Making the Veil of Ignorance Work ^{*}

Evidence from Survey Experiments

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Impartial reasoning plays a pivotal role in defining justice or, more concretely, fair distribution. Regarding impartial reasoning, contemporary theorists have emphasized the importance of depriving people of information relevant to their positions in society, such as their economic class, with the aim of facilitating unbiased judgments about the conception of justice. This manner of withholding information varies; the content and degree of information deprivation may vary depending on conceptions of “the veil of ignorance.” John Rawls’s conception is the most famous and has been intensely debated. Importantly, the issue of the veil’s validity is questioned not only in purely theoretical terms but also in empirical terms: an experimental approach has been employed to test and determine whether subjects truly exhibit impartial reasoning to justice (e.g., Frohlich & Oppenheimer, 1987, 1992; Frohlich, Oppenheimer, & Eavey, 1990; Lissowski, Tyszka, & Okrasa, 1991; Jackson & Hill, 1995; Scott, Matland, Michelbach, & Bornstein, 2001; Michelbach, Scott, Matland, & Bornstein, 2003; Mitchell, Tetlock, Newman, & Lerner, 2003; Herne & Suojanen, 2004; Traub, Seidl, Schmidt, & Levati, 2005; Herne & Mard 2008; Amiel, Cowell, & Gaertner, 2009; Wolf & Lenger, 2014; Bruner, 2018; Bruner & Lindauer, 2019).

Our study aims to provide empirical feedback on impartial reasoning to justice through online survey experiments. We focused on whether and how different conceptions of the veil of ignorance and Rawls’s method of reflective equilibrium affect people’s impartial reasoning to justice. We investigated the influence of different experimental veils of ignorance and the experimental practice of reflective equilibrium—the well-known method of reconciling principled and our considered judgments—on people’s reasoning to the difference (maximin) principle, which Rawls conceived of as the principle selected behind his conception of the veil of ignorance and endorsed by the state of reflective equilibrium.

The remainder of this paper is organized as follows: The first section provides the theoretical background of impartial reasoning and reviews the relevant extant experimental research. The second section explains the experimental design. The third section presents

the results of our two survey experiments. The fourth section discusses the implications of our results for the Rawlsian project toward justice as impartiality, that is, the importance of reflecting psychological findings in the Rawlsian project.

1 Background

1.1 Theoretical background of impartial reasoning

Impartiality is a key notion in making just or fair judgments. *Justitia* (Lady Justice), considered the original personification of justice, wears a blindfold that represents impartiality, such that no particular interests, perspectives, or statuses sway the balancing of competing claims. Achieving this balance is a fundamental task of political, legal, and social thoughts. Two renowned contemporary philosophers, Harsanyi (1953, 1955, 1975) and Rawls (1971), have shown that this task is key to elucidating fair distribution. They have suggested that to reach a unanimous agreement on fair distribution, we must be deprived of idiosyncratic information. This deprivation is justifiable, as it establishes the initial situation, *the original position*, in which all reasonable people would rationally choose specific principles of distributive justice. This is proposed as a purely hypothetical device and is symbolized as *the veil of ignorance*.

Harsanyi was the pioneer of using the veil of ignorance as a purely hypothetical device for distinguishing relevant conceptions of distributive justice. In Harsanyi's argument, people in the original position are unaware of their own identity. Given that people are rational and self-interested, the unanimous decision rule behind the veil is to maximize average utility. Specifically, given that no one conceives of their relative position in a society that consists of n individuals, it can be assumed that they would rationally and unanimously assign equal probability, $1/n$, to each possible position (i.e., from the best to the worst position) in all possible distributional settings. This would license impersonal utility aggregations and subsequently permits an impartial rational chooser who represents the aggregate social

utility to prefer a distributional setting that maximizes the average utility of members of society behind the veil. According to Harsanyi (1975, p.598), the impartial rational chooser would uniquely support the principle of average utility as a principle of justice (Gauthier, 1986, pp.238-245; Moehler, 2013, pp.23-35; Gaus & Thrasher, 2015, pp.52-57).¹

Rawls developed this mode of reasoning for a different conception of justice in a more distinctive and influential manner. His veil of ignorance is more substantial than Harsanyi's, in that any person in the original position is ignorant not only of their own identity but also of all other kinds of information, including the conception of good and the specific features of psychological propensities, such as risk preferences (Rawls, 1971, p.137). This thick veil of ignorance, Rawls contends, rationalizes the maximin principle as a unanimous decision rule that is presented with possible distributional settings because nobody in the original position would appeal to special risk attitudes. As the possibility of taking the worst position is given the most weight, the rational and self-interested decision-maker in the original position would opt for the difference principle. According to the difference principle, primary goods should be distributed to the greatest advantage for the worst-off members of society.²

It is well known that Harsanyi (1975, p.595) objected to this view, arguing that maximin is irrational in that all agents cannot take a reasonable action involving unfavorable contingencies, such as the small possibility of a plane accident when heading for an excellent job opportunity. However, his further, and more important, objection tends to be dismissed: even under the thick veil of ignorance, all rational agents would assign *subjective* probabilities to outcomes (Harsanyi, 1975, p.599). If they choose the difference principle, it will simply mean that they estimate an extremely high probability for the worst outcome; that is, they are very likely to be in a worse-off position in society. In other words, Harsanyi suggests

¹It is a common error to regard the average of the social utility function as representative of any individual agent. This mistaken view is widespread even in the experimental veil of ignorance literature, except for a few studies (e.g., Amiel, Cowell, & Gaertner, 2009; Konow, 2009). For this, see also note 8. We owe this point to an anonymous reviewer.

