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# An Experimental Assessment of Gender Equality Lessons for Japanese 4th Graders

***Shin AKITA***: *Department of School Education, Matsumoto University, Matsumoto, Japan*.

♣***Kazuo MORI***: *Professor Emeritus, Tokyo University of Agriculture and Technology, Tokyo, Japan.*
*E-mail: kaz-mori@cc.tuat.ac.jp*

**ABSTRACT:** *This study aimed to evaluate the effects of a gender equity lesson in a Japanese elementary school. Seventy-three fourth graders (34 boys and 39 girls, aged 9–10) from three elementary schools in Aomori Prefecture, Japan, participated in an 80-minute gender equity lesson focused on occupational gender stereotypes. The lesson's effects were assessed using a pre- and post-test experimental design with two measurement tools: an implicit association test and a questionnaire survey. The results indicated a statistically significant reduction in gender-occupation bias after the lesson. However, implicit attitudes toward men and women remained stable, with no significant changes observed. These findings highlight the challenges of promoting gender equity initiatives in Japan and suggest potential limitations of implicit assessment tools for younger children. This study represents a unique attempt to examine the effects of a gender equity lesson for elementary school children by employing both implicit and explicit assessment procedures.*

***Key words:*** *Fourth-grade students, Gender equality education, Gender-occupation stereotypes, Paper-format implicit association test, Pre- and post-test design.*

## 1. Introduction

September 27, 2024, marked the day when a Japanese female politician came closest to becoming Prime Minister of Japan (Asahi Shimbun, 2024). Sanae Takaichi, 63, the Minister of Economic Security, received 181 votes in the first round of the election for the leadership of the Liberal Democratic Party (LDP), placing first among the eight candidates. At the time, the LDP was Japan's ruling party, holding a strong majority in the lower house, having consecutively led the government with three Prime Ministers for 12 years since 2012. Winning the LDP leadership would have automatically made Takaichi the next Prime Minister, potentially the first female Prime Minister of Japan. However, the number of votes Takaichi received fell short of a majority, and she lost in a runoff vote, obtaining 194 votes compared to 215 votes for Shigeru Ishiba, 67, a former LDP Secretary-General, who ultimately secured the leadership.

Japan ranked 118th of 146 countries in 2024, being the bottom of OECD countries only but Turkey (World Economic Forum, 2024). Japan's low index score reflects low subindices in Economic Participation and Opportunity and Political Empowerment, ranked 120th and 113th, respectively. Meanwhile, the other two subindices are ranked higher, 58th in Health and Survival and 72nd in Educational Attainment. However, those subindex scores are close to the ceiling, 0.973 and 0.993, respectively, while the other low subindex scores are as low as 0.568 and 0.118, for Economic Participation and Opportunity and Political Empowerment, respectively.

Since Japan enacted the Equal Employment Opportunity Law in 1985, progress has stagnated for nearly 40 years (See Akita & Mori, 2022, for review). Therefore, Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) has been concerned about this issue and has attempted various measures to

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rectify the situation through school education. MEXT set school education guidelines with specific teaching objectives for gender equality education. The first author of the present paper was an elementary school teacher specializing in social studies education for 13 years, engaging in gender equity education. After obtaining a position at a teachers' college, he began collaborating with an educational psychologist, the second author, and soon realized that the critical reason for the stagnation in gender equity education stems from the lack of assessment of its effectiveness. Most schoolteachers regularly conduct their lessons with various creative approaches, but they tend to be content with simply delivering the lessons. As a result, they have neglected to consider how much these carefully designed lessons have actually influenced students' perceptions of gender equality.

Akita and Mori (2022) assessed the effect of gender education by utilizing the paper-version of the FUMIE Test, developed by Mori, Uchida, and Imada (2008), before and after a gender equity lesson in an elementary school with 92 sixth graders (46 boys and 46 girls, 11–12 years old). The FUMIE Test was a paper-based group performance test utilizing the same principle as the Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998). It could be more easily administered in school classes within five minutes or so without using computers. They administered the FUMIE Test with the target word, "女性 (woman)," to assess implicit images of women among the sixth graders. The results showed that the boys' implicit image of "woman" improved after the lesson. Their follow-up study (Akita & Mori, 2023) revealed that the implicit image of the boys in the same cohort remained higher than the pre-lesson level after three years, demonstrating the long-lasting effect of gender education in elementary school.

