Preference Aggregation in Social Choice Under Risk

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Abstract

Politicians, CEOs and various other types of *dictators* make *social choices* that influence both their own and others' welfare. When a dictator's preferred alternative differs from *recipients'*, it is unclear which preferences they *aggregate* and how they determine this set of *admissible preferences*. This paper introduces an experimental framework that can answer these questions in two-person social choice problems, and applies it to study social choice under risk. I find that over one-third of dictators aggregate their recipient's risk preferences. These *aggregators* tend to admit wide ranges of preferences that are both more and less extreme than their individual preference. However, risk-averse and -seeking aggregators favour preferences similar to their own: risk-averse (-seeking) aggregators rarely admit risk-seeking (-averse) preferences. Additional results suggest that recipients' preferences carry the greatest weight when dictators' own preferences are incomplete. These findings highlight the context-dependence of social choice, which has important implications for the design of public and private institutions that rely on such decisions.

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1 Introduction

Politicians, CEOs, mutual fund managers and various types of group leaders frequently make *social choices* (Arrow, 2012): decisions whose outcomes impact all members of a group, who each may have different preferences over the available alternatives. When the agent making the decision - the *dictator* - is impacted by the decision's outcome, their preferences over the available alternatives may conflict with their *recipients'*. In such cases, which preferences is a dictator willing to *aggregate*, or use as the representative preferences in their social choice? Existing experimental paradigms cannot identify the full set[1] of such *admissible preferences*, yet identifying this set helps characterize various potential effects that the social choice environment may have. For instance, do such choices systematically moderate extreme individual opinions, or can they exacerbate them as well? Do social choices promote the representation of diverse opinions, or do dictators only aggregate preferences similar to their own? The answers to these questions have crucial implications for the design of public and private institutions that rely on social choices.

This paper introduces an experimental framework for identifying a dictator's set of admissible preferences in two-person social choice problems. I apply this framework to study the aggregation of risk preferences, as risk is a common feature of many social choices. For instance, a public health policymaker may decide between strict and lenient pandemic mitigation measures, and the primary investigator of a research team may decide whether to take on a project in a novel or well-established field of research. My analysis covers two main topics. I begin by characterizing the extensive and intensive margins of preference aggregation, documenting trends in the prevalence of this behaviour and the size of admissible preference sets. Next, I study the link between individual and social choices. I first examine whether and how the preferences an aggregator admits depend on their individual preferences. This sheds light on the similarity between own and aggregated preferences, and how the preferences used in social choices are shifted relative to individual preferences. I then investigate the individual specific-factors that may prompt dictators to aggregate in the first place. This helps establish whether preference aggregation is concentrated among individuals with extreme or incomplete risk preferences.

The experimental design allows dictators' admissible preference sets to be both measured and linked to their individual choice behaviour. The main experimental condition presents a dictator with a series of social choices that impact their own payment and that of a passive recipient, wherein they must decide whether to select their own preferred alternative or aggregate their recipient's preference. To identify preference aggregation, I modify the design of a traditional choice list by eliciting dictators' choices conditional on their recipient's preference. That is, in each line, dictators could choose an option regardless of their recipient's preference or match their recipient's preferred option. I identify *aggregators* as dictators that match their recipient's preferred option over some range of choice list lines. Aggregators' admissible preference sets are measured using the largest and smallest certainty equivalents associated with that range. To quantify the relationship between individual and admissible preferences, dictators also make *individual choices*: they complete a traditional choice list with the same payment options as in the main condition, but their choices impact only their own payment.

[1]Several previous experiments (e.g., Füllbrunn and Luhan (2020), Bolton et al. (2015) and Song (2008)) have attempted to measure *whether* a dictator aggregates *a particular* preference, but not their full set of admissible preferences.

