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“I’m no Expert”: Japanese STEM Women’s Self-definition as Social Reflection via Collocation and Content Analysis

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Currently, in STEM environments, female employees are often recognized as minorities due to their positioning or occupancy rate, which may lead to experiences of “imposter syndrome”. This study applies frameworks of mixed-gender discourse, such as limited involvement in activity as an agent, markedness, and gender-differentiated roles, to clarify how women in STEM position themselves or are positioned by the society. Using corpus linguistics and content analysis, it is clarified that female researchers are usually linguistically marked or tend to distinguish themselves as non-experts. Thus, their portrayal within a misogynistic society may considerably interact with how female researchers represent themselves.

Keywords: marked content analysis, lexical analysis, collocation, imposter syndrome, self-positioning

Marginalization of Japanese Women in STEM Fields

Japanese society is often cited as one characterized by patriarchy and male chauvinism and still ranked 125th out of 146 countries in the gender gap index (World Economic Forum, 2023). This gap affects many social aspects, with inequality between women and men evident in educational, political, and economic power.

One example is the strong sense of gender-differentiated roles and responsibilities expected of women and men in Japan. This division of roles is thought to be rooted in traditions established during the period of high economic growth after World War II (Ando, 2002). Even after this period ended, women who had been full-time housewives began taking on part-time work, reinforcing gender-based roles in the labor system. This custom of dividing roles in terms of gender also affects women’s positioning in the workplace even now, including in academia, universities, and research institutions.

These gender-differentiated roles are especially evident in STEM fields compared with other disciplines.

Kono (2018) stated that the ratio of female to male researchers is significantly smaller than the general population, with only 144,126 out of a total of 917,725 researchers in Japan being women in 2017. In particular, only 10-14% of all STEM (e.g., fields of science and engineering) researchers in Japan are women, which is significantly different from the percentage of women working in humanities and social sciences. Thus, women are a minority in science fields, regardless of their occupation.

Furthermore, it was found that women make up nearly 60% of research assistants compared to only 30% of full-time researchers, such as Principal Investigators (PIs). In this way, the gender-differentiated roles and responsibilities of men and women—based on social norms—are influential even in academia and research institutions, where women are engaged in supportive occupations rather than in leading research as PIs.

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When considering basic human rights such as employment and promotion based on aptitude and performance regardless of gender, it is considered undesirable that these gender-differentiated roles established after the war are still in effect in the modern workplace.

In fact, this norm whereby women are not the agents of activity but instead support male agents in their achievements—in other words, the marginalization of women—is also not uncommon in other areas. Many studies in the fields of linguistics or women's studies have been conducted on this topic. In addition, concepts that seem to be the key to evaluating this marginalization of STEM women have been analyzed in terms of linguistics.

Previous Research in Linguistics and Women's Studies

The use of linguistics and discourse frameworks to study gender has provided abundant evidence of how women are positioned, behave, and react in this misogynistic society. In this section, it is investigated how previous research has examined gender-differentiated roles in STEM from the perspective of linguistics and women's studies.

Research Principal or Auxiliary Work?

Stubbs (1996) investigated the influence of gender differences on social norms and position by examining two different notes addressed to the associations of Boy Scouts and Girl Scouts, written by Baden-Powell, a British Army officer and writer.

Using these messages as a small corpus, the synonyms of happy and happiness were extracted, and a comparative discourse analysis was conducted, observing their co-occurrence positions and co-occurrence relationships with other verbs. As a result, it was found that while boys were addressed as agents actively pursuing happiness, the synonyms of "happy" were more likely to be used as nouns and adjectives in the text addressed to the Girl Scouts. This suggested that, for girls, happiness was something portable to be conveyed to others and that they could only be agents with respect to making somebody else happy. Here, we can see that a woman's purpose is thought of as playing a supporting role in making a man happy.

Furthermore, Spender (1985) observed that mixed-gender conversations exhibit gender-differentiated roles, with a linguistic division of functions between men and women. She described how female speakers often play a supportive role, helping their male conversation partners speak more easily, rather than expressing their own opinions and assertions. This observation suggests limited opportunities for women to take initiative in mixed-gender conversations. In other words, much like their roles in society, women often adopt a supporting role in conversation rather than taking the initiative or a leading role in discourse.

An overview of previous research on gender roles in language reveals a similar division of roles in STEM, where men are often PIs and women primarily support research work.

Markedness and Marginalization

Tannen (1993) used the linguistic concept of "markedness" to describe situations where women are given special attention for reasons other than their original roles and actions, when they appear in public as subjects rather than in supporting roles.

She explains this phenomenon by describing her observations when attending a conference at which she did not pay any attention to the clothing of the male participants, but instead observed the wide variety of unique clothing worn by the female participants:

> Some years ago, I was at a small working conference of four women and eight men. Instead of concentrating on the discussion I found myself looking at the three other women at the table, thinking how each had a different style and how each style was coherent.

She explained that none of the male participants stood out because they were all wearing ordinary suits, and were therefore considered "unmarked". Meanwhile, the female participants were considered special targets. The phenomenon she observed is explained by the linguistic concept of markedness. For example, with the words "Actor" and "Actress", a gender marker is added to the ending of the original word, creating a concept that differs from its original meaning. In other words, "Actor" just refers to a male actor, while the special ending "-ess" is used to indicate a female actor.

Applying this concept of "markedness" to the differentiated roles between men and women in STEM in Japan, men are unmarked when engaging as a PI or in other active roles in research—they are not given special attention because of their gender, but there is a high possibility that female PIs could be marked and treated as special.

Social Norms and Self-regulation

There are some other concepts in gender study, such as imposter syndrome and aspiration cooling, which feed into employment and promotion being decided on biological traits.

Etmanski (2019) noted that PhD students' career aspirations shift away from wanting to work in academia, and above all, female STEM students majoring in physics, mathematics, and other sciences easily lose their aspirations for an academic career.

Additionally, Sandberg (2014) argued that claiming one's accomplishments usually leads to more success, but when women do this, they end up paying the price in society and the workplace.

According to Ettus (2012), while 57% of male graduates of Carnegie Mellon University's master's program tried to negotiate for a higher starting salary, only 7% of female students did so. Women are also expected to be more dedicated, which means they are required to make sacrifices with less chance of reward (Hewlett & Luce, 2006).

Imposter syndrome refers to feelings involving the suspicion that signifiers of professional success in the form of promotion, publication, prizes, award of a permanent contract, award of any contract, grant funding, student evaluations, etc… have been given by mistake or through committing activity of deception (Breeze, 2018).

