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Do negative attitudes toward older adults vary by occupation? Focus on the stereotype content model

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Do negative attitudes toward older adults vary according to the occupation of the older adult? Addressing this question is crucial to foster continued employment opportunities for older individuals. To explore this, we conducted an online experiment with Japanese participants, examining how negative attitudes fluctuate when comparing non-older and older adults within specific occupations. This study applied the stereotype content model across 16 occupations and unveiled a three-cluster solution, indicating variations in stereotype mappings between non-older and older workers. Moreover, it was observed that the propensity for these differences varied across clusters. Notably, in occupations where the workers were perceived as more competent and warmer than the general older adults, stereotypes shifted more positively when participants were informed that the workers were older. Conversely, in occupations where workers were perceived as more competent and less warm, both competence and warmth shifted in a negative direction with the introduction of age information. In addition, respect—the degree to which the target person is esteemed and/or admired by others—was strongly associated with both competence and warmth. It is anticipated that the insights gleaned from this study can inform practical interventions aimed at mitigating negative attitudes toward older adults concerning employment.

KEYWORDS

competence, occupation, older adults, respect, stereotype, warmth

1 Introduction

The global population is projected to age rapidly over the next half-century, prompting several countries to enact policies aimed at retaining older individuals in the workforce to bolster resources for social security. In particular, Japan is experiencing rapid aging, with the proportion of the working population aged 65 years and older increasing from 7.3% to 13.3% between 2000 and 2020 (Cabinet Office Japan, 2023). Consequently, amendments to the Employment Stabilization of Older Persons Act in 2021 now mandate efforts to implement measures ensuring employment until the age of 70. Therefore, the proportion of older adults participating in the workforce is expected to continue rising.

Prior studies have documented the existence of the stereotypical perception that older adults are less competent than younger generations (e.g., Cuddy and Fiske, 2002; Rosen and Jerdee, 1976). Such stereotypes have also been reported to work against older workers in job interviews and layoff selection (Krings et al., 2011; Osborne and McCann, 2004). As the manifestation of these negative attitudes toward older adults threatens the

societal challenge of promoting the employment of older workers, its resolution requires a thorough understanding of the stereotypes regarding older adults and their associations with these occupations[1]. If stereotypes of older workers are particularly strong in certain occupations, this may represent a critical issue, highlighting the urgent need to reduce stereotypes of older workers and ensure fair and objective treatment in those occupations.

Recognizing the existence of stereotypes allows us to consciously work toward suppressing their effects (Devine, 1989), and several methods have been proposed and validated to achieve this (e.g., Kawakami et al., 2000; Galinsky and Moskowitz, 2000). Therefore, even in occupations where stereotypes of older workers are prevalent, specific interventions could be developed to improve workplace environments and treatment. Based on these findings, this study posed the research question, "Do negative attitudes toward older adults vary by occupation?" and aimed to measure and document the stereotypes ascribed to older workers across a wide range of occupations. In this study, "older adults" refers to individuals aged 65 and older; this criterion is based on the projected future employment situation in Japan (Cabinet Office Japan, 2023).

1.1 Stereotype content model

To measure a broad range of stereotypes, the framework proposed in the stereotype content model (SCM; Fiske et al., 2002) was employed. The SCM maps the stereotypes ascribed to different groups along two dimensions: competence, which is a trait such as being intelligent and/or capable, and warmth, which is a trait such as being good-natured and/or friendly. Fiske et al. (2002) empirically examined stereotypes in 23 social groups (e.g., rich people, Asians, and housewives) and exhibited that they could be mapped onto two dimensions. Within the SCM, older adults belonged to an area that was perceived as low in competence and high in warmth. In addition, a mapping distribution of the subtypes of older adults was obtained. Boudjemadi et al. (2023) mapped 17 subtypes expected in older adults (e.g., wise, traditional, and sick) onto the SCM and demonstrated that they resulted in three-cluster solutions.

If older adults were classified by occupation, where would they be placed on the SCM? How does this differ from mapping occupational stereotypes in the SCM (Strinic et al., 2022)? These questions are important for elaborating on the relationship between the stereotypes ascribed to older adults and occupational stereotypes. Prior studies have systematized the findings on the stereotypes ascribed to older workers (Posthuma and Michael, 2009) and have demonstrated that certain stereotypes ascribed to older workers are more pronounced in certain occupations (Arrowsmith and McGoldrick, 1996; Chiu et al., 2001). However, few studies have comprehensively and directly examined the impact of the specific occupation in which older adults are employed. This leaves a gap that this study seeks to help fill using the SCM framework.

While role congruity theory may help us understand why such negative attitudes toward older workers are occupation dependent, it alone cannot fully capture the influence of contextual factors such as occupation type. According to this theory, prejudice can arise when a social group is ascribed stereotypes that are inconsistent with the attributes necessary to be successful in a given social role (Eagly and Karau, 2002). It has also been found that each occupation has a typical age (i.e., age norm) for workers in that occupation and that the stereotyping of older workers is more pronounced when the age norm is lower (Cleveland et al., 1988; Perry et al., 1996). Given these findings, it is expected that negative attitudes toward older workers will further intensify if they are perceived as failing to meet the attributes and age norm required to work in a given occupation. However, the relationship between the occupations in which older adults are employed and their mapping position in the SCM (hereafter referred to as SCM coordinates), as well as the propensity in SCM coordinates for a wide range of occupations, remains unknown. Therefore, this propensity was identified by analyzing and typifying how the SCM coordinates for each occupation differ between non-older and older workers. This approach provides new insights into the interaction between age-related and occupational stereotypes.