The present paper expands on the experimental studies of Akita and Mori (2022; 2023) to a younger cohort, namely elementary school fourth graders. We use a similar experimental design as Akita and Mori (2022; 2023), assessing the educational effects before and after a gender equity lesson. In this study, we employ two assessment measures: a revised FUMIE Test suitable for younger participants and a gender-based occupation questionnaire tailored for fourth-grade students.

## 2. Methods

### *2.1. Participants*

Seventy-three fourth graders (34 boys and 39 girls, 9–10 years old) from three elementary schools in Aomori Prefecture, Japan, participated in the present study. Although the present study was closely related to gender identity issues, we used the traditional binary genders because the school register used them. While gender identity has been slowly gaining recognition, traditional gender dichotomy is still used in Japanese schools.

### *2.2. Development of the Hiragana FUMIE Test*

The FUMIE Tests used in the Akita and Mori (2022; 2023) studies were revised for sixth graders composed of evaluation words familiar to the sixth graders (Akita, Tsushima, Saito, & Mori, 2019) from the original FUMIE Test (Mori, Uchida, & Imada, 2008). For the present study, we needed to further revise the test for even younger participants. Mori, Matsumoto, Karasawa, Ejima, Mure, & Uchida (2020) developed a FUMIE test for third graders by replacing the evaluation words with child-familiar words written in three Hiragana letters. Japanese children learn the 46 Hiragana letters first, usually before the elementary school education. They learn the Japanese writing system, that consists of Kanji characters, Hiragana and Katakana letters step by step during elementary school years. Therefore, Mori et al. (2020) revised the Hiragana version of the FUMIE test for third graders. They also examined the familiarity of each word with a group of third graders.

### *2.3. Pre-Test: FUMIE Test Administration Procedures*

In class, we administered the Hiragana FUMIE test using the target words "おんな (women)" and "おとこ (men)" to evaluate implicit perceptions of men and women, following the standard procedures outlined by Uchida and Mori (2018). To streamline the process, we assessed both target words consecutively on the same test sheet: the first half dedicated to "women" and the second half to "men." For each target word, participants completed four lines of marking tasks, alternating between "○ (positive)" and "× (negative)" responses. Each line was completed within 20 seconds, with two lines assigned to each marking type. (Refer to Appendix 2 for an example of a Hiragana FUMIE test sheet.) The test itself took approximately three

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minutes to complete, in addition to about 15 minutes allocated for distributing the test sheets, providing general instructions, and collecting the sheets.

### *2.4. Pre-Test: Gender-based Occupation Survey*

Immediately after administering the FUMIE Test, we asked the students to complete a Gender-based Occupation Survey (see Appendix 3). The survey consisted of a single question: "What occupations are suitable for men and women?" This was followed by a list of ten occupations, including nursery teacher, pastry chef, and medical doctor, adapted from Kokubu (2023). Students were given three minutes to categorize the ten occupations into one of three groups: suitable for men, suitable for women, or suitable for either. The purpose of the survey was to evaluate students' perceptions of gender-based occupations prior to the gender equality lesson.

### *2.5. Outline of the Gender Equation Class Activities for 4th Graders*

The instructor (one of the co-authors) conducted an 80-minute lesson (see Appendix 1) with the objective of helping students understand that Japan lags behind other countries in achieving gender equality. The lesson included the use of two video materials: one from AC Japan (2022) and another from JICA (2023). These videos were designed to prompt students to think critically about unconscious gender-occupation biases and the current state of gender equity in Japan. To further illustrate Japan's position in terms of gender equity, the instructor presented data from MEXT (2023) and a TV program aired by TV Asahi (2023). Additionally, another TV program from TV Tokyo (2023) was shown, featuring a young female carpenter, to highlight the presence of women in non-traditional occupations. Since the video materials were not specifically created for children and included some unfamiliar terms and Kanji characters, the instructor provided explanations in simple and accessible language as needed. To evaluate the impact of the lesson, we conducted the same FUMIE test and Gender-based Occupation Survey as pre- and post-tests within the 80-minute session.

