

The Social Research on the Experience of Unconscious Gender Bias

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Abstract

The objective of this research is to discuss how Sociology contributes to identify “the experience of the unconscious gender bias” against female scientists and to assess its impact on their career development. This research is at the first stage of three-year research project¹. The final aim of this research is to identify the social factors that sustain a positive research environment for the female scientists. This research focuses on the daily communication in the research laboratory settings and tries to find some answers to the methodological questions of how it is possible to investigate the experience of unconscious gender bias by the social research and how it is possible for a person to be aware of the unconscious gender bias against them in the daily communication.

Introduction

According to Gender Equality Bureau Cabinet Office, the percentage of the female scientists in Japan in 2018 is 15.3% (Women and Men in Japan 2018). This is the worst among the advanced countries. One of the reasons for this is said to be the unconscious gender bias against women at recruiting and promoting of the female researchers in STEM fields (Otsubo 2013). According to Otsubo (2013), Japanese universities has largely two types of support for female researchers. One is “Infrastructural Development” such as maternity leave and research living with the partner. The other is “Leadership Development” such as positive action, human resource development program, seminars of how to get research grants, etc. Those practices have made good effect, but “the female researchers and the senior managers of university should be aware that there is bias and barriers against women everywhere when it comes to hiring and promoting women.” Otsubo said that it is important to make a change in their consciousness.

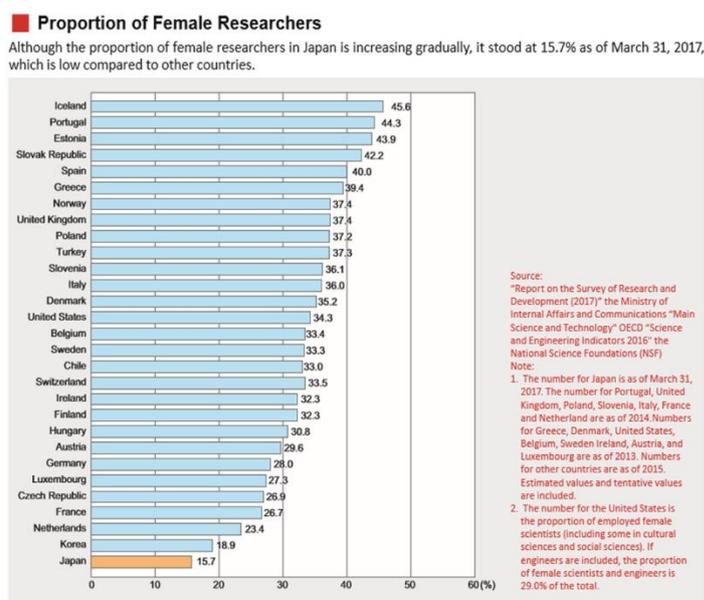
Studies in the field of Psychology in the US have shown the evidences of the unconscious bias against female scientists on recruiting in the STEM fields (Moss-Racusin et al.2012). Our social research does not investigate the unconscious bias itself but the experience of the unconscious bias in order to investigate the social impact of the unconscious bias on the lives of the individual. This research aims to identify the facts of their experiences of being biased and the social factors that made them continue their research. This research is on the first stage of three-year research project from 2018 to 2020. The final aim of this research is to suggest the social factors that sustain a positive research environment for the female scientists. This research will contribute to prevent the discrimination against female researchers that is repeated in the daily communication in their research laboratory.

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Social Background

According to Gender Equality Bureau Cabinet Office (2018), the proportion of the female researchers is low compared to other countries. It was 11.2% in 2013 and 15.7% in 2017. The number of female student in the undergraduate enrollment is increasing. However the percentage of female researchers increased only 4.5% in 15 years.

Figure 1. Proportion of female researchers in Japan



Gender Equality Bureau Cabinet Office. 2018. Education and Research Fields, Women and Men in Japan.

The issue of positive action in higher education in Japan

According to Article 2 of The Basic Act for Gender-Equal Society (1999), it is written, "Positive provision of opportunities for either women or men within necessary limits to redress gender disparities in terms of formation of a society where both women and men shall be given equal opportunities to participate voluntarily in activities in all fields as equal partners in society". However, in the field of higher education, the proportion of female researchers is only 11.2% in 2003, and the Third Basic Plan for Gender Equality stated "increasing the share of women in leadership positions to at least 30% by 2020 in all fields in society". However, as it was shown above, the proportion of the female researchers in the field of higher education is only 15.7% in 2017.

According to Ehara (2015), the number of enrollment of female students to university is increasing every year but the number of female researchers is not. There has been the rigid gender divisions by the field of research. The number of female students are small especially in STEM fields. This means that female students in STEM fields stop their research for some reasons while they are studying in the higher education in Japan.