The main results shed light on dictators' willingness to aggregate others' preferences, as well as how they choose which preferences to admit. First, a considerable fraction of dictators allow their recipient's preferences to influence their social choices, and admissible preference sets tend to be large. Depending on the conservativeness of the classification scheme used, 36% to 43% of dictators are identified as aggregators, and the median aggregation range spans 24% to 34% of the choice list. Second, most risk-averse and -seeking aggregators use the same heuristic to establish their set of admissible preferences. While most of these aggregators admit preferences that are both more and less extreme than their own, all admissible preferences tend to lie on the same side of risk neutrality as the aggregator's individual preference. That is, risk-averse (-seeking) aggregators rarely admit risk-seeking (-averse) preferences.

The above conclusions rely on the assumption that matching the recipient's preferred option stems from a desire to aggregate their preferences. I test this assumption by investigating the influence of alternate behavioural mechanisms that may drive such behaviour. First, as individuals often take advantage of opportunities to randomize between risky payment options (Agranov and Ortoleva, 2017, 2021), I conduct a treatment that investigates whether matching may be a means of randomizing. In each choice list line, in addition to being able to select one option with certainty, dictators may use a slider to choose a positive probability of implementing both options. To the extent that individuals who randomize prefer to do so with a known instead of an unknown probability, using the slider to randomize is preferable to randomizing by matching another subject's choice. This in turn implies that, if randomization was the main motive for matching ones recipient's choice, the behaviour identified as aggregation should be less prevalent in this treatment. Furthermore, recent work suggests that stochastic individual choice is indicative of incomplete individual preferences (Agranov and Ortoleva, 2022, 2021). This treatment thus additionally allows me to investigate the link between incomplete preferences and preference aggregation.

Second, I assess whether matching the recipient's choice stems from a desire to delegate the decision to another subject. Individuals are typically reluctant to forgo agency in this way; in fact, many retain decision rights even when delegation maximizes their payoff (Bartling et al., 2014; Fehr et al., 2013). However, individuals are *more* willing to forgo agency when they have never made a choice before, compared to a scenario where they have already determined their choice (Dykstra et al., 2022). I thus introduce variants of each treatment that alter the order of the conditions. If delegation was the main motive for matching one's recipient's choice, the behaviour identified as aggregation should be more prevalent among dictators who face the Social condition before the Individual condition.

Treatment- and variant-level comparisons reveal no significant differences in either the proportion of aggregators or the sizes of admissible preference sets, suggesting that matching the recipient's preference was not a form of randomization or delegation. Interestingly, however, preference incompleteness influences the intensive margin of aggregation. Dictators with incomplete individual preferences tend to admit larger sets of risk preferences, suggesting that recipients' preferences carry the greatest weight when dictators are uncertain of their own decisions. Empirically, this influence may be problematic when groups of recipients have extreme or conflicting opinions (e.g., in the political domain), as uncertain dictators may unintentionally perpetuate or exacerbate inter-group polarization. This finding thus has implications for institutional design in such environments. For instance, it supports the presence of

advisory boards to counsel politicians in domains where they have relatively little expertise.

This research contributes to a growing experimental literature on decisionmaking for others. This paper is most similar to prior work that has compared individual choices to social choices with identical payoffs for oneself and a recipient. While it is known that individuals adjust their tolerance for risk (Füllbrunn and Luhan, 2020; Montinari and Rancan, 2018; Andersson et al., 2016; Bolton et al., 2015; Pahlke et al., 2015; Ertac and Gurdal, 2012; Polman, 2012; Bolton and Ockenfels, 2010) and strategic uncertainty (Charness and Jackson, 2009; Song, 2008) between the two settings, my findings shed light on the cause of such *responsibility effects*, which in turn helps to reconcile the mixed evidence regarding their presence and size (Polman and Wu, 2020). Specifically, my results suggest that the alternative a dictator chooses may be a function of recipients' preferences, implying that social choices have the potential to both increase and decrease risk-taking.