²Unlike Harsanyi, who uses utility as a metric for justice, Rawls (1971, pp.90-95) argues that the conception of primary goods that all would rationally desire to have, such as basic liberties, income, and the social bases of self-respect, provides a more suitable basis for interpersonally comparing people's positions.

that people choosing the difference principle in Rawls's original position can be interpreted as operating within his subjective probability-based framework (Moehler, 2013, p.32).³

With this, we can reasonably claim that the thrust of the Rawls-Harsanyi debate is as follows: while Rawls's original position does not allow the parties to have subjective probabilities with respect to outcomes, Harsanyi's does. On this point, Rawls strongly believes that any risk preference must be absent in rational deliberations over conceptions of justice because any special attitude toward risk involves subjective and, thus, possibly biased preferences. If they count as ideal preferences for specifying the principle of distributive justice, the divergence of people's rational life plans may be belittled. This is the so-called "separateness of persons" concern. Thus, Rawls (1971, pp.172-175) argues that knowledge of the likelihood of occupying positions in society should be justifiably precluded from the conception of the veil of ignorance: the difference principle can be uniquely endorsed under relevant impartial reasoning.

Moreover, Rawls provided an additional argument for the difference principle by appealing to the method of *reflective equilibrium*. Even if the proposed impartial reasoning to the principle of distributive justice is widely acknowledged and reasonable, the principle in question may not match our considered judgments formed under conditions that are favorable for deliberation (Rawls, 1971, p.48). If so, the principle at stake is not ubiquitously shared and is, thus, unstable. Reflective equilibrium requires either revising the conditions that fundamentally support impartial reasoning (i.e., the conception of the veil of ignorance) or correcting our considered judgments. In other words, this process of deliberation enables us to finally achieve reflective equilibrium, in which the principle of distributive justice is congruent with our considered judgments. Rawls (1971, pp.578-580) contends that the difference principle (along with the two other principles of justice) is justified not only by the relevant impartial reasoning but also by the support deriving from our considered judgments.

³This suggestion reflects a common way of taking probabilities as part of the description of states of affairs in terms of subjective expected utilities in economics. For this point, see Mongin and Pivato (2016, p.712).

This methodology is widely espoused by contemporary normative political philosophers (e.g., Daniels, 1996; Scanlon, 2002; Copp, 2012).

1.2 Experimental studies on impartial reasoning

In sum, first, as explained above, the veil of ignorance is a purely hypothetical device for impartial reasoning that aims to define the relevant conception of justice in unanimous applications. Second, Rawls's veil of ignorance differs from Harsanyi's in that while the former does not allow people to calculate the probability of occupying societal positions, the latter postulates the subjective (equal) probability of taking each position. Third, Rawls's method of reflective equilibrium provides a comprehensive justification for the specific conception of distributive justice by fitting this principle with our considered judgments.

However, these three points immediately raise related concerns about the significance of theoretical debates over the plausibility of Rawls's argument for the difference principle unless we refer to the rich context of people's tastes and judgments. How can ordinary people acknowledge a *purely hypothetical* construction with a view to specifying a pertinent conception of distributive justice? This is connected to the second concern: do people truly endorse impartial reasoning to the difference principle, as Rawls presumed? There is also the question of whether Rawls's mode of justification for the difference principle through reflective equilibrium is *truly reflective*, such that the principle at stake coincides with *our* considered judgments rather than only with Rawls's intuition (Hare, 1973).

These questions have prompted several empirical approaches to Rawls's argument. Specifically, recently developed experimental studies have been conducted to fill the gap between Rawls's abstract constructions and the contextual richness of people's preferences and considered convictions. Frohlich and Oppenheimer (1992) conducted laboratory experiments on impartial reasoning to justice.⁴ They constructed a social choice problem of income distribution (including the principle of average utility and the difference principle), in which

⁴Frohlich and Oppenheimer (1992) is a book-length work of the research reported by Frohlich, Oppenheimer, and Eavey (1987) and Frohlich and Oppenheimer (1990).

participants were unaware of their income class. Since their income classes were randomly assigned after their decision, this controlled setting approximately represents the veil of ignorance. In the first experiment, Frohlich and Oppenheimer examined whether subjects behind the experimental veil of ignorance would opt for the difference principle. The second experiment involved a group's deliberative choice on the principle of distributive justice; in each group, subjects discussed which principle (income distribution) should be chosen before making a collective judgment. According to Frohlich and Oppenheimer (1992, p.28), this experiment was intended to echo the method of reflective equilibrium; they believed that a collective decision after lengthy discussions in each group would imply that each participant is reasonably satisfied with their decision. Their results indicate that the difference principle (maximinimum income) was the most unpopular while restricted utilitarianism (utilitarianism constrained by an income floor) was highly supported (Frohlich & Oppenheimer, 1992, pp. 58-60).⁵ Importantly, the popularity of restricted utilitarianism has been replicated in prior works (Lissowski, Tyszka, & Okrasa 1991; Bruner, 2018; Bruner, & Lindauer 2020).⁶

Frohlich and Oppenheimer's laboratory experimental research on impartial reasoning seems to deal with the three concerns mentioned above. Indeed, their experimental approach has gained many followers, primarily by virtue of the thoughtful construction that can occur in a controlled laboratory setting (Lissowski, Tyszka, & Okrasa 1991; Jackson & Hill, 1995; Herne & Suojanen, 2004; Traub, Seidl, Schmidt, & Levati, 2005; Amiel, Cowell, & Gaertner, 2009; Wolf, & Lenger, 2014; Bruner, 2018). However, there is room to question whether their laboratory-based experiment approach can adequately address the aforementioned concerns.