Laws related to gender equality in workplace in Japan

Some laws and acts related to gender equality in workplace have been established since the establishment of Equal Opportunity Law in Japan.

1985 Equal Opportunity Law

1997 Revised Equal Opportunity Law

1999 The Basic Act for Gender-Equal Society

2005 Act on Advancement of Measures to Support Raising Next- Generation Children

2016 The Act on Promotion of Women's Participation and Advancement in the Workplace

2018 Revised Equal Opportunity Law

Sexual harassment was included in the matters of the employer's consideration obligation of the worker's safety in the revised equal opportunity law in 1997 and it was enacted in 1999 when "Expansion of Women's Participation in Policy and Decision-making Processes in All Fields in Society" is stated in the Basic Act for Gender-Equal Society established in 1999. Harmonizing work and life, Balancing work and childrearing was stated by the Act on Advancement of Measures to Support Raising Next-Generation Children in 2005. And some actions to stop harassment prevention is suggested in the employer's guideline by the Act on Promotion of Women's Participation and Advancement in the Workplace. Harassment regarding to maternity, sexual orientation, gender identity are included in the in the matters of the employer's consideration obligation of the worker's safety in the revised equal opportunity law in 2018.

These laws and acts promote women not only to participate in the society but also to take the readership in the society. However, one important thing is missing. Those laws and acts addresses to stop discrimination and harassment to develop gender equality in the society, but there is no laws and acts that prohibits workplace harassment itself in Japan. It is limited to employer's consideration obligation for worker's safety and therefore there is neither the common definition of harassment nor the common concept of harassment itself by law. Each institute or company has its own rules and guidelines for the prevention of the harassment. There is no differentiation between bullying and harassment in Japan, either. According to Kawabata (2014), only 50 % of schools in higher education in Japan has the guideline of harassment prevention. This shows that there is a rules of harassment prevention but they are not working effectively. Under this condition, especially in higher education, there is no legislative measurement to prevent the harassment against undergraduate students and graduate students and post graduate students. Those researchers work for the research laboratory as a part-time worker and most of them are not paid because they are seen as interns. For those researchers, the higher education is not only the place to study and research but also the place to work. However, the status of those workers are weak and it makes them easy targets of harassment.

Issues of Masculinity

There are three major theories of Masculinity in the field of gender. The key words of these theories are homosociality (Sedgwick, 1985), the domination of Masculinity (Bourdieu, 1990) and homogeneity (Connell, 1995). However, in this article we do not go further to theoretical discussion. These theories are largely divided into two groups. One focuses on the homophobia and misogyny keeps men's social position as beneficial to men and the other focuses on the production of the power relationship between men and women that is constructed by performing gender roles in everyday life.

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There are three previous studies that investigate the gender issues in the research laboratory. Sakanashi (2017) showed that the exclusiveness and the homosociality in the research laboratory maintains homophobia and misogyny. Kitana (2014) shows that there is a structure that maintains the dictatorship of professors in the research laboratory. Ehara (2015) showed that homogeneity by the same sex group and by the same age group in the research laboratory that maintains “Men’s First consciousness”.

Sakanashi (2007) interviewed 17 researchers of Hokkaido University and showed three characteristics of university laboratories. 1. Exclusiveness; Members of laboratories stay together for long hours that limits their social communication within the members. 2. The power of faculties; faculties are the top of pyramid in the research laboratories and have many rights. 3. Homosociality: misogyny and homophobia. Female students are disadvantaged in the research laboratories in several ways. In addition there are some gay jokes. Female students try to adjust themselves to the rules of homosociality by struggling with it in the research laboratory. Sakanashi showed that in many laboratories, most of teachers and graduate students are male in Japan. In the laboratories, teachers and male students tend to make rules at the convenience of themselves. Female students are often disadvantaged. Interview data suggest that there should be many latent harassment cases in even "ordinal" university laboratories. Even when harassment cases take place, it can be hidden in the exclusive and homosocial laboratories.

Kitanaka(2014) said “Minorities such as women, students with full time jobs outside university, students from other universities, students transferred from other universities, students from other countries etc. are the reserved army of harassment victim.” Kitanaka showed some characteristics of high risk research laboratory. 1. Fields of natural sciences, the experiment centered research which is often performed by team. 2. Too much pressure on researchers due to the global competition which is evaluated by the “impact factors” or the number of citation in other research articles. Too much pressure on researchers due the hard global competition which is evaluated by the “impact factors” or the number of citation by other research articles. 3.“KOZA-SEI” or the independent recruiting and promoting system by the research laboratory. There is no job opening to the public. Only the graduates of the research laboratory can be employed. The research laboratory keeps its own independency.