The study hypotheses regarding the differences in SCM coordinates are as follows. First, it is anticipated that when the SCM coordinates of each occupation of non-older adults are utilized as a baseline, the SCM coordinates of older adults should shift from the baseline toward those of general older adults (H1). This is because information about older adults has been reported to be a stable and pervasive attributional factor in employee evaluations, such as job performance (Dedrick and Dobbins, 1991), and all SCM coordinates for each occupation should be influenced by the general stereotype of older adults as having low competence and high warmth. Next, we consider how much the SCM coordinates of older adults will shift from the baseline. Based on role congruity theory (Eagly and Karau, 2002), we expect that the amount of shift would be greater for occupations in which the baseline is farther away from the SCM coordinates of general older adults (H2). Furthermore, the above-mentioned previous findings on age norms lead us to expect that the shift would be greater for occupations in which the age norm is lower (H3).

Evidence suggests an interaction between occupational stereotypes and gender (e.g., Reeves et al., 2021). While we recognize the significance of incorporating gender as a variable, this study deliberately focuses on age-related stereotypes to more precisely delineate the scope of analysis. The implications of this focus, including any potential limitations, will be examined in the Discussion section, where we delineate the interpretive boundaries in the context of relevant prior research.

1.2 Predictors of SCM coordinates

It is crucial to identify the predictors of SCM coordinates to enhance the comprehension of the relationship between the stereotypes ascribed to older adults and occupational stereotypes.

1 This point is also mentioned in a prior study that identified future challenges in researching stereotypes ascribed to older adults in the workplace (Posthuma and Michael, 2009).

Fiske et al. (2002) focused on status and competition as predictors of SCM coordinates and found the emergence of stereotypical perceptions that high-status groups were more competent and groups with strong competitive relationships were less warm. Boudjemadi et al. (2023) extended these findings to include older adults. They argue that it is more appropriate to use socioeconomic status rather than power in the SCM framework for older adults, although the two concepts are related. This is because status was originally considered a predictor variable in the SCM (Fiske et al., 2002), and many older adults no longer hold positions of power. However, they also note that this measure alone is not sufficient as a predictor. Therefore, they added respect, which is the degree to which one is esteemed and/or admired by others and is considered as an informal dimension of social hierarchy (Blader and Siyu, 2017), as a new predictor. By analyzing the SCM for 17 subtypes of older adults, they found that the predictor of competence was status or respect (depending on the cluster), whereas the predictor of warmth was competition (Boudjemadi et al., 2023).

In this study, we defined older workers as those aged 65 and over. Accordingly, the predictors of the SCM coordinates for older adults—status, respect, and competition—adopted by Boudjemadi et al. (2023) remain promising predictors. If this assumption holds true, it may provide valuable insights for interpreting the results of this study. Therefore, status, respect, and competition were examined in an exploratory manner. We anticipated that competence would exhibit a positive correlation with status or respect, whereas warmth would exhibit a negative correlation with competition (H4).

1.3 Hypotheses

H1. The SCM coordinates of older adults in each occupation are closer to the SCM coordinates of general older adults as opposed to the SCM coordinates of non-older adults.

H2. The differences in SCM coordinates between non-older and older adults are greater for occupations that are farther from the SCM coordinates of general older adults.

H3. The differences in SCM coordinates between non-older and older adults are greater for occupations with younger age norms.

H4. Competence on the SCM scale correlates positively with status or respect, while warmth correlates negatively with competition.

2 Method

2.1 Participants

In this study, participants rated 17 subtypes consisting of 16 occupations and general older adults. Each of the 16 occupations was assigned three different age information items, and each participant rated four different targets from these combinations. Under these conditions, a power analysis assuming a small effect size of $f = 0.10$ ($\alpha = 0.05$, $1 - \beta = 0.80$, $N_{group} = 3$, $N_{repeat} = 4$) for the age information resulted in a required sample size of $n = 62$ per subtype. Therefore, the total sample size required to analyze the 17 subtypes was $N = 1{,}054$. Based on these findings, an online experiment was conducted among 1,185 Japanese adults (19–64 years old). The mean age of the participants was 42.78 years ($SD = 9.78$) and there were 649 men and 536 women. Participants were recruited through Lancers, Japan's leading crowdsourcing service. The gratuity for each participant was 110 JPY.

2.2 Target occupation and age information

The decision to limit the number of occupations to 16 was based on the goal of focusing on occupations that are representative and well-distributed across the SCM coordinate space. We believed that this approach would allow us to efficiently and clearly capture the overall propensity for fluctuations in SCM coordinates. Additionally, the decision to limit the number to 16 also took into account the cost of conducting the survey and the potential burden on participants when responding. If a distinct propensity is identified in a particular occupation, related occupational groups can be targeted in future research to further explore stereotyping mechanisms. Therefore, although this study examines a limited number of occupations, the findings would provide a foundation for more comprehensive research in subsequent phases.

