness** of physicists, understood as insecurity and instability of work due to the dominant pattern of employment through multiple temporary contracts. While the instability of employment in science hits both women and men, the interviewees notice that it is especially detrimental to the female scientists, as it hinders their decisions about family formation (for details see the chapter on “Career paths...”). Therefore, implementing permanent employment in science is desirable, as it will enable female scientists to “*make projectable career paths*” and to be given “*realistic perspectives*” (13_F_L). However, this would require a systemic solution rather than an effort of a single institute:

- *One very easy step: to stop the precariousness of the profession of researcher, because it turns immediately against women. When you have to do 5 post-docs, at 40 years old you have lost all the women. The few of them we have, who are courageous enough to come in our domain, will be disgusted. You cannot settle for a short term contract if you want to create your family.* 34_F
- *What I would really like is having more female permanent positions, so you need to have more permanent positions, uh, openings. But we know that this is not happening at Xx* [respondent's home institution] *in general, because there are no permanent positions anymore.* 12_F_L
- *To facilitate the work, under normal conditions so people do not think that 'in three years my contract will end and what then', to think about these young people, especially when it comes to young people, there are also girls in this, ugly speaking, reproductive age.* 57_F

Mobility is a frequent experience of physicists and is seen as an indispensable element of their careers (see the chapter on “Mobility, migration and internationalization of science”). At the same time, it is a challenge in terms of their professional and private lives. Therefore, any **facilitation of mobility** is needed, but it seems that the most expected measure is institutional support in settling partners of the relocating scientists, namely in their seeking employment. In case of dual career couples, it simply means offering a job for the partner of an admitted physicist:

- *And Xxx* [respondent's institution] *is a big institution therefore I think that it could be done more, also for the first time, offer limited jobs but also long-term perspectives for the partner.* 17_F

When a physicist's partner works outside the field, the assistance in looking for a job in an institutionally and culturally unfamiliar setting seems to the bare minimum, however support can be based on a systemic solution of formal agreements with the representatives of other economic branches on time-limited employment. While these measures would be applicable both to male and female physicists, they can be crucial for women's decisions on moving or migrating as it is them, who are more often objectively and culturally constrained with the demands of their partner's professional career.

- *When you move in a new country and your partner follows you, he could receive information and help in his research for a job (...) Ok, you are, whatever, mathematician or florist, we know this company or this one in Xxx* [respondent's host country]*, we can help you to adapt your CV (...). It could be just one person in the university, but that could make a huge difference.* 37_F

- *For every time that we got a "No, thank you" when we offered the job to a female, I think that if there was a better coordination among us, or a better link with the industry, so that the partner of the person that we wanted to hire will have had a possibility, then it would have been easier to hire the females. So, having like an agreement with some, eh, I don't know, Xxx* [name of a company] *or any other big company, that for, eh, 5 years can have, eh, host an engineer that is normally working somewhere else in the world and having this, eh, double career help support. That is the thing, that, that, you need. Because only in this way, the women when she got the offer, she can say 'yes, I come, but I need a job also for my husband'.* 12_F_L

Some of the interviewees discuss introducing **direct measures** for enhancing the presence and advancement of female physicists. These include special hiring programs offering female physicists high-profile positions:

- *Xxx* [interviewee's home country] *has special job offers, positions dedicated to women, also special scholarships, very prestigious. It's not easy to get it, but women have additional motivation to be productive, to apply for such prestigious position, because it's of course time-limited, but after that you can get a permanent position if everything will be ok. I think that something like this could be here at our university, maybe every department (...) but I guess that physics is this discipline where women are the most underrepresented so it's worth thinking of such a solution.* 61_F

- *I think, the only thing would be to offer specific programs for women. Something like 'excellent women in physics' or so, hm. So as temporary measure. That they are systematically searching for excellent women. (...) So yes, I think, the only thing would be to offer specific programs for women 19_M_L*

Another method of increasing the proportion of female physicists discussed by one of the respondent would be openness to interdisciplinary projects and hiring women from other disciplines, which are more gender-balanced:

- *Something like my transfer could be a good solution. I came to physics although I'm not a physicist, so science should be treated in more interdisciplinary way. Because there is no harm if somebody without physics background comes, if we want to have more women, we could invite them from chemistry, medicine, biology, why not? There are plenty of them there, they can come here.* 60_F

Enhancing the presence of female physicists in the research institutes further requires deep structural changes warranting gender balance in leadership positions and in the decision-making bodies through introducing new positions in the structure of the institutions and changing existing procedures:

- *I think that some sort of intermediate positions could be created, like 'the leader position'. Because there is plenty of areas that could be covered. We don't have this leader position, only the supervisor* [who, according to the procedures, needs to be a senior, a scientist with habilitation]*. (...) this could have helped women to prove themselves.* 65_F

Additionally, in the context of structural integration of gender equality a few interviewees from one of the institutes talk about the possibility of establishing a gender equality office, which could work on raising gender awareness among the physicists and preventing acts of gender discrimination.