Kitanaka (2014) showed that there is a gender structure that makes men compete each other and its competition produce men’s first system. 1. The research laboratory is run by the “dictatorship by the faculties” that gives high pressure on students of research laboratory where students are assumed to be the “hands and feet of the faculties.” Some of their work are paid, but some are non-paid because it is seen as obligatory. 2. There is a strong reprimand and force of compensation by faculties and other students if there is a loss of drugs, instruments, equipment by the miss carriage of research. 3. Researchers work overtime unnecessarily to get a good assessment from faculties and other students. This makes it difficult to balance between their work and life. 4. There are misconducts and harassment relating to the authorship. The team work research often causes problems of authorship and harassment.

Ehara (2015) said the cause of the low percentage of the female scientists is higher education that raises “Men’s First Consciousness”. “Education provided by the Japanese university has been targeted boys of 18 to 22 years of age and the education for boys is education to become a salaried worker and that for girls is to become a housewife or to play a supplementary role for men in the society.”

Methodological Questions

Moss-Racusin’s study (2012) shows the evidence of the gender bias in the science faculty. In a randomized double-blind study (n = 127), science faculty from research-intensive universities rated the application materials of a student—who was randomly assigned either a male or female name—for a laboratory manager position. The bias had no relation to the faculties’ age, sex, teaching field, or tenure status. Their research shows the existence of devaluated candidates for a laboratory manager position. The candidates were described as competent, but not stellar. On a scale of 1 to 7 (7 highest)

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professors(n=127) gave John a score of 4.0 for competence, but only 3.3 for Jennifer. John was viewed more favorably as someone the evaluators would hire or mentor. John was also offered a higher average starting salary: \$30,328 for John, but only \$26,508 for Jennifer. Biology professors whose classes can be >50% female, were just as biased as physicists. Women professors were just as biased as men. Junior professors were just as biased as seniors.

Moss-racusin et al. (2015) experimentally investigate the unconscious bias of science faculty. In their research, the science faculties were asked to evaluate applicants for a laboratory manager by reading their application materials. Their research eliminates the social factors that may affect the results of their research to investigate the evidence of unconscious bias. Therefore they eliminate the actual social interaction between science faculties and candidates. Our research focuses on the experiences they feel that they are biased in the daily social interaction in the research laboratory. If it is unconscious, it would be often repeated and it is possible for people to notice that they are biased by others. However, it is almost impossible to investigate the social impact of the unconscious bias that takes place in the case of recruiting and promoting because no candidate would be able to notice that they are biased. They showed the evidence of unconscious bias in the science faculty, however our research aims to show the social effects that unconscious bias has on the lives of researchers. In order to do this, we need to investigate the experience of the unconscious gender bias in actual social interaction in the research laboratory. Unconscious gender bias works not only when recruiting and promoting people. But also it works in the daily communication in the research laboratory. According to Sakanashi(2007), one of his 17 interviewees said "Women is not suitable for science." This shows that it is not only professors but also students that have unconscious gender bias in the research laboratory. Our research investigates what impact it has on female researchers in actual social interaction.

There are common factors regarding to the characteristics of the research laboratories in STEM field shown by the Sakanashi's and Kitanaka's findings. Sakanashi showed that it is the experimental research style that leads to constructs limited human relationship and the closed and longer hour communication in the small number of people makes it difficult for female researchers to make a claim against the harassment they suffer from. Kitana showed that the competitive research environment in STEM and those laboratories where the research is based on the experimental research style lead to construct the dictatorship of the faculties which causes harassments.

Theoretical questions

There are two theoretical perspectives on the issue of the less female researchers in Japan from the view point of gender. From those studies shown above, it is possible to classify them into two perspectives that explains the main reasons why it is difficult for female researchers to continue their research in Japan. One is based on the research of Sakanashi's work that pointed out some possibility that there is "the social exclusion of women from men's territory" in the research laboratories of STEM field. The other is based on the arguments of Ehara and Otsubo that showed some possibility that there is gender bias that was constructed by the gender roles in society in which higher education and academic fields are not exclusive.

To make it more simple and understandable, this research tentatively defines that there are two theoretical models to explain the less female researchers in Japan. One is "Male Bond model" that explains the cause of the less female researchers as "social exclusion of women". The other is Men's First model that explains it as "gender bias in higher education". There is a clear difference between the Male Bond Model and Men's First Model. The former one views women as wives and mothers

One is based on the ideas that the society reproduces the stereotypical gender roles in the household and the image of women as "care takers" such as mothers and wives. In this perspective, men include women as supplementary roles to keep their power over women. Women are seen as necessary part to

keep men's better social status in the society. In this case, harassment is justified as a sanction against women as they deviated from the roles of supplemental being to men in the society. It is seen as a system that keeps the power relationship between men and women. The higher education is seen as a part of the system. Therefore academism itself is not exclusive to the system that reproduces the submissive roles of female researchers in the research laboratories. The other one is based on the ideas that there is homophobia and misogyny that exclude women from the society. In this perspective, women are seen as sexual beings that destroys the bond of male researchers and male workers. Women are not necessary and are target of exclusion because they violate men's territories. Men try to keep their identity by excluding women².