The 16 occupations were determined by selecting one or two occupations from each of the 15 major categories based on the industrial classification table published by the Ministry of Health, Labour and Welfare (The Japan Institute for Labour Policy and Training, 2022). In determining the occupations, we imposed the following conditions: (a) the occupations examined in prior studies mapping the SCM of occupations were used as a reference (Imhoff et al., 2013; Friehs et al., 2022; Sakuma, 2018); (b) the occupations were those that can be imagined to be held by older adults aged 65 or older, regardless of gender[2]; and (c) four occupations were assigned to each of the four quadrants formed by competence "C" and warmth "W" in the SCM. Namely, the four quadrants are high competence–high warmth (HC-HW), high competence–low warmth (HC-LW), low competence–high warmth (LC-HW), and low competence–low warmth (LC-LW). As few occupations could be assigned to the LC-LW quadrant, two non-occupational categories (recluses and homeless individuals) were included as subtypes. We included two non-occupational categories because, in Japan, recluses are perceived as associated with young people, while the homeless are perceived as associated with older adults. We believed that this distinction would be useful when considering age-related differences.

Three types of age information were utilized, namely: non-older adults, older adults, and no information. The age of older adults was set at 68 years to reflect the actual employment situation in Japan (i.e., mandatory efforts to ensure employment until the age of 70 years). The age of the non-older adults was set at 38 years, which provides a sufficient age gap for older adults and enables imaginable

2 For example, occupations related to general affairs (secretarial, personnel, etc.) were excluded because it is difficult to imagine older adults working in such occupations in Japan, and construction-related occupations were excluded because it is difficult to imagine women working in such occupations.

employment in the 16 occupations mentioned above. To measure the age norm for each occupation, participants assigned to the no-information group were asked how old they imagined the target to be when they rated it after completing all ratings for the target. The 16 occupations used in this study and their assignment to the four quadrants assumed prior to the experiment were: (a) HC-HW: nurse, professor, priest, and novelist; (b) HC-LW: corporate executive, Diet member, attorney, and doctor; (c) LC-HW: caregiver, taxi driver, farmer, and hairdresser/barber; and (d) LC-LW: building janitor, unskilled worker, homeless, and recluse.

2.3 Procedure and analysis

The participants accessed the study description online and provided consent to participate. Individuals were subsequently assigned 4 of the 49 target types (16 occupations × 3 age information + general older adults). Four targets were drawn, one from each of the four quadrants, and occupations within each quadrant were drawn at random. Participants were subsequently asked to complete a series of questionnaires designed to measure the SCM (i.e., competence, warmth) and predictors of the SCM coordinates (status, respect, and competition). The order in which the questionnaires were presented on these three scales was counterbalanced across the participants. After completing the questionnaire, participants who rated the target without age information were asked how old they thought the target was when they rated it. Finally, participants were asked about their demographic variables. Statistical analyses were performed using the R software (version 4.3.3). The data used in the analysis and R codes were posted on the Open Science Framework (OSF) repository.

2.4 Questionnaire items

The age and occupation of the target were presented to the group of participants who received age information, and only occupation was presented to the group who received no age information. The dimensions of competence and warmth on the SCM scale were assessed using a total of six items (three items each on a 6-point Likert scale), consisting of statements such as "38/68-year-old *target*[3] individuals are intelligent" and "38/68-year-old *target* individuals are friendly" (Shimizu et al., 2021).

The three dimensions of status, respect, and competition on the predictor scale were assessed using a total of 10 items (three items each for status and respect, and four items for competition, all rated on a 6-point scale). These items included statements such as "38/68-year-old *target* individuals have money and resources," "38/68-year-old *target* individuals are esteemed," and "The more power 38/68-year-old *target* individuals have, the less power others are likely to have" (Boudjemadi et al., 2023). Each dimension's score represents the mean of the corresponding items, with higher scores indicating a stronger perception of that dimension. Participants' age and gender were recorded as demographic variables. All questionnaire items were translated and presented in Japanese (see the Supplementary material for English version).

3 Results

3.1 Reliability analysis

Principal component analysis was performed on the three measured scales of SCM and predictors to determine the number of factors with an eigenvalue of 1 or greater. Factor loadings and commonalities for each questionnaire item were subsequently calculated using maximum likelihood estimation with Promax rotation, and each item was checked to determine whether it exceeded the acceptable value of 0.50 (Hair et al., 2009).

Two factors were identified in the SCM scale using eigenvalues, as anticipated, which were separated into competence ($\alpha = 0.94$) and warmth ($\alpha = 0.94$); factor loadings and commonality were above acceptable levels for all questionnaire items. Regarding the principal component analysis of the predictors of SCM coordinates—status, respect, and competition—as anticipated, three factors were identified from the eigenvalues of the predictors. However, the commonality was below acceptable levels for the two questionnaire items in the competition dimension. The competition dimension consisted of competition and cooperation (i.e., reverse items), and the two items that fell below acceptable levels both belonged to the competition dimension. Given that competition is considered an important predictor and it is not theoretically reasonable to exclude it, competition and cooperation were separated and reanalyzed as four factors. The results showed that the factor loadings and commonality were above acceptable levels for all items and separated into status ($\alpha = 0.91$), respect ($\alpha = 0.92$), cooperation ($\alpha = 0.90$), and competition ($\alpha = 0.83$). Therefore, the subsequent analyses were performed using these four factors. As a summary of the measured data, the mean scores on the SCM and predictor scales by occupation as well as the participants' estimates of the mean age of workers in each occupation can be found in Supplementary Table S1.

