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Preferences for policies from the perspectives of different generations: Evidence from a stated choice experiment in Japan

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Abstract

Although policy choices can impact not only the present but future generations, only the present generation can make such choices. If a policy imposes a burden on future generations, will the present generation consider the policy's impact on future generations when making a choice? In response to this intergenerational social dilemma, numerous empirical studies have shown that when asked to imagine themselves as a future generation, the present generation's participation in resource distribution decision-making is significantly impacted for decisions that consider future generations; moreover, local governments in Japan have made efforts that use this methodology as a social practice (Saijo, 2022). In this study, we aim to clarify what is needed for future generations to be considered by analyzing the respondents' policy preferences using an online stated choice experiment survey. The respondents were assigned different generational standpoints and were asked to choose their favorite of three policy packages, each of which comprised several policies. The results show that, in general, respondents tended to avoid placing direct burdens on the present generation, regardless of the generation they represented. However, respondents who took their children and grandchildren's standpoints tended to prefer policies that would not burden future generations. In addition, respondents with prosocial tendencies made choices that focused on future generations.

Keywords: Generational standpoint; Policy preferences; Stated choice experiment; Present generation; Future generation

JEL codes: C25, D64, H50

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1. Introduction

In many countries, policies are decided indirectly and democratically through elections and parliamentary voting at the national and local levels. However, people who participate in elections, debates, and voting in assemblies are the present generation. Moreover, the benefits of the policies they choose accrue to their generation, even if a policy addresses population aging or the declining birthrate. When the question of how the financial resources to implement a policy should be obtained arises, two options are available: the funds can be provided by taxes on the present generation or by issuing government bonds, which places the burden of redemption on future generations. Unsurprisingly, the choice to place the burden on the present generation has been repeatedly avoided, instead postponing it for future unborn generations to bear (MoF, 2022[1]; Miyazato, 2015[2]).

These intergenerational social dilemmas extend the effect of an individual's rational behavior to the detriment of an entire generation. For example, the present generation's rational behavior, which is often detrimental to future generations, has become an extremely important topic of discussion as the effects of climate change have increased.

Studies that have experimented with intergenerational social dilemmas have shown that asymmetric resource distribution shifts can be regarded as customary when the previous generation's group passes on advice to a group of succeeding generations (Schotter and Sopher, 2003). Hillis and Lubell (2015) showed that in an intergenerational public goods game, intergenerational collaborative advice positively affected contributions by and collaborative conversations among individuals in a subsequent generation.

These studies have shown that passing on advice to succeeding generations influences decision-making in those generations. However, one succeeding generation is only a part of a continuous group linkage; the primary focus is on how the decision-

[1] This study reported that in Japan's FY2022 budget, one-third of the revenues were financed by issuing government bonds, which, according to the report, burdens future generations.

[2] Using generational accounting of Japan's redistributive policies, this study reported that from the 1990s to the mid-2000s, burdens were passed on to future generations, reducing the working-age population's burden.

making influences each succeeding generation in the linked groups. However, for real-world problems, we need to instead focus on how to influence the "previous" generation's decision-making (i.e., that of the present generation).

How can the present generation consider the interests of future generations? Experimental studies in the *Future Design* literature have shown that participants who are assigned to play the role of future generations are more likely to deliberate and make resource distribution decision choices that consider those generations (Kamijo et al., 2017; Shahrier et al., 2017; Hara et al., 2019; Timilsina et al., 2021; Hiromitsu, 2017). To explore this issue more deeply, we conducted an online stated choice experiment survey for the current study. We created policy packages comprising multiple policies that would divide the burdens between the present and future generations. The respondents were randomly selected to answer the choice experiment questions from the standpoint of one of three generations (i.e., their own, their children's, or their grandchildren's generation) before they were asked to choose one favorite package from the three policy packages in each choice set. Investigating individuals' preferences for different policies from the standpoint of their children and grandchildren's generations is a novel effort in the literature. Studies (e.g., Graham et al., 2017; Fairbrother et al., 2021) have observed the distribution of benefits between current and future generations; however, neither of these studies investigated policy preferences from the standpoint of future generations.

The policies included in the packages in this study are related to the consumption tax rate, temporary benefit payments in extraordinary catastrophes, percentage of total public infrastructure investment to maintain the already existing public infrastructure, social insurance premiums as a percentage of salary, and renewable energy rates in the energy mix. To analyze respondents' preferences for these policies from different generational standpoints, we used both conditional logit (CL) and latent class logit (LCL) models. The LCL approach allows us to explore the heterogeneity among respondents' preferences for different policies from each generational standpoint and categorize the respondents into different types. We then used a multinomial logit (ML) model to analyze what respondent socioeconomic characteristics and social value orientations would affect their probabilities of falling into the different types obtained from the LCL results.

The remainder of this paper is organized as follows. Section 2 presents the hypotheses, and Section 3 describes survey issues. Section 4 provides the results and discussion. Finally, Section 5 presents the conclusions and implications for future work.