Figure 2. Two perspectives of gender bias in Japan

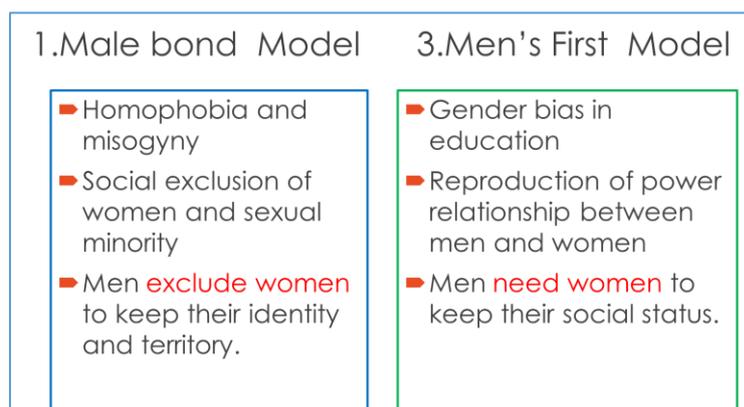
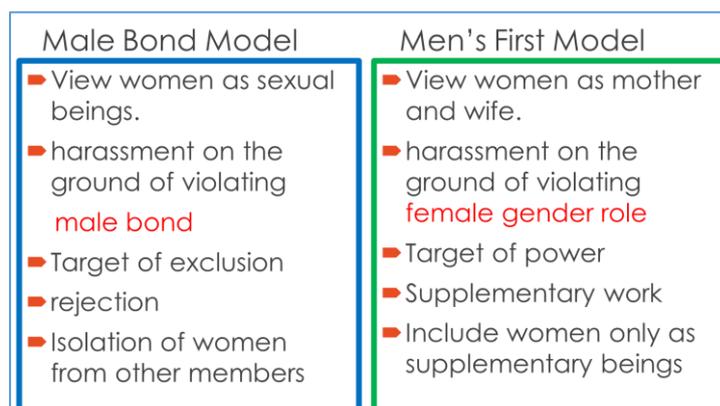


Figure 3. The difference between Model 1 and Model 3.

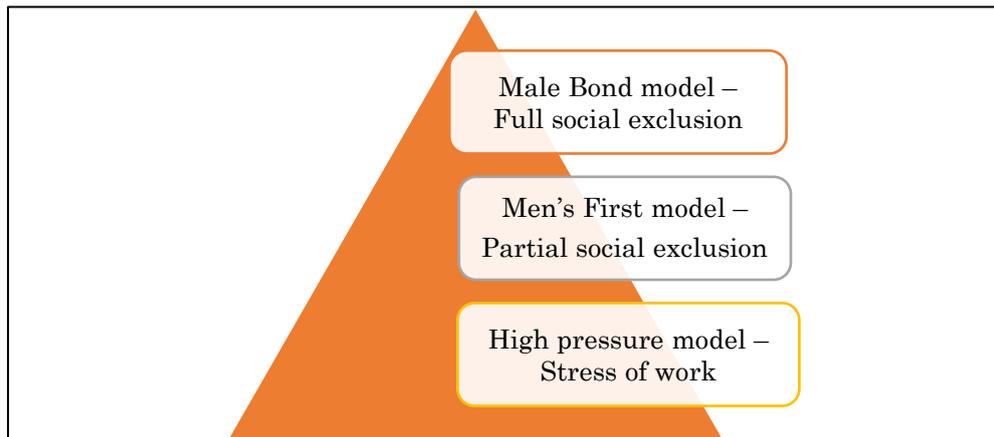


It seems that Men's First Model explains well the situation of women in Japan in general. However, in the case of Sakanash's research, it seems that Male Bond Model explains the situation of female researchers in Japanese universities better. In this research, we hypothesize the relationship between those models by the degree of social exclusion. The figure 3 shows the pyramid of the risk of unconscious gender bias. Male Bond Model is in the highest risk of social exclusion because they are the target of full social exclusion and Men's First Model is in the next highest risk of social exclusion because they are the target of partial social exclusion. There is one more model named High Pressure Model that shows relationship between the stress of work and the risk of social exclusion. As the

² In fact, the social exclusion of women in Japan still exists only in some tradition or religion in Japan such as women shall not enter the Sumo wrestling link" and "women forbidden custom" in some areas due to folk beliefs.

previous studies of Kitanaka has shown, the global competition gives high pressure on the researchers and this environment lead to the harassment in the research laboratory. This should be counted as one of the risk factors of social exclusion of female researchers from the research laboratory. This model does not explain the cause of gender bias itself but it explains the risk of the social exclusion of female researchers. It will be easier to understand the relationship of the models if High Pressure Model is added at the bottom of the pyramid. This research will try to explain the situation of less number of female researchers by investigating the cause of unconscious gender bias based on the hypothesis of the risk of social exclusion of women.