Cvetkovich (2007) pointed out that depression caused by 'imposter syndrome' is common among academics of any discipline, career stages, and social locations, and they fear what could happen if their fraudulence, inauthenticity, or inadequacy were to be found out.

Research Question and Method

Research Aims

It is possible that female researchers in STEM internalize the roles and social norms expected of their gender since they are at an early stage of their careers, thereby experiencing aspiration cooling or imposter syndrome.

They also tend not to say that they are qualified because claiming their accomplishments comes at a cost, or they may face some kind of revenge from society. According to social norms in academia, it seems that it is

more socially acceptable for women to support research devotedly than to conduct research by themselves. For this reason, there may be a phenomenon whereby some people choose to engage in research assistance work rather than PI work.

In this research, the positioning of Japanese female employees, who are not agents conducting research but subsidiaries performing 'shitwork' to assist other agents, is examined. Using methods such as corpus linguistics and content analysis, an evaluation will be performed to ascertain whether expressions such as having a role prescribed by society, internalizing that social norm, and being content with that role are observed in conversations.

Furthermore, this work intends to clarify whether women are treated as special, compared to male researchers, when they act as an "agent" of activity rather than as support staff, or whether it is possible that some additional meaning could be given to the original meaning of "researcher", as seen in Tannen (1993). It will also be clarified whether some self-definition can be seen through an examination of collocation in corpus linguistics.

Research Methods

Content analysis. Content analysis is a research method that analyzes words, topics, and concepts in a text to find patterns in the communication, behavior, psychology, and emotions of individuals in a given community or system. This method is commonly used in fields such as nursing. It is said that it can clarify explicit and implicit messages that exist inside texts and speech. It is also possible to use quantitative methods, such as examining the occurrence rate of a certain word or the collocative rate surrounding that word, as well as qualitative analysis that carefully observes and explains the relationships between concepts (Columbia University Irving Medical Center, Mailman School of Public Health, 2004).

Ueno (2008) stated that content analysis is a linguistic, systematic, and replicable technique for compressing many words and sentences of text into fewer content categories, based on explicit rules of coding. It has also been remarked that content analysis is a hybrid (mixed or multi-method) research approach that involves both qualitative and quantitative research methods. Ueno (2008) also gave several examples of content analysis used in the field of nursing, indicating that the advantages of this method are as follows: (1) The characteristics and essences of the words or text of subjects can be extracted by analyzing data scientifically, academically and objectively; (2) analyzing the content of open-ended descriptions, the thoughts of individuals and groups can be extracted; and (3) the characteristics of the writing style (method of expression, word usage) of a certain subject (individual or group) can be clarified using content analysis. In each case, the strength of content analysis is that useful insights can be obtained by manually analyzing words and context at the same time.

Corpus linguistics. Corpus linguistics is a quantitative analysis method. According to Teubert (2005), its purpose is to explore meaning within a discourse community through description and empirical study. In corpus linguistics, each language fragment is analyzed from psychological and social perspectives to elucidate the implicit meaning conveyed by morphemes, words, and phrases. Thus, investigating these minimal elements in words clarifies global elements, such as the overall meaning and message of the discourse. An example of corpus linguistics appears in the research by Stubbs (1996), where corpus analysis was used to examine the collocation and frequency of the word "happy" or its synonyms. The study found that these terms conveyed different messages when directed towards the Boy Scouts and compared to Girl Scouts.

Research Methods and Data in This Study

The main research questions in this study are divided into the following two tasks:

(1) How are female researchers marked and defined by society (others)?

(2) How do female researchers define themselves?

The methods of corpus linguistics and content analysis are used to clarify research questions (1) and (2), respectively.

Research Frame 1: Markedness and Social Positioning of Researchers

Research design and extraction. To clarify the question of how female researchers are defined and marked by society and others, this study extracts "female researchers (*Josei Kenkyusha*)", "woman researcher (*Onna Kenkyusha*)", "male researcher (*Dansei Kenkyusha*)", and "man researcher (*Otoko Kenkyusha*)" using X (formerly Twitter) as the subject of analysis, and examines the relevant concepts, topics, and contexts that collocate at a high frequency with each word. Similarly, whether female researchers are marked in comparison with male researchers will be analyzed using the data.

The four words "female researcher/male researcher", and "woman researcher/man researcher" were extracted from X (formerly Twitter) from the top 25 tweets of each extraction. Then, those extracted words were qualitatively analyzed with respect to the context, themes in relation to social norms, social positioning, and presence as a marked object or not for qualitative categorizations. Then, the frequency of the words that appeared in each qualitative category is counted for the quantitative analysis.

About "*Onna* (woman)" and "*Josei* (female)". This study extracted "female/woman researcher" and "male/man researcher" as a contrast, and the differences of nuance between female (*Josei*-女性) and woman (*Onna*-女) are described as follows (Weblio Online Dictionary, 2024a; 2024b).

The definitions of "woman" (*Onna* in the Japanese language) are listed below from 1st to 6th, from semantic to pragmatic.

(1) The sex of human that has the ability to bear children. Woman, girls ⇔ Man.

(2) Animals and plants other than humans that are female. Female. "-Horse".

(3) A mature woman. A woman who has grown to the point as to bear children. A full-fledged woman.

(4) A person who has qualities that are generally considered to be possessed by a woman, such as being kind or weak. "Even if she seems strong, she's still a woman".

(5) Honor as a woman. Appearance and capacity. Feminine. "Nice woman"; "She raised the honor as a woman".

(6) Mistress. concubine. "He has a woman".

(1)-(3) have the meaning of being female related to reproduction, and (4)-(5) have characteristics unique to women, numbers (5)-(6) represent women as a sexual ideal and being.

On the other hand, the word "*Josei* (female)" is seen as a gender marker, a sexual distinction between men and neutral. The word "female" did not used to be so common, and seems to be used more after the *Meiji* era started, to correspond to their counterparts in the Indo-European language.

In other words, the word "*onna*" seems to have existed since ancient times and has been associated with human reproductive roles, sexual expectations, and the ideal of a sexual being, whereas the word "*josei*" was created to correspond to counterparts in the Western academic concept.

Data: Features of X (Twitter) and other online resources. According to Comnico Co., Ltd. (2024), X (formerly Twitter) is mainly used for short communication of up to 140 characters and is used by a wide range of age groups, with an average age of 37. Other characteristics include the creation of a culture of connection based on interest and the ability to spread information through the repost (retweet) function.