3.2 Hypothesis testing

Prior to testing the hypotheses, we mapped the SCM coordinates for each occupation for both the 38- and 68-year-old groups for which the target's age information was presented, and we included arrows indicating the shift from the 38-year-old group to the 68-year-old group.[4] The results are presented in Figure 1. Each occupation falls into three clusters, the reasons for which are explained in detail later.

To test H1, we performed a between-participants comparison using the Euclidean distance[5] D1 between the SCM coordinates

3 In the experiment, instead of the word *target*, the assigned occupation was presented to the participants.

4 Comparisons to the group that did not receive age information were possible. However, we decided that fixing the age difference and increasing the gap (i.e., comparing the 38-year-old group with the 68-year-old group) would be more useful for clearly capturing the overall propensity in stereotypes about older workers.

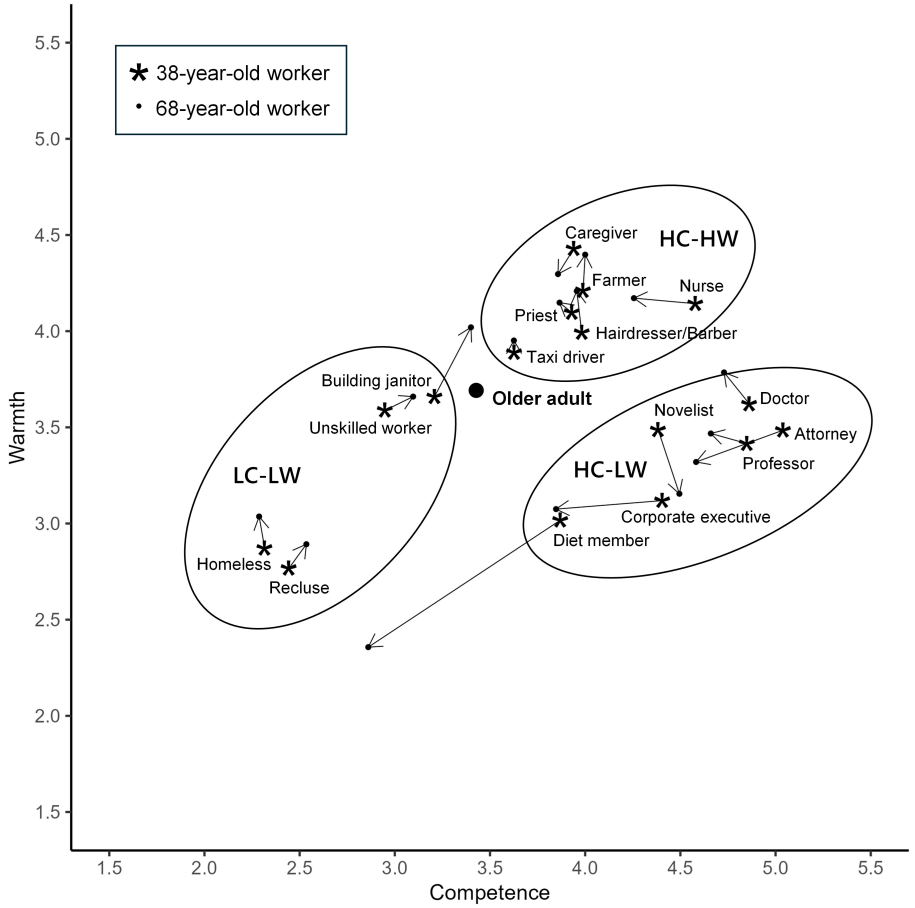

FIGURE 1
Occupations mapped by competence and warmth in the stereotype content model. HC-HW, high competence and high warmth; HC-LW, high competence and low warmth; LC-LW, low competence and low warmth.

of the general older adults and the SCM coordinates of each occupation as the dependent variable and age information (38 vs. 68 years) as the independent variable. As the residuals from the regression analysis of the dataset did not follow a normal distribution,[6] the Wilcoxon rank sum test was used in the analysis. The results indicated that the effect of age information on distance D1 was not significant ($r = 0.00$[7], 95% CI = [0.00, 0.04], $p = 0.867$). Therefore, H1, which states that the SCM coordinates of older adults in each occupation are closer to the SCM coordinates of general older adults as opposed to the SCM coordinates of non-older adults, was rejected.