Figure 3. Pyramid of the risk of social exclusion of women



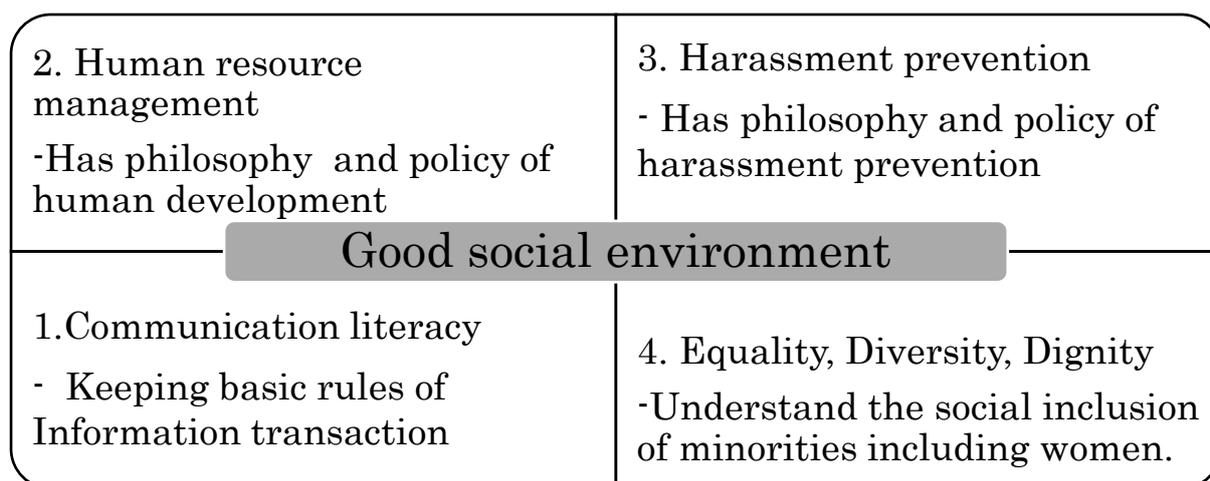
This research is based on the hypothesis that the cause of the less female workers is the social exclusion of women. However, this research does not investigate which model best describes the cause of the social exclusion of women because it is not the main aim of this research. What we need to know is how to stop the risk of social exclusion of women. So, this research focuses more on the Male Bond Model because the risk of social exclusion seems to be much higher than the Men's First Model. But this does not mean that our research ignore the Men's First Model because in theory, full social exclusion of women from a community is the form of an ultimate discrimination against that would not be possible without the rigid gender segregation and the strong connection between gender and power in a community as the Men's First Model describes. So, this research assumes that investigating the existence of the Male Bond Model is also verifying the Men's First Model itself at the same time.

What's a good research environment?

This research will investigate not only the negative experience of female researchers but also the positive experience of female researchers. As it is written in the above, the final aim of this research is to suggest some factors that contribute to construct a good social environment in the research laboratory for female researchers to continue their research. Since this research focuses on the experience of the unconscious gender bias in the daily communication in the research laboratory, this research investigate the social interaction of people in the research laboratory. So, before starting our research, we need to define tentatively some factors that maintains the sustainable research environment that stops harassment, exclusive communication, the partiality in the supervision by the faculties. The factors that stop the social exclusion of women maybe showing a respect to female researchers, open communication, equal opportunity of communicate with faculties and other researchers etc. This research tentatively define what a good social environment should be. We assume a good research environment makes a good quality of communication which encourages female researchers' good performances that makes them continue their research and this gives them satisfaction and this leads to

the increase of female researchers. To construct a good social environment, it seems that knowledge and understanding of good social communication is important. To make it more specific, this research will investigate four important factors. 1. Communication literacy that keeps the basic rules of information transaction. 2. Human resource management that has a philosophy and policy of human development. 3. Harassment prevention that has philosophy and policy of harassment prevention. 4. Equality, Diversity, Dignity that develops the understanding of the social inclusion of minorities including women.

Figure 4. Elements of Good Social Environment



Methodological question and focus

“Unconscious bias” is the terminology of psychology. Since this research is social research, we do not investigate unconscious bias itself because it is impossible for a person to be aware of their unconscious bias in their daily communication without any feedback from others or by testing of unconscious bias. So, this research will investigate only the experiences that people became aware of being biased by others. As it was shown in the above, this research aims to identify the experiences of the unconscious gender bias against female scientists in their daily communication in the research laboratory. To do so, we need a tentative definition of the “experience” of unconscious gender bias. This research tentatively defines the experience of unconscious gender bias as follows.