Additionally, the content of tweets is said to be highly influential due to their high spreadability, and many are malicious and sensational due to the platform's high level of anonymity.

Furthermore, it is essential to share emotions in order to increase satisfaction when using social media, and it is important to speak the truth and support each other (Goldenberg & Gross, 2020).

On the other hand, Dehingia et al. (2023) analyzed the misogyny contained in tweets posted to Twitter from India from 2018 to 2021 and found misogynistic content in 2% of all tweets. The content can be divided into the following six categories, such as sexist abuse, sexual objectification, threatening to physically or sexually harm women, asserting women's inferiority, justifying violence against women, and dismissing feminist efforts. It was also found that many such tweets are offensive and hateful, urging women to follow the social norms that position them as sexual ideals.

The content of these tweets is highly topical, sensational, or malicious or involves positive messages aimed at the general public. They are affectively and emotionally charged, and include sexual misogyny that idealizes traditional norms about female sexuality.

In this study, the following sites were searched to investigate two categories of "female/male researcher" and "woman/man researcher" (see Table 1).

Table 1

Data on the Extracted Words

Data #	Searched word	URL	Searched date
1	Female researcher	https://twitter.com/search?q=%E5%A5%B3%E6%80%A7%E7%A0%94%E7%A9%B6%E8%80%85&src=typed_query	06/28/2023
2	Male researcher	https://twitter.com/search?q=%E7%94%B7%E6%80%A7%E7%A0%94%E7%A9%B6%E8%80%85&src=typed_query	06/28/2023
3	Woman researcher	https://twitter.com/search?q=%E5%A5%B3%E7%A0%94%E7%A9%B6%E8%80%85&src=typed_query	06/29/2023
4	Man researcher	https://twitter.com/search?q=%E7%94%B7%E7%A0%94%E7%A9%B6%E8%80%85&src=typed_query	06/29/2023

Note. Tweets appearing at 1st to 25th priority could be diverse depending on each user's recommendation system.

Research Frame 2: Self-definition by Female Researchers

As mentioned above, female STEM doctoral students tend not to desire an academic career. This tendency not to use their abilities to the fullest is due to social restraint rather than self-restraint. Claiming accomplishments can lead to paying a price in society and the workplace, and living up to the stereotype of being "dedicated" can lead to likability. Social norms also influence self-definition, even though they include symbols of professional success (promotions, publications, awards, getting a permanent contract, getting a contract, getting a grant, student support, etc.). They tend to think of themselves as frauds and unsuitable for relevant academic positions.

As the subjects to be observed, this study selected the female speakers in each section at Science Agora, an event held every fall by the Japanese Science and Technology Agency called the Annual Science Meeting that

connects science and society. Their discourses were carefully observed to find patterns in the psychology and emotions of female speakers and to explore relevant topics. By analyzing these concepts, we attempted to clarify the explicit and implicit messages about how they self-position.

As a concrete method, the four scenes shown in Table 2 were extracted for analysis from Science Agora from 2008 to 2015.

Table 2

The Details of Each Event and Speaker

Data#	Event name	URL	Content of talk
1	What are you doing about science communication!? ~ Discussion park on the 20th memorial of SC	https://www.youtube.com/watch?v=Vbdg8xcAD98	Science communicator and career path
2	Masters who manipulate the charm of science ~ Talk event & live streaming	https://www.youtube.com/watch?v=2SryXEznSHs&t=3169s	Scientific communication and "Science Celebrity"
3	The present and future of robots and humans based on the movie "Time of Eve (2010)"	https://www.youtube.com/watch?v=T4-bJ1c2t0k&t=313s	Manga artists and AI scientists
4	Researcher *Ogiri* (comedy skit) ~ An edition: Let's realize the world of manga together! ~	https://www.youtube.com/watch?v=ncVyI8KwBok	How to make the world of manga (SF) a reality

Result

Result from Research Frame 1: Markedness and Social Positioning of Researchers

Extraction of related concept. To clarify the question of how female researchers are defined and marked by society and others, this study extracted the terms "female researchers *(Josei Kenkyusha*)", "woman researcher (*Onna Kenkyusha*)", "male researcher (*Dansei Kenkyusha*)", and "man researcher (*Otoko Kenkyusha*)" using data from X (formerly Twitter). The markedness of each term was analyzed quantitatively and qualitatively to determine whether female researchers are marked in comparison with male researchers.

Based on the corresponding data from the above, the terms "female researcher/male researcher" and "woman researcher/man researcher" in the Japanese language were examined on X. Then, tweets appearing at 1st to 25th priority were taken as the data for qualitative and quantitative analysis.

Additionally, researchers of women's studies/feminism [*josei-gaku kenkyusha* (女性学研究者)] were eliminated from the data, although they seem similar to the term for female researcher [*(josei-kenkyusha* (女性研究者)].

Content analysis on the posts ranked from 1st to 25th clarified 11 categories in terms of meaning and concept, as shown in Table 3. Those concepts were further examined with respect to collocated words, topics, and content of meaning.

Table 3

Frequency of Each Topic Collocating with "Female/Male Researcher"

Content of meaning	Female researcher (*Josei Kenkyusha*)	Male researcher (*Dansei Kenkyusha*)
A. Self-introduction	1 (4%)	0 (0%)
B. Public relations (PR)	5 (20%)	0 (0%)
C. Sexual positioning	3 (12%)	2 (8%)
D. As a comparison with male/female researcher	3 (12%)	7 (28%)
E. Gender equality, reversed discrimination	12 (48%)	8 (32%)

Table 3 to be continued

F. Trans-female researcher	4 (16%)	0 (0%)
G. Competitiveness	1 (4%)	0 (0%)
H. Agent of activity	1 (4%)	4 (16%)
I. Life with hardships	1 (4%)	0 (0%)
J. As a character in 2D media	1 (4%)	0 (0%)
K. Agent of harassment	0 (0%)	11 (44%)

Note. Number of frequencies on the corresponding phrase per data.

Based on the results above, it was clarified that the following five contents of meaning were frequently collocated with the terms “female researcher”: E. Gender equality, reversed discrimination (48%), B. Public relations (PR) (20%), F. Transgender (from male to female) researcher (16%), C. Sexual positioning (12%), D. As a comparison with male/female researcher (12%), where they are listed in the sequence of a high frequency rate.