### *2.6. Post-Test: FUMIE Test and Gender-based Occupation Survey*

At the conclusion of the gender equality lesson, we administered the same Gender-based Occupation Survey and FUMIE Test again, but in reverse order. These post-tests were conducted to evaluate the impact of the gender equality lesson.

## 3. Results

### *3.1. Calculation of $IAQ_{100}$ Scores*

Following the standard procedure outlined by Uchida and Mori (2018), we calculated the Implicit Association Quotient ($IAQ_{100}$) for each target word, "men" and "women." First, we counted the total number of words marked in 40 seconds (20 seconds for each of the two lines) for both the positive task ($W_P$) and the negative task ($W_N$). The $IAQ_{100}$ scores were then calculated using the following formula:

$$IAQ_{100} = 100 \times (W_P - W_N) / (W_P + W_N).$$

The $IAQ_{100}$ index represents the balance between the positive and negative implicit images for the target words, expressed per 100 words. A positive $IAQ_{100}$ score indicates a more positive implicit image, while a negative score suggests a more negative implicit image.

After calculating the $IAQ_{100}$ scores, we excluded the data of students who marked only one word or fewer in a single task, as it was assumed they had accidentally failed to perform the task correctly. Among the 16 tasks (eight for the pre-test and eight for the post-test), six boys and one girl failed at least one task. Their data, including the survey responses described below, were discarded on a case-by-case basis. As a result, the analysis was conducted using the complete data from 66 students, consisting of 28 boys and 38 girls.

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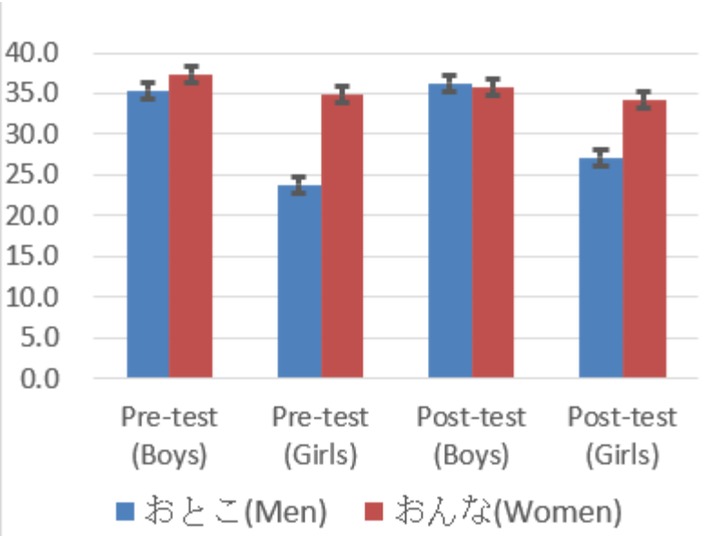


**Figure 1.** Average IAQ100s of "Men" and "Women" for Boys and Girls at Before and After the Gender Equation Lesson. (The vertical bars show the standard errors.)

### *3.2. Comparison of the IAQ$_{100}$s Before and After the Lesson*

Figure 1 presents the average IAQ$_{100}$ scores of boys and girls for the target words "men" (blue bars) and "women" (red bars) before and after the gender equality lesson. As shown in the figure, there were minimal differences in IAQ$_{100}$ scores between the pre- and post-lesson assessments. A three-way ANOVA indicated that the main effect was not statistically significant ($F$ = 0.15, n.s.).

The IAQ$_{100}$ scores for "men" were lower than those for "women" in the girls' data, while boys showed similar IAQ$_{100}$ scores for both target words. This resulted in a significant interaction effect between gender and target ($F$ = 10.64, $p$ < .01). Although the girls' IAQ$_{100}$ scores for "men" appeared to improve after the lesson, the two-way interaction did not reach statistical significance ($F$ = 0.09, n.s.).