To test H2 and H3, a between-participants comparison was conducted using the Euclidean distance D2 between the SCM coordinates of the 38- and 68-year-old groups (i.e., arrow length in Figure 1) as the dependent variable, and the distance D1 from the SCM coordinates of the general older adults (far vs. near[8]) and the age norm of each occupation (young vs. older) as the independent variables. As in H1, the residuals from the regression analysis of the dataset did not follow a normal distribution, and a two-factor analysis of variance (between-participants) was conducted after applying an aligned rank transformation (ART; Wobbrock et al., 2011) to the dataset. The results indicated that the main effects of distance D1 and age norms on distance D2 were significant: $F_{(1,1547)}$

5 The SCM coordinates of the general older adults (competence = 3.42; warmth = 3.69) were used as the initial point for calculating the distance D1. By determining the distance between this initial point and the participant's rating for each occupation, we could treat distance D1 as a group (n = 90–101 per occupation). Using the same approach, we also calculated the distance D2 at H2 and H3. Specifically, the initial point was the SCM coordinate for each occupation in the 38-year-old group, and the distance to the participant's ratings in the 68-year-old group was determined for each.

6 Normality was confirmed visually using histograms and quantile-quantile plots; the same method was used to confirm normality in hypothesis testing after H1.

7 This value is the Wilcoxon effect size r, which is .10–.30 (small effect), .30–.50 (moderate effect), ≥ .50 (large effect).

8 The method used to create the two groups was as follows. First, the mean distance from the general older adults was calculated for each of the 16 occupations in the 38-year-old group. Next, two groups of eight occupations each were created using the median of the 16 mean distances as the threshold. The same grouping method was used to create two age norm groups.

TABLE 1 Results of the regression analysis for each dimension.

	β	95% CI	*p*	VIF
Competence				
1 Status	0.44	[0.42, 0.46]	<0.001	1.62
2 Respect	0.51	[0.48, 0.53]	<0.001	2.33
3 Cooperation	0.02	[0.00, 0.04]	0.024	1.65
4 Competition	−0.13	[−0.15, −0.11]	<0.001	1.34
5 Age of target	−0.08	[−0.09, −0.06]	<0.001	1.03
Adjusted R^2	0.72			
Warmth				
1 Status	−0.27	[−0.30, −0.24]	<0.001	1.62
2 Respect	0.60	[0.56, 0.63]	<0.001	2.33
3 Cooperation	0.15	[0.12, 0.18]	<0.001	1.65
4 Competition	−0.11	[−0.13, −0.08]	<0.001	1.34
5 Age of target	0.02	[−0.01, 0.04]	0.150	1.03
Adjusted R^2	0.43			

= 18.27, $p < 0.001$, and $F_{(1,1547)} = 4.54$, $p = 0.033$, respectively. Their interaction was also significant, $F_{(1,1547)} = 4.45$, $p = 0.035$. The results of the sub-effect test indicated that the effect of distance D1 was found when the age norm was older (far > near, $r = 0.16$, 95% CI = [0.09, 0.23], $p < 0.001$). The effect of age norms was also found when D1 was far from the general older adults (young < older, $r = 0.11$, 95% CI = [0.04, 0.18], $p = 0.002$). In summary, H2, which states that the differences in SCM coordinates between non-older and older adults are greater for occupations that are farther from the SCM coordinates of general older adults, was supported, whereas H3, which states that the differences in SCM coordinates between non-older and older adults are greater for occupations with younger age norms, was rejected.

To test H4, a multiple regression analysis was conducted with competence and warmth on the SCM scale as the dependent variables and the predictors of status, respect, cooperation, and competition as the independent variables (see Table 1). The results showed that all predictors had significant effects for competence, with effects for status and respect that were positive (β = 0.43, 95% CI = [0.41, 0.45], $p < 0.001$; β = 0.51, 95% CI = [0.48, 0.53], $p < 0.001$, respectively). For warmth, predictors other than cooperation had a significant effect, with competition exhibiting a negative effect (β = −0.10, 95% CI = [−0.13, −0.08], $p < 0.001$). Residuals from the regression analyses of both datasets exhibited normality. Therefore, H4, which posits that competence on the SCM scale correlates positively with status or respect, while warmth correlates negatively with competition, was supported. In addition, the results of the regression analysis for each occupation demonstrated similar overall propensity, although some variation was observed among individuals (see Supplementary Figures S1, S2).

3.3 Cluster-by-cluster analysis

Figure 1 illustrates that in areas of high competence and low warmth, half of the occupations have arrows pointing to the lower left and are longer. This propensity may explain, among other things, why H1 was rejected. Therefore, the shift in the SCM coordinates was reanalyzed as a result of disparities in age information at the granularity of areas (i.e., occupational clusters). K-means clustering was used to determine the optimal number of clusters when the 16 occupations in the 38-year-old group were divided into 2–8 clusters. Several metrics have been proposed to evaluate the optimal number of clusters, and discussions are ongoing to determine the most appropriate metrics. Therefore, in this study, 30 evaluation metrics that can suggest the optimal number of clusters were prepared, and the number of clusters was determined by the majority rule of these metrics (Charrad et al., 2014). Consequently, a three-cluster solution was identified as optimal. The ellipses in Figure 1 show the boundaries of each cluster, indicating that the HC-HW cluster is higher in both competence and warmth as opposed to the general older adults, the HC-LW cluster is higher in competence but lower in warmth, and the LC-LW cluster is lower in both competence and warmth. The 30 evaluation metrics and the optimal number of clusters suggested by the results are provided in Supplementary Table S2.