2. Hypothesis

To test how resources would be distributed between the current and next generations, Kamijo et al. (2017) conducted an intergenerational sustainability dilemma game where subjects were divided into six generations. Each generation was divided into two cases, one with only their own generation and the other with a future generation, where the future generation was approximated by asking the subjects to play the role of the future generation. The results showed that subjects were more than 60% more likely to choose a sustainable resource distribution that considers the interests of future generations when they conferred with the future generation than when they talked only with the present generation. Treating the imaginary future generation as an approximation of the (currently) non-existent future generation, a hypothesis was established to determine whether the policies chosen by different generations would differ and which generation would be burdened.

In a US public opinion survey on climate change, 76% of Generation Z and 81% of millennials said that the US should develop alternative energy sources rather than expand fossil fuel production, whereas the percentages of Generation X and those older than the baby boomers were 72% and 63%, respectively (Tyson et al., 2021).[3] Because younger generations are closer in proximity to non-existent future generations, the authors stated that future generations would make different choices than the others on issues that have significant externalities and attention, such as climate change.

In contrast, Shahrier et al. (2017) analyzed whether people who consider future generations' burdens are prosocial, where participants were categorized using a social value orientation. They showed that when imaginary future generations were also

[3] In this study, Generation Z, millennials, Generation X, baby boomers, and the silent generation were defined as those born after 1996, between 1981 and 1996, between 1965 and 1980, between 1946 and 1964, and between 1928 and 1945, respectively.

included, people living in rural areas were significantly more likely than those living in urban areas to sustainably distribute resources to future generations; in addition, those who made such decisions were more likely to have prosocial tendencies.

Based on these discussions, we present the following hypotheses.

Hypothesis 1: Respondents' preferences for individual policies differ depending on their generational standpoint, such as their own, their children, and their grandchildren's generations.

Hypothesis 2: Policies that do not place burdens on future generations are more preferred when respondents' standpoints are their children and/or grandchildren's generations than their own generation.

Hypothesis 3: Prosocial respondents are more likely than respondents who are not prosocial to consider the benefits of future generations.

3. Survey issues

3.1. Questionnaire design

The questionnaire consists of three parts, where the first part is a choice experiment with 10 choice sets from which participants select policy packages. The second part includes six questions related to selecting resource distributions between the respondent and an imaginary partner, which is intended to elicit respondents' social value orientation. The questions in the third part address respondents' socioeconomic characteristics, such as gender, age, occupation, number of people living together, number of children and grandchildren, and annual income.

3.1.1. Choice experiment design

In a choice experiment, individuals are typically asked to repeatedly select their preferred alternatives from choice sets that are presented to them. In our survey, we provided 10 choice sets. Each choice set had three alternatives: Policy packages A, B, and

C. Each package had five common attributes (i.e., policies): the consumption tax rate, distributing temporary benefit payment in extraordinary catastrophes, percentage of total public infrastructure investment to maintain already existing public infrastructure, social insurance premiums as a percentage of salary, and renewable energy rate in the energy mix. Tables 1 and 2 present short descriptions of these policies and their levels, respectively; detailed explanations are provided below.

Consumption tax rate

A consumption tax is a tax for social security purposes such as pensions, medical care, long-term care, and low fertility (Cabinet Secretariat, 2011); the tax rate is chosen based on what is considered desirable. Generally, raising tax rates is burdensome for the present generation, making it less burdensome for future generations because it secures the government's financial resources (Watanabe et al., 2015).[4] The actual consumption tax rate in Japan has shifted step-by-step from 3%→5%→8%→10% from 1989 to 2019. Therefore, the levels of this attribute were set at 2%, 6%, 10%, 14%, and 18%, using the present tax rate of 10% as the middle rate.

Distributing temporary benefit payments in extraordinary catastrophes

In Japan, temporary benefit payments are sometimes made to each citizen when a disaster that has a large impact on the whole country or society occurs (e.g., providing disaster condolence money to the bereaved families and victims of the Great East Japan Earthquake (Ministry of Health, Labor and Welfare, 2011) or providing the “Special Cash Payment” as part of emergency economic measures for COVID-19 (Ministry of Internal Affairs and Communications, 2020)). While a large benefit payment amount offers relief to the present generation, distributing benefit payments increases fiscal expenditures. The future tax increases planned to cover such expenditures will be a heavy burden on future generations (Fiscal System Subcommittee of Fiscal System Council, 2020). The actual benefit payment for the “Special Cash Payment” mentioned in the example was 100,000

[4] The author determined that a consumption tax to finance the government's public investment (fiscal spending) would reduce intergenerational inequality more than an income tax.

Japanese yen (JPY). Therefore, the levels of this attribute were set as 0 JPY, 50,000 JPY, 100,000 JPY, 150,000 JPY, and 200,000 JPY.