### *3.3. Comparison of the Occupation Survey Data Before and After the Lesson*

Students classified ten occupations into three categories—"for men," "for women," or "for either"—before and after the lesson, as indicated on the Gender-based Occupation Survey sheet (Appendix 3). No omissions were observed, allowing us to analyze the responses of all 66 students.

Rather than examining how each specific occupation was classified, we counted the number of occupations placed in each category by each student. Figure 2 illustrates the occupation preferences of boys and girls before and after the gender equality lesson. As expected, both boys and girls distributed the ten occupations relatively evenly across the three categories before the lesson. However, after the lesson, they were more likely to classify occupations into the gender-neutral category, "either." A two-way ANOVA was conducted on the number of occupations classified as "either" by boys and girls before and after the lesson. The results indicated a statistically significant lesson effect with a large effect size ($F$ = 120.25, $p$ < .01, $\eta^2$ = 0.65).

We also counted the number of students who classified all ten occupations into "either" before and after the lesson, separately for boys and girls. Before the lesson, three boys and no girls selected the neutral category for all ten occupations, whereas after the lesson, this number increased to 12 boys and 21 girls. Notably, two boys reduced their use of the "either" category after the lesson, while no girls showed a decrease. This suggests that the gender equality lesson had a greater impact on the girls compared to the boys.

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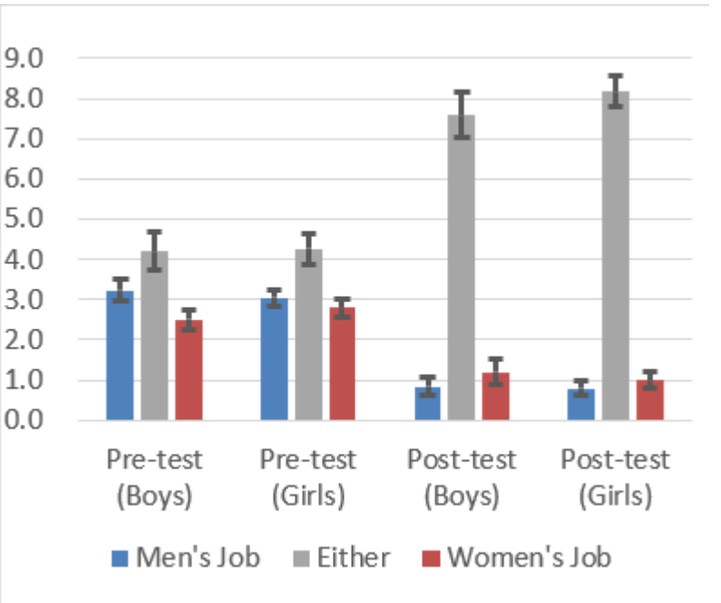


**Figure 2.** Occupation Preferences for Boys and Girls before and after the Gender Equation Lesson. (The vertical bars show the standard errors.).

## 4. Discussion

### *4.1. Why Did the Lesson Not Show an Effect on the Implicit Image of Women?*

The gender equality lesson was effective, as evidenced by the intended changes in the occupation preference questionnaire responses after the lesson. However, unlike previous studies (Akita & Mori, 2022; 2023) using similar experimental designs, this study did not demonstrate an improvement in the implicit image of women. Why might this have occurred?
Several possibilities may explain this discrepancy:

a) Different Target Words for Women

In this study, we used "おんな" (written in three Hiragana characters) as the target word for women, instead of "女性" (written in two Kanji characters) used in previous studies. Although both terms refer to women, "おんな" is a more basic and familiar word for children, whereas "女性" is derived from Chinese and consists of Kanji meaning "female" (女) and "gender" (性). We selected "おんな" to make the Hiragana FUMIE test more appropriate for children, as it matches the evaluation words in length and format. This linguistic difference could have influenced the implicit image scores.

b) Ceiling Effect

The implicit image of women in this study was substantially higher than in previous studies. The $IAQ_{100}$ scores for women were approximately 35 in this study, compared to around 8.0 for girls and as low as 1.0 for boys before the lesson in earlier research. In previous studies, the low baseline scores allowed room for improvement after the lesson. However, in this study, the pre-lesson scores were already relatively high, leaving little room for further improvement.