Group comparisons were subsequently made for each dimension of competence and warmth for each cluster, with the SCM coordinates as the dependent variable and age information (68 vs. 38 years) as the independent variable (see Table 2). The results of the Wilcoxon rank sum test showed no shifting effect of age information on the SCM coordinates for both competence and warmth in the HC-HW cluster ($p = 0.186$, $p = 0.100$, respectively). In the HC-LW cluster, the SCM coordinates of the 68-year-old group shifted significantly more negatively than those of the 38-year-old group for both competence and warmth ($p < 0.001$ and $p = 0.008$, respectively). In the LC-LW cluster, there was no significant difference in competence ($p = 0.214$), and the SCM coordinates of the 68-year-old group shifted significantly more positively for warmth ($p = 0.008$). Shifts in the predictor scale also resulted in different propensities across clusters (see Table 3).

4 Discussion

We conducted an online experiment with Japanese adults to compare the occupational stereotypes ascribed to 38- and 68-year-old workers. The findings of the analysis of 16 occupations showed that when the SCM coordinates of the 38-year-old group were used as the baseline, the degree to which the SCM coordinates of the 68-year-old group approached those of the general older adults tended to vary depending on the area to which the baseline belonged. This finding suggests that prior findings indicating that stereotypes ascribed to older workers are stable and pervasive (Dedrick and Dobbins, 1991) are not supported when a comprehensive examination of occupational types is conducted. In addition, the finding that stereotypes ascribed to older adults are more pronounced in occupations with younger age norms (Cleveland et al., 1988; Perry et al., 1996), was not replicated in this study.

A particularly intriguing finding was observed within the HC-LW cluster, where the warmth perception of the 68-year-old group diverged from the SCM coordinates of the general older adults. Contrary to expectations, the warmth perception was rated more negatively by the 68-year-old group compared to the 38-year-old group. We delve into the underlying reasons for

TABLE 2 Results of the Wilcoxon rank sum test for age information by each dimension.

Dimension	*M* (*SD*)		Effect size *r* [95% CI]	Direction	*p*
	38 years	68 years			
HC-HW					
1 Competence	4.01 (0.81)	3.93 (0.84)	0.04 [0.00, 0.10]	−	0.186
2 Warmth	4.13 (0.81)	4.20 (0.90)	0.05 [0.00, 0.10]	+	0.100
HC-LW					
1 Competence	4.57 (0.94)	4.20 (1.13)	0.16 [0.10, 0.22]	−	<0.001
2 Warmth	3.36 (0.85)	3.20 (0.99)	0.08 [0.02, 0.14]	−	0.008
LC-LW					
1 Competence	2.73 (0.95)	2.83 (0.96)	0.04 [0.00, 0.11]	+	0.214
2 Warmth	3.22 (0.96)	3.40 (0.98)	0.09 [0.03, 0.16]	+	0.008

The negative signs in the "Direction" column indicate that the scores of the 68-year-old group are lower as opposed to those of the 38-year-old group, and vice versa for the positive signs. CI, confidence interval; HC-HW, high competence and high warmth; HC-LW, high competence and low warmth; LC-LW, low competence and low warmth.

TABLE 3 Results of the Wilcoxon rank sum test for age information by each predictor.

Predictor	*M* (*SD*)		Effect size *r* [95% CI]	Direction	*p*
	38 years	68 years			
HC-HW					
1 Status	3.42 (0.84)	3.48 (0.89)	0.04 [0.00, 0.11]	+	0.138
2 Respect	4.00 (0.90)	4.10 (0.95)	0.06 [0.01, 0.12]	+	0.043
3 Cooperation	3.30 (1.21)	3.32 (1.14)	0.01 [0.00, 0.08]	+	0.649
4 Competition	2.55 (0.94)	2.68 (1.00)	0.07 [0.01, 0.12]	+	0.028
HC-LW					
1 Status	4.59 (0.94)	4.88 (0.82)	0.16 [0.10, 0.21]	+	0.000
2 Respect	3.95 (0.96)	3.80 (1.13)	0.04 [0.00, 0.10]	−	0.159
3 Cooperation	3.26 (1.19)	3.13 (1.22)	0.05 [0.00, 0.11]	−	0.088
4 Competition	2.96 (1.08)	3.41 (1.17)	0.20 [0.15, 0.26]	+	0.000
LC-LW					
1 Status	2.28 (0.72)	2.35 (0.81)	0.03 [0.00, 0.10]	+	0.395
2 Respect	2.59 (1.16)	2.77 (1.22)	0.07 [0.01, 0.14]	+	0.042
3 Cooperation	2.41 (1.19)	2.45 (1.22)	0.01 [0.00, 0.08]	+	0.754
4 Competition	2.76 (1.15)	2.79 (1.12)	0.02 [0.00, 0.09]	+	0.602

The negative signs in the "Direction" column indicate that the scores of the 68-year-old group are lower as opposed to those of the 38-year-old group, and vice versa for the positive signs. CI, confidence interval. HC-HW = high competence and high warmth; HC-LW = high competence and low warmth; LC-LW = low competence and low warmth.