First, we question whether these experimental veils of ignorance are suitable approximations of Rawls's thick veil of ignorance. According to their experiments, participants

⁵In their experiments, subjects were first introduced to the alternative principles of justice and subsequently asked to rank them. Thus, it is doubtful that their setting induced impartial reasoning to justice (Gaertner & Schokkaert, 2012, p.81).

⁶Bruner (2018) made a nuanced exploration of this, as he tested not just for the difference principle but also Rawls's another condition under which the second principle holds, that is, the principle of fair equality of opportunity. He found that subjects behind the veil supported utilitarianism and fair equality of opportunity, with the former lexically prior to the latter.

are not deprived of information on probabilities regarding their possible incomes. In other words, the experimental design does not forbid subjects from assigning subjective (equal) probabilities to each income class. Consequently, the results of the experiments are unreliable, especially when examining whether participants would choose the income distribution mirroring the difference principle. Hence, these experimental studies do not provide an appropriate test of whether people follow impartial reasoning to the difference principle in the manner postulated by Rawls.

Second, Frohlich and Oppenheimer’s introduction of group decision-making in their experimental design is not an adequate representation of the reflective equilibrium method. Reflective equilibrium is a state pursued by *each* individual through the process of deliberating between their principles and our considered judgments, and is not one achieved by a unanimous agreement among individuals through group discussions. Considered judgments are those made by a particular person who is willing to make a correct decision in light of the relevant class of facts (Rawls, 1971, pp.48-51; Daniels, 1996, p.22).⁷

Laboratory-based experimental studies on impartial reasoning have been conducted to overcome the failures of Frohlich and Oppenheimer’s approach. Traub, Seidl, Schmidt, and Levati’s (2005) study is important for two reasons. First, their experimental study involved an important distinction between Rawls’s thick veil of ignorance and Harsanyi’s thin veil in investigating how subjects respond to possible income distributions. Their experiment utilized two different information scenarios. In the first scenario—Rawls’s veil-based scenario—participants were told that while all income distributions consisted of components of those sets, not all components necessarily entered the income distributions. In the second scenario—Harsanyi’s veil-based scenario—participants knew the possible incomes and their

⁷One might claim that, even if true, our considered judgments require collective deliberation when we attempt to merge each person’s equilibrium into a converged state that would fully support the principle of distributive justice. However, this process for convergence should not be confused with the requisite deliberation by the method of reflective equilibrium; being reflective on judgments under favorable circumstances is an exercise of mental capacity that operates *within* each person, not beyond them. Rather, a quest for convergence on considered judgments should be placed, independently of an evaluation of each person’s reflective state, on their judgments with respect to justice (Daniels, 1996, pp.33-36; Scanlon, 2002, p.149; Baderin, 2017, p.20).

probability distribution. In the second scenario, the study did not involve group discussions; it examined the individual decision problem when faced with a specific set of conceptions of justice. The results also demonstrated the unpopularity of maximin.⁸

However, there are four notable problems with their study. First, as Traub, Seidl, Schmidt, and Levati (2005, p.287) admit, the setting of the first scenario may not prevent some subjects from assigning certain probabilities to the entries in the income sets. Second, their study's lack of group deliberation does not indicate that it incorporated reflective equilibrium into the experimental design. Specifically, they attempted to investigate respondents' perceptions of the stimuli of income distributions in each scenario. Third, their samples were relatively small compared with other related studies on impartial reasoning to justice (Gaertner & Schokkaert, 2012, p.81). Fourth, the sample representativeness might be biased, as the subjects were university students. This problem is a characteristic of the extant laboratory experiments on impartial reasoning to justice. We question whether their study indeed showed the unpopularity of maximin under the Rawlsian framework.

1.3 Research questions for the experimental study

Our research aims to answer three questions. The first question is, "How well does the difference (maximin) principle fare under the experimental design that echoes the Rawlsian framework?" Since the experimental veils of ignorance utilized in prior studies seem to deviate from Rawls's thick veil, our experimental results using a veil that more closely reflects the Rawlsian framework may be important. Admittedly, the close reflection does not mean that the experimental Rawlsian veil is equated with Rawls's original position. However, we believe that it can be described as much more "Rawlsian" than the experimental veils used in prior works.

The second, and more important, question is, "How do the different conceptions of the

⁸Another unique feature of their experiment is that it involved combining the self-concern and umpire modes with the two information scenarios. In this part of their experiment, they aimed to investigate people's actual perceptions of the two different theorems regarding Harsanyi's argument for average utilitarianism. For related and important studies, see Amiel, Cowell, and Gaertner (2009) and Konow (2009).

veil of ignorance, that is, Harsanyi’s and Rawls’s, and the presence or absence of the practice of reflective equilibrium affect people’s impartial reasoning to maximin (and other principles)?” If our proposed experimental veils of ignorance and the presence or absence of the experimental reflective equilibrium practice result in significantly different responses, we could provide empirical feedback on impartial reasoning to justice through reflecting on the results of our experiments.