c) Performance Differences in Positive and Negative Tasks

Analysis of the performance data revealed that children performed significantly better on positive tasks than on negative ones. In positive tasks, children marked "○," which can be drawn in one stroke, whereas negative tasks required "×," which involves two strokes. While Mori et al. (2008) demonstrated that stroke differences did not affect task performance speed in adults, this may not hold true for younger children with less developed motor skills. Consequently, the children in this study may have found negative tasks more challenging, resulting in higher $IAQ_{100}$ scores overall.

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d) Differences in Lesson Content

The content of the gender equality lesson in this study focused on occupational choices for men and women, whereas previous studies emphasized women's rights more broadly. While the children in this study were able to directly connect the lesson to the occupation survey, they may have struggled to generalize the lesson's content to their implicit image of women.

### *4.2. Limitations and Future Perspectives of the Present Study*

Although the fourth-grade children showed a clear improvement in the occupation preference survey after the lesson, no significant changes were observed in their implicit images of women. As noted by Akita & Mori (2023), improvements in implicit attitudes toward women have been shown to persist for over three years in older students. In contrast, the direct effects observed in the occupation survey may not have the same lasting impact. It would be overly optimistic to conclude that the gender equality lesson was fully effective. The children's responses may simply reflect what they learned during the lesson, rather than a deeper internalization of gender equity principles. In other words, the knowledge they gained might remain isolated as academic information, rather than integrating into their social attitudes and behaviors.

To address this, a follow-up survey is necessary to determine whether the knowledge acquired during the lesson transitions into enduring attitudes that influence their social lives. This point is particularly critical given that progress toward reducing the gender gap in Japan has stagnated for nearly 40 years.

Mori et al. (2020) developed the Hiragana FUMIE test specifically for younger children who can only read Hiragana. This study represents the first practical application of the new test, but its suitability for young children remains questionable due to their less-developed motor skills, as discussed earlier. While Mori et al. (2020) adjusted the evaluation words and used Hiragana instead of Kanji, they did not account for the physical drawing abilities of younger children. Future studies must consider developing a revised assessment tool that better aligns with the developmental capabilities of young children to measure implicit attitudes more accurately.

In conclusion, we found that the gender equality lesson for fourth-grade students was partially effective, as demonstrated by the changes in the occupation preference survey. However, unlike previous studies with sixth (Akita & Mori, 2022) and ninth graders (Akita & Mori, 2023), this study failed to show an improvement in implicit attitudes. This discrepancy may be attributed to potential deficiencies in the implicit assessment tool used. In our previous paper (Akita & Mori, 2023), we optimistically proposed conducting a large-scale survey using implicit measures, such as the FUMIE test, to assess current attitudes toward gender differences in Japanese children and adolescents. Nevertheless, we must now acknowledge an additional limitation: the Hiragana FUMIE test may not be suitable for younger children in its current form.


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**Appendix 1.** Teaching Plan for 4th Grade Comprehensive Studies: "5. Achieving Gender Equality"

1. Teaching Objective.

Understand that Japan lags in achieving gender equality compared to other countries.

2. Lesson Outline (Total: 80 minutes)

Pre-test:

- FUMIE Test (20 minutes) [Cf. Appendix 2]
- Gender-based Occupation Survey (3 minutes) [Cf. Appendix 3]

Lesson Content: Questions and Instructions [Teaching Points] <Materials Used> → Anticipated Student Responses/Thoughts