Other strands of this literature have investigated paternalistic choice (Ambuehl et al., 2021) and social choices made by benevolent social planners (Ambuehl and Bernheim, 2021). The present experiment models a different yet broad class of social choices where the dictator has a stake in the decision's outcome. For instance, politicians often stand a greater chance of re-election after implementing successful policies, and financial advisors are frequently paid a commission after making profitable investments for their clients. The finding that aggregators favour preferences similar to their own suggests that being impacted by a social choice may influence a dictator's decision. Future work may wish to investigate whether and how having a stake in a social choice impacts the set of preferences a dictator aggregates.

My experimental framework shares many similarities with dictator games (see Camerer (2003) for a review) and variants thereof that introduce payoff risk (Cettolin et al., 2017; Freundt and Lange, 2017; Brock et al., 2013). While these games quantify a dictator's trade-off between their own and their recipient's *payoffs* or *risk exposure*, my framework quantifies the trade-off between their own and their recipient's *preferences*. Studying the relationship between these measures of altruism may be a promising direction for future research.

The rest of this paper is structured as follows. Section 2 presents the experimental design and implementation details. Section 3 analyzes the results, both at the treatment and variant levels (in Section 3.1) and at the individual level (in Section 3.2). Section 4 concludes by discussing the implications of these results and offering directions for future research on social choice.

2 Experimental Design

My research objectives include (i) measuring the set of preferences dictators aggregate in two-person social choice problems (ii) examining the link between individual choice behaviour and preference aggregation. My experiment is designed to achieve these objectives. The Standard treatment introduces an experimental framework that leverages strategic elicitation to achieve objective (i). The Randomization treatment and order variants address the influence of alternate behavioural motives (i.e., motives unrelated to preference aggregation) that strategic elicitation may induce in a social choice setting. To achieve objective (ii), all treatments and variants present subjects with both social and individual choices. Henceforth, I use the terms "subject" and "dictator" interchangeably.

2.1 Experimental treatments and variants

2.1.1 Standard treatment

Subjects' core task involved a choice list with a "standard" structure: they selected one of two payment options in each line. The risky option, which remained constant throughout the choice list, provided a 50% chance of winning $10 and a 50% chance of receiving $0. The certain option paid some amount of money for sure. The payment began at $0 and increased in 25-cent increments from one line to the next, reaching a maximum value of $10. Monotonicity was enforced by requiring that a subject switch at most once between the risky and certain payment options.

Each subject completed this core task under two conditions. In the Individual condition, they made *individual choices*, which affected only their own payoff. In the Social condition, they made *social choices*, which affected both their own payoff and that of an anonymous, passive recipient. Recipients were participants who had only completed the Individual condition, and did so prior to the dictator sessions.[2] To identify the desire to aggregate the recipient's preferences, I allowed dictators to condition each social choice on their recipient's preferred payment option. That is, in each line of the Social condition choice list, dictators could choose one option regardless of their recipient's preferred option or choose their recipient's preferred option.[3]

Appendix Figures A.1 and A.3 respectively display the Individual and Social condition choice lists in the Standard treatment. As illustrated in Appendix Figure A.3, the use of strategic elicitation in the Social condition resulted in two adjacent sub-lists. Monotonicity was enforced separately in each sub-list. I say that a dictator *aggregates* their recipient's preference in a given line if they choose their recipient's preferred option, and refer to dictators who do so as *aggregators*.

2.1.2 Randomization treatment

The purpose of this treatment is twofold. First, it serves to investigate whether matching the recipient's choice may be a means of randomizing between payment options. Second, it sheds light on a potential mechanism underlying preference aggregation; specifically, the extent to which having incomplete individual preferences influences one's propensity to aggregate others' preferences. The Randomization treatment's core task and decision conditions were identical to those in the Standard treatment, but the structure of the choice list was modified. Instead of choosing one payment option with certainty, subjects used a slider to indicate the probability with which they (in the Individual condition) or they and their recipient (in the Social condition) should receive each option. To keep the structure of the Social choice list consistent across treatments, social choices impacted recipients who had completed a Standard individual choice list, and thus had chosen either the risky or sure payment options with certainty in each line.[4]

[2]Recipients were only informed *after* they completed the experiment that their choice data would be available to future subjects, and that they may receive additional earnings based on these future subjects' choices.