The third question is, “Do the different conceptions of the veil of ignorance propel ordinary people to unanimously select specific principles?” For impartial reasoning, the unanimity of agreement that leads all people to rationally choose the unique principle of distributive justice is very significant. Recently, Bruner and Lindauer (2020) demonstrated that there is no robust connection between preferences of various descriptions of the original position and those of distributive justice principles. Our experiments tested the unique connection between the different veils of ignorance and distributive principles, particularly concerning the uniqueness Rawls supports. Our study differs in significant ways from Bruner and Lindauer’s: while the latter examined the uniqueness thesis by asking individuals to rank the principles and select the most favorable impartial frame textually, we investigated the robust relationship in question by showing individual graphs that visualize the difference of veils in terms of the information about probability distributions, on which Rawls places heavy weight.

For this purpose, we investigated whether the experimental veils of ignorance influence the probability of people choosing maximin in online survey experiments. First, we employed online survey experiments because they ensure a required sample size for quantitative analysis at a reasonable cost and also facilitate the acquisition of sample sizes representative of the population. Second, the survey method is suitable for research on impartial reasoning to justice, as it easily establishes an artificial situation in which subjects behave in a rational and self-interested manner behind the veil of ignorance because their reactions are intended to be individual. This facilitated an experimental framework that stimulated subjects to examine

their determination, which approximately represents the process of reflective equilibrium.

2 Experimental Design

2.1 Participants

An online survey involving our experiments to examine the causal effects of Harsanyi’s and Rawls’s veils of ignorance was conducted in Japan from March 5 to 11, 2019.⁹ The participants were recruited from an online panel registered with a Japanese research firm (Rakuten Insight Inc.), which had over two million, two hundred thousand monitors as of April 2019. Although the total number of participants who had accessed the survey was 1,940, 158 did not agree with the consent form and 142 did not complete the survey.¹⁰

The participants were selected using a quota sampling method to balance the marginal distributions of gender (male, female), age (18-29, 30-39, 40-49, 50-59, 60+), and region (Hokkaido/Tohoku, Kanto, Hokuriku, Chubu, Kansai, Chugoku/Shikoku, Kyushu) between the participants and the Japanese population. The proportion of male participants was 49.8% and the mean age was 49.7 (the median was 49). These values were approximated with those of the target population.¹¹ The representativeness of the participants in the survey was greater than that of the existing studies that used student samples.

2.2 Procedure

The survey procedure is summarized in Figure 1. First, the participants were required to agree with the consent form to start the survey. Second, they were randomly assigned to one of two control groups or of four treatment groups after answering questions about

⁹Our experimental study was reviewed and approved by the Kansai University Institutional Review Board for Behavioral Research with Human Participants (approval number 2018-1).

¹⁰These participants were not included in our analysis. The sample size of our survey was 1,640.

¹¹According to the estimated results by the Statistics Bureau of Japan, the estimated proportion of male was 48.7% as of July 1, 2018. Also, the National Institute of Population and Social Security Research estimated the Japanese mean age (including minors) in 2018 to be 46.7.

Figure 1: Procedure of the survey

their demographic characteristics and political attitudes.¹² Third, we showed a hypothetical scenario to the participants and asked them to choose the most desirable one from four options (the first experiment). Subsequently, we asked the participants to consider the features of the four options and choose the option again (the second experiment). Finally, we conducted a manipulation check to confirm whether the participants had carefully read the vignette of our experiments.

¹²Before these questions, we displayed a warning message called “Audit” to prevent survey satisficing (Clifford & Jerit, 2015). This warning message has been detailed in Supplementary Appendix A.2 (URL: <https://osf.io/7pjtg/>).

2.3 Vignette

2.3.1 First experiment

In order to examine the causal effects of veils of ignorance, an original hypothetical scenario, which covers the choice situation of income distributions in the existing studies on impartial reasoning as argued above, was constructed for the first experiment. Specifically, we created the following situation, where the participants were asked to opt for a subsidy scheme after a catastrophic disaster that has completely destroyed the victims' belongings:

You have lost all of your property, such as your savings, land, and house, due to a natural disaster like the Great East Japan Earthquake. You will not be able to survive, as you are penniless. For this reason, you have decided to migrate to X country that will subsidize any victim of the disaster along with four other victims. Now, you have moved to X and swiftly apply for a subsidy for living expenses. Then, a public officer explains the following rules to you.

- ***You must reside permanently in this country to receive a subsidy.***
- ***There are four subsidiary patterns for allocating the subsidies to the five persons, and you will choose one option from subsidy schemes 1 to 4.***
Of the five refugee categories, the amount to be awarded will be decided by a lottery.
- ***Once the amount is fixed, you can never change it for life.***

Following the explanations above, a table composed of four subsidy schemes that echo different principles of justice was shown to the participants. Subsequently, they chose the most preferable scheme: Subsidy 1 represents the principle of maximizing the average (average utilitarianism); Subsidy 2 represents the principle of maximizing the average with a range constraint; Subsidy 3 represents the principle of maximizing the average with a floor constraint (restricted utilitarianism); and Subsidy 4 represents the principle of maximizing

the floor (the difference principle). Instead of an instruction to understand the principles of justice, we added an explanation regarding each scheme's features to the vignette below the table:

You must choose one option from the four subsidy schemes 1 to 4 according to the above rules.