On the other hand, the term “male researcher” prominently appeared as: K. An agent of harassment (44%), then E. Gender equality, reversed discrimination (32%) and D. As a comparison with male/female researcher (28%), which were found to be the same as for the data on female researchers. Additionally, male researchers appeared as H. Agent of activity (16%) more frequently compared with female researchers.

In the next section, the examples are shown qualitatively.

Content analysis. A qualitative analysis of the topics and concepts of meaning with a high frequency rate and co-occurring with the terms “female/male researcher” was conducted.

Topics and concepts co-occurring with “female researcher”.

[E. Gender equality, reversed discrimination (48%)]

Example 1)

I took a quick look at the following notions, which are introduced (within a certain information source) in Japan.

- The ratio of female researchers is noticeably low. Although it has improved, it is still low compared to other countries.
- It is becoming less attractive as a destination for researchers.

Example 2)

I wonder if it is possible to immediately guarantee employment to all researchers until they retire at the age of 65, as a research system reform of a different dimension. Japan’s research system is completely broken with the situation where those researchers who got Grants-in-Aid for Scientific Research B (= research categories that can only be obtained by leading researchers in the field) remain in the position as specially appointed assistant professors (= fixed-term employment). This is not the time to forcefully increase the proportion of women.

(Female researcher, data 9)

In Example 1, gender equality with respect to the employment and promotion of female researchers in Japan is claimed based on some information resources. In Example 2, some people lament the lack of female researchers as a negative aspect of Japan’s research system, while others believe that women are given preferential treatment through affirmative action and are stealing jobs from talented men; for example, male-appointed assistant professors who received Grants-in-Aid for Scientific Research B. In this case, it has been presumed that there has never been a case of a female researcher taking that fund while being a specially appointed assistant professor.

This notion of affirmative action towards female researchers is actually demonstrated frequently in the next advertisement, given by a university's public relations message.

[B. Public relations (PR) (20%)]

Example 3)

Public Relations [News] Osaka University is working to increase the ratio of female researchers - July is "Osaka University Diversity & Inclusion Strengthening Month" - https://bit.ly/3CNjTTR ★About PR for gender equality initiatives

(Female researcher, data 13)

These advertisements posted by a university about the pursuit of affirmative action are frequently shown in 20% of all of tweets in the data.

[F. Transgender (male to female) researcher (16%)]

Example 4)

As you probably know, last year, a trans woman was hired as an assistant professor at Kyoto University, a position reserved for women.

The reason why the quota for women was created was that "(usually in academia) the environment is not conducive for female researchers to get pregnant and give birth", so it was frequently rumored employing trans women would be deviant from the main idea.

Moreover, it is rumored that the employed researcher changed her gender just a year before employment.

(Female researcher, data 12)

As in the case of affirmative action, the priority given to the transgender researcher is claimed to be an abuse of equity-related systems and governance.

As well as claiming the possibility of reverse discrimination towards those who are not female researchers, others have a meaning that is sexually positioned.

[C. Sexual positioning (12%)]

Example 5)

Honestly, it's really disgusting to see female researchers promoting themselves by wearing underwear, I don't know if they're posting pictures of themselves in their underwear as part of their profession.

(Female researcher, data 5)

Example 6)

A beautiful female researcher invents cell medicine, commonly known as "using medicine to be popular". Inadequacies in the paper, irreproducibility, death of a supervisor… This is a mystery set in a medical school. It's exactly the same riot as that about the XX cells case, which has caused a stir in society. Is it okay to have so much "referenced content"? Desire is scary.

In this context, the female researchers are described as wearing underwear, using medicine to be popular, or as beautiful, thus positioning them as something inadequate and contradictory to the academic setting.

In summary, the term "female researcher" is frequently used to claim the inequity of affirmative action or is used in the context of sexual objectification, by minimizing the qualifications of female researchers as inadequate, suggesting they could be harmful to or annoy and lower the status of male researchers.

Topics and content collocated with "male researcher".

Example 7)

In April, a male researcher who was a member of the Tokyo branch of a literary society was reappointed as branch president. In March, this researcher was suspended from his job for two months by his university in Tokyo district for committing academic harassment.

(Male researcher, data 12)

Considering the nature of X, whereby it spreads messages easily and causes a stir, it is possible that the number of occurrences was high because the search was conducted immediately after this incident of harassment. This stereotypical news reporting about a person responsible for academic harassment tends to co-occur with the term "male researcher" in the data collected by this study, as seen in Example 7.

[E. Gender equality, reversed discrimination (32%)]

This item is talked about in the context of reverse gender discrimination and the privilege of female researchers, where female researchers are more likely to receive coverage when it comes to their research, while men who do comparable research are not reported on. Depending on each perspective, it also concerns the markedness of female researchers and the unmarkedness of male researchers.

Example 8)

I say this regularly, but I don't consider myself to be a woman, so even reading books about feminism makes me unpleasant rather than uncomfortable, but if I were a male researcher, I wouldn't be unpleasant, and I would still be tagged as a woman. I recently thought that it was a reaction to society, which presses women's stories to me though I'm not living under the tag of woman.

(Male researcher, data 16)

Example 9)

As with my German history teacher, the important thing for a male researcher is whether or not he can marry a wife from a wealthy family. The professor also said, "Thanks to my wife, I am able to do research".

On the other hand, whether a man can be a big dad to a female researcher is a different matter.

(Male researcher, data 18)

In the context of Example 8, the writer suggests that if she were a male researcher, she would not be emotionally affected by book that presses upon women some other stereotypical life story. In this case, the term "male researcher" is cited as the standard to which she should be compared, and cannot herself be an agent of activities. This referential usage of "male researcher" means that it can be used only when the gender of the researcher is important to consider. Additionally, "male researcher" is used in the context of a comparison with female researchers in Example 9, and the writer suggests that male researchers can be invested in by their rich spouses, but the opposite is rare. Also in this example, a "male researcher" would not represent an agent of activity, thus the term would not appear without the demands for comparison.

Thus, "male researcher" appears in 28% of the total data as a reference to show a contrast with female researchers, and this portion would increase if it includes other cases, in which the term implicitly includes the meaning of contrast, as seen in Examples 13 and 14.

Male researchers are thus presented as a contrast to women, and the term "male" is used only in contexts where gender needs to be specified. In other words, normally, the word "researcher" alone would mean a man, and it would be considered highly unmarked. On the other hand, the term "female researcher" is used to impress the negative stereotypes of female researchers, in which they are given preferential treatment through affirmative action despite their incompetence, or as objects of sexual positioning.