[3]The strategic elicitation method used in the Social condition choice list also allowed dictators to choose their recipient's least-preferred option. Among all 96 Standard treatment dictators in the sample analyzed in Section 3 (which excludes those who selected dominated options in the Individual condition), only one took advantage of this opportunity.

[4]Randomization treatment subjects completed a comprehension question to ensure they understood that their recipient had chosen one option with certainty.

The Individual and Social condition choice lists faced by subjects in the Randomization treatment are displayed in Appendix Figures A.2 and A.4, respectively. Probabilities were available in increments of 10% and were required to sum to one in each line. Monotonicity was enforced by requiring that subjects choose the certain option with at least the same probability as that chosen in the previous line.

It is plausible that randomizers will prefer choosing their randomization probability (by using the slider) to randomizing with some unknown probability (by matching the recipient's choice). Thus, if randomization was the main motive for matching the recipient's choice, the behaviour identified as aggregation in the Standard treatment should be less prevalent in the Randomization treatment. Furthermore, as randomization in individual choices is suggestive of incomplete individual preferences (Agranov and Ortoleva, 2022, 2021), this treatment can provide a measure of the link between incomplete preferences and preference aggregation.

2.1.3 Order variants

These variants of the Standard and Randomization treatments serve to investigate whether matching the recipient's choice may be a means of delegating one's decision to another subject. Roughly half of the subjects in each treatment completed the Individual condition before the Social condition, and the remainder completed the conditions in the reverse order. As individuals are most willing to delegate when they have never made a choice before (Dykstra et al., 2022), if delegation was the main motive for matching the recipient's choice, the behaviour identified as aggregation should be more prevalent among dictators who faced the Social condition before the Individual condition.

2.2 Experimental procedures

The experiment was programmed and deployed in oTree (Chen et al., 2016). Subjects were recruited from the University of Toronto student body using the ORSEE online recruitment system (Greiner, 2015). Experimental sessions were run remotely: subjects received a link to the experiment in the morning on a particular day, and were required to complete it within a scheduled time window on that day. Before proceeding to each condition, subjects were required to correctly answer comprehension questions to ensure they had understood the relevant instructions for that condition.

Treatment	Order variant	Number of subjects
Standard	Individual→Social	60
Standard	Social→Individual	52
Randomization	Individual→Social	57
Randomization	Social→Individual	52

Table 1: Overview of Experimental Sessions

As summarized in Table 1, a total of 221 dictators participated in the experiment. All received a show-up fee, plus additional compensation determined by their choice in one line of one of the two choice lists they completed. The line that counted was randomly selected at the beginning of the experiment but revealed at the end. If it was from the Social condition choice list, a dictator's recipient's choice data was used to determine which option would be paid or played out.

Prior to making their social choices, dictators were informed of the possibility of being matched many-to-one with a recipient. They were truthfully told that, in such cases, one dictator would be randomly selected to have their choices influence the recipient's payoff. Dictators and recipients were indeed matched many-to-one: two recipients participated in the experiment. Recipients also participated remotely, and were recruited and compensated according to the same procedures as dictators.

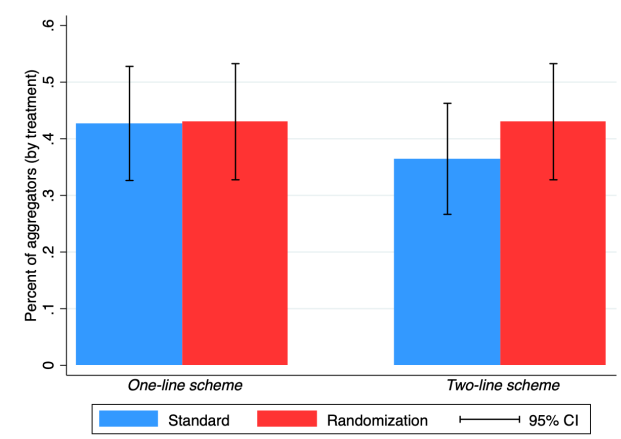
All payments were made via electronic bank transfer. The median Standard treatment dictator earned \$10.75 and took 10 minutes to complete the experiment. In the Randomization treatment, median earnings and duration were \$11.75 and 16 minutes, respectively. Both dictators and recipients received their show-up fee and payment from their own choices the day they participated in the experiment. Recipients received additional payment from dictators' choices after dictators had participated.