	A	B	C	D	E
Subsidy 1	¥ 2,100,000	¥ 2,200,000	¥ 4,100,000	¥ 4,600,000	¥ 5,500,000
Subsidy 2	¥ 2,200,000	¥ 2,900,000	¥ 3,400,000	¥ 3,800,000	¥ 4,800,000
Subsidy 3	¥ 2,500,000	¥ 2,700,000	¥ 3,600,000	¥ 4,100,000	¥ 5,300,000
Subsidy 4	¥ 2,600,000	¥ 2,700,000	¥ 3,300,000	¥ 3,400,000	¥ 3,600,000

Subsidy 1 is *the scheme with the highest average amount*. Subsidy 2 is *the scheme that raises the average while preventing the difference between the maximum and minimum amounts from expanding*. Subsidy 3 is *the scheme that raises the average with a guarantee of the minimum amount necessary for living (¥ 2,500,000)*. Subsidy 4 is *the scheme with the highest minimum amount*.

Which one of these four schemes do you think is the most desirable?

2.3.2 Second experiment

As shown in the survey procedure, we asked the participants again which scheme they preferred after the first experiment. Additionally, in the second experiment, we also required the participants to select the options that represent the features of each scheme before selecting one scheme. This mimics the process of reflective equilibrium, a state carefully pursued by each person under the relevant information. The text that urges each subject to examine the principles in light of their considered judgments is as follows:

In the previous question, we asked you which subsidy scheme you would choose. Although the question is hypothetical, as explained earlier, it is an important question that will affect your life. Thus, we request you to consider again which scheme you would choose.

First, please answer which features apply to which subsidy scheme.

	Sub- sidy 1	Sub- sidy 2	Sub- sidy 3	Sub- sidy 4	Don't know
The scheme with the highest average amount					
The scheme that raises the average while preventing the difference between the maximum and minimum amounts from expanding					
The scheme that raises the average with a guarantee of the minimum amount necessary for living (¥ 2,500,000)					
The scheme with the highest minimum amount					

Which one of these four schemes do you think is the most desirable?

2.4 Experimental stimuli

2.4.1 Treatment group 1: $\text{Treatment}_{\text{uniform}}$

The participants in both treatment groups chose an option in the hypothetical situation where figure(s), as experimental stimuli, were embedded, whereas those who were assigned to the control group answered the questions without them. The control group represents the original position in which agents assign subjective probabilities to outcomes under uncertainty. This echoes Harsanyi’s important objection to Rawls: rational agents would estimate an extremely high probability of the worst outcome even under severe uncertainty. For treatment group 1—hereafter “ $\text{Treatment}_{\text{uniform}}$ ”—we added a figure above the table in the scenario that has a uniform distribution, with the following additional explanation, “The

results of previous lotteries were illustrated in this figure.” This was a visual cue for the participants to strongly recognize the equiprobability that reflects the features of the veil of ignorance. This figure was aimed at presenting Harsanyi’s thin veil of ignorance because they could reasonably calculate the expected value of each subsidy scheme.

Figure 2: Experimental stimulus in Treatment_{uniform}

2.4.2 Treatment group 2: Treatment_{random}

Unlike Treatment_{uniform}, we added three figures where the probability distributions could be randomly changed by each participant for treatment group 2—hereafter “Treatment_{random}.” As shown in Figure 3, first, we generated five uniform random numbers and repeated this process a thousand times to make one thousand figures entitled “one year ago,” which have different probability distributions in all cases. The figures entitled “two years ago” and “three years ago” were also generated by the same procedure. Second, one figure for each year was randomly selected from the one thousand figures and embedded in the scenario. We believe that the participants in Treatment_{random} were not able to calculate the expected amount value in each subsidy scheme because the probability distributions were unassured. Thus, we assumed that the experimental stimuli were closer if not identical to Rawls’s thick veil of ignorance than the figure that had a uniform distribution. We could thereby answer the question of which principle people prefer under Rawls’s thick veil of ignorance by analyzing the causal effects of the experimental stimuli on the subsidy scheme choices made.

Figure 3: Example of experimental stimuli in $\text{Treatment}_{\text{random}}$

2.5 Manipulation check

To evaluate how effective the manipulation of our experiments is, we asked the participants how to decide the amount of subsidy. This method, called “the factual manipulation check,” is useful for detecting survey satisficers (Kane & Barabas, 2019). We used this question as a robustness check of the results of our experiments:

We would ask you about the above questions. Please answer in which way the five amounts (A to E) we explained in the questions should be distributed.

1.By government policy, 2.From the result of a lottery, 3.Do not know

3 Results

3.1 Results of first and second experiments

We estimated the causal effects of the experimental stimuli in our online survey experiments using multinomial logit regressions¹³ because the outcome variables in our experiments were categorical. The results of the multinomial logit regressions are summarized in Table 1. The

¹³We used the nnet (ver.7.3-12) R package for the multinomial logit regressions (Venables & Ripley, 2002).

reference category of the outcome variables is Subsidy 3 and that of the treatment variables is the control group in both experiments. We summarized the estimated results of the first experiment in the upper part of Table 1 and that of the second experiment in the lower part. The coefficients with an asterisk are statistically significant at the 5% level.