this phenomenon utilizing the predictors outlined in the SCM scale. Examining Table 3, which illustrates the directional shift in scores for predictors (i.e., the variance in scores between the 38- and 68-year-old groups), we observed positive (+) shifts for status and competition and negative (−) shifts for respect and cooperation within the HC-LW cluster. Conversely, the standard partial regression coefficients (β) of the predictors for warmth displayed in Table 1 show negative (−) coefficients for status and competition and positive (+) coefficients for respect and cooperation. Therefore, when the directional shift for a predictor is + (−) and the standard partial regression coefficient β is − (+), it suggests an association with a negative shift in warmth perception. All predictors exhibited the aforementioned pattern, indicating a negative shift in warmth perception within the 68-year-old group. Consequently, the presence of several predictors associated with a negative shift in warmth might outweigh the stereotypical perception of higher warmth in older adults, ultimately resulting in a negative shift in warmth perception.

Another finding contradicted our expectations. Specifically, in the HC-HW cluster, the warmth of the 68-year-old group shifted more positively than that of the 38-year-old group. To consider the reason for this, we note that the shift direction of respect in the 68-year-old group in this cluster was positive (+) and the shift amount was significant ($r = 0.06$, $p = 0.043$). Respect had the highest explanatory power among the predictors of warmth ($\beta = 0.60$). Moreover, the only other predictor that differed significantly

between the 38- and 68-year-old groups is competition ($r = 0.07$, $p = 0.028$), whose explanatory power is small at about one-fifth that of respect ($\beta = -0.11$). Therefore, in the HC-HW cluster, the degree of association between higher respect and higher warmth exceeded that between higher competition and lower warmth, which may have resulted in a positive shift in warmth in the 68-year-old group. However, focusing on the competence dimension in the HC-HW cluster, the negative shift in the 68-year-old group was small and did not cause a significant difference in the 38-year-old group. One reason for this may be that many occupations in the HC-HW cluster have a lower level of competence than those in the HC-LW cluster and are closer to the competence of the general older adults. In other words, the logic may be that the farther the SCM coordinates are from general older adults, the greater the difference between the 38- and 68-year-old groups. This is consistent with the findings for H2, which was derived from role congruity theory (Eagly and Karau, 2002) and supported by the present findings.

Several occupations in the HC-HW cluster require relatively low competence, whereas some in the HC-LW cluster require high competence. One reason for this may be that the perception of warmth is reduced owing to the high level of competence. This is consistent with the findings of prior studies that group perceptions in the SCM have an ambivalent nature (Fiske et al., 1999). Therefore, high-competence occupations tend to belong to the HC-LW cluster, and competence, as well as warmth, may be negatively shifted by the information conveyed regarding the worker being older. Considering role congruity theory (Eagly and Karau, 2002), older workers in occupations belonging to the HC-LW cluster were the most likely to be negatively stereotyped.

The case of nurses in the HC-HW cluster is a valuable reference for mitigating negative shifts in the stereotypes ascribed to older adults. Nurses are the only workers whose competence was as high as that of workers in the HC-LW cluster; however, their warmth was also high. This may be because of the nurses having a positive image regarding their dedication to work. This speculation is supported by the fact that nurses' respect scores were the highest in all age information groups (see Supplementary Table S1). Notably, this result is also consistent with that of a prior study (Boudjemadi et al., 2023) that found respect to be a strong predictor in the HC-HW cluster. Therefore, one strategy to mitigate the negative stereotypes ascribed to older workers engaged in occupations in the HC-LW cluster is to increase their perceptions of respect.

What else should one keep in mind to increase perceptions of respect other than creating a perception of the target's dedication? One clue to this question is the rating given to 68-year-old Diet members belonging to the HC-LW cluster. The 68-year-old Diet members had the highest scores for competition among all the age information groups and had much lower scores for respect (see Supplementary Table S1). One possible explanation for this finding is the strong distrust of older Diet members. The timing of this experiment coincided with the period when allegations of slush funds by Diet members were trending in the news in Japan, which may have strongly reflected the perception that older Diet members are obsessed with power and money. Individuals who engage in actions that lead to distrust and the social backgrounds that enable them to do so should rightly be questioned. Nevertheless, the negative stereotyping of older workers in the HC-LW cluster may be mitigated if perceivers are aware that distrust-amplifying behavior by certain individuals may negatively distort their perception of the occupational category to which they belong. Importantly, in the HW-LC cluster, negative attitudes toward older adults were more pronounced in occupations in which both competence and warmth are relatively low, and the area includes corporate executives.

The exceptionally large shift in the SCM coordinates for Diet members may have strongly influenced the results. Therefore, we reexamined the shift in SCM coordinates for the five occupations, excluding Diet members. Consequently, we confirmed that competence scores significantly decreased ($p < 0.001$) in the 68-year-old group ($M = 4.46$, $SD = 0.90$) compared to the 38-year-old group ($M = 4.71$, $SD = 0.87$). In contrast, regarding the warmth coordinates, a decrease was observed in the 68-year-old group ($M = 3.36$, $SD = 0.90$) compared to the 38-year-old group ($M = 3.43$, $SD = 0.80$); however, the difference was not statistically significant ($p = 0.375$). Therefore, while the pattern specific to the HC-LW cluster was still observed, increasing the number of occupations within this cluster and conducting a similar evaluation is necessary to improve the reliability of the results.