3 Results

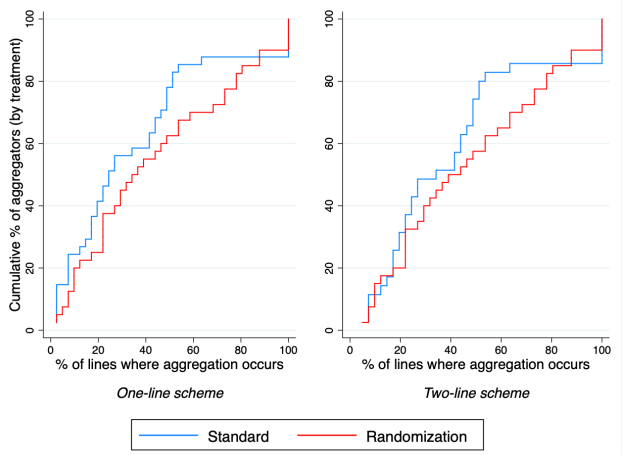
The sample of dictators analyzed excludes those who select dominated options in the Individual condition. That is, I remove dictators who choose to receive \$0 for sure over the risky prospect, and/or the risky prospect over \$10 for sure, with any positive probability in the Individual condition. This exclusion criterion results in a sample of 96 dictators in the Standard treatment and 93 dictators in the Randomization treatment. All reported p-values are from two-sided tests. I begin by documenting and discussing treatment- and variant-level trends in preference aggregation, then turn to a within-treatment analysis of individual and social choices to investigate the links between individual choice behaviour and preference aggregation.

3.1 Aggregation at the treatment and variant level

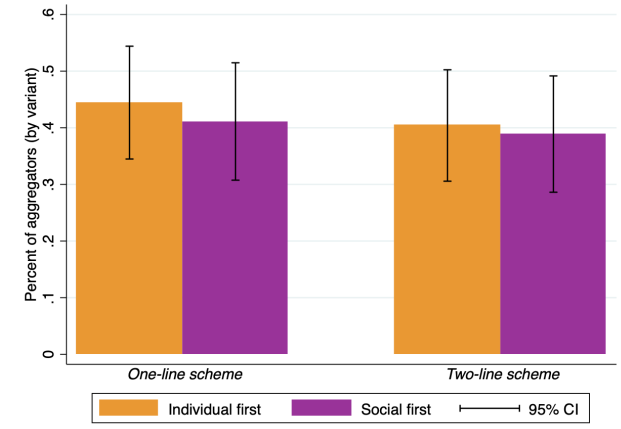
I first focus on the prevalence and degree of preference aggregation at the treatment and variant levels, and consider two classification schemes to identify aggregators. The one-line scheme identifies any dictator who aggregates their recipient's preference in at least one line of the choice list as an aggregator. To rule out aggregation driven by indifference or misremembering one's individual preferences, I also consider a more conservative two-line scheme requires that a dictator aggregate in at least two lines.



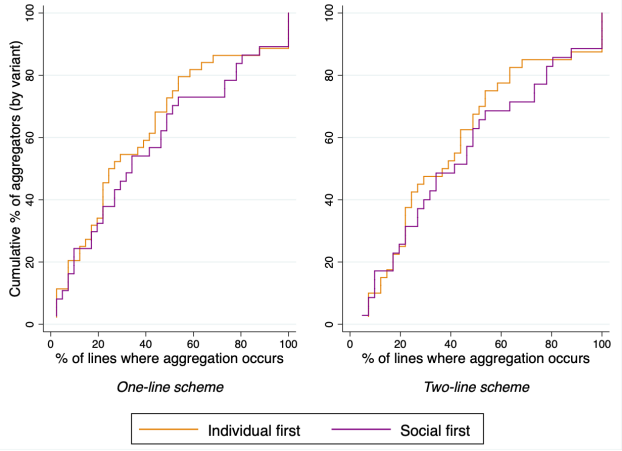
(a) Percent of Aggregators, by Treatment