However, while they emphasize that existence of such a body is a norm in research centers around the world, it remains unclear to what extent they perceive it as an effective solution fostering gender equality:

- *In most of the places I've worked there were or gender equality networks or offices. We can take the example.* 79_M

Few of the respondents who admit that research institutes - as well as other social actors - could and should take active steps to foster gender equality in physics at the same time admit that they are lacking competence necessary to identify effective measures for resolving existing problems:

- *I really do not know how this could be solved, but we are not moving in the right direction.* 29_M
- *(...) any actions directed outside, to attract women to physics are thinkable, we have to only identify this problem, because I don't know what I should do, now I walk through mist.* 54_M_L
- *I have no ideas what could be done.* 06_F

Conditions for success in implementing gender equality measures

In some of the interview narratives the problem of effectiveness of various gender equality solutions is raised. Among the conditions of success in fostering gender equality in physics the respondents point at the necessity of transforming gender equality **ideas and regulations into actions:**

- *We don't only have to speak about this, we must act. 79*_M

This opinion might sound obvious and not requiring further discussion. However, the accounts of a few interviewees imply that in some cases gender equality procedures and measures remain 'on the books' and organizations fail in “making staff aware of specific measures and creating opportunities to discuss any questions or issues they may have” (Lee, Faulkner, Alemany 2010: 9). Apart from adequate publicity and promotion of gender equality solutions, it is also necessary to monitor their effectiveness in improving female physicists' everyday life, which might be problematic:

- *I have the impression that the first problem is that no one knows the actions implemented. You tell me there are some of them in the Xxx* [interviewee's institution]*, but I never heard anything about this. The first point could be to communicate better about the existing measures.* 36_F
- *I have the impression that there are records and announcements at the high management level, but it is never followed by concrete effects in everyday life in the laboratories.* 34_F

In this context it is worth noticing that the analyses of various equality initiatives in the workplace demonstrate that their effectiveness depends on establishing clear leadership and responsibility for organizational change (see for example Kalev et.al. 2006; Vinkenburg 2017). It is argued that it “will guarantee the long-lasting effect of a gender policy since this proximity to 'power' prevents a gender policy from becoming just another policy paper (...)” (European Commission 2012a: 27). Our respondents also point out the role of the **management engagement** in the gender equality initiatives:

- *I think GEPs are a good solution but a real commitment is needed from management.* 42_M
- *Talking about it is a fine thing and it works well if important persons talk about it.* 49_F

Similarly, some respondents emphasize that the establishment of gender equality aims and solutions

should be a result of **multi-actor engagement**, which means cooperation between the actors from all levels of institutional hierarchy and equally engaging female and male scientists: At the same time, there should be agreement between the institution's leadership and associated departments or institutes (Lipinski 2014; Morimoto et. al. 2013).

- *This requires persuasion and not forceful imposing, if this came from the central authorities it would be nonsense, if this came from the faculty authorities it would be nonsense too. If this came through a talk within a faculty and well formulated questions, and then this group formulates conclusions, it might work.* 59_M_L
- *Solutions must be found together, women and men.* 46_F

Few of the interviewees discuss the positive aspects of having gender equality targets imposed by other actors, including the state and international institutions. **Pressure from outside** mobilizes to action, especially when financial incentives are introduced:

- *In my point of view, you need pressure from outside, from any institution. Somebody has to say: If you don't do this, you will not get the money.* 19_M_L
- *Or we can imagine that the Ministry* [for Science] *creates a programme that would award universities for accepting women for the post of assistant professor or offer an allowance for those universities. In our system financial incentives are activators of change.* 59_M_L

Last but not least, one of the respondents argues for the necessity of tailoring gender equality measures by taking account of the **cultural and institutional specificity** of research organizations and monitoring the results of the undertaken actions:

- *Keep listening to ideas. Pro-actively look for solutions for advice, not everything will work. Cultures are different and institutions are different. A program that works somewhere else may not be successful here, but you have to keep pushing and looking. There is lots of inertia and it is tiring. It can be discouraging.* 04_F_L

Only few interviewees present negative attitudes toward any institutional and systematic interventions in the field of gender equality in physics. Their doubts concerning the effectiveness and worthiness of institutional measures for gender equality in science stem from a belief that they are not targeted at the roots of inequalities, which are primary socialization and women's attitudes:

- *The role of institution is limited. Any mechanisms introduced in academia could be even counterproductive. Inequalities are made and strengthened at the phase of upbringing and families are the ones that are solely responsible for a low number of women in physics. (...) I think that laws regulating such issues when people are already shaped/determined, would be a loss for everyone, and especially for science.* 53_F_L
- *I think it's not an institutional problem after all. I think it's more about what women think that society expects from them. It's more about their values and their believes.* 14_F

Evaluation of institutions in fostering gender equality

Both semi-structured and expert interviews addressed the problem of the respondents' perception of work done by their own institutions for enhancing gender equality. The interviewees were asked whether their institutions are taking any actions to support women in physics and, if yes, how they assess these activities. Additionally the persons being in leading positions were prompted to talk

about their own engagement in fostering gender equality.

