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RECEIVED 02 April 2025

ACCEPTED 10 June 2025

PUBLISHED 09 July 2025

## CITATION

Shimizu Y (2025) Promoting cooperative behavior for people with disabilities: focus on the fact that “anyone may become a person with disabilities”.  
*Front. Soc. Psychol.* 3:1604911.  
doi: 10.3389/frsps.2025.1604911

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# Promoting cooperative behavior for people with disabilities: focus on the fact that “anyone may become a person with disabilities”

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Around the world, forming societies in which people with disabilities (PWD) can play an active role alongside able-bodied people (AP) is expected. However, prejudice against PWD held by AP persists. Therefore, reducing prejudice against PWD and promoting cooperative behavior for PWD are important. Meanwhile, PWD are characterized by the fact that “anyone may become a person with disabilities.” Considering this viewpoint, we tested the hypotheses that presenting participants with an explanatory statement emphasizing that anyone may become a person with disabilities will reduce prejudice against PWD (Hypothesis 1) and increase cooperative behavior for PWD (Hypothesis 2). An online experiment was conducted and data from 354 Japanese AP (22–69 years, 226 males and 128 females) were analyzed. Cooperative behavior was measured by a one-time public goods game. Results showed that presenting the above-mentioned statement did not reduce participants’ prejudice against PWD (not supporting Hypothesis 1), but it increased cooperative behavior for PWD (supporting Hypothesis 2). In other words, participants in the experimental group were not willing to move closer psychologically toward PWD, but participants were willing to cooperate with PWD just in case participants were to become PWD. Effective strategies to reduce prejudice should continue to be explored.

## KEYWORDS

prejudice against people with disabilities, cooperative behavior, public goods game, attitude change, construal level theory

## 1 Introduction

### 1.1 Prejudice against people with disabilities

In recent years, many efforts have been made in countries around the world, including Japan, to realize an inclusive society. One of the goals is a society in which people with disabilities (PWD) can live actively together with able-bodied people (AP). For example, in Japan, the “Act for Eliminating Discrimination against Persons with Disabilities” was revised and enforced in 2024, prohibiting unfair discriminatory treatment against PWD and making it mandatory to provide reasonable accommodation ([Japan Cabinet Office, 2024](#)). However, prejudice toward PWD held by AP persists as a factor hindering the success of PWD. For example, in the “Public Opinion Survey on People with Disabilities ([Japan Cabinet Office, 2023a](#)),” a total of 88.5% of participants answered “Yes” or “To some extent, yes” to the question “Do you think there is discrimination and prejudice against people with disabilities in the world on the basis of disability?” Indeed, it has been reported

that PWD are more likely to be perceived as incompetent (Canton et al., 2023) and that negative emotions against PWD are widely prevalent (Muto and Kugihara, 2015). Given the above, the reduction of prejudice against PWD is an urgent issue.

In seeking to reduce prejudice against PWD, educational interventions have been implemented to provide correct information about PWD. For example, Hayward et al. (2021), who implemented an educational program on disability in Ecuador, found that participants' knowledge of disability increased and prejudice against PWD decreased. De Boer et al. (2014) also found that a 3-week educational program on disability for kindergarten and elementary school students reduced prejudice against others their age with disabilities. In addition, Bogart et al. (2022) reported that the effectiveness of interventions is greater when educational programs are conducted by instructors with disabilities. In sum, educational interventions regarding PWD are effective in reducing AP's prejudice against PWD.