1. Let's Think About Gender Through TV Commercials.
   [Encourage students to consider the meaning conveyed by the TV public service advertisement.]
   <AC JAPAN* "Was the voice you heard a man's voice or a woman's voice?"> → "I guess that was a woman's voice. Was it a man's?"
2. Think About Gender Equality in the SDGs.
   [Help students understand gender equality and the Gender Gap Index.]
   < JICA "SDGs Video Series // Goal 5 // Achieve Gender Equality" **>
3. Consider an Example of Nepal.
   [Progress while confirming the culture and daily lives of people in Nepal.]
   → "It's strange that men work outside and women stay home in Nepal. My mom works outside, though."
4. Make a Prediction.
   Which country has a higher Gender Gap Index, Nepal or Japan?
   → "Japan should be higher than Nepal. Maybe it's in the world's top 10?"
5. Confirm the Facts.
   [Introduce data showing the percentage of female principals in Japan: 21% in elementary schools, 7% in junior high schools, and 8% in high schools.]
   < MEXT Data***, The TV Asahi Program****>
   → "There aren't many women in leadership positions. Everyone thinks men have an advantage."
6. Learn About a Female Carpenter Working in Nagano Prefecture.
   [Do not express the teacher's own values regarding the introduced women.]
   <TV Tokyo Program*****>
   → "Even women can work hard as carpenters. Female carpenters are amazing!"

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7. Summarize What You've Learned.
   [Evaluation Criterion for Teaching Outcomes: Understand that Japan lags in achieving gender equality compared to other countries.]
   → "I hope Japan achieves gender equality soon. I was surprised to learn that Japan isn't gender-equal in the global ranking."

Post-test:

- Gender-based Occupation Survey (3 minutes)
- FUMIE Test (14 minutes)

Materials Used:

* AC JAPAN (2023) The public service advertisement "Kikoete kitano wa Dansei no Koe desuka? Josei no Koe desuka? (Was the voice you heard a man's voice or a woman's voice?)" It contained some written messages in Kanji characters. The instructor read and explained those messages orally. [https://www.youtube.com/watch?v=10l7UqcP9EQ]

** Japan International Cooperation Agency (JICA) "SDGs Video Series // Goal 5 // Achieve Gender Equality" [https://www.youtube.com/watch?v=JALwGEsWKxA]

*** MEXT of Japan (2024) "*Kocho, Fuku Kocho, Kyoto ni Shimeru Josei no Wariai* (The Percentage of Women Among Principals, Vice Principals, and Assistant Principals)" [https://www.mext.go.jp/content/20211220-mxt_syoto01-000011607_00306.pdf]

**** TV Asahi (2023) The TV program "*Ikegami Akira no Nyusu Sodatta no ka!! Nihon wa susunderu? okureteru? Tettei Kaisetsu Special* (So That's How It Was! Akira Ikegami's News: Is Japan Progressive or Falling Behind? A Thorough Special Analysis)," broadcasted by TV Asahi from 18:56 to 21:00 on September 30, 2023. [The video footage available from the author on request.]

***** TV Tokyo (2023) TV program *Gaia no Yoake: Furui Ie ga Takara no Yama ni Naru!* (Dawn of Gaia: An Old House Becomes a Treasure Trove!), broadcasted by TV Tokyo from 22:00 to 22:45 on February 3, 2023. [https://txbiz.tv-tokyo.co.jp/gaia/vod/post_267208?utm_source=txplus&utm_medium=matome2301203&utm_campaign=gaia] The first episode featuring a female carpenter in her 20s, working for the construction company Sansuisha, was used in the lesson.