When directly asked about any solutions that their institutions have implemented to enhance gender equality a considerable group of interviewees (representing 7 out of 11 institutions) either blankly deny there are any, as in the case of the respondents from the Polish and Romanian institutes, or admit **they have never heard of any special programs** or "*extra affirmative action*" (22_F). In this context one of the respondents metaphorically describes perceived underdevelopment of his institution in dealing with gender inequality:

- *I do not see any particular effort on this topic at Xxx [interviewee's institution]. I think Xxx's gender policy is like a delayed train that already departed late from the original station and will arrive late anyway at destination.* 42_M

A few of the respondents admit that while there are some institutional frameworks in their institutions, including a gender equality office, their **knowledge about the existing procedures and solutions and their effectiveness is limited**:

- *So, I know we have a gender equality officer, but what is done exactly, I would not know.* 08_F
- *I know Xx [equality office in one's institution], but there is little popularity of the existing measures, very little is known.* 46_F

It is necessary to notice that these are mainly early career physicists who admit that their knowledge about gender equality measures introduced in their institutions is either lacking or limited, however a few of the senior scientists and leaders also signalize this problem and simultaneously provide possible causes of their being ill-informed. Some of the interviewees complain that their insufficient knowledge is the result of **poor dissemination of the information on the activities and measures** taken by the bodies responsible for gender equality in their institutions. In some cases gender equality policies are argued to be boiled down to a **sheer formality** known to a limited number of people rather than real actions engaging all stakeholders:

- *I know that it exist but I haven't ever been in contact with it. I see it as a formal thing and I perceived it as far away from me and I am a research director so, I should have noticed that. But I haven't ever received communication or something similar.* 45_M_L
- *I've heard we have rules to enhance equality in selection committees or to make human resources aware of the gender equality problem, but I'm not very familiar with these actions. I have to confess I heard there is a committee working in woman/man equality issues. But I don't know exactly what they are doing concretely. It's like they are checking a box, 'we made an equality plan', but the staff working in the laboratories is not concerned afterwards.* 38_F_L

When talking about inefficiency of gender equality actions in engaging all employees, two female physicists notice that it happens that male employees are either not being informed about some initiatives or do not feel being involved or interested in them:

- *Two professors forwarded the announcement of the Gender in Physics Day, but only to the female PhD students, so no one of my male colleagues went to the event. It should be broader announced.* 51_F
- *Well, most male colleagues have simply not felt addressed from the invitation* [to an event introducing gender equality work and GENERA]*, there they said to themselves, 'well, I do not have anything to do with this, it does not interest me' (…)* 06_F

The opinions of some of the interviewees suggest that the undertaken measures and actions towards gender equality are perceived as misguided as they either d**o not have an impact** on everyday relations in the institutions or their positive **effects are limited** to a small group of recipients rather than to a broader population of physicists:

- *There are some measures, for example the Xxx* [equality office in one's institution]*, but I believe that in everyday life they don't affect so much.* 50_M
- *Yes, so I believe that (…) [own institution's gender equality] programmes are already very good (..) but they reach relatively few women and not the broader population. That is rather targeted towards excellent women, so few excellent women.* 06_F
- *I would give Xxx* [respondent's institution] *high marks for awareness and motivation, but medium on concreteness, on real world issues.* 04_F_L

Some interlocutors point that inefficacy of some of the measures is the result of their **poor design** and **lack of comprehensiveness**. Therefore, instead of resulting in far-reaching positive consequences, these solutions generate negative responses of the physicists who feel that their engagement in such activities as role-model talks and gender equality trainings was only a waste of their precious time:

- *When I was in Xxx* [a city where a respondent did her PhD], *there were these talks where women from industry would come to speak with us of career stuff. The problem was that these talks were completely not adapted to the audience. There was this lady telling us that her biggest success with her husband is that they both pay 50% of the cleaning lady at their home? How is it a success? It was a completely loss of time and they forced us to go to these useless talks which had no relation to research.* 37_F
- *How long it has no far-reaching consequences? It is hard. So, only to give an obligation seminar? And we (as group leaders/scientists) just hear for one day how important gender equality is in the scientific career. You go there, you leave and you are angry because you've lost a day.* 19_M_L

As far as knowledge and opinions about specific activities taken in home institutions to foster gender equality are concerned, the respondents identify interventions targeted at pupils, measures concerning recruitment and promotion as well as solutions for enabling reconciliation of work and private life. A few of the institutes take up activities aiming at **attracting pupils to physics.** These initiatives are seldom addressed exclusively to schoolgirls, as in the case of the Girls' Days in two of the German institutions:

- *What comes to my mind and what I think is a good initiative is that they have, like here, Girl's Day at this institute and, also, I think at Xxx* [another physics institute in the same city]*. And then they try to show good examples of successful female scientists (…).* 11_M