## 1.2 Focus on the fact that “anyone may become a person with disabilities”

Educational interventions about disability can be said to reduce prejudice by presenting information about “PWD,” who are not fully understood by AP. Such an approach is consistent with the Construal Level Theory, which states that events that are psychologically distant (consisting of spatial, social, and temporal distances) are more likely to be perceived and judged in a stereotypical manner, while events that are psychologically closer are more likely to be processed concretely (McCrea et al., 2012). It is meaningful to apply the Construal Level Theory in research on stereotypes and prejudice. For example, McCrea et al. (2012) found that participants in an abstract thinking state were more likely to evaluate themselves and others in stereotype-consistent ways, which led to increased group identification. These tendencies were not observed in participants engaged in concrete thinking. Furthermore, abstract thinking has also been shown to reduce discriminatory judgments based on specific social categories (e.g., sex, race, religion). For instance, Luguri et al. (2012) demonstrated that conservative individuals in an abstract mindset tended to show greater tolerance toward non-mainstream groups, such as same-sex couples, Muslims, and atheists. Thus, the Construal Level Theory offers a valuable framework for elucidating the psychological mechanisms underlying stereotypes and prejudice. Based on the above, presenting information about PWD is likely to reduce the psychological distance between AP and PWD and suppress stereotypical judgments about PWD. In fact, it has been reported that educational interventions regarding PWD reduce AP's social distance toward PWD (Ma and Hsieh, 2020).

Meanwhile, one of the major characteristics of PWD is that “anyone may become a person with disabilities.” Even the most physically strong and mentally healthy person may have physical disability by an unforeseen accident or mental disability by being placed under excessive stress conditions. This is a feature that differs significantly from racial and sexual minorities, which have been the focus of prejudice research in social psychology. Focusing on this characteristic and informing AP of the fact that “anyone

may become a person with disabilities” could bring closer the psychological distance toward PWD and reduce AP's prejudice. Therefore, an intervention that focuses on the above feature is also consistent with the Construal Level Theory.

Incidentally, the perspective that “anyone may become a person with disabilities” is also significant from the standpoint of indirect reciprocity, which holds that altruistic behavior toward one individual can lead to reciprocal benefits from others, even if the recipient does not directly reciprocate (Nowak and Sigmund, 1998, 2005). Recognizing the possibility of becoming a PWD oneself may encourage AP to perceive PWD as a potential future version of themselves. This form of perspective-taking is considered a psychological mechanism that fosters empathy and moral concern (Batson et al., 1997). By adopting this future-oriented perspective, cooperation with PWD can be reframed not only as an act of helping others who are currently in need, but also as an investment in one's own potential future wellbeing. In this context, previous research has shown that an individual's reputation for being kind to others can influence future cooperative relationships (Milinski et al., 2002; Wedekind and Milinski, 2000). Although this study does not focus on the role of reputation, it highlights the connection between future-oriented perspective-taking and behavior toward PWD.

A previous study like this approach conducted an intervention aimed at reducing prejudice against older adults. The social group of older adults is like PWD in that (unless they die before age 65) “everyone will be an older person.” Focusing on this point, Shimizu et al. (2022) showed that presenting participants with an explanatory statement that included the fact that “everyone will be an older person” reduced prejudice against older adults, and the effect lasted for about 1 week. It has been suggested that the effect's mechanism is that presenting the above statement shortens the subjective time to become older, which is “how long one feels it will be before one becomes an older person” (Shimizu, 2022). In other words, by manifesting the fact that “everyone will be an older person,” the psychological and temporal distance to older adults has been brought closer and anti-old prejudice has been reduced. Therefore, this study will examine whether presenting an explanatory statement that emphasizes the fact that “anyone may become a person with disabilities” will reduce prejudice against PWD.

## 1.3 Summary and hypotheses of this study

PWD often require a certain degree of support from their surroundings, and it is meaningful to promote AP's cooperative behavior for PWD. Thus, we will focus not only on prejudice, but also on cooperative behavior for PWD. To begin with, most prejudice studies have been limited to measuring attitudes as the dependent variable. Although there is a small to medium correlation between attitudes and behavior (Bechler et al., 2021), more accurate predictions of actual discriminatory behavior require validation of effects on behavioral indicators. In this study, we focus on a one-time public goods game as a measure of cooperative behavior. In a public goods game, each player contributes a portion of his/her resources to the group, and the sum of the resources

is multiplied by  $k$  ( $k \geq 1$ ), divided equally, and then returned (Isaac and Walker, 1988). In this game, each player cooperates with the others, rather than aiming for a free ride through non-cooperation, resulting in greater resources for the group. Therefore, the public goods game is considered an appropriate indicator of cooperative behavior.