1. It is often repeated in the daily communication.
2. It is often felt wrong or uncomfortable by others.
3. It is often women that feel so.
4. It has a negative impact on the career development of women in the long run.

So, the experiences of being biased is the subjective experiences that were perceived by people that they were biased. This research will not investigate whether the experiences are true or false, but it will investigate the fact that they thought they were biased in the daily communication in the research laboratory. These negative experiences will influence the degree of satisfaction of female researchers and the motivation to continue their researches. To identify the factors that construct a good social environment in the research laboratory, we also need to eliminate those factors that would influence the results of analysis. To do so, it is necessary to include the items in the questionnaire that are supposed to give the negative impact on the lives of female researchers.

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The factors that construct a good social environment in the social communication in the research laboratory can be identified by not only the assessment of the good social environment but also by eliminating the factors of negative experiences from the analysis.

Two approaches

This research will take two approaches. This research aims to identify not only the factors that makes it difficult for female scientists to continue their research but also the factors that contributes to construct satisfactory research environments for female scientists to continue their research. The one approach will investigate the interpretation of the social behaviors of the individual and the other approach will investigate the social norms of the research community. The former approach will focus on the social interaction that causes the negative experiences of social exclusion and power relationship in their daily communication in the research laboratory. The latter approach will focus on the laboratory management that sustains the positive experiences of social inclusion and equal relationship in their daily communication in the research laboratory. Because the unconscious bias is constructed not only by the social background of the individuals but also by the social norms of the community or the group that they belong to. Therefore both approaches are necessary to verify the factors that sustains the good social environment of the research laboratory for female researchers.

Research Design

This research is a pilot study that aims to develop a research method to identify the experience of unconscious gender bias. The target of this research will be students, researchers and faculties of graduate school of Hokkaido University. The reason to choose this university is that Sakanashi (2007) did his interviews to 17 people including one faculty in Hokkaido University. So we will do this research in Hokkaido University to verify his findings by utilizing both quantitative and qualitative researches. Researchers and Faculties will answer to the questions by recalling their past research environments when they were graduate students. Since we are also interested in the generation gap or gap by age in the social environment in the research laboratory, we will include them in our target of research. By including not only students but also post graduate researchers and faculties, the assessment of good social environment by the respondents could be varied by the age group. The social skill, such as social communication skill may vary according to the age because it is assumed that the longer the experiences in the society, the better the social communication skill would be. So we need to control the age by eliminating the influence of the age on the result of analysis.

This research will employ a set of quantitative and qualitative researches because that will give a better picture of the experience of female scientists in the research community. Quantitative research will enable us to grasp a rough picture of the present situation. Qualitative research will give us a chance to get the meaning or the reasoning given to the actions by each individual. This research design will make our investigation further on how female researchers manage to come over the conflicts or the dilemmas they face between them and their research community.

The items of independent variables of the web questionnaire planned at present are as follows. Items of independent variables that identify the characteristics of the respondents are the sex, the age, the years of grade, master's course or doctor's course, the status of child care, the status of nursing care, the field of research, the type of school entered last, the number of years since the graduation or the withdrawal from the last education. Items of independent variables that identify the characteristics of the research laboratories are the number of people in the research laboratory by sex, by age and by Japanese or non-Japanese, the number of the faculties in the research laboratory by sex and by age, the sex of the main supervisor, the style of laboratory research is experimental or not.

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The items of dependent variables to assess the social environment of the research laboratory are as follows. Average number of academic articles written and presentations made per year, the degree of satisfaction about their research laboratory, the frequency of consultation with the main supervisor, the facts or events in their daily communication regardless of that it is negative or positive experiences, needs for a good social environment such as the needs of staff education or trainings to stop negative communication in the research laboratory.