More often these projects aim at explaining the rules of physics, popularizing physics to schoolchildren or encouraging high school students regardless of their sex to study physics and mathematics at a university level. While none of these programs is explicitly addressed to girls or young women, one of them is argued to be inspired by the willingness of raising the number of female students in the institution. The respondent being directly involved in this initiative finds it an important part of his duties and evaluates it as useful and effective in winning the interest of young women:

- *I am very proud of the Xxx program I am responsible for which has been a huge success. (…) It*

is a project encouraging students in their final year of college to follow a first year University Physics course. (...) They have a tutor and they take the exam and if they pass the exam they get a credit... This was inspired by the idea that we suspect at college the interest is 50/50 girls and boys but there is something that breaks the girls. (...) The girls were almost always in a group where the tutor was a young women chosen to be a role model. Already in the first year [of this program] *50% were girls.* 02_M_L

Some physicists discuss the gender equality **interventions in recruiting, retention and advancement process** that are applied in their institutions. These measures include active looking for female candidates, formal or informal rules of giving preference to females when the skills of candidates are equally rated and founding special grants for female scientists.

- *When we open a position we have to search for a minimum number of female candidates. There must be roughly 4 out of 10 otherwise the rector doesn't allow us to proceed unless we justify our shortlist.* 02_M_L
- *I was discussing just with the personal office when they explained me the rules for hiring somebody in my group and they said: It's not that you are forced to fixed quotas but somehow you are encouraged to consider a bit the gender balance.* 21_F_L
- *Now we have the Xxx* [a name of scholarship] *which is only for women in budding professorial positions.* 04_F_L

Additionally, the respondents from Poland talk about the routinely practiced statutory requirement of considering career breaks caused by caring duties when deciding about recruiting, retention and promotion. The interviewees who talk about the gender equality interventions in the recruitment, retention and promotion generally find them both legitimate and carefully observed.

- *I believe inherently that it is already established [in selection procedure] that women, if it is 50/50, are preferred. This is, I do believe, already clear. It is also established that interviews cannot not be conducted without an equal opportunity commissioner, ehm, and I find this good.* 20_M_L
- *(...) institutions do it in this way, that they all decide that for example there is, let's say, 8 years for the post of an adjunct professorship, but if there is maternity leave, this time is not included. This is an additional time. Or parental leave ... And everyone is scrupulously observing this rule.* 71_M

While not many respondents in leading positions declare being active in working out any gender equality measures, a few of them admit they initiated or conducted career workshops for both female students and employees. Moreover, some of the respondents recognize that senior physicists and the institutional leaders demonstrate attitudes of strong support for or authentic engagement in setting up measures for raising the number of female physicists:

- *For professors in my group it is crystal clear that there should be more women in the field. And they say that without any reservation.* 51_F
- *On the faculty level, the last deans have more actively participated with the Equality Office. They have thought about and promoted policies that the Dean's Office as whole put together to raise number of women faculty. There is a conscious effort to carry out actions, which I find positive.* 04_F_L

Negative assessments appear when interviewees talk about measures for enhancing women's visibility and power through establishing gender quotas in various scientific collective bodies. While

from the perspective of female physicists enrolled to a number of such committees, this requirement becomes a time-consuming burden, for the heads of the institutes it might breed difficulties in finding the sufficient number of female candidates:

- *I've been in so many commissions only because I was the only women and this disrupt much of my research time. But often a presence of a woman is required by law and this ends up to be very requesting task for the few women in certain disciplines.* 41_F

[In the EU grants or awards] *there is sometimes this requirement that there should be an adequate number of women in various commissions, and this is truly a problem for us. We forcefully try to have any women in our council, any female doctoral student, etc. (...)* 68_M_L

Additionally, one of the physicists reports a situation in which the employer demonstrated serious insensitivity to the difficult situation of own female employee, who due to changes in the national legislation on parental leave lost her position at the institute:

- *(...) they changed the parental leave laws, (...) before you were extended for the period of time you took leave (...). So when you went on parental leave and if your contract would have still been running for a year or something like that, then you got that year plus the time you were on leave. And now it is the case that, when the parental leave is longer than the remaining time of your contract, then you come back from parental leave and your position is simply gone. They changed that at the beginning of the year and apparently there was a post-doc here who had a child. And then the law changed while she was on leave. And then she came and found out that she did not have a position anymore when she comes back and asked whether they could make an exception so that her contract could be extended. And the directors said 'no'. No one cares.* 07_F