In this study, we use the simplest form of the public goods game: a one-on-one, one-shot interaction. While many previous studies have focused on repeated public goods games with three or more players (e.g., Peña, 2012; Pereda et al., 2019), the public goods game can still serve as a valid measure of cooperative behavior even in dyadic settings (Dou et al., 2018; Spraggon and Oxoby, 2009). Therefore, its use in this study is reasonable. Nonetheless, it should be noted that the prisoner's dilemma game is more commonly used as the standard framework for one-on-one interactions (Nowak and Sigmund, 1993).

The following two hypotheses are examined in this study: presenting an explanatory statement about the fact that “anyone may become a person with disabilities” will reduce AP's prejudice toward PWD (Hypothesis 1) and increase AP's cooperative behavior for PWD (Hypothesis 2).

## 2 Materials and methods

### 2.1 Participants

Regarding the power analysis, see the Open Science Framework (OSF) repository (<https://osf.io/w2zxe/>). A total of 400 Japanese participants (aged 22–73) was recruited using Lancers, Japan's leading crowdsourcing service, in January 2025. Participants who answered incorrectly to the reading check item in the public goods game (see below;  $n = 3$ ) and to the trap item “Please choose the second ‘I agree’ from the right” ( $n = 2$ ) were excluded from the analysis as they did not read the instruction carefully. We also excluded participants with extremely short 2.5% ( $<184$  s) and extremely long 2.5% ( $>1,268$  s) response times for the entire experiment ( $n = 20$ ), as well as participants with missing responses ( $n = 1$ ). Because this study targets AP, participants who answered “yes” or “do not wish to answer” to the question “Are you currently diagnosed with any disability?” ( $n = 21$ ) were also excluded. Some of the above excluded participants were duplicates. The above screening resulted in 354 analyzed participants (22–69 years old, 226 males and 128 females) with a mean age of 45.64 years ( $SD = 9.40$ ). It is worth noting that the results did not change substantially when data from all participants were included in the analysis (see the OSF repository). The compensation per participant was 49 yen.

### 2.2 Procedure

Participants were randomly assigned to the experimental ( $n = 186$ ) or control group ( $n = 168$ ), and presented the respective explanatory statement (no time limit was set). Participants then responded to the manipulation check items. Next, to allow time before measuring prejudice toward PWD, we asked about social desirability. Participants then answered items on prejudice against PWD and engaged in a public goods game. The opponents of

the public goods game included a person with disabilities (PWD condition) and an able-bodied person (AP condition), and the order was counterbalanced. To control for the effect of the opponent's age, the opponent was specified as “a person who is the same age as you.” Finally, subjective wealth, age, sex, and presence of familiar PWD were asked.

### 2.3 Experimental manipulation and manipulation check

Participants were presented with one of the following explanatory statements as a “short summary of the latest research findings.” In the experimental group, we used the statement: “Anyone may become a person with disabilities. For example, an unforeseen accident may leave you person with physical disabilities. It is also possible that being placed in an extremely stressful situation may result in the retention of a mental disability. According to the Japan Cabinet Office's ‘2023 White Paper on Persons with Disabilities,’ there are 4.36 million people with physical disabilities, 1.094 million with intellectual disabilities, and 6.148 million with mental disabilities. Although this is not a simple total because some people have more than one disability,  $\sim 9.2\%$  of the population has some form of disability. Therefore, people with disabilities are by no means irrelevant to you.” In the first half of the statement, consideration was given to include simple examples to give participants a concrete image of the fact that “anyone may become a person with disabilities.” The latter part was developed with reference to Japan Cabinet Office (2023b) to show that PWD are not uncommon and irrelevant to anyone.

The control group received an explanatory statement on topics unrelated to PWD. Specifically, it was a description of the media and the Internet from Ikeda (2010), which had been used as the control condition in a previous study by Shimizu et al. (2022) on reducing ageism. The full text of that study is available on the OSF repository.

To examine whether the experimental manipulation worked as expected, all participants were asked two items: “Anyone may become a person with disabilities (Q1)” and “I feel that people with disabilities are irrelevant to me (Q2).” The options were “1. not at all disagree,” “2. disagree,” “3. somewhat disagree,” “4. somewhat agree,” “5. agree,” and “6. very agree.” It was assumed that the experimental group would score higher on Q1 and lower on Q2 than the control group.