Percentage of total public infrastructure investment to maintain already existing public infrastructure

This attribute refers to the government's maintenance and renovation budget to be used for already constructed infrastructure (e.g., public facilities, roads, bridges, ports, and airports) as a proportion of the government's entire budget for public infrastructure assets. On one hand, increasing this percentage is generation-neutral in terms of benefits because it allows the infrastructure assets currently in use to be maintained and rehabilitated; this prevents accidents due to aging and ensures long and safe use for both the present and future generations. On the other hand, raising this ratio is expected to lower the fiscal expenditure for new infrastructure construction, so the burden will not be as heavy for future generations (Ministry of Land, Infrastructure, Transport, and Tourism, 2018).[5] The estimated value of this ratio in Japan was approximately 57% (i.e., 5.35 trillion JPY to 9.4 trillion JPY) in FY2020.[6] Using this value as a middle ratio, we set the levels of this attribute as 37%, 47%, 57%, 67%, and 77%.

Social insurance premiums as a percentage of salary

This attribute is the social insurance premiums employees pay for medical care, long-term care, employment, etc., which are based on a percentage of their salaries. Increasing this ratio is a burden for the present generation but lightens the burden for future generations because it secures the government's financial resources (Ministry of Health, Labour, and Welfare and Welfare, 2023). The actual ratio of social insurance premiums in Japan is approximately 18.6% (Ministry of Finance, 2021). Therefore, the

[5] The report states that preventive maintenance will improve efficiency by extending service life, etc.

[6] Public works-related expenditures for FY2020 were estimated in the budget as 6.1 trillion JPY and 3.3 trillion JPY for national land resilience measures (3-year and 5-year). Maintenance and renewal expenditures are estimated based on preventive maintenance and the average of 5.2 trillion JPY in FY2018. A lower limit of 5.5 trillion JPY was adopted in FY2023 (Ministry of Land, Infrastructure, Transport, and Tourism, 2018).

levels of this attribute were set as 5%, 10%, 15%, 20%, and 25%.

Renewable energy rate in the energy mix

This attribute indicates the share of renewable energy compared to total energy, which consists of fossil fuels, nuclear power, and renewable energy. Increasing the renewable energy rate is a burden on the present generation because it requires investing in renewable energy facilities. However, the burden on future generations will be lighter because energy itself will be inexpensive, diseases and economic costs will be reduced by avoiding fossil fuels, and climate change will be mitigated until 2030 (The United Nations, 2023). The renewable energy rate target in Japan is currently 22-24% (Agency for Natural Resources and Energy, 2021). Since the probability that the Japanese government will reduce this rate in the future is extremely low, we set the levels as 22%, 32%, 42%, 52%, and 62%.

Based on these five types of policies and the five levels of each, 3,125 (5^5) possible packages could be created if we apply a full factorial design. However, this number is obviously too cumbersome for respondents to deal with. Therefore, we adopted a D-optimal design to create ten choice sets, where each includes three policy packages.[7] Table 3 presents an example of the choice sets included in the questionnaire.

3.1.2. Social value orientation

To explore the respondents' social value orientations in the questionnaire, we adopted Murphy et al.'s (2011) approach. The respondents were asked to distribute resources between themselves and an imaginary partner. Based on their choices, they were classified into four orientation types: altruistic, prosocial, individualistic, and competitive. An example of the resource distribution question is shown in Figure 1, where nine combinations of numbers were arranged to indicate the respondent's and imaginary

[7] D-optimal designs are computer-assisted experimental designs that maintain statistical validity as much as possible without using orthogonal tables. In the case of discrete choice experiments, D-optimal designs are generally used to reduce the number of choice sets while maintaining statistical validity.

partner's shares. Different combinations of these were repeated six times to determine the respondent's orientation type.

3.2. Data collection

An online questionnaire survey was administered in Japan by the Survey Research Center Co., Ltd. at the end of August 2021. First, an email invitation was sent to a pool of respondents aged 20 to 70 years. Each respondent who agreed to participate in the survey accessed the link provided by the Survey Research Center and answered the questions. Before answering the choice experiment questions, the recruited respondents were randomly and evenly assigned the perspective of their own, their children's, or their grandchildren's generation. After the assignment, they were asked to make choice experiment decisions based on their assigned generational standpoints.[8] All questions in the questionnaire, including those in the choice experiment, were the same, no matter what generational standpoint the respondents were assigned.

A total of 500 valid responses were obtained; the average time taken to answer the questionnaire was approximately 15 minutes. The respondents' male/female ratio and age composition in each assigned generational group were based on the official statistics published by the Population and Household Statistics of the Statistics Bureau of the Ministry of Internal Affairs and Communications.