Extraction related to "woman/man researcher". Next, the frequency and content of topics that co-occur with "woman/man researcher", which has a slightly different nuance from "female/male researcher"—are to be examined.

The terms "woman researcher (*Onna Kenkyusha*)/man researcher (*Otoko Kenkyusha*)", which have a different nuance from "female researcher/male researcher", are extracted from the data as the results that came up from 1st to 25th. Following this procedure, the next six categories are shown as the content of meaning (see Table 4).

Table 4

Topics and Contents of Meaning that Co-occur with "Woman/Man Researcher"

	Content of meaning	Woman researcher (*Onna Kenkyusha*)	Man researcher (*Otoko Kenkyusha*)
A	Character in manga or animation	17 (68%)	N/A
B	Sexual fantasy	5 (20%)	
C	Gender equality including reversed discrimination	6 (24%)	
D	Disgusting personality	6 (24%)	
E	Negative discourse (bursting into tears, sad)	7 (28%)	
F	Love and romance	3 (12%)	

Characters from anime and manga were the most common, accounting for 68% of all tweets. Next were those associated with negative emotions, such as "sad" female researchers (28%), followed by those that include perspectives of gender equality and inequality (24%), and disgusting personality (24%). Of these terms, 20% were also associated with sexual fantasies.

On the other hand, the term "man researcher" did not appear at all. Although the words "researcher" and "man" appeared in separate sentences, they were not meant to indicate the gender of the researcher.

Content analysis (2). Next, we will conduct a content analysis of tweets that include the word "woman researcher" and observe the related topics in the context of their positioning in society.

[A: As a character in games, manga, movies, and illustrations (68%)]

Example 10)

If you're into "Vampire die soon", I think you'll also be into *Drakura-kun* by Mr. Monkey Punch, the author of "Lupine the Third", so I hope you like it!!!

A silly battle between a woman researcher, who wants to kill vampires forever and a vampire, who wants to suck the blood of virgins.

(Woman researcher, data 15)

Here, there were many examples of woman researchers or woman doctors, appearing as attributes of characters in illustrated fantasy worlds, where young and attractive people are often exposed. "Woman researcher" appearing as a character in manga and illustrations accounted for nearly 70% of the total.

[E: Negative events such as sadness, crying, heartbreak, etc. (28%)]

Example 11)

"I don't want to give up on work, marriage, or children, but I don't have time to wait until I'm mentally and financially stable". Here is the account of a 30-year-old woman researcher, who cried a lot at the new year.

(Woman researcher, data 5)

As seen in Example 11, 28% of all tweets containing the term “woman researcher” appear in the context of sadness about being without stability in their working life or a fulfilling private life, all of which are uttered by the woman researcher herself.

[C: Gender equality (including cases of reverse discrimination towards) “male researchers” in life, work, etc. (24%)]

Example 12)

I regret not studying harder and getting promoted. We need to stop woman researchers like that vice president from advocating convenient preferential treatment for women from their high positions.

(Woman researcher, data 7)

Example 13)

For the time being, please don’t burden your tax dollars with woman researchers’ butts. I am astonished by the monstrous greed with which I ask.

(Woman researcher, data 11)

Similar to the content that co-occurred with “female researchers”, in those tweets containing “woman researcher”, writers assume that woman researchers have not earned their professional status through legitimate ability or effort but rather because they have gained this status through affirmative action and are a nuisance to society.

[D: As a person with an unpleasant personality (in the real world, not as a character in manga or movie) (24%)]

Example 14)

People say things like “The only woman researchers in fields besides mathematics and lucrative fields are those with strong noses, you’re still too humble. If you’re on Twitter, it would be more effective to get as much attention as to let Dr. Ai’s account blow up”.

(Woman researcher, data 8)

Example 15)

When I was at a hotel at a conference, a woman researcher recommended me to have some coffee, and I replied, “Coffee sold in the hotel is expensive. At work, it’s free (so I will not order it)”. She replied, “That’s just... Isn’t it brown water?” Is there anyone who is sarcastic? What about brown water? Brown water? Hot water, old hag!

(Woman researcher, data 13)

In addition, many of the tweets denied the character of woman researchers, and many of them cited episodes from real-life encounters with “woman researchers”.

Example 14 describes the stereotypical woman researcher’s personality as strong-willed, while Example 15 insults a woman researcher as an “old hag” for being tight with money, dislikes her, thinks she is overbearing, and includes ageism towards woman researchers who are not young.

[B: Perspective from sexual fantasy (20%)]

Example 16)

Kanna: “I don’t know who *Yamura* is, but I’ve met a female researcher with really big breasts. She was a nice person. Her breasts were so big it was disgusting”.

(Female researcher, data 14)

Others described them as objects of sexual objectification, similar to “female researchers”, as seen in the content analysis of “female researcher”.

Summary on research frame 1: Markedness and social positioning of researchers. As mentioned above, the term "male researcher" appears as a contrastive standard to female counterparts in 28% of all the extracted data. This would imply that the term "male researcher" is seldom used without a sphere of meaning besides comparative references, and "researcher" usually implicitly means a male researcher. Thus, it is also guessed that male researchers are unmarked.

On the other hand, female researchers are considered marked and do not appear in contrast with men. The term "female researcher" appears alone without reference to male counterparts in connection with gender equality, transwomen, and affirmative action. Rather, the term "female researcher" could have the aspect of being a term coined in modern times to mean a certain social background or system.

Regarding female and male researchers, the term "man researcher" was not found in any tweets, suggesting that "researcher" usually connotes "man" by default, similar to the case with "male researcher".

In contrast, when the word "female" is added to the term "researcher", it often carries a special and additional meaning attached to the core of terminology, such as by describing special situations with a unique character in a 2D game, movie, manga, etc. In addition, her personality is portrayed as arrogant, strong-willed, and greedy, or as a stereotype of an evil woman. Moreover, the term is also used in association with sexual objects or romantic imagination.

Result from Research Frame 2: Self-definition by Female Researchers

Extraction of concepts related to "woman researcher". As mentioned above, female STEM doctoral students tend not to desire an academic career, or they think of themselves as frauds and unsuitable for relevant academic positions due to imposter syndrome or aspiration cooling. This section examines this tendency towards self-restraint, which could originate in socially imposed gender roles, by examining the surrounding topics and concepts.