When asked about available solutions for fostering gender equality, some physicists point at **measures for reconciling work and private life**. Besides, the respondents had the possibility to separately discuss this issue, as they were directly asked whether they were offered any solutions to balance their family life and career and how they evaluate those solutions. Most of the physicists point at **childcare support**, including the existence of nurseries and kindergartens, but also day-care facilities, after-school facilities and summer daycare. In most cases these childcare facilities are located outside the workplace and are run either by local authorities or private actors. However, a few interviewees declare using or at least having knowledge about childcare support provided by their employers. This support consists rarely in regular day-care centres, which - according to the respondents - exist in two institutions, however in one of them the facilities are outside the physicists' site, which makes their location inconvenient. Some of the interviewees report the existence of spaces at their institutes, when they can leave their children in the afterhours, in the emergency situations or during school breaks. In this context one of the female physicists talks about informal rule of tolerating the practice of bringing children to the workplace during vacation:

- *We have an office where people, men and women, can come to work with their child if their child is sick and they have a problem with the, uh, baby sitting or such. So we have this place, we have an online booking and people can, eh, book the room for a day or two and it is having a computer space and a game space, so that they can stay there with their children.* 12_F_L
- *(...) very often you can see children during vacation season running in the hallways. Under supervision, of course! No one here gives you a dirty look when you come here for a while to work with a child. So I don't think that there is some kind of impediment from the Institute or Faculty in this topic. And this is all informal, but it's cool that this is not repressed.* 55_F

Among other measures of childcare support the respondents talk about institutional help in finding appropriate facilities outside workplace and receiving funding for childcare. These solutions are generally very well evaluated by the interviewees who appreciate that their institutes are “very child-friendly” and “help a lot” the researchers who have children. However, some of the female physicists talk about weaknesses of the existing measures. One of the respondents notices that the child care facility in her institute does not allow to satisfy all parents' needs. Other comments on the expensiveness of the kindergartens offered by the employers, lack of (breast)feeding rooms, and conditionality of financial assistance for childcare:

- *(...) the university, that it opened a kindergarten for children, I would not say it is for employees' children, only for people who make a lot of money, as far as I am concerned this kindergarten is quite expensive.* 57_F
- *I remember one day I read an email sent by social services of Xxx [respondent's own institution]. It offered financial assistance for childcare under conditions. I sent an application, but it was not accepted because I did not meet all the conditions.* 34_F

The respondents recognize also other than direct support in childcare measures existing in their institutes that make it easier to balance their occupational and private duties. Female leaders in two German institutions talk about working out informal rules of **scheduling professional meetings at times more convenient to parents**:

- *(...) there is openness, openness in allowing time to go from not setting telecoms too late in the afternoon, because the mother or the father has to go home with the children, (...). Yeah, it's just that it is an agreement, saying “Let's make a meeting at 5” - “Sorry, I cannot, because I have to go pick up the child”, so it's, okay, then we fix it, we do it every day, every day of the week at 3.30. And you agree with that.* 12_F_L
- *Well we continue the discussed things like the timing of our seminars or scheduling of our seminars, not have them too late to have them on family friendly times, that's one thing.* 16_F_L

A few physicists, mainly from German, Polish and Romanian institutions, point to the existence of formal or informal rules of granting parents with **flexible working hours** which helps them to better fulfill their caring duties.

- *We have part time employees or have a PhD student in my group who works from home every second week to combine the PhD work with their family.* 16_F_L
- *There are situations when someone has to be relieved from teaching during one semester and is asking for such relief because he has to take care of the child or there are some special circumstances and these are things that we solve on a regular basis and we try to encourage our female and male colleagues to speak about this.* 58_F_L
- *The Institute is permissive with work-family life (...) It's good that you don't have to stay longer hours if it's not necessary.* 75_F

Few respondents discuss a specific measure, namely a special grant funded by one of the Polish research funding organizations and used for encouraging scientists with caring duties to continue their careers after longer breaks. While they generally find this program needed, one of the physicists notice that it is underfunded, which makes it not fully effective:

- *(...), there are grants that are dedicated to women, after a longer absence at work. Special grants. So, you know, there is a kind of balance. I can't apply for such a grant, women can. Only money that is allocated in these grants, is too little. (...) I think that these regulations could*

actually operate well, only if the funds were higher. 69_M

The theme of insufficient funding for balancing professional and private life returns in the narrative of another interviewee who discuss the superficiality of the measures available in her institution for dual career couples. If necessary resources were available, the institutions would be able to offer jobs to the partners of engaged scientists:

- *Or another example, the dual careers office has no power or money so is useless. So when they hire a man and his wife is looking for a job, they just forward the wife advice of job listings or counseling. This is not a solution.* 04_F_L

Last but not least, a few respondents refer to the issue of **measures counteracting gender discrimination**, including overt sexism. Some of them demonstrate a belief that there is no need for introducing so far non-existent special solutions, either because general formal rules are sufficient or because the organizational culture of the institution is permeated by the idea of equality:

- *The statute of our institute and our rules are based on some general laws, which state that one must not discriminate on the basis of this and this. (…) So additionally writing it in would be … There is no director's decree that for example that one must not discriminate on the basis of skin colour or gender, there is nothing like this. But it results from the fact that all our rules are based on the documents of higher rank, on bills, where there is this issue. And I think that the awareness of people in our institute, or the scientists in general is such, that everyone knows* 69_M
- *Equality of possibilities is important. And here [at the Institute], I think, this equality exists. It is not a problem here* 55_F
- *At Xxx* [respondent's institute] *there are no job/position restriction, or any kind of differences.* 80_F_L