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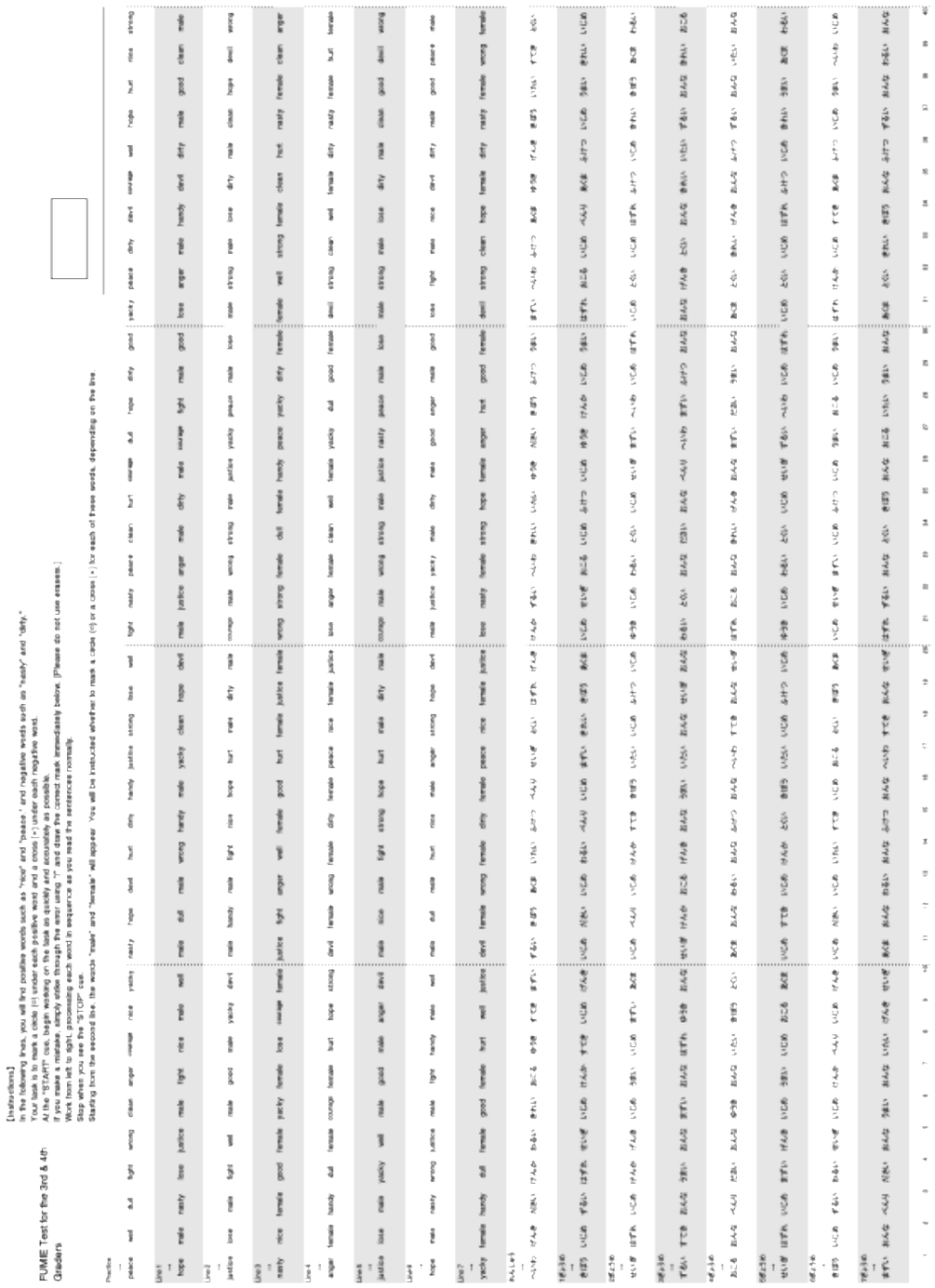
## Appendix 2: FUMIE Test for 3rd and 4th Graders

The actual words used are shown in the bottom half. All the words are written in three Hiragana characters, including the target words "おとこ" (male) and "おんな" (female).





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**Appendix 3: Gender-based Occupation Survey**

Adapted by the authors based on page 25 of Kokubu (2023). Kokubu, Mari (2023). *Josei no Shiten de Tsukuru Jendaa Byodo Kyoiku* (Gender Education Created with a Women's Perspective), Akashi Shoten Publishing, Tokyo, ISBN:4750355534. [in Japanese]

**What occupations are suitable for men and women?**

| | | | |
|---|---|---|---|
| ① Nursery Teacher | ② Elementary School Teacher | ③ Pastry Chef | |
| ④ Police Officer | ⑤ Carpenter | ⑥ Medical Doctor | |
| ⑦ Nurse | ⑧ Prime Minister | ⑨ Pilot | ⑩ Florist |

Choose the suitable ones and write their numbers in the boxes below.

| For Men | For Either | For Women |
|---|---|---|
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*Email: kaz-mori@cc.tuat.ac.jp*