Table 1: Results of multinomial logit regressions

First experiment						
	<u>Subsidy 1</u>		<u>Subsidy 2</u>		<u>Subsidy 4</u>	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Treatment _{uniform}	-0.1801	0.2293	0.1842	0.1912	-0.2542	0.1431
Treatment _{random}	-0.2692	0.2307	0.0738	0.1922	-0.3355*	0.1426
Intercept	-1.2973*	0.1164	-0.6044*	0.0907	0.2907	0.0713
N	1636					
AIC	2662.552					
Second experiment						
	<u>Subsidy 1</u>		<u>Subsidy 2</u>		<u>Subsidy 4</u>	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Treatment _{uniform}	-0.2818	0.2418	-0.0070	0.2027	-0.3223*	0.1357
Treatment _{random}	-0.2177	0.2394	0.1530	0.1980	-0.3876*	0.1373
Intercept	-1.6751*	0.1219	-0.2177*	0.0684	-0.2818*	0.0949
N	1636					
AIC	3903.228					

Note: The reference category of the outcome variables is Subsidy 3 and that of the treatment variables is the control group. The coefficients with an asterisk (*) are statistically significant at the 5% level.

Table 1 shows that more participants tended to prefer restricted utilitarianism to maximin under highly uncertain situations. The coefficients of Treatment_{random} for Subsidy 4 in both experiments were negative and statistically significant at the 5% level. Although the coefficients of Treatment_{uniform} for Subsidy 4 were also negative, only the coefficient in the second experiment was statistically significant. Moreover, the absolute values of the coefficients of Treatment_{uniform} for Subsidy 4 were smaller than those for Treatment_{random}. These results show that severely uncertain conditions do not always facilitate the selection of maximin.

However, the statistical significance and values of the coefficients of the treatment variables in the multinomial logit regressions depend strongly on the reference category of the

outcome variables. Additionally, it is difficult to directly interpret the change in choice probabilities for each subsidy scheme from the results of the multinomial logit regressions. For these reasons, we show the choice proportion in each experimental group to make the key findings easier to capture.¹⁴

Figure 4 demonstrates that the participants in the first experiment tended to choose Subsidy 4 (maximin) as the most preferable scheme. Of all the participants, 49.6% in the control group, 42.8% in $\text{Treatment}_{\text{control}}$, and 41.9% in $\text{Treatment}_{\text{random}}$ selected Subsidy 4. However, the differences between the choice proportion of Subsidy 3 and that of Subsidy 4 varied among the control and treatment groups. The differences in the control group, $\text{Treatment}_{\text{control}}$, and $\text{Treatment}_{\text{random}}$ were 0.220, 0.121, and 0.093, respectively. The difference in $\text{Treatment}_{\text{random}}$ was the smallest among the experimental groups. This implies that more participants tended to prefer restricted utilitarianism to maximin under highly uncertain situations. The differences in the distributions of the subsidy scheme choice between the control and treatment groups were larger in the second experiment compared with those in the first experiment. The proportion of Subsidy 4 was only 1.5% larger than that of Subsidy 3 in $\text{Treatment}_{\text{control}}$, and the proportion of Subsidy 4 was 1.1% smaller than that of Subsidy 3 in $\text{Treatment}_{\text{random}}$. Unlike the control group, the differences between the choice proportion of Subsidy 3 and that of Subsidy 4 in the treatment groups were extremely small in the second experiment.

Figure 5 is a Sankey diagram that displays who changed their preferences from the first to the second experiment. Most participants chose the same options in the second experiment as in the first experiment. The relationship between the results of the first and second experiments was strong (Cramer’s $V = 0.693$). However, some participants changed their preferences over the subsidy schemes when they chose their options for the second time. The participants who changed their choice from Subsidy 2 or 4 to Subsidy 3 were relatively large compared to the others. Moreover, the number of participants who changed their choice in

¹⁴We conducted simulation-based postestimation to interpret the results of Table 1. It is summarized in Supplementary Appendix C (URL: <https://osf.io/7pjtq/>).

Figure 4: Choice proportions for each subsidy in each experimental group

the control group was smaller than that in the treatment groups.

In sum, the results of our experiments suggest that more participants were likely to opt for the principle of restricted utilitarianism, not maximin, when they strongly recognized the randomness of their gain. According to Rawls, rational agents under highly uncertain situations would choose the difference principle. However, our results demonstrate that the participants tended to choose the other principle of justice. The experimental stimuli for recognizing randomness significantly increased the choice probability of Subsidy 3. Although Treatment_{uniform}, which we operationalized as the thin veil of ignorance, had similar effects on the choice probability as Treatment_{random}, its effect sizes of Treatment_{uniform} were relatively smaller.

Figure 5: Sankey diagram showing attitude changes in each experimental group

3.2 Robustness check

Overly complex and long vignettes normally increase the number of survey satisficers, who do not carefully read the instructions and messages as the experimental stimuli. Survey satisficers might be included in our data because our hypothetical scenarios are not simple. Although survey satisficing is the optimal behavior for the participants, it causes a serious bias in the estimated results from the survey data. In other words, we can check the robustness of the experimental results by examining the relationship between survey satisficing and the experimental stimuli. The experimental results lack robustness if the causal effects of the experimental stimuli are larger among survey satisficers than those who read the vignette carefully.