Table 4 reports the summary of the sample's socioeconomic characteristics. The male-female ratio was 49.6% versus 50.4%, while the mean age of our sample was 51.10 years, which is 3.44 years older than the official mean age (i.e., 47.66 years) in 2020. With respect to their current occupation, 37.8% of the respondents had full-time jobs, 14.4% had part-time jobs, 8.0% were self-employed or freelancers, and the remaining

[8] Respondents were asked to imagine the assigned generation and answer from that standpoint, but were not offered a strict definition of "putting yourself in every generation's shoes." In other words, we did not mention how respondents should perceive future generations, that is, whether they should answer in place of their actual children or grandchildren, or whether they should answer assuming their children or grandchildren's general generations. We left this to the respondents' own perceptions. In addition, since the respondents' ages vary, their child/grandchild generation is relative to their actual age. For example, a child for a 70-year-old respondent would be approximately 40-50 years old, whereas a child for a 50-year-old respondent would be 20-30 years old.

39.8% did not have jobs. The education level distribution revealed that 54.8% of the respondents had college or advanced degrees, considerably higher than the percentage obtained from the 2020 National Census (i.e., 25.6%). In addition, 34.8% had two family members living together, 21.4% lived alone, and 25.4% had three family members in the household. Meanwhile, about half (47.2%) of the respondents had no children, 19.4% had one child, 24.0% had two children, and 9.4% had three or more children. Most (76.0%) did not have grandchildren. Finally, of the 397 respondents who provided their annual household income, 39.8% had annual incomes of less than 4 million JPY, 37.8% were between 4 and 8 million JPY, and the remaining 22.4% reported incomes of more than 8 million JPY.[9]

4. Results and discussion

4.1. Results of the conditional logit model

Table 5 presents the results of the conditional logit model. As the table shows, the coefficients of the consumption tax rate and social insurance premium as a percentage of salary are significant and negative for all generational standpoints. This suggests that all respondents, regardless of the generational standpoint they were assigned, did not favor increasing either of these two rates. Recall that raising the levels of these two policies would increase the present generation's burden but lighten that for future generations. Hence, respondents assigned the standpoints of their children and/or grandchildren should not be against raising the consumption tax rate or social insurance premiums.

In contrast, the coefficients of distributing temporary benefit payments in extraordinary catastrophes are significant and positive from all generational standpoints, indicating that all respondents, regardless of their generational standpoint, are receptive to increasing temporary benefit payments. This result is also somewhat implausible because raising this amount would increase fiscal expenditures, and the future tax increases planned to cover such expenditures would be a heavy burden on future generations.

[9] The official median annual income in 2021 obtained from the Japanese Ministry of Health, Labour and Welfare was 3,990,000 JPY.

The coefficients of the percentage of total public infrastructure investment to maintain already existing public infrastructure are significantly positive in all three cases. This is plausible because increasing this percentage is generation-neutral or somewhat reduces future generations' burden.

The coefficient of the renewable energy rate in the energy mix is significantly negative in the sample of respondents' own generation but insignificant in the samples of respondents' children and grandchildren's generations. The former is plausible because respondents whose standpoint is their own generation are not in favor of increasing the present generation's burden.

Although these results imply the same preferences for four of the five policies, the preferences for the renewable energy rate in the energy mix do reflect differences. Therefore, *Hypothesis 1* is partially supported.

4.2. Results of latent class logit model

As mentioned in the Introduction, the LCL approach allows us to explore the heterogeneity in respondents' preferences for different policies from each generation's standpoint. The first issue in applying the LCL approach is determining the number of latent classes. We calculated the Akaike information criterion (AIC) and Bayesian information criterion (BIC) with various numbers of classes (1, 2, 3, 4, and 5) in each generational standpoint sample and found that the 3-class model in each sample had the minimum values of the AIC and BIC, implying that the 3-class model was optimal. Therefore, we selected three classes to estimate the LCL model.[10]

4.2.1. Estimation of 3-class LCL model

Table 6 presents the results of estimating the 3-class LCL model from different generational standpoints. The upper panel shows the respondents' own generation, the middle one is their children's generation, and the bottom one is their grandchildren's generation.

[10] The AIC and BIC values of classes 1 to 5 are available upon request.

With respect to the results from the standpoint of the respondents' own generation, approximately 39.45% of the respondents were included in Class 1, whereas the remaining 30.86% and 29.7% were included in Classes 2 and 3, respectively. Heterogeneity in preferences for different policies is found among the different classes. For instance, raising the consumption tax rate and renewable energy rate in the energy mix are undesirable for the respondents in Classes 1 and 2 but are desirable for those in Class 3, although the coefficient of the renewable energy rate in Class 1 is estimated to be insignificant. Increasing social insurance premiums as a percentage of salary is significantly not preferred by the respondents in Classes 1 and 2, but has a negligible effect on the preferences of Class 3 respondents. The remaining two policies (i.e., distributing temporary benefit payments in extraordinary catastrophes and percentage of total public infrastructure investment for maintaining already existing public infrastructures) are estimated to be positive in all classes; however, the former and latter are insignificant in Classes 2 and 3, respectively.