Other interviewees declare the necessity of better dealing with the issues of gender discrimination, which so far has been unsatisfactory. Therefore, one of the physicists reports own engagement in preliminary anti-harassment activities in her institute, and the other welcomes with hope emerging gender equality down-top initiatives:

- *For example, we, last year we made this work conduct declaration, where we really wanted to make clear that here we should respect each other and not having problem related to (…) harassment or such and it would be valid also for visitors or people attending our conferences or working at premises that are from our institute like there are small laboratories that are out of this building, but are connected to us. And we really worked hard in making this text, that then the directors approved and we put it on the, on the webpage and now we are trying to make other initiatives and like having somebody coming to talk about harassment and such, so we are collecting the list of actions that then the directors can, can decide, but we are gain slow. Very, very slow. So we managed to get this equality webpage only now instead of the end of March, so it takes time* 12_F_L
- *Also the young students are more aware, including men. There have been projects dealing with gender equality, diversity and harassment that were student initiatives, some of which were proposed by young men which I find very encouraging.* 04_F_L

However, statements of few respondents suggest that the problem of gender discrimination is sometimes swept under the rug rather than dealt with diligently:

- *when there was this one case, with the PhD student who left* [because of gender discrimination]*, there were discussions here and it was asked what should be done and somehow commitment was demonstrated, but somehow nothing much came from it and it faded: (...) Nothing much is left now, from this dynamic, which arose there, which is actually a little bit of a pity.* 06_F

Physicists on special measures

The use of special measures has been widely argued to be an adequate solution “to overcome the effect of historical discrimination and accelerate the attainment of substantive equality for women” (UNDP 2014: 33; see also CEDAW 2004; Rees 2002; Mühlenbruch, Jochimsen 2013). Special measures - named also 'specific' or 'positive measures' - refer to all actions “aimed at favouring access by members of certain categories of people, in this particular case, women, to rights which they are guaranteed, to the same extent as members of other categories, in this particular case, men” (EIGE Gender Equality Glossary and Thesaurus). They encompass a wide variety of instruments, policies and practices, including allocation and/or reallocation of resources; preferential treatment; targeted recruitment, hiring and promotion; numerical goals connected with time frames; and quota systems (CEDAW 2004). Currently, some of these measures are used to counter the underrepresentation of women in science (especially in the STEM disciplines), including individual fellowships for female researchers, legislative gender quotas applied in the decision-making of research organizations, such as scientific committees, advisory boards, expert groups, and university governing bodies and setting targets of a defined proportion of the unrepresented sex in recruitment and promotion procedures (Rees 2002; Mühlenbruch, Jochimsen 2013; Id 2014; Lipinsky 2014). However, the suitability of special measures for science, particularly quotas, is debatable. It is argued that in “academia, where merit and autonomy have a central value, sanctions and incentives” applied to quotas “could be seen as compromising either, and therefore corrupting the system” (Wallon et.al., 2015: 16) Additionally, the concern is raised that gender quotas in various scientific committees “would place greater demand on the small pool of female scientists who would serve on these panels — possibly enough to hamper their career progress” (Vernos 2013: 39). Finally, it is unsettled whether more women in various committees and boards will increase female representation in science and their promotion. The results of the studies on the impact of gender composition of decision-making bodies on hiring and promotion practices are ambiguous (Zinovyeva, Bagues 2011; Williams, Ceci 2015)

In the context of controversy over applying selected special measures to counteract gender inequality in science, recognizing physicists' opinions about these solutions is valuable. The participants of both types of interviews had the opportunity to express their views on special measures in general and quotas in particular. The analysis of their narratives demonstrate that while the general idea of implementing solutions to foster gender equality in science is in many cases acceptable, affirmative action is preferred by a minority of respondents. Above all, regardless of the sex of the interviewees there is a lot of ambivalence about quotas as well as overt resistance to it. The respondents representing ambivalent attitudes towards quotas, while agreeing that they are effective in raising the number of female scientists, point to a number of negative side-effects of their usage and advise to use them carefully, to use them “*as a medicine*”. Those who present an uncompromising stance against quotas either see them as inadequate measures for counteracting gender inequality in science or - explicitly or implicitly - question the necessity of introducing them since there is no inequality in science:

- *I do not agree with affirmative action but I think it would be more useful to start encouraging women earlier to participate in physics.* 03_M
- *It the field I came from there is no need to create special measures for enhance gender*

equality. 80_F_L

- *The women who feel good in this profession, they do not have any barriers to enter these* [scientific] *councils. There are just less of them. 69_M*

The **negative aspects of using affirmative action** that have been perceived (or experienced) by both its' opponents and those who present ambivalent attitudes to it can be categorized in four broad themes, according to which special measures: 1. cause injustice to women, 2. challenge the idea of quality and merit, 3. are discriminatory for men, and 4. are implemented by force and therefore breeding resistance.