Thus, we investigated whether the participants in our experiments read the scenarios carefully in the following two ways. First, we used a question for the manipulation check. In our experiment, the participants selected one of the three options: the amount of subsidy was decided by government policy, the amount of subsidy was decided from a lottery, and do not know (DK). We identified the participants who chose the option of “by government policy” (18.66%) or “DK” (16.28%) as survey satisficers. The total estimated proportion

of survey satisficers in our survey was 34.9%. To check the robustness, we examined the interaction relationship between survey satisficing and the experimental stimuli.

Second, we ascertained the extent to which the participants understood the features of each subsidy scheme. As shown above, the participants selected which options represented the features of each scheme in the second experiment. While 447 (27.3%) participants completely understood the features of each subsidy scheme, 300 participants (18.3%) did not. For a further robustness check, we also examined the interaction relationship between the participants' levels of understanding of each subsidy scheme and the experimental stimuli.

In order to scrutinize the interactions between the experimental stimuli and survey satisficing or participants' levels of understanding, we estimated the causal effects of the experimental stimuli based on the model including interaction terms with survey satisficing and the participants' levels of understanding through multinomial logit regressions. The results are summarized in Table S2 of Supplementary Appendix D.1 because of the amount of information they contain.¹⁵ We separated the model for estimation into Model 1 (interaction with survey satisficing) and Model 2 (interaction with participants' levels of understanding) to prevent multicollinearity. Concerning all the results, the coefficients of the interaction terms were not statistically significant at the 5% level. These results suggest that the conditional effects of survey satisficing or participants' levels of understanding were not statistically significant and were not large (if present at all).

The results of the multinomial logit regressions with interaction terms suggest that our experimental results are robust. None of the coefficients of interaction terms were statistically significant. Notably, our estimated results indicate that the causal effects of $\text{Treatment}_{\text{random}}$ among the participants who read the vignette carefully tended to be larger than that among the other participants. These findings imply that Rawls's thick veil of ignorance has a negative causal impact on the choice for maximin.

¹⁵A simulation-based postestimation was conducted to interpret the results of Table S2 as well as Table 1. These are summarized in Supplementary Appendix D.2 (URL: <https://osf.io/7pjtg/>).

4 Discussion

According to the results of multinomial logit regression analysis, the choice ratio of maximin was significantly lower in the treatment groups, specifically in $\text{Treatment}_{\text{random}}$, than in the control group in both experiments. In other words, more people in the control group tended to prefer maximin than in the treatment groups. More precisely, the first experiment revealed that the causal effects of different treatments (veils) differed significantly, such that the choice probability for maximin in $\text{Treatment}_{\text{random}}$ was significantly lower than in $\text{Treatment}_{\text{uniform}}$, compared with the control group. These results were more evident in the second experiment. The results were reinforced by robustness checks, such that the conditional effects of survey satisficing and participants' levels of understanding were not statistically significant, and the treatment effects among the participants who completely understood the principles tended to be larger.

Based on these results, we can first say that maximin fares better under the non-figured experimental veil of ignorance originally proposed by Frohlich and Oppenheimer than under Harsanyi's thin and Rawls's thick veils of ignorance. This finding is quite remarkable, as it contrasts with most laboratory experimental findings, which have found that maximin is unpopular under the experimental veil of ignorance in question. It is important to recall that this finding is based on the results of online survey experiments, which secure sample representativeness and establish a situation in which each subject can reasonably make their choice in a self-examined manner. Thus, our experimental data seem to be derived from a more representative sample than those in previous studies and are more in accord with the Rawlsian methodology—that is, inciting the practice of reflective equilibrium within subjects.

Second, and more importantly, our finding that Harsanyi's thin and Rawls's thick veils of ignorance significantly lower the proportion of choosing maximin has not been shown in prior studies. Under the situation in which participants saw the randomized probability distribution graphs (i.e., Rawls's thick veil of ignorance), they were less likely to support the

difference principle than those in the control group. This result runs contrary to Rawls’s impartial reasoning. Maximin was chosen less frequently even when subjects were presented with the figure showing the uniform distribution of probabilities—that is, Harsanyi’s thin veil of ignorance. Our interpretation of this result is that the figures used for the two experiments affect people’s attention to the effects of probabilities, regardless of uniform or random probability distributions. This can reasonably accommodate the subjects’ reactions under the thin and thick veils of ignorance.

However, the effects of visual cues in question do not change the significance of the effects observed using the randomized probability distributions because, with respect to the choice probability for Subsidy 4 (maximin), the causal effects of $\text{Treatment}_{\text{random}}$ (the thick veil) were larger than that of $\text{Treatment}_{\text{uniform}}$ (the thin veil). Furthermore, the choice ratio for maximin in the treatment groups, especially in $\text{Treatment}_{\text{random}}$, decreased in the second experiment, that is, after self-examination through the practice of reflective equilibrium. In addition, this tendency was more robust in the cases of respondents who understood the principles correctly. Clearly, these results contradict the uniqueness thesis. Thus, our experiments replicate the results of Bruner and Lindauer’s (2019) experiments. Moreover, our findings are important in two respects: the uniqueness Rawls upholds is shown as empirically unsupportable under the experiments of Frolich and Oppenheimer’s kind of impartial reasoning to distributive principles. The uniqueness at stake is challenged more robustly by the experimental method of reflective equilibrium, especially among the careful subjects. In other words, our experiments rigorously demonstrated that, contrary to Rawls’s expectations, there is no positive correlation between the thick veil and the difference principle.