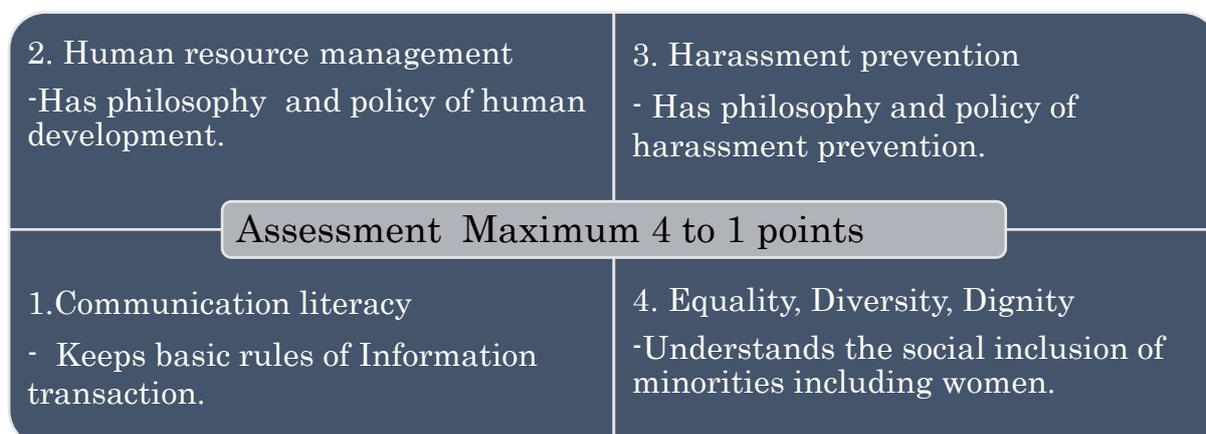
Assessment of the research laboratory

One of the uniqueness of this web questionnaire is that has the series of questions that ask the respondents to assess the quality of communication in the research laboratory based on the view point of “a good social communication”. As it was shown in the above, we need to identify those factors that maintain a sustainable research environment that stops the harassment, the exclusive communication, the partiality in the supervision by the faculties for those in the research laboratory regardless of gender. So, this research tentatively assumes that there are four main factors that maintains a good quality of communication in the research laboratory as follows.

1. It has a good communication literacy that keeps the basic rules of information transaction.
2. It has a good human resource management that has a philosophy and a policy of human development.
3. It has a good harassment prevention that has a philosophy and a policy of harassment prevention.
4. It has a good Equality, Diversity and Dignity policy and management that develops the understanding of the social inclusion of minorities including women.

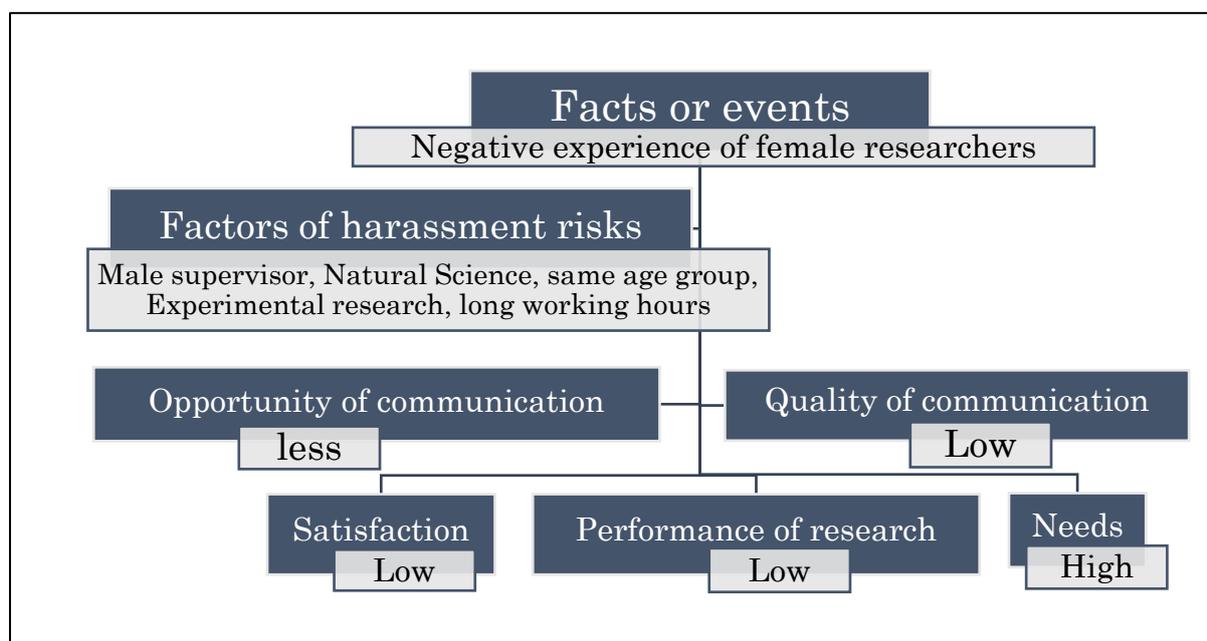
Those four factors that are assumed to maintain good quality of communication in the research laboratory will give influences on the results of analysis. Good research laboratory would have these practices. However, degree of good practice will be different by each research laboratory. It is necessary to have items that assess these factors before the analysis. In this research, items related to these factors must be included in the questionnaire. This research will ask the respondents to assess the quality of communication in their present or their past research laboratories. Each assessment is composed of a series of questions of 10 to 15 and the respondents will be asked to assess in the ranges from the highest of 4 points to the lowest of 1 points. The analysis will be made by the group divided by the degree of good social practice in the research laboratory. By doing so, we will be able to eliminate the effect of good social practice on the result of the analysis.