Table 5

Self-definition, Roles, and Markedness Seen in Science Agora Speakers

#	Event name	Observed expression
1	What are you doing about science communication!? ~ Discussion park on the 20th memorial of SC	I'm no expert (Female speaker) I'm an expert (Male speaker)
2	Masters who manipulate the charm of science ~ Talk event & live streaming	I'm no expert (Female speaker) I'm an expert (Male speaker)
3	The present and future of robots and humans based on the movie "Time of Eve (2010)"	The example of female marked participants, who coincide with the example referenced in Tannen (1993)
4	Researcher *Ogiri* (comedy skit) ~ An edition: Let's realize the world of manga together! ~	The example of implicit disclaimer of "I'm no expert (Female speaker)"

Self-positioning as a non-expert. As shown in Table 5, among the Science Agora speakers, female speakers defined themselves with "I am not an expert", while male speakers who appeared in the same position and job type defined themselves as "I am an expert". "It is a home" was observed in Data 1, 2, and 4.

Example 17)

Male science communicator 01:

01 (Regarding risk communication) you may have frequently received a lot of inquiries

02 during covid, and you could be required to take a role as an expert to report. I'm

03 still not sure to which extent this (limitation of the right to give the message as a

04 science communicator) has been changed in the last 10 years.

(Data 1)

In this example, the audience of this event, who have been working as science communicators, make a suggestion to a female speaker that while "science communicator was not previously recognized as a profession, from now on they should have a strong ability to communicate as experts". In contrast, female speakers stated that they avoided appearing as experts, as shown in Example 18.

Example 18)

Female communicator 01:

01 Well, what should I say about this point? Huh, when I get an inquiry about risk
02 communication or something like that... I really get this kind of inquiry, then it
03 made me confused. I could tell many examples of possibilities, but there are times
04 when I feel like I'm running away.

(Data 1)

The utterance "I feel like I'm running away" implies that she felt that she was not strongly confident about how and what kind of information science communicators should convey as experts.

In this context, another male science communicator intervened to help progress the same issue from the perspective of the strength of science communicators.

Example 19)

Male communicator 02:

01 After listening to your story, I was wondering if we have to communicate as an
02 expert of science, or are we required to act as a bridge between researcher and
03 others, since it is difficult to communicate with researchers? I feel like it's all
04 mixed up, so what do you think about this issue?

(Data 1)

In 02-03, although this male communicator is not a science expert, he states that he has the role of mediating things that are difficult for researcher to explain. In other words, science communicators have the advantage of being able to do things that scientists cannot do.

The male communicator once again expresses the completely opposite opinion that they should be "science communication experts" and should recognize the role of "science communication experts", which researcher cannot play.

Still, these endeavors of the male communicator to label himself as an "expert" are broken by the female communicator's refusal to position themselves as an "expert", as shown in the following examples.

Example 20)

Female communicator 02:

01 Yes, experts are doing research in their own specialty, but science communicators
02 are not necessarily experts in that field.
(omit)
03 sometimes visitors (to Science Museum in *Nigata*) asked me about risk (about covid)
04 and so on, saying like "You're an expert in the field, please give me an answer".
05 After telling them that I am not an expert in the field, and I'm not researching it, I
06 would say that there is this kind of information.

(Data 1, 41:37~)

As can be seen in Example 20, female communicators tend not to mention that they are qualified, stating that rather than conducting research, they are helping to disseminate it to society.

In this way, male communicators often describe science communicators as experts, while female communicators position themselves as neither experts nor researchers to describe the same profession.

This tendency to position themselves as a "non-expert" or as an "assistant to experts" is also found in Example 21 in Data 2.

Example 21)

Female science talent:

01 I used to look at biographies of the world's great people, such as Marie Curie and
02 Einstein, and thought physics looked interesting, but I discovered a new equation
03 that I would never be able to be like them. Even though I may not be able to do
04 anything about it or elucidate new phenomena, I would like to encourage
05 students who have given up and fall asleep in physics classes in high
06 school to tell them that this is interesting. So, when I was in academia, I was
07 often asked why I didn't become a researcher, but during my university
08 years I realized that there are many ways to be involved.

(Data 2)

In Example 21, this female science talent indirectly says that she is not a researcher by using the phrase, "I was often asked why I didn't become a researcher". Through her story, she insists that she could not be so competitive as to be successful as a researcher but could take on a role supporting children's education.

Following this self-introduction, other male science talents start to introduce themselves, but using totally different concepts and positioning of themselves.

Example 22)

Male science talent 01:

01 I was also called today as one of the masters, and I was even asked to be the host.

(Data 2)

First of all, in this example sentence, the male science talent states that he is a "master", which means he is a researcher on the topic in the previous discussion. In addition to his expertise, he also serves as the host. He is positioned basically as a researcher/expert more than just a moderator.

The same kind of positioning and stance are also found in the utterances given by the next male talent 02.

Example 23)

Male science talent 02:

So, I'm going to introduce myself as the complete opposite of what they have just talked about, I mean I have spent my life working hard to make insecticides (laughter) to kill insects.

(Data 2)

Here, the male science talent 02 mentions his past researching pesticides, which connects him to the present, and does not imply any context for hiding or denying that he is a scientific expert.

In Data 2, as in Data 1, male science talents position themselves as "experts" and appeal to their competence, while the female science talent stresses that she is not an expert or researcher but plays a supporting role in helping the younger generation to realize how interesting science is.

This grammatical structure, “Create an entry point for (the student’s) curiosity” or “Create an opportunity for them” is like Stubbs’ observation of happiness, with sentences such as the “woman makes (the family) happy”. Both sentence structures place the agent of activity or realization on the other person. It can be said that this statement is almost like the statement that defines work as one’s own role, while women define their role as supplemental or assistant work.

In addition, the tendency for female science talents to minimize their own abilities was found, while male talents tend to maximize and promote their abilities.

Example 24)

Female speaker:

01 Well, I’m in charge of giving an unreasonable request (*Muchaburi*), so I’ve been

02 preparing a lot of manga and anime for this day...

(Data 4)

Example 25)

Male MC:

01 As expected, you will start as a professional of unreasonable request (*Muchaburi*), so

02 I hope you will enjoy the first *Muchaburi* strike.

(Data 4, 1:03:52~)

In the Japanese language, “*Muchaburi*” means asking questions with amateurish ideas, and in the context of Examples 24 and 25, she is participating in the event as a speaker and a non-expert in science, which positions her as an amateur who may inquire about something crazy. However, she is a historian and cannot be said to be a non-expert in her own field.