### 2.4 Questionnaire items

Prejudice against PWD was measured using 8 items (Muto and Kugihara, 2015), including “I do not want to live with people with disabilities.” The options were “1. not at all disagree,” “2. disagree,” “3. somewhat disagree,” “4. somewhat agree,” “5. agree,” and “6. very agree.” The mean was used as the score (Cronbach's  $\alpha = 0.93$ ), with higher scores indicating greater prejudice against PWD.

Social desirability was measured using 24 items of the Japanese version of Balanced Inventory of Desirable Responding (Tani, 2008). The options were “1. not at all applicable,” “2. not

applicable,” “3. somewhat not applicable,” “4. neither applicable nor not applicable,” “5. somewhat applicable,” “6. applicable,” and “7. very applicable.” This scale consisted of self-deception (12 items;  $\alpha = 0.85$ ), including “My first impressions of people usually turn out to be right,” and impression management (12 items;  $\alpha = 0.84$ ), including “I always obey the laws, even if I’m unlikely to get caught.” Each mean was used as the score, with higher scores indicating higher social desirability.

As demographic variables, participants were asked about their subjective wealth, age, sex, and whether they had familiar PWD. Subjective wealth was measured using the single item (Shimizu, 2022), “How do you feel about your current economic situation?” The options were: “1. very hard,” “2. hard,” “3. somewhat hard,” “4. somewhat affordable,” “5. affordable,” and “6. very affordable.” The presence of familiar PWD was measured using the single item, “Do you currently have a family member or close friend who has been diagnosed with any disability?” The options were: “no,” “no answer,” and “yes.” “No” was coded as 0, and “no answer” and “yes” were coded as 1 in the analysis.

## 2.5 Public goods game and reading check

In the public goods game, participants were told that the task was to exchange points with an imaginary opponent. It was clarified that the source was 10 points each, and that the “public goods” offered by two people would be multiplied by 1.5 and distributed to both people in equal amounts. As a reading check, participants were asked how many times the “public goods” would be multiplied. The options were: “0.5×,” “1.5×,” and “2.5×.” Participants were then told that the person with whom they would be playing the public goods game was “a person of your age with a disability [PWD condition]/an able-bodied person [AP condition],” and asked how many of the 10 points they would be willing to offer. The order was counterbalanced. After that, feedback was given that “the opponent offered 5 points” and that no further trials would be made (i.e., the exchange with the same opponent would be terminated after one trial). To minimize the impact of the first trial (PWD condition/AP condition) on the second trial (AP condition/PWD condition), the points offered by the imaginary opponent were fixed at 5 points, half of the original source. It was explicitly stated that the results of the public goods game would have no effect on the compensation for participating in the study.

## 2.6 Analysis

Statistical software R (ver. 4.2.0) was used. The data, the R script, and the list of questions were posted on the OSF repository. To test Hypothesis 1, a regression analysis was conducted with prejudice against PWD as the dependent variable, group (1 = experimental group, 0 = control group) as the independent variable, and social desirability, subjective wealth, age, sex, and presence of familiar PWD as control variables. To test Hypothesis 2, a similar regression analysis was conducted with cooperative behavior for PWD as the dependent variable, group as the independent variable, and cooperative behavior for AP, social

desirability, subjective wealth, age, sex, and presence of familiar PWD as control variables.

## 3 Results

### 3.1 Manipulation check

The mean of responses to “Anyone may become a person with disabilities (Q1)” was 5.32 ( $SD = 0.72$ ) in the experimental group, and 4.85 ( $SD = 0.87$ ) in the control group. A Welch’s *t*-test showed that the experimental group had a higher score than the control group [ $t_{(326)} = 5.47, p < 0.001, d = 0.59$ ]. The mean of responses to “I feel that people with disabilities are irrelevant to me (Q2)” was 1.96 ( $SD = 0.88$ ) in the experimental group, and 2.46 ( $SD = 1.00$ ) in the control group. A Welch’s *t*-test showed that the experimental group had a lower score than the control group [ $t_{(334)} = 4.98, p < 0.001, d = 0.53$ ]. Therefore, we believe that the experimental manipulation worked as expected.