These results indicate that the respondents in Class 1 want to avoid increases in the consumption tax and social insurance premiums but are willing to increase temporary benefit payments and existing public infrastructure renewal. Those in Class 2 want to avoid increases in the consumption tax, social insurance premiums, and renewable energy rate, but are willing to increase the rate of existing public infrastructure renewal. The respondents in Class 3 are willing to accept an increase in the consumption tax, temporary benefit payment, and renewable energy rate and are more likely to accept the burdens of the current generation than those in Classes 1 and 2.

The preferences of three classes for different policies in the other two generational standpoints are similar in the sense of statistical significance to those from the respondents' own generational standpoint except: (1) the coefficient of distributing temporary benefit payments in extraordinary catastrophes is significantly negative in Class 2 when respondents stand for their grandchildren's generation; (2) the coefficient of the percentage of investment used to maintain existing public infrastructure is insignificant in Class 2 when respondents stand for their children's generation and is significantly positive in Class 3 when they stand for either their children or grandchildren's

generations; (3) raising insurance premiums is significantly undesirable in Class 3 when respondents stand for either their children or grandchildren's generations; and (4) the coefficient of the renewable energy rate in the energy mix is significantly positive in Class 1 when respondents stand for their children's generation but is insignificant in Class 2 when they stand for their grandchildren's generation. These differences can be viewed as partially supportive evidence for *Hypothesis 1*.

4.2.2. Labeling the classes

These results make labelling the classes difficult because the elicited preferences for each policy in each class are not sufficiently clear. Therefore, we use NLOGIT 6.0 and obtain individual-based willingness to accept (WTA) measures for each policy to investigate each class's generational tendencies. WTA is the minimum amount of money that a respondent is willing to sacrifice to avoid something undesirable (i.e., decreasing the level of a policy when they have a positive preference for it or increasing the level of a policy that they have a negative preference for). In our study, individual-based WTA for each policy is calculated by dividing the estimated individual-based coefficient of temporary benefit payments by those of each policy. A larger WTA value indicates the respondents emphasize the present generation.

Table 7 shows the average of the estimated individual WTA values, which, in most cases, are largest for the Class 2 respondents. In contrast, the values of the Class 3 respondents are generally the smallest, especially for the policies that raise the consumption tax rate and social insurance premiums. Combining these WTA results with the LCL estimates, for each generational standpoint, we label the Class1, 2, and 3 respondents as generation-neutral, present generation emphasis, and future generation emphasis, respectively.

Figure 2 compares the predicted probability of the generational standpoint of the respondents in each class. The figure illustrates that the probability respondents are members of the group that emphasizes future generations increases from 29.7%→33.61%→40.67% when their generational standpoint changes from their own generation→their children's generation→their grandchildren's generation. This result

supports *Hypothesis 2,* as more respondents emphasize future generations when they stand for their children and/or grandchildren's generation than when they stand for their own generation.

4.2.3. Typological distribution by social value orientation (SVO)

Based on the 500 respondents' resource distribution choices, the results of Murphy et al.'s (2011) social value orientation (SVO) typology are: 67.4% (337/500) of the respondents are categorized as prosocial, 30.4% (152/500) are individualistic, 1.6% (8/500) are competitive, and 0.6% (3/500) are altruistic.

Table 8 shows the average probabilities by the three generational standpoints of prosocial type respondents being in each labelled class. The average probability of prosocial respondents being in a class that emphasizes the future generation is higher than that of them being in a class that emphasizes the present generation, regardless of their generational standpoint. This result supports *Hypothesis 3*.

4.3. Results of multinomial logit model

We used a multinomial logit (ML) model to investigate the types of respondents likely to belong to each class. We first obtained each respondent's probability of being in each class estimated by NLOGIT 6.0 (three probabilities for each respondent in the three classes). We then classified each respondent into the corresponding class based on the highest probability among the three.

Table 9 reports the results obtained from the ML regression. The table shows that respondents who choose a policy package from the standpoint of their grandchildren are 15% less likely to be in the generation-neutral class and 8.4% more likely to be in the future generation-oriented class than those who choose a policy package from their own generational standpoint. Male respondents are more likely to emphasize the future generation. Respondent age has no significant effect on the probability of being in the future generation-oriented class, while it has the opposite influence on the probabilities of being in present generation-oriented and generation-neutral classes.

In addition, the probability of being in the present generation-oriented class is

significantly higher (11.9%) when the respondent has a full-time job. Regarding education, the probability of being in the generation-neutral class is significantly lower (1.6%) for those with more years of education and the probability of being in the future generation-oriented class is significantly higher (1.6%) with more years of education.

Finally, respondents classified as prosocial types in the SVO are significantly 7.7% less likely to be in the present generation-oriented class and 10.6% more likely to be in the future-generation-oriented class than in the generation-neutral class, which provides support for *Hypothesis 3*.