This utilization of the female researcher outside of her major, which ends up hiding her potential, could be one characteristic leading other’s more dominant interpretation of her to be as a non-expert (in science) rather than as an expert.

Visual visibility of transgender women speakers. Tannen (1993) used the linguistic concept of “markedness” to describe situations in which women are given special attention for reasons other than their original roles and actions.

Figure 1. Visual markedness of transgender speaker.

In this streaming video of Data 3, it is seen that the 2nd speaker to the left is dressed more decoratively compared to the male speakers, as shown in Figure 1. This clothing of the female (transgender) participant implies that her role is not only to appear as a science expert but that her appearance itself is the focus rather than what she talks about. This is the markedness of a female (transgender) researcher, and she wears special attire by understanding her role to be invited here as a marked transgender researcher, not as a science expert.

As seen in this chapter, women in STEM have the tendency to minimize their abilities, seeing their role as a subject to other experts. Even if they are a researcher themselves, they may be staged for something outside of their area of expertise, and could find themselves in a position where they cannot introduce themselves as an expert.

Additionally, the very existence of a female researcher is symbolized, and she was implicitly expected to do things other than within her original role as a researcher like any male researcher. Thus, there are certain trends in how women position themselves, as well as the issue of how society defines female researchers.

Discussion

"Female Researchers" within Social Norms and Self-consciousness

Based on the analysis so far, the terms "female/woman researcher" are somewhat coined within the context of dealing with social and institutional issues, whereby they are seen as entities that should be protected by affirmative action due to being inherently incompetent. The terms also are found in the context of reverse discrimination against male researchers, since they have obtained their current positions through unequal means.

This description of women online is consistent with the observations by Dehingia et al. (2023), including sexual objectification, threatening to physically or sexually harm women, asserting women's inferiority, and dismissing feminist efforts.

These are the images that Japanese society generally has about female/woman researchers and they cannot be neglected. On the contrary, the term is never talked about in terms of the original meaning of "researcher", for example, in the context of what kind of research has been conducted or what kind of awards have been received. In other words, when the term "female/woman" is added to the word "researcher", the implicit and additional meaning of the term besides that of the "researcher" becomes focused, or marked.

On the other hand, the term "male researcher" appears only when the context requires the label "male" to be used as a marker to contrast with female researchers. The term "man researcher" was not found on X at all, which means that the word "researcher" has the unlabeled implicit meaning that it is normal for such a person to be male.

Perhaps reflecting this social image or view towards female researchers, women in STEM avoid positioning themselves as "experts" and do not emphasize their abilities; rather, they are found to minimize their competence by saying "I am not an expert". It was also found that women in STEM help other experts and the younger generation commit themselves to research, that is, they were involved in helping other actors make something happen. Furthermore, when women were invited to events, they were not given the same standing as other male researchers but were invited because of their uniqueness as "women".

How are the things observed in this study, such as those mentioned above, connected to feminism beyond language, and what kind of social structure do they indicate? Also, how should they be handled in terms of the concept of gender equality?

Self-definition as Optimization in Society

In overviewing how women in Japanese STEM fields are positioned or position themselves, it seems to contradict the concept of the Sustainable Development Goal (SDG) established by the United Nations in 2015 of "Achiev[ing] gender equality and empower[ing] all women and girls".

The fact that female researchers define themselves as non-experts and minimize their abilities cannot simply be said to be a psychological problem on the part of women who suffer from imposter syndrome. "Imposter syndrome" is the underestimation of oneself, believing that one does not have certain abilities and is not worthy of being evaluated.

When observing the self-definition at Science Agora, it seems that the female speakers are suffering from imposter syndrome. However, in reality, this image (a non-specialist, supporting role) is what society imagines about female researchers.

In the end, female researchers are referred to within a narrative that they have been privileged to advance in their careers despite being incompetent and that they are a nuisance to both male researchers and the country. It is also stipulated that such a person has a selfish or unpleasant personality. Alternatively, they are sexually harassed as part of a sexual fantasy. When the word "woman" is combined with the word "researcher" in this way, it is given a completely different meaning than the word "researcher" on its own, and is picked up and focused on in some way. This is because "researchers" are usually men, and women entering this male world is an affront to social norms.

It is precisely because female workers in STEM understand the risks of calling themselves "experts" that they desperately position themselves with the phrase "I am not an expert" and try to demonstrate to the public that they have a good personality that makes them want to help everyone with their research or study. In other words, the reason female researchers minimize their abilities is because they understand how society views them. They understand that they will be criticized socially if they deviate from social norms, so they speak in public in accordance with the traditional female norm of being in the role of "assistant" or "supporter".

In addition, women in STEM tend not to say that they are qualified because claiming their achievements and accomplishments means paying a price, and they usually try to follow social norms of being "dedicated". It is thought that it is more socially acceptable to support research devotedly than to conduct the research. For this reason, there may be a phenomenon in which some people choose to engage in research assistance work instead of leading research.

Sandberg (2014) argued that claiming one's accomplishments usually leads to more success, but when women do this, they pay the price in society and the workplace. This also applies to Japanese female researchers, and it can be said that the strategies for promoting their abilities are structured in completely different ways for women and men. In other words, the self-definition of female researchers is a social structural one. The "imposter syndrome" seen among female researchers at Science Agora appears to be a self-defense measure to avoid the "aspirational cooling" of female researchers as seen on X.

This supports the findings of Etmanski (2019) that female students in STEM do not pursue academic careers.

The Shift of Status of Japanese Woman

Of course, the above-mentioned attitudes among Japanese women in STEM may be due in part to cultural customs. Confucian values were dominant in Japan during the long Edo period from 1603 to 1868. Traditionally, there has been a custom whereby an individual's life is to be defined by their innate elements,

such as social class or gender, as seen in the famous proverb, “A frog’s child is a frog (people have their own innate role)”. In this context, actions that are inconsistent with a person’s role have been a target of criticism.

Kaibara Ekiken, a Confucian scholar of the Edo period, says: “A bad woman is a woman who can’t bear a child, who has a disease, who is talkative” (Woman’s University [1716~1736]). According to this norm, when a woman becomes an “expert” or a “researcher”, she transcends the role that her gender naturally dictates, and she is always linguistically marked. This situation could lead to her suffering double binds or double standards.