(b) Size of Aggregators' Admissible Preference Sets, by Treatment



(c) Percent of Aggregators, by Variant



(d) Size of Aggregators' Admissible Preference Sets, by Variant

Figure 1: Aggregation Statistics by Classification Scheme, Treatment & Variant

Figure 1 displays statistics on the prevalence and degree of aggregation by classification scheme, treatment (with variants pooled) and variant (with treatments pooled). Figures 1a and 1c show the percent of aggregators. Figures 1b and 1d plot the distribution of the sizes of aggregators' admissible preference sets, as measured by the percent of choice list lines in which an aggregator aggregates their recipient's preference.

I focus first on the Standard treatment results, indicated in blue in Figures 1a and 1b. As shown in Figure 1a, 42.7% of dictators are identified as aggregators using the one-line classification scheme. This proportion decreases only modestly to 36.5% under the two-line scheme, suggesting that the prevalence of aggregation is not driven by knife-edge cases that could be consistent with indifference or misremembering one's individual preferences. Figure 1b provides further evidence for this fact. While admissible preference sets are of course larger under the two-line scheme, both schemes suggest that most aggregators admit a wide range of risk preferences. The median aggregator aggregates their recipient's preference in 24.4% or 34.2% of lines under the one- and two-line schemes, respectively. Converting

these percentages into a dollar value helps put them into perspective: the latter corresponds to a range of certainty equivalents spanning \$2.50, and the former to a certainty equivalent span of \$3.50. Furthermore, Wilcoxon signed-rank tests reject the null hypotheses that aggregators' Individual condition switching lines are the same as each of their Social condition switching lines ($p < 0.001$ for both Social condition choice lists, under each classification scheme). Aggregators' sets of admissible preferences are thus large enough to suggest that the observed preference aggregation behaviour is not due to small shifts that could be indifference- or mistake-driven.

The proportion of aggregators is not only large in absolute terms, but also relative to the proportion of subjects displaying other forms of responsibility effects. For instance, previous work has suggested that dictators may have a social responsibility motive: they take fewer risks in their social choices relative to their individual choices, regardless of their recipient's risk preferences (Bolton et al., 2015; Charness and Jackson, 2009). Appendix Table B.1 reports the proportion of subjects displaying several types of responsibility effects, including effects that are both dependent and independent of the recipient's preference. Regardless of the classification scheme used, preference aggregation is by and large the most prominent form of social choice behaviour, accounting for roughly 70% of responsibility effects. In contrast, other motives account for no more than 17% of these effects.

Next, I investigate whether alternative motives may have driven the behaviour identified as preference aggregation. Figures 1a and 1b provide a visual comparison of aggregation statistics across treatments, while Figures 1c and 1d compare these statistics across variants. Appendix Tables B.2 and B.3 report the results of statistical tests and regressions assessing the significance of treatment- and variant-level differences in these statistics. Recall that if dictators matched their recipient's choice so as to randomize between payment options, aggregation should decrease from the Standard to the Randomization treatment. Alternatively, if matching stemmed from a desire to delegate decisions to the recipient, dictators who faced the Individual condition first should be less likely to aggregate their recipient's preferences.

Figure 1a shows that, relative to the Standard treatment, a larger share of dictators are classified as aggregators in the Randomization treatment, regardless of the classification scheme used. Admissible preference sets also tend to be larger in Randomization treatment, as shown in Figure 1b. That said, both statistical comparisons and regression analysis reveal that these increases are not significant.[5] With regards to delegation, Figures 1c and 1d respectively indicate that aggregation occurs more frequently and to a larger degree in variants where the Social condition is presented first. Again, however, these differences are not significant. These results suggest that the strategic elicitation mechanism was used as intended, and thus matching the recipient's choice indeed reflects a desire to aggregate their preferences.