### 3.2 Hypothesis testing

The means, standard deviations, and correlation coefficients for each indicator are shown in Table 1. To test Hypothesis 1, we conducted a regression analysis with prejudice against PWD as the dependent variable (Table 2). The results showed that the effect of group was not significant [ $\beta = -0.03$ , 95% Confidence Interval (CI;  $-0.13, 0.08$ ),  $p = 0.63$ ], not supporting Hypothesis 1. To test Hypothesis 2, we conducted a regression analysis with the offered points of public goods game in PWD condition as the dependent variable (Table 2). The results showed that the effect of group, with the experimental group having more cooperative behavior for PWD than the control group, was significant [ $\beta = 0.06$ , 95% CI (0.00, 0.12),  $p = 0.04$ ], supporting Hypothesis 2. Note that the Variance Inflation Factor, a measure of multicollinearity, was smaller than 1.30 in both analyses.

### 3.3 Additional analysis

Regarding Hypothesis 2, we tested whether the effects of the experimental manipulation varied depending on the participants’ age, sex, and the presence of familiar PWD. A regression analysis was conducted with cooperative behavior for PWD as the dependent variable, group, age, and the interaction between group and age as the independent variables, and cooperative behavior for AP, social desirability, subjective wealth, sex, and presence of familiar PWD as control variables. Results showed no interaction between group and age [ $\beta = -0.01$ , 95% CI ( $-0.07, 0.05$ ),  $p = 0.83$ ]. The similar analysis also examined the interaction between (1) group and sex, and (2) group and the presence of familiar PWD, but found no interaction effects for either [in order,  $\beta = 0.00$ , 95% CI ( $-0.06, 0.06$ ),  $p = 0.93$ ;  $\beta = 0.05$ , 95% CI ( $-0.01, 0.11$ ),  $p = 0.11$ ]. In sum, the effect of the experimental manipulation did not differ depending on the participants’ age, sex, or the presence of familiar PWD.

TABLE 1 The means, standard deviations, and correlation coefficients for each indicator.

Experimental group ( <i>n</i> = 186)		<i>M</i>	<i>SD</i>	Range	1	2	3	4	5	6
1	Prejudice	2.98	0.99	1~6	—					
2	Point of PWD condition	6.23	2.82	0~10	−0.17*	—				
3	Point of AP condition	6.06	2.85	0~10	−0.03	0.83**	—			
4	Self-deception	3.76	0.85	1~7	−0.17*	−0.04	0.02	—		
5	Impression management	4.02	0.93	1~7	−0.23**	0.07	0.06	0.40**	—	
6	Subjective wealth	2.91	1.00	1~6	−0.09	−0.07	−0.08	0.32**	0.14	—
7	Age	45.66	9.91	23~69	−0.13	−0.01	−0.14	0.18*	0.12	0.07
Control group ( <i>n</i> = 168)		<i>M</i>	<i>SD</i>	Range	1	2	3	4	5	6
1	Prejudice	3.00	0.91	1~6	—					
2	Point of PWD condition	5.65	2.75	0~10	−0.25**	—				
3	Point of AP condition	5.79	2.70	0~10	−0.08	0.83**	—			
4	Self-deception	3.69	0.82	1~7	−0.10	0.12	0.05	—		
5	Impression management	4.16	0.89	1~7	−0.18*	0.11	0.11	0.20**	—	
6	Subjective wealth	2.74	0.92	1~6	−0.13	0.07	0.02	0.19*	0.05	—
7	Age	45.61	8.82	22~65	−0.13	0.09	−0.01	0.26**	0.05	−0.02

PWD, people with disabilities; AP, able-bodied people. \**p* < 0.05, \*\**p* < 0.01.

TABLE 2 Results of regression analysis with prejudice against PWD and cooperative behavior for PWD as dependent variables.