These findings have two implications for the argument concerning impartial reasoning to justice. First, our finding that maximin was more popular under the non-figured experimental veil of ignorance than under the thin and thick veils may suggest that ordinary people tend to follow the subjective probability-based reasoning that Harsanyi postulates as an objection to Rawls’s employment of the maximin rule. However, in light of the findings

of behavioral economics, this result may be interpreted as the result of people’s loss-averse reactions after catastrophes, when they have no choice but to depend on a subsidy to live: people tend to overweigh small probabilities to prevent losses in such situations that approximately represent the veil of ignorance. This bias has been identified in cognitive psychology (Kahneman & Tversky, 2000). Specifically, the responses of people behind the experimental veil of ignorance seem to echo the reference point at which they have nothing, which may lead them to underweigh the opportunity costs for choosing a riskier scheme with higher subsidies (Thaler, 2000, pp.273-276; cf. Mitchell, Tetlock, Newman, & Lerner, 2003, p.523).

One might question this implication because the veil of ignorance differs from the situation after a catastrophe, in that the latter’s distinct features may spur people to expect rectification for their losses. Since the respondents have legitimate holdings before the catastrophe, they might see the subsidy as restitution. To this query, we have two responses. First, in our experiments, the subjects did not choose between the subsidies, but between the subsidy *schemes* that mirror the major distributive principles regulating the basic structure of society (Rawls, 1971, p.61). This, we believe, defuses the concern about the rectification effects of the vignette frame. Second, even if the vignette frame may affect people’s choices, the contextual effects at stake do not undermine the results of our experiments based on the differences between the control and treatment groups. Thus, one cannot disregard our finding that more respondents chose maximin under the non-figured experimental veil than under the thin and thick veils, which may illustrate their loss aversion independently of the rectification effects of the vignette frame.¹⁶

The second and more important implication of our results is that, contrary to Rawls’s impartial reasoning, maximin was significantly lowered under the thick veil compared with the non-figured and thin veils. Recall that under the treatment setting, in which the respondents saw the figures of randomized probability distributions over subsidies, the choice ratio

¹⁶Admittedly, it is important to investigate how impactful the contextual effects are under the veil of ignorance experiments of this sort. This is a task for another time. We are grateful for this point from an anonymous reviewer.

of maximin was significantly lower than under the other two settings. After self-examination by the experimental method of reflective equilibrium, particularly among the careful subjects, the choice proportion of maximin under the thick veil was significantly lower than that under the two other veils. Thus, their choice of maximin seems to contrast with Rawls's impartial reasoning for the difference principle.

Why did this happen? Our conjecture is that people cannot predict which subsidy they may obtain in radically uncertain situations. Paradoxically, this may push people to take slightly riskier choices, for example, choosing restricted utilitarianism over maximin. This heuristic is endorsed, given the distinction between “chance” and “luck” people perceive, particularly in lottery gambling. As Wagenaar and Keren (1988) demonstrate, while “chance” is utterly undetermined and coincident, “luck” is often considered more controllable; this is, however, an illusion. This pattern of people's perceptions has been identified by psychological studies on gambling (Langer, 1975, 1977; Keren & Wagenaar, 1985; Wagenaar & Keren, 1988; Rogers, 1998, pp.123-124; Toneatto, 1999). “Perceived luckiness” seems to support our findings that more people tend to take chances under excessively uncertain settings in which the principle of loss aversion does not hold.

If the discussions above are reasonable, the principles of loss aversion and perceived luckiness cannot be disregarded for impartial reasoning to justice. Owing to Rawls's (1971, pp. 458-462) emphasis on social psychology's empirical findings on people's motivation for justice, our findings are crucial for ascertaining the relevant impartial reasoning to justice.¹⁷

To this end, one might object that findings in human psychology should not be exaggerated in examining whether impartial reasoning to justice is pertinent or which principles

¹⁷One might object that our claim misunderstands what Rawls asserts concerning human psychology: Rawls assigns importance to psychological factors, such as loss-aversion, for the stability of a well-ordered society. He does not take them as factors for reconsidering the reasoning with which the parties under the veil may engage. In response, the results of our experiments impel supporters of the Rawlsian project to doubt “all along I [=Rawls] have assumed that general facts about the world, *including basic psychological principles*, are known to the persons in the original position and relied upon by them in making their decisions” (Rawls, 1971, p.456; emphasis added). For this reason, we believe that our findings illuminate the relevance of psychological principles and that this cannot be neglected for the development of the relevant impartial reasoning to justice.

are important. Rawls (1971, pp.491-493) emphasizes the profound influence of justice as a moral notion (stipulated by philosophical inquiries) on our social feelings. However, it is important to note that, unlike Immanuel Kant, Rawls was not a metaphysical dualist who believed in the contrast between the ideal and the empirical selves. Rawls (1971, pp.256-257) explicitly affirmed that his philosophical inquiry into the relevant principle of justice had to be consistent with our natural psychological capacities (Baldwin, 2008, pp.251-252). Given this, the relevant impartial reasoning to justice should reflect findings in human psychology, such as the principles of loss aversion and perceived luckiness.

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