The most often risen argument against affirmative action towards female scientists is the belief that it is indeed **the source of treating women unequally**. Firstly and most importantly, when gender quotas or preferential treatment apply to selection procedures, there appears prejudice against female scientists who received a nomination to a scientific committee or were chosen for a position that they are not fit to perform their tasks. It is because their selection for a post is believed not to be based at all on meritocratic criteria and therefore "*they don't really deserve their nomination***"** (37_F):

- *I'm not sure that's a good idea. It always leaves me a little puzzled. When you are there because you have forced the institution to select you for a committee or even for a position, your entourage will inevitably blame you. In any case, even if it is unconscious and not expressed, you colleagues will think you did not have the level and you are not legitimate* 34_F

Bias against female scientists who were selected due to preferential treatment or quotas is not hypothetical only, but it reflects real life situations, which can be harmful for women as the experience of one of the respondents confirms:

- *After I got this position and I came here there were actually good friends of mine and good colleagues at my institution asking me how it feels, what does it feel like to be selected to the job only because you're a woman. So, that was really like a slap in the face.* 15_F

According to another interviewee the exposition to accusations of receiving unjustified privileges impels women to constant proving that they deserve their positions. This damaging side-effect of preferential treatment together with male resistance towards over-privileging women are the sufficient reasons to their rejection:

- *If you start in having the position just because you are female then you start already that you need to demonstrate over and over that you actually deserve the position and it is not that it was an unfair selection, but you also deserve it. So for me this forced selecting female is only damaging us. I, I understand the good intention behind and I understand that it is a fast way to reach the higher number, but you just create enemies and you don't really change the mentality.* 12_F_L

Special measures are believed to be harmful to women not only because they expose female scientists to objections to their capability, but also because they challenge their sense of personal worth based on the idea of merit and self-reliance:

- *I don't feel different from a man, I would complain thinking that I won the competition because there were quotas. I win competition because I am competent. I feel injured to think about quotas because it looks like a zoo, as we were in a cage, I don't feel comfortable with that.* 39_F
- *I felt discriminated against only in Xxx* [country in Europe] *or in Zzz* [one of the European physics institute] *when they applied some special measures for women. I don't like it. I don't*

need a support only because of the fact that I'm a woman. I don't want to be treated special. 63_F

Moreover, the examples of a few female physicists confirm the concern that introducing gender quotas in scientific collective bodies would overburden the eligible female physicists who are few with the duty to serve on a number of committees. This in turn may impede their scientific advancement, which would mean bringing the opposite effect to the intended one of the gender equality measures:

- *I'm already a sort of that women who suffered from that because now I get to be part of many review panels and things like that because they need to fill a certain quota of women and then as I am one of the pure women who are there I have so much of this work that it's holding me back from doing my other things which might be more important to push my career further.* 16_F_L
- *In every committee there has to be a woman so as a woman you are asked at least twice as many committees and it always takes time. I have learned over the years to say no. If I wouldn't say no I would do 60hrs of only committee work.* 01_F

Another argument against affirmative action in science formulated mostly by the respondents working in Polish institutions states that using special measures **lowers the quality of science**, which is the consequence of enrolling/accepting women on the basis of their womanhood, not competence:

- *As there is nothing to choose from you will not have more women without quality loss. The fact that somebody is a woman shouldn't be an argument.* 55_F
- *I don't like this measure [quotas in decision-making bodies], because we would choose..., this must be the representation of the best individuals (...).The statistics in physics is simply merciless, there is far less women and their choice will result in this that we won't choose the best, who truly should properly represent, no. 67_M*

In this context one of the interviewees explicitly opposes using quotas in the process of allocation of grants, as they challenge physics' objective and proven to be effective methods of evaluation:

- *As far as grants are concerned I would be against. In my opinion allocation in physics is based on merit, some accidents can always happen, but generally the achievements are evaluated in independent manner and introducing any mechanisms will not be welcome by anybody, women including, in my opinion. Physics has independent methods of verification of success and I would stick to this.* 54_M_L

Some of the female respondents remark that preferential treatment of women, special programmes for female scientists and gender quotas may be **discriminatory for men.** It happens by refusing them access to resources and - through making competition unfair - by limiting their chances to be hired. It is perceived as a real threat and therefore makes special measures unwelcome:

- *I understand it is done for good intention and for helping, so there are a lot of programs also for helping women to go back in science after having pregnancy and so on. But for those males that were also sharing the responsibility of the family, they say: 'I do not have that opportunity'. 12_F_L*
- *(...) sometimes the quota is a bit unfair against men too. Cause there are many good qualified men, who have less chances 23_F*
- *(...) if there is a competent man he must not be hired because of quotas, that's a double discrimination. 40_F*