No.	Independent variables	Prejudice		Point of PWD condition	
		β	95% CI	β	95% CI
1	Group (1 = experimental, 0 = control)	−0.03	[−0.13, 0.08]	0.06*	[0.00, 0.12]
2	Point of AP condition	—	—	0.84**	[0.78, 0.89]
3	Self-deception	−0.04	[−0.15, 0.07]	−0.02	[−0.08, 0.04]
4	Impression management	−0.18**	[−0.29, −0.07]	0.01	[−0.05, 0.07]
5	Subjective wealth	−0.07	[−0.18, 0.03]	0.02	[−0.04, 0.08]
6	Age	−0.09	[−0.19, 0.02]	0.10**	[0.04, 0.16]
7	Sex (1 = men, 0 = women)	0.00	[−0.10, 0.11]	−0.05	[−0.11, 0.01]
8	Presence of familiar PWD (1 = yes, 0 = no)	−0.17**	[−0.27, −0.07]	0.04	[−0.02, 0.10]
	Adjusted <i>R</i> <sup>2</sup>	0.07**	[0.02, 0.12]	0.70**	[0.65, 0.75]

β is standardized. PWD, people with disabilities; AP, able-bodied people. \**p* < 0.05, \*\**p* < 0.01.

Regarding Hypothesis 2, during the public goods game, 111 participants (31.36%) offered 5 points (half of their resources) under both the PWD and AP conditions. It is assumed that some of these participants may not have engaged in careful consideration and instead defaulted to provide the half of their resources. Therefore, excluding these participants, we conducted exploratory hypothesis testing with the remaining 243 participants. To test Hypothesis 2, we conducted a regression analysis with the number of points offered in the public goods game under the PWD condition as the dependent variable. The results showed a marginally significant group effect, with the experimental group displaying more cooperative behavior toward PWD than the control group [ $\beta = 0.07$ , 95% CI (0.00, 0.14),  $p = 0.06$ ], providing partial support for Hypothesis 2.

## 4 Discussion

This study examined the effects of presenting an explanatory statement emphasizing that anyone may become a person with disabilities. Results showed that participants' prejudice against PWD was not reduced, but the cooperative behavior for PWD increased. One possible reason why the prejudice was not reduced is that presenting the above statement may have aroused a reaction to distance oneself from PWD. This is because, being subjected to experimental manipulation may have increased the estimated probability that one would have disabilities, even though for many people the probability of "having disabilities" is not realistically high.

In contrast, a previous study (Shimizu et al., 2022), which aimed to reduce prejudice against older adults by focusing on

the viewpoint that “everyone will be an older person,” found that the intervention was effective. At first glance, the results of Shimizu et al. (2022) appear to be inconsistent with our results. However, this is due to the differences in characteristics possessed by older adults and PWD. Older adults are the group to which one “must” belong unless one dies before age 65, so for many people, the likelihood of becoming an older adult is far greater than the likelihood of becoming a person with disabilities. Therefore, perceived psychological resistance to the content that “everyone will be an older person” may be relatively low, and people are likely to accept this content without distancing themselves psychologically from older adults. For these reasons, this study probably did not find the same effect as in the case of prejudice against older adults.

Meanwhile, in this study, presenting an explanatory statement emphasizing that anyone may become a person with disabilities increased cooperative behavior for PWD. One possible reason for this is that the participants assumed that they would have disabilities by any chance. If they were to have disabilities, cooperative behavior from others would be very beneficial to themselves, and this may have led many participants to have the attitude that they should cooperate as well. This is consistent with the framework of indirect reciprocity, which states that altruistic behavior toward another person results in reciprocation from others, even if that person does not reciprocate directly (Nowak and Sigmund, 1998, 2005). In combination with the discussion up to the paragraph above, it can be considered that participants in the experimental group were not willing to move closer psychologically toward PWD (i.e., prejudice did not decrease), but responded that they would cooperate with PWD just in case they became PWD (i.e., cooperative behavior increased). Note that the present study found a small to medium correlation between higher prejudice and less cooperative behavior, which is consistent with previous studies on the relationship between attitudes and behavior (Bechler et al., 2021).

Regarding the additional analysis of this study, we examined whether the results of the hypothesis testing varied according to participants’ age, sex, and the presence of familiar PWD. No moderating effects were found. However, other variables may moderate the results. For example, participants with poorer health status might be more receptive to the message that “anyone may become a person with disabilities.” Therefore, future research should consider the possibility that hypothesis testing outcomes may differ depending on participants’ health status.