5. Conclusion

In this study, we conducted an online stated choice experiment survey to investigate individual policy preferences from the standpoints of their own, their children's, and their grandchildren's generations. The CL regression results show that respondents in general tend to avoid imposing direct burdens on the present generation (e.g., raising the consumption tax and social insurance premium rates), no matter what generation they stand for. However, the LCL regression results provide evidence that, from each generational standpoint, a number of individuals consider the burden on future generations. The percentage of these individuals in the sample increases when respondents' generational standpoint changes from their own to their children and grandchildren's generations.

In addition, based on the ML regression results, respondents who choose a policy package from the standpoint of their grandchildren are more likely to be in the future generation-oriented class than those who choose a policy package from their own generational standpoint. This evidence explores the importance of people's generational standpoints when they make decisions. Moreover, prosocial respondents are more likely to consider future generations, which is consistent with Shahrier et al.'s (2017) findings.

Finally, when assigning the generational standpoints to the respondents, we left how the respondents should understand their children or grandchildren's generations up to their own perceptions and provided no detailed explanation. This manipulation could prevent inducing respondents' choices. However, whether the respondents answered the questions

in place of their actual children or grandchildren or whether they considered their children or grandchildren's general generations (even if they did not currently exist) are unclear. Therefore, this issue should be strengthened in a more refined way in future. Moreover, most previous studies of *Future Design* emphasize the importance of presenting an imaginary future generation in the decision-making processes. However, individuals find it somewhat difficult to understand an imaginary future generation. Our approach of asking people to stand for their children and/or grandchildren's generations might be viewed as an alternative to presenting an imaginary future generation because it is much easier to understand. The results obtained from both methods should be compared to determine which is more suitable.

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Table 1. Policies and their impact on current and future generations

Policies	Description	Impact on the present generation	Impact on future generations
Consumption tax rate	Tax rate for social security purposes such as pensions, medical care, long-term care, and low fertility.	Raising tax rates would be a burden on the present generation.	Raising the tax rate would secure the country's financial resources, so the burden would be lighter for future generation.
Distributing temporary benefit payments in extraordinary catastrophes	Desirable amount of money to distribute to each citizen as a temporary benefit in the event of a disaster with a major impact on the country or society as a whole.	A larger benefit package would be a relief for the present generation.	If a special major disaster occurs and benefits are distributed, the financial outlay will increase, which would be a burden on the future generation that would have to cover the costs.
Percentage of total public infrastructure investment to maintain already existing public infrastructure	A desirable percentage of the government budget for public infrastructure assets, such as public facilities, roads, bridges, ports, and airports, to be used to maintain and renovate those already constructed.	Increasing this percentage would allow us to maintain and refurbish the infrastructure assets we currently use.	Increasing this percentage would reduce the proportion of new infrastructure assets to be built and allow maintaining and rehabilitating as many of the existing infrastructure assets currently in use as possible, reducing the burden for future generations.
Social insurance premiums as a percentage of salary	A desirable percentage paid out of the salaries of those who work for a company to be used for social insurance premiums for medical care, long-term care, employment, etc.	Increasing the premium percentage would be burdensome for the present generation.	Increasing the percentage would secure the government's financial resources, so the burden would be lighter for future generation.
Rare of renewable energy in the energy mix	A desirable percentage of the total power source mix, which consists of fossil fuels, nuclear power, and renewable energy, for renewable energy.	Increasing the renewable energy rate would require investment in renewable energy facilities, which would be a burden on the present generation.	Increasing the percentage would ease global warming by eliminating the use of fossil fuels, thus lightening the social burden for future generation.

Table 2. Levels of each policy

Policies	Real-world values	Unit	Levels				
Consumption tax rate	Transition from 3 to 5 to 8 to 10%.	%	2	6	10	14	18
Distributing temporary benefit payment in extraordinary catastrophes	The amount of the "Special Cash Payment" as part of emergency economic measures for the new-type coronavirus infection was 100,000 yen.	10,000 yen	0	5	10	15	20
Percentage of total public infrastructure investment to maintain already existing public infrastructure	According to the MLIT White Paper, maintenance and renewal costs were 56.6% of the 8.3 trillion yen in social capital investment in FY2020, or 4.7 trillion yen.	%	37	47	57	67	77
Social insurance premiums as a percentage of salary	About 15% on average.	%	5	10	15	20	25
Renewable energy rate in the energy mix	According to the Agency for Natural Resources and Energy, the target renewable energy rate for 2030 is 22%-24%.	%	22	32	42	52	62

Table 3. Example of a choice set

	Policy packages		
	A	B	C
Consumption tax rate	8%	10%	3%
Distributing temporary benefit payment in extraordinary catastrophes	0 yen	200,000 yen	150,000 yen
Percentage of total public infrastructure investment to maintain already existing public infrastructure	57%	47%	67%
Social insurance premiums as a percentage of salary	25%	10%	5%
Renewable energy rate in the energy mix	32%	52%	42%
Please choose the most desirable package with a ✔ in □	□	□	□