There are different social expectations or norms for women with respect to what are considered desirable attitudes, roles, and behaviors than there are for men, even in academia. For this reason, the meaning and behavioral norms implied by the terms “researcher” and “expert” are different from those of the role expected of women, and there is a possibility that what a researcher should be and what a woman should be contradict with one another.

Ehrmann (1959) suggested that gender double standards refer to the use of different criteria for judging women than those used for judging men. Sandberg (2014) pointed out that when men highlight their accomplishments, it tends to lead to promotions and salary increases, while women who do the same receive some kind of punishment, which is a type of double bind. Even if they are in the same position, the words men and women use to define themselves can be completely different.

Women in science may face some contradictory messages, such as “Achieve a lot (occupational policy)/Behave like a woman (social norms)” or “Please work well, but not so well as to threaten social norms”. These contradictions lead women to position themselves as non-experts who are simply there to help real researchers.

The Right Person in the Right Place?

In fact, the social representation of and prejudice against female researchers seen in this study, resulting in imposter syndrome and the issue of the employment of women in research assistant positions, poses several practical problems.

For example, in 2011 in the United States, the Equal Employment Opportunity Commission enacted a law that provides legal assistance for discrimination based on stereotypes, based on Title VII of the Civil Rights Act of 1964. So, from an equity perspective based on human dignity, any person should be assessed solely on the basis of whether or not they are suitable/qualified to engage in the job, not on how they look based on socially decided assumptions.

One problem is that not all Japanese women are innately suited for research assistantships or teaching jobs, but concepts of gender-differentiated role may make it easier for them to aim for assistantships. Although there are women who can succeed as PIs, role norms may prevent them from doing so. Research and research assistant work are both specialized jobs, but they require different types of abilities. However, men may tend to be categorized as researchers because those roles are considered higher in rank.

In reality, aptitude is not so simple as to be based on gender; there are people who can work in research jobs while not being good at research assistant or teaching jobs. The minority who deviates from the traditional view of women’s attributes and aptitude cannot be saved in the current social system.

The aforementioned SDGs state the following:

> Gender bias is undermining our social fabric and devalues all of us. It is not just a human rights issue; it is a tremendous waste of the world’s human potential. By denying women equal rights, we deny half the population a chance to live life at its fullest. (The Global goals, 2024)

Female researchers are human beings before they are women, and the fact that they are unable to live their own lives because of their gender attributes is a problem related to human dignity.

The original reason Japanese women are in a lower position in their academic careers could be that they spend more time doing housework and raising children than men. In fact, women generally engage longer hours in household than men. There is also the aspect that they are not working hard to progress in their careers.

This public opinion may be influenced by the division of labor in Japan, which used to be the standard of society during Japan's high economic growth era from 1954 to 1973. In this vision, men are encouraged to work hard at the company, while women are in charge of everything at home. In modern times, the social structure has changed, and it could be possible to improve this disparity in social and economic status between men and women by following the Swedish-French model of a gender-equal society by reducing the burden of housework and childcare on women; this support could realize conditions in which the starting points are equal, making the results more likely to be equal.

Furthermore, the proportion of single people has recently been increasing in Japan, and in 2023 in Tokyo, the rate of unmarried women at the age of 50 was 23.79% according to statistics provided by the Tokyo Metropolitan Government Bureau of Social Welfare (2024). In regions where single women now account for one-quarter of the population, many of them are educated in the same way as men and have not spent their lives doing too much housework or childcare; these women are unable to lead traditional lives. Regardless of their situation, it should be taken into account that these women are forced to accept the psychological framework of being a "wife" or "mother".

The problem is that female researchers who have received academic training still have their professional roles determined through the filter of gender, and if they call themselves researchers or experts, they are labeled as deviants of social norms and face retaliation. There is a problem with resigning own self to supporting work in order to avoid such retaliation from society. This is because even if the woman herself thinks she has overcome the problem for the time being, the next generation will also struggle with this treatment if the situation is not improved.

In Japan, the words for "nurse (*kango-fu*)" and "nursery worker in kindergarten (*hobo*)" have female attributes as a suffix or word stem, so they are being replaced with a more gender-neural expression. This is based on the recognition that it is important to consider qualification or personal preference as a human being, regardless of gender, in terms of what they want to do and what they are capable of doing.

Considering this point, it is necessary not only to limit the use of simple term "female researcher" but also to assess the context surrounding the term and the way it is used. Instead of saying, "I am not an expert", female STEM workers can be encouraged to call themselves "experts" without fear of social retaliation.

This will give us an opportunity to think about the relationship between words and society, which is similar to the relationship between the egg and the chicken, and to improve society through words.

Conclusions

In current STEM academic institutions, female employees make up only 10-14% of all positions, of which 30% are "full-time researchers" such as PIs, with nearly 60% of assistants being women.

How do female STEM workers and researchers, who are minorities in terms of job positions and occupancy rate, think about their status as minorities? Also, how do people often treat female workers in STEM?

As for the emotional state of women in academia, Cvetkovich (2007) and Etmanski (2019) stated that women easily suffer from imposter syndrome and feel themselves to be fraudulent and inadequate in their occupation, and thus are more likely to stop aspiring to achieve more in their academic careers. Meanwhile, women are required to make sacrifices with less chance of reward (Hewlett & Luce, 2006).

In this study, some frameworks of mixed-gender discourse, such as lack of involvement in activity as an agent (Stubbs, 1996), markedness (Tannen, 1993), and gender-differentiated roles (Spender, 1985) are used to help clarify the discourse surrounding self- and other-positioning for female employees in STEM, by applying corpus linguistics and content analysis based on scripted data from tweets on X and speech from a scientific event.

Consequently, the lexical search of X clarified that while the terms “female/woman researcher” are frequently cited in the context of affirmative action or as objects of sexual fantasy, the term “male researcher” usually appears in reference to “female researcher”. Moreover, the lack of the term “man researcher” in the lexical search means that the term “researcher” usually connotes the lexical element of “man”, thus female/woman researchers are linguistically marked.

There was also a phenomenon whereby female speakers at scientific events referred to themselves as “non-experts” by minimizing their own qualifications and referring to their roles as supporting ones. This is the phenomenon commonly referred to as imposter syndrome; however, this problem in self-positioning can actually be related to societal norms and misogyny, which can be seen in how society defines “female/woman researchers”; self- and society-positioning are actually interlocked with one another. This linguistic and communicational observation could be the key to gender equality progress in Japanese STEM as a human rights issue.

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