Last but not least, according to some of the respondents special measures are undesirable or at least questionable, because they are **implemented by force,** disrupt natural processes and, therefore, **breed resistance**. Instead, as gender inequality is a sensitive issue, it needs to be tackled cautiously:

- *I am somewhat divided on this point. I think the intentions are good, but the effects can be very harmful. As you say (...) 'Hell is paved with good intentions'. If you force people to do something, chances are, it will have the opposite effect of what you wanted to do.* 35_M.
- *(...) don't do this by force, because everything that is* [done] *by force becomes artificial and it is grist to the mill for those who are against.* 56_F
- *It's the same like introducing special measures for race (e.g. black people). It is a sensitive field and things have to be done naturally. (...) It's also artificial. Kind of an abrupt modification of the rule.* 82_M

Describing special measures for gender equality as forced and therefore risky solution recurs in a few narratives of the physicists. In this context, two of the respondents additionally identify explicitly the entity responsible for imposing special measures on the scientific community. This is the European Union as the founder of scientific projects and the HR Excellence in Research Award:

- *We're forced to hire a specific number of women (in European projects): I understand that's for a good aim, but to me this is counter-productive.* 44_M
- *(...) because we try to (...) receive some privileges, also from the European Union, there is sometimes this requirement that there should be an adequate number of women in various commissions, it is truly a problem for us, we try by force to have any women in our council (...). This EU policy, that there should be 60% of women or else and so on, personally I don't - let's say - understand this, because for me it doesn't matter.* 68_M_L

As it was previously signaled, raising objections to special measures does not necessary mean rejection of any actions towards gender equality in science. According to the interviewees who question the appropriateness of their introduction, it is instead necessary to act ”*at base*”, understood either as influencing the youth making decisions about thinkable career paths or facilitating work-life balance of the physicists (see the previous paragraph on the Role of institution in fostering gender equality).

Only a dozen or so respondents overtly **support special measures** as a method of fostering gender equality in science. Most of them argue that their introduction will generally **accelerate the systemic change**, understood not only as a numerical increase in proportions of female physicists in high-rank positions, but also as a change of social mentality. The respondents believe that otherwise this transformation would proceed very slowly or even would be impossible. Therefore, despite social resistance and the arguments raised by their opponents of being unjust and compromising quality, quotas and preferential treatment should be introduced. Applying these special measures, which are a complement to the criteria of excellence, rather than their contradiction, will help to “create a real change in the laboratories and institutions” and therefore “all the structure will be more balanced”**:**

- *I believe that it is helpful, to start, that real equality is possible. Otherwise it will simply only go forward very slowly. (...) there are probably always some people who will say 'Oh, she only got the position, because there is this quota'. You have to say to yourself, you just need to stand above that and say 'I am excellent regardless, even if I am a woman and, uh, fulfilling this quota'. So you are not getting the position only because of the quota, but also because of the quota.* 06_F

- *I think that if there doesn't appear an outside factor [quotas], women won't be entering the Scientific Council for long. Mentality and the way women in physics are perceived must change. I think that this measure would meet with a negative reception by the majority of the council, but it would help us very much for a start, right? It would be a cool solution, because in our system ..., exactly how to do it, so that women would begin to appear in the council?* 65_F
- *Of course, if you force parity in committees, or meeting's stakeholders for example, you have a risk to hire women who could not completely deserve it. There will be angry people and outcry. But, by the fact that women are present in these committees, it will create a change in the mentalities and allow hiring more young women*. 38_F_L

Few of the interviewees talk about further, specific advantages of applying special measures in the scientific community. They argue for example that introducing quotas will enable to counteract the gender bias of the male nature of scientific excellence, which indeed governs the processes of evaluation. Additionally, special grants for women are seen as a method of overcoming female mental barriers to apply for top positions:

- *Quota would be good otherwise you would just hire a man again, not because he is better but just because he is a man.* 51_F
- *You force male to take a look around at women candidates, to have the perception of professionals no matter what gender is.* 77_F
- *In a way we have this freedom (...), but on the other hand there are so many blockages we have learned for the whole life, that it is difficult. Therefore, I think that a special grant program for women, so that there was this requirement that it has to be a woman, it would certainly be beneficial.* 64_F

Last but not least, a few of the respondents who are in favour of introducing special measures additionally discuss their **temporary nature**. Special programmes for women as well as quotas in decision-making bodies and recruitment should not be set up as permanent solutions. Rather they are perceived as a method of overcoming long-time injustice. Once the gender balance is achieved, which should happen at some time in the future, special measures will no longer be necessary:

- *I don't know how many years it will takes* [a special program for female physicists] *and till it is normal but then they can do away with it.* 19_M_L
- *I believe it [the quota system] is necessary to change the society first. Secondly, it is important to turn and change it back to normal after the world has changed.* 20_M_L
- *After a transitional moment, the selection will again be based solely on excellence, but in an audience composed equally of men and women.* 38_F_L

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