Table 4. Sample socioeconomic characteristics

Characteristics	n	%	Characteristics	n	%
Gender/Ages			***Occupation***		
Male/20-29 years old	32	6.0	Managers and executives	9	1.8
Male/30-39 years old	39	8.0	Company employee	153	30.6
Male/40-49 years old	51	10.0	Civil servants, Organization employees, Teachers	27	5.4
Male/50-59 years old	45	9.0	Self-employed or Freelancer	40	8.0
Male/60-69 years old	42	8.0	Part-time job, including temporary and contract employees	72	14.4
Male/70-79 years old	39	8.0	Student	11	2.2
Female/20-29 years old	30	6.0	Housewife/Househusband	89	17.8
Female/30-39 years old	36	7.0	Unemployed including pensioners	96	19.2
Female/40-49 years old	48	10.0	Other	3	0.6
Female/50-59 years old	45	9.0	***Educational level***		
Female/60-69 years old	45	9.0	High school	149	29.8
Female/70-79 years old	48	10.0	Vocational school	55	11.0
Number of children			University / Junior college	243	48.6
None	236	47.2	Graduate school	31	6.2
One	97	19.4	In school	2	0.4
Two	120	24.0	Other	7	1.4
Three or more	47	9.4	I don't want to answer	13	2.6
Number of grandchildren			***Household annual income***		
None	380	76.0	Less than 2 million yen	56	11.2
One	34	6.8	2 million yen – less than 4 million yen	102	20.4
Two	40	8.0	4 million yen – less than 6 million yen	88	17.6
Three or more	46	9.2	6 million yen – less than 8 million yen	62	12.4
Household size			8 million yen – less than 10 million yen	41	8.2
One (solitude)	107	21.4	10 million yen or more	48	9.6
Two	174	34.8	I don't want to answer	103	20.6
Three	127	25.4	***Respondents' generational standpoint***		
Four	63	12.6	Their own generation	167	34.0
Five	21	4.2	Their children's generation	167	34.0
Six or more	8	1.6	Their grandchildren's generation	166	33.0

Table 5: Conditional logit model results

Policies	Own generation	Children's generation	Grandchildren's generation
Consumption tax rate	-0.0702***	-0.0559***	-0.0599***
Distributing temporary benefit payment in extraordinary catastrophes	0.0497***	0.0422***	0.0283***
Percentage of total public infrastructure investment to maintain already existing public infrastructure	0.0065**	0.0092***	0.0119***
Social insurance premiums as a percentage of salary	-0.0203***	-0.0302***	-0.0288***
Renewable energy rate in the energy mix	-0.0059**	-0.0002	0.0023
Predictive Power (%)	54.31	49.04	46.11
Log-likelihood	-1656.38	-1703.99	-1731.30
Observations	1670	1670	1660

Notes: Predictive power refers to the proportion of choices correctly predicted by the model. *, **, and *** denote that the estimated parameter is significantly different from zero at the 10%, 5%, and 1% levels, respectively. Standard errors and z values are omitted to save space.

Table 6. Latent class logit model results

Standpoints	Policies	Class 1	Class 2	Class 3
Own generation	*Consumption tax rate*	-0.2724***	-0.0527**	0.0374**
	Distributing temporary benefit payment in extraordinary catastrophes	0.1219***	0.0088	0.0443***
	Percentage of total public infrastructure investment to maintain already existing public infrastructure	0.0142**	0.0098*	0.0054
	Social insurance premiums as a percentage of salary	-0.0319*	-0.0336***	-0.0039
	Renewable energy rate in the energy mix	-0.0148	-0.0144*	0.0188***
	Estimated latent class probability (%)	0.3945	0.3086	0.2970
	Predictive power (%)	71.68		
	Log-likelihood	-1469.48		
	Observations	1670		
Children's generation	*Consumption tax rate*	-0.2074***	-0.0407**	0.0474**
	Distributing temporary benefit payment in extraordinary catastrophes	0.1070***	-0.0055	0.0413***
	Percentage of total public infrastructure investment to maintain already existing public infrastructure	0.0110*	0.0041	0.0175***
	Social insurance premiums as a percentage of salary	-0.0931***	-0.0403***	-0.0204*
	Renewable energy rate in the energy mix	0.0241***	-0.0194***	0.0229***
	Estimated latent class probability (%)	0.4064	0.2575	0.3361
	Predictive power (%)	78.44		
	Log-likelihood	-1497.01		
	Observations	1670		
Grandchildren's generation	*Consumption tax rate*	-0.2325***	-0.0935***	0.0272*
	Distributing temporary benefit payment in extraordinary catastrophes	0.1265***	-0.0232*	0.042***
	Percentage of total public infrastructure investment to maintain already existing public infrastructure	0.0084	0.0112**	0.0304***
	Social insurance premiums as a percentage of salary	-0.1162***	-0.029***	-0.0335***
	Renewable energy rate in the energy mix	0.0177	-0.0043	0.0206***
	Estimated latent class probability (%)	0.2693	0.3240	0.4067
	Predictive power (%)	79.34		
	Log-likelihood	-1541.46		
	Observations	1660		

Notes: Predictive power refers to the proportion of choices correctly predicted by the model. *, **, and *** denote that the estimated parameter is significantly different from zero at the 10%, 5%, and 1% levels, respectively. Standard errors and z values are omitted to save space.