4.1 Implications

This study revealed novel insights, demonstrating that the SCM coordinates for each occupation exhibit variation based on the age information of the workers employed, with this propensity varying across occupational clusters. Further, negative attitudes toward older workers were found to be more prevalent in occupations in the HC-LW cluster. These findings are anticipated to benefit not only individuals interacting with older workers, such as workplace managers, colleagues, and hiring interviewers, but also the older workers themselves. This is because, by knowing these characteristics, the following types of intervention can be applied. "Counter-stereotype training" (Kawakami et al., 2000) involves actively seeking out information and experiences that challenge stereotypes; "perspective taking" (Galinsky and Moskowitz, 2000) encourages imagining situations from the perspective of older people; and the "contact effect" (Allport, 1954; Burnes et al., 2019) promotes active interaction with older people. Additionally, encouraging people to view older workers as respectable reduces negative explicit attitudes (Maline and Johnston, 2013). Particularly, respect emerged as the most influential predictor among the SCM coordinate predictors. The study explored the significance of dedication and trustworthiness as factors contributing to increased respect, alongside the potential presence of implicit distrust within certain occupations. These findings offer valuable insights for formulating strategies aimed at mitigating negative stereotypes.

In the future, the proportion of older workers in the workplace is likely to increase further, which may lead to changes in how stereotypes manifest. However, the perception that older workers are "less competent" is a stereotype commonly held across cultures and age groups. Moreover, completely avoiding the decline in physical and cognitive functions among older adults is difficult; therefore, older workers are unlikely to become the majority in many workplaces, except in certain industries, even if their

numbers increase. Thus, stereotypes about older adults will most likely persist as long as there are age differences among workers, and consequently, the results of this study could be considered applicable to future trends.

4.2 Limitations

First, as the participants were not presented with information about the target's gender, we did not conduct an analysis of the interplay between gender and occupational stereotypes. Evidence suggests that as the target age increases, age-based stereotypes become more dominant (Kite et al., 1991), while the influence of gender-based stereotypes decreases at the workplace (Martin et al., 2019). Consequently, the impact of gender stereotypes is expected to be relatively minor in the older group (68-year-olds), whereas they may still persist in the younger, non-elderly group (38-year-olds). This relationship, however, remains to be tested empirically.

Additionally, the literature on gender stereotypes within role congruity theory suggests an interaction between age and gender (e.g., Eagly and Steffen, 1986; Koch et al., 2015). For instance, negative perceptions of older female workers may be particularly pronounced in male-dominated fields compared to female-dominated ones. We were unable to directly observe this behavior in our study. Considering this interaction may help explain our findings, where occupations such as Diet members showed significant differences in perception based on the target's age information.

Furthermore, recent trends suggest a gradual convergence of gender roles, which likely contributes to a reduction in traditional gender stereotypes (Diekman and Eagly, 2000). However, findings from Eagly et al. (2020) indicate that beliefs in gender equality in competence and women's advantage in communion have grown, but men's perceived advantage in agency remains largely unchanged. Exploring how these trends manifest among older workers would provide valuable insights. To better understand the relationships discussed above, it would be essential to provide gender information for targets or assess participants' assumptions regarding target gender.

Second, given that the participants were limited to Japanese adults, it is unclear whether a similar propensity can be obtained for non-Japanese adults. To clarify this, it is necessary to conduct similar experiments with non-Japanese samples and compare the findings.

Third, although this study did not examine the participants' occupations, it is possible that if, for example, participants were in the same occupation as the target, their perceptions of competition would be more intense and foster negative stereotypes. To analyze this effect, improvements to the experimental design are required, such as recruiting participants by occupation or having participants assume that they belong to a particular occupation. Finally, the status, respect, cooperation, and competition variables used in this study were treated as predictors, similar to prior studies (Boudjemadi et al., 2023). However, this causal relationship may be reversed (e.g., perceived competence in SCM affects perceived respect). To clarify the causal direction, it would be necessary to assume a casual variable and manipulate it while controlling for other variables.

4.3 Conclusions

In this study, through an online experiment involving Japanese adults, we examined and compared the stereotypes ascribed to non-older and older adult workers across 16 occupations potentially employing older adults. The results of the analysis using the stereotype content model showed that the mapping of stereotypes for each occupation differed with age information and the propensity varied across occupational clusters. In occupations where workers were perceived as more competent and warmer than general older adults, stereotypes shifted more positively when presented with the information that the workers were older. However, in occupations where the workers were perceived as more competent but less warm, both competence and warmth shifted in a negative direction. Respect was the predictor most strongly associated with competence and warmth. We expect that the findings of this study can be applied in practice to mitigate negative attitudes toward older adults concerning their employment.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: https://osf.io/g6x72/.

Ethics statement

The studies involving humans were approved by the Ethics Committee of the University of Tokyo (UTSP-23030). The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

YK: Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. YS: Conceptualization, Formal analysis, Methodology, Writing – review & editing. KK: Conceptualization, Funding acquisition, Methodology, Project administration, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/frsps.2024.1486914/full#supplementary-material

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