Figure 5. Assessment of the quality of communication in the research laboratory



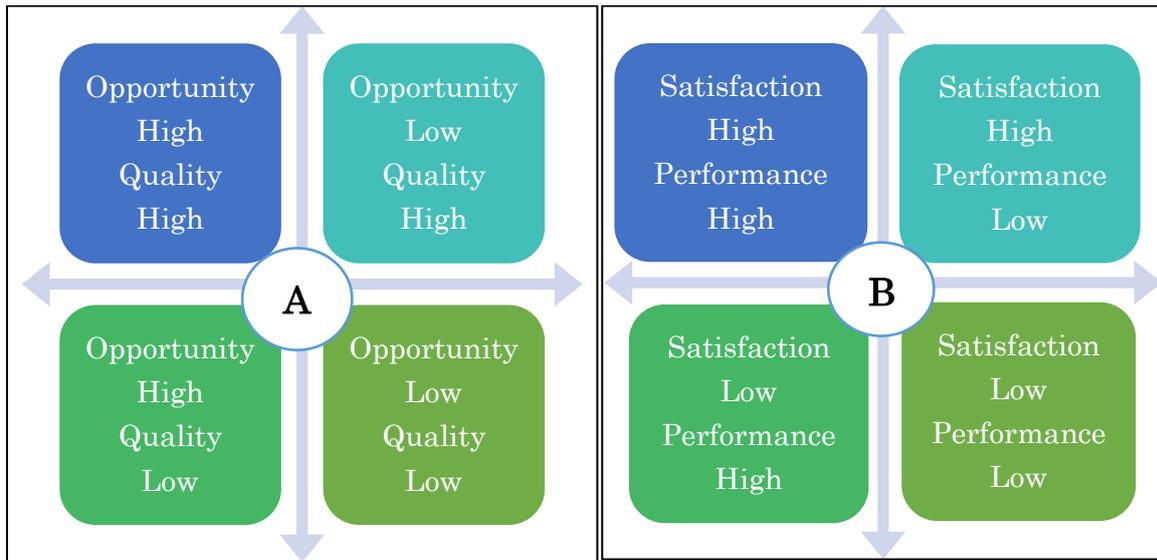
Since this is the pilot study, we have no previous studies that have examined the reliability and validity of each assessment. This research will contribute to construct the research methodology to investigate the experience of unconscious gender bias and the reliability and the validity of each assessment should be investigated if there is any chance to do experimental intervention study in the future. The figure 6 shows the hypothetical model of the results of the unconscious gender bias. Our research assumes that even though there are some negative experiences for female researchers and there are some risks of harassments, this directly leads to the low satisfaction and low performance of research. Thus this research assume if there is a good communication opportunity and a good quality of communication, it would not affect every day life of female scientists. Because this research assume that if there is a high opportunity of communitarian and a high quality of communication, it would be possible to stop the repetition of the negative experiences that makes it difficult for the female researchers to continue their researches. So our hypothesis is that if the opportunity of communication is low and the quality of communication is low, this would lead to the dissatisfaction and low performance of female researchers and thus female researchers stop their researches and leave their research laboratories.

Figure 6. Hypothetical model of results of the unconscious gender bias



The figure 7 will show that how our research plans to verify the hypothesis shown in the figure 6. We will divide the respondents into four groups by the degrees of the quantity of communication and the quality of communication as described in the figure A on the left. We will also divide the respondents into four groups by the degrees of the satisfaction and performance as described in the figure B on the right. We will compare the results of the corresponding pair of A and B and make a correlation between them. For example, the group in A that has high opportunity of communication and high quality of communication should be correlated with the group in B that has high satisfaction and high performance to verify our hypothesis. In the same manner, the group in A that has low opportunity of communication and low quality of communication should be correlated with the group in B that has low satisfaction and high performance to verify our hypothesis. By doing this, this research will investigate if there would be some correlation between the satisfaction of female researchers and the opportunity of communication and the quality of communication.

Figure 7. Method of verification



Conclusion

This research design tries to identify the negative experiences caused by the unconscious gender bias that affects female researchers in their daily communication in their research laboratory.

We will need to investigate the experiences of the unconscious gender bias in detail in the interviews with female researchers who answered the web questionnaires and agreed to our interview. As it is written in the above, this research is at the first stage of three-year research project. The final aim of this research is to identify the social factors that sustain a positive research environment for the female scientists. And this research is the pilot study and it has just started, we need to make some amendments in our plan in the future in according to the progress of our research.

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