Table 7. Average values of estimated individual WTA (JPY)

Standpoints	Policies	Class 1	Class 2	Class 3
Own generation	*Consumption tax rate*	22,580	40,268	6,922
	Percentage of total public infrastructure investment to maintain already existing public infrastructure	1,237	7,207	1,446
	Social insurance premiums as a percentage of salary	2,884	23,434	1,764
	Renewable energy rate in the energy mix	1,322	9,558	3,687
Children's generation	*Consumption tax rate*	19,428	154,284	10,340
	Percentage of total public infrastructure investment to maintain already existing public infrastructure	1,082	16,463	4,101
	Social insurance premiums as a percentage of salary	8,926	146,372	5,484
	Renewable energy rate in the energy mix	2,180	60,136	5,238
Grandchildren's generation	*Consumption tax rate*	19,262	76,938	6,148
	Percentage of total public infrastructure investment to maintain already existing public infrastructure	824	11,669	7,497
	Social insurance premiums as a percentage of salary	9,586	30,364	8,862
	Renewable energy rate in the energy mix	1,424	2,662	4,892

Table 8. Average probabilities of prosocial respondents being in each class

Standpoints	Generation-neutral	Emphasizing present generation	Emphasizing future generation
Own generation	0.5735	0.5625	0.7255
Children's generation	0.7353	0.5476	0.7018
Grandchildren's generation	0.7045	0.7037	0.7647

Table 9. Multinomial logit model results (marginal effects)

	Generation-neutral	Emphasizing present generation	Emphasizing future generation
Standpoint of children's generation	0.0316	-0.0273	-0.0043
Standpoint of grandchildren's generation	-0.1499***	0.0659	0.0839*
Male	-0.0405	-0.0678	0.1084**
Age	-0.0035**	0.0030**	0.0004
Occupation (regular job DUMMY)	-0.0756	0.1190**	-0.0434
Occupation (irregular job DUMMY)	-0.0172	0.0844	-0.0671
Education (converted to years of education)	-0.0165*	0.0010	0.0155*
SVO (prosocial DUMMY)	-0.0296	-0.0765*	0.1061**
Log-likelihood	-510.86		
Observations	487		

Notes: *, **, and *** denote that the estimated parameter is significantly different from zero at the 10%, 5%, and 1% levels, respectively. Standard errors and z values are omitted to save space.

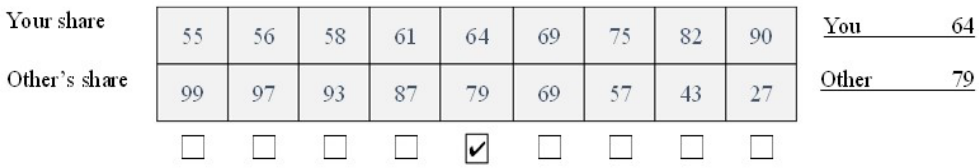

Figure 1. Resource distribution

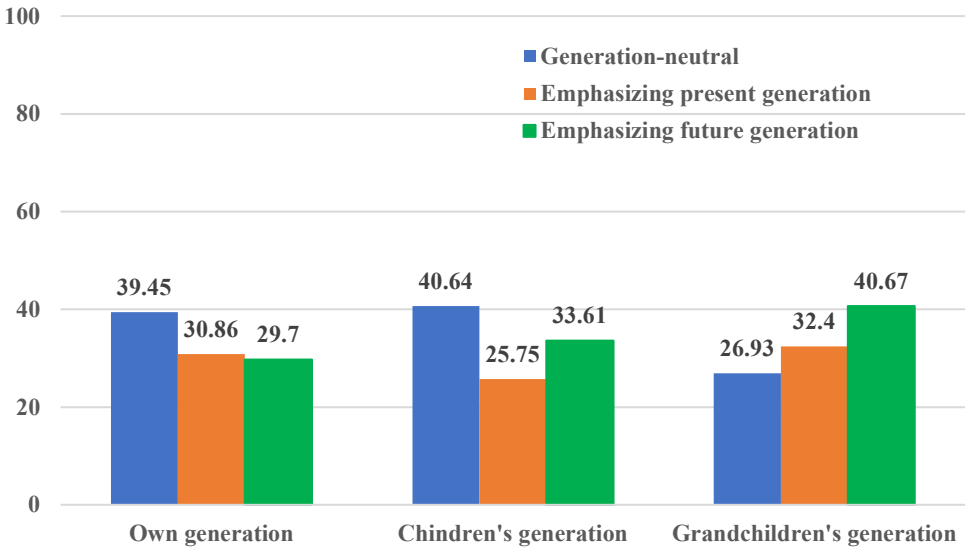

Figure 2: Predicted probability of respondents in each class