In addition, approximately one-third of participants offered 5 points in both the PWD and AP conditions during the public goods game. It is assumed that some of these participants may not have engaged in careful deliberation and instead defaulted to providing half of their resources. While it remains unclear whether these participants made their decisions thoughtfully, Hypothesis 2 was still partially supported even after excluding them from the analysis. Therefore, the experimental manipulation in this study can be considered to have promoted cooperative behavior toward PWD to some extent.

It is important to consider the underlying motivations behind participants’ cooperative behavior. In public goods games, these motivations may differ depending on whether the partners are

PWD or AP. Previous studies have shown that people often feel sympathy or pity toward PWD (Cuddy et al., 2007), and such emotions may promote cooperative behavior. This tendency may be especially pronounced among participants who possess a strong sense of moral responsibility and justice. Conversely, unconscious stereotypes—such as the beliefs that PWD have low abilities or are unable to contribute to society (Canton et al., 2023)—may lead participants to expect low levels of cooperation from their partners, which in turn may result in uncooperative behavior on their part. Moreover, the same behavior may be interpreted differently depending on the perceived status of the partner: the uncooperative behavior of AP might be viewed as intentional selfishness, whereas identical behavior from PWD might be attributed to limitations in ability. These differences in attribution are likely to influence participants’ subsequent decisions and actions. This study did not investigate these underlying motivations directly; therefore, further research is needed to explore these psychological processes in more detail.

## 4.1 Limitations and conclusions

This study has four major limitations. First, people with physical, intellectual, and mental disabilities are treated collectively as PWD, and prejudice against individual disabilities is not considered. Previous studies conducted in Japan have reported that different stereotypes of competence and warmth are held for diverse disabilities (Shimizu et al., 2021). In addition, the perception of controllability over a disability affects prejudice against PWD (Granjon et al., 2024). Therefore, the effect of the experimental manipulation may vary depending on the degree of controllability of the individual disabilities.

Second, we did not examine the persistence of the experimental effects on cooperative behavior for PWD. In this study, the items of social desirability were asked after the experimental manipulation, allowing time before the measurement of prejudice and cooperative behavior. However, the time interval is not sufficient, and the persistence of the effect of the experimental manipulation is unknown. Note that in Cecchetti et al. (2021), who implemented an educational intervention regarding PWD, the positive intervention effects (seen immediately after the intervention) disappeared in 1 year. Like that, sustaining the effects of experimental manipulation is a major issue in prejudice research.

Third, in the public goods game used in this study, participants were aware that the points had no real value and that their compensation would not be affected by the game’s outcome. This may have resulted in low motivation to engage meaningfully in the task. In future studies, it may be necessary to enhance participants’ motivation by linking compensation to the results of the game.

Fourth, the experimental manipulation consisted of several distinct elements, each of which may have contributed to the observed effect to an unknown extent. In this study, participants were presented with various messages, including the possibility of acquiring a physical disability, the possibility of developing a mental disability, the number and proportion of

PWD, and the notion that having a disability is not something irrelevant to oneself. It remains unclear which of these elements most effectively promoted cooperative behavior toward PWD. Future research should examine the individual effects of each component in detail to develop more targeted and effective experimental manipulations.

Despite the above limitations, this study could promote cooperative behavior for PWD through a simple online experimental manipulation of presenting an explanatory statement. The simplicity of the experiment in this study is meaningful because many of the previous findings required a certain lengthy and costly intervention. However, since this study did not find any effect on prejudice against PWD, future studies should be conducted in combination with other interventions such as educational interventions, aiming for both behavioral and attitudinal changes. Continued psychological research on prejudice is needed to realize an inclusive society in which diverse people, including PWD, can live comfortably.

## 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 at: the Open Science Framework (OSF) repository (<https://osf.io/w2zxe/>).

## Ethics statement

The studies involving humans were approved by the Ethics Committee of the University of Tokyo. The studies were conducted in accordance with the local legislation and institutional requirements. The ethics committee/institutional review board waived the requirement of written informed consent for participation from the participants or the participants' legal guardians/next of kin because this study was an online survey, and participation in the survey was considered as consent to

participate. Additionally, it was explained that participants could stop answering at any time.

## Author contributions

YS: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

## Funding

The author(s) declare that financial support was received for the research and/or publication of this article. This work was supported by the JSPS KAKENHI (24KJ0988).

## Conflict of interest

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