[5]Why might having the ability to randomize have directionally increased the frequency and degree of aggregation? In the Randomization treatment, dictators were able to aggregate their recipient's preferences deterministically by matching their recipient's preferred option, or probabilistically by increasing the likelihood of implementing each option when it is preferred by the recipient. As it turns out, dictators took advantage of this additional aggregation method. Under the one-line classification scheme, 51.0% of Randomization treatment aggregators do so exclusively probabilistically, and 19.6% aggregate probabilistically in some lines of their aggregation range. These proportions are even larger under the two-line scheme, at 52.0% and 20.0% respectively. The Randomization treatment results thus suggest that, if anything, providing dictators an additional way to aggregate moderately increases this behaviour along both the extensive and intensive margins.

3.2 Aggregation at the individual level

The findings documented thus far indicate that a considerable fraction of dictators aggregate their recipient's risk preferences, and these admissible preference sets tend to be large. I now compare dictators' choices in the Individual and Social conditions to investigate the link between individual choice behaviour and the extensive and intensive margins of preference aggregation. I focus first on how aggregators determine their set of admissible preferences, then examine the individual-specific factors that may prompt a dictator to aggregate in the first place.

I first investigate whether and how an aggregator's individual preference determines the bounds of their admissible preference set. Aggregators are identified using the one-line classification scheme, although the results remain qualitatively unchanged under the two-line scheme. I focus solely on Standard treatment aggregators, as the Standard choice lists permit the calculation of an aggregator's individual certainty equivalent, as well as the certainty equivalents associated with the most risk-averse and -seeking preferences they aggregate. I approximate an aggregator's individual certainty equivalent, CE_{Ind}, as the dollar value corresponding to the midpoint between the last line they chose the risky bet and the first line they chose the sure payment in the Individual condition. The smallest certainty equivalent aggregated, CE_{Soc}^{min}, is approximated as the dollar value corresponding to the midpoint between the last line where the risky bet is chosen irrespective of the recipient's preference, and the first line where aggregation begins. The largest certainty equivalent aggregated, CE_{Soc}^{max}, is approximated as the dollar value corresponding to the midpoint between the last line where aggregation occurs, and the first line where the sure payment is chosen irrespective of the recipient's preference.[6] These certainty equivalents provide measures of an aggregator's individual risk preference, as well as the most risk-averse and -seeking preferences they admit.

	Admissible preferences		
	Only risk-averse or -neutral	Risk-averse, -neutral & -seeking	Only risk-seeking or -neutral
	(1)	(2)	(3)
Aggregator's preference			
Risk-averse	61.5	38.5	0.0
Risk-neutral	38.5	23.1	38.5
Risk-seeking	6.7	20.0	73.3
Total % of aggregators	*34.2*	*26.8*	*39.0*

Notes. The cells of columns (1) through (3) display the proportion of aggregators with a given type of risk preference that admit a given range of risk preferences. The aggregator indicator is defined using the one-line classification scheme. An aggregator, or admissible preference, is deemed risk-averse for certainty equivalents smaller than \$4.88, risk-neutral for certainty equivalents equal to \$4.88 or \$5.13, and risk-seeking for certainty equivalents greater than \$5.13.

Table 2: Individual Preference vs. Absolute Bounds of Admissible Preference Set

Table 2 reports the proportion of aggregators who admit given ranges of risk preferences, where ranges are defined relative to risk neutrality. The final row displays the proportion relative to all aggregators in the Standard treatment, and rows 1 through 3 displays proportions relative to all Standard treatment aggregators with a given type of individual risk preference. Most aggregators only admit

[6] When defining the certainty equivalents associated with the upper and lower bounds of an aggregator's admissible preference set, I exclude lines in which they admit a preference for a dominated payment option (for which a certainty equivalent cannot be calculated).

weakly risk-averse or -seeking preferences, as opposed to a set of preferences that strictly contains a risk-neutral preference. The final row of Table 2 reveals that nearly three-quarters of aggregators exclusively admit preferences that are weakly risk-averse or -seeking. This occurs because aggregators tend to only admit preferences that are similar to their own. As shown in rows 1 and 3 of Table 2, the majority of risk-averse (respectively, -seeking) aggregators admit only weakly risk-averse (respectively, -seeking) preferences. Significantly more risk-seeking aggregators admit only weakly risk-seeking preferences than any other range of risk preferences ($p \leq 0.003$ for both ranges, two-sample difference-of-proportions tests). Similarly, significantly more risk-averse aggregators admit only weakly risk-averse preferences than only weakly risk-seeking preferences, but the difference with respect to risk-averse, -neutral and -seeking admitted preferences is not significant ($p = 0.0007$ and $p = 0.24$ respectively, two-sample difference-of-proportions tests).

	Relative values of individual and admissible preferences				
	$CE_{Soc}^{max} < CE_{Ind}$	$CE_{Soc}^{max} = CE_{Ind}$	$CE_{Soc}^{min} < CE_{Ind} < CE_{Soc}^{max}$	$CE_{Ind} = CE_{Soc}^{min}$	$CE_{Ind} < CE_{Soc}^{min}$
	(1)	(2)	(3)	(4)	(5)
Aggregator's preference					
Risk-averse	0.0	0.0	61.5	38.5	0.0
Risk-neutral	15.4	7.7	30.8	38.5	7.7
Risk-seeking	6.7	13.3	60.0	20.0	0.0
Total % of aggregators	*7.3*	*7.3*	*51.2*	*31.7*	*2.4*

Notes. The cells of columns (1) through (5) display the proportion of aggregators with given ranges of admissible preferences. The aggregator indicator is defined using the one-line classification scheme. An aggregator, or admissible preference, is categorized as risk-averse for certainty equivalent smaller than \$4.88, risk-neutral for certainty equivalent equal to \$4.88 or \$5.13, and risk-seeking for certainty equivalent greater than \$5.13.

Table 3: Individual Preference vs. Relative Bounds of Admissible Preference Set

I further investigate the link between individual and admissible preferences by comparing the relative values of CE_{Ind}, CE_{Soc}^{min} and CE_{Soc}^{max}. Table 3 reports the proportion of aggregators who admit given ranges of risk preferences, where ranges are defined relative to an aggregator's individual preference. As shown in the final row, the vast majority of aggregators admit a set of preferences that weakly contains their own preference (90.2%, or the sum of columns (2) through (4) in the final row). That is, most aggregators' certainty equivalents satisfy $CE_{Soc}^{min} \leq CE_{Ind} \leq CE_{Soc}^{max}$. This yields a significant positive correlation between an aggregator's individual certainty equivalent and the mean certainty equivalent they aggregate ($\rho = 0.74$, $p < 0.0001$, Spearman's rank correlation), as suggested by the proportions test results. Table 3 also illustrates how the preferences used in social choices are shifted relative to an aggregator's individual preference. As shown in the first and third rows of column (3), at least 60% of risk-averse and -seeking aggregators admit preferences that are both more *and* less extreme than their own.

Tables 2 and 3 thus suggest that the range of risk preferences a dictator admits is tightly associated with their individual risk preference. This pattern is largely driven by aggregators with non-neutral risk preferences, who favour non-neutral preferences similar to theirs but display little relative favouritism for more versus less extreme preferences.

Next, I examine whether and how individual risk preferences, and/or the incompleteness thereof, influence the prevalence and degree of preference aggregation. I thus expand my focus to aggregators from both treatments. As previously discussed, in the Randomization treatment, aggregators' decision to

randomize in the Individual condition provides a proxy for whether a dictator's individual preferences are incomplete. Since randomization in a single choice list line is consistent with expected utility preferences (Agranov and Ortoleva, 2021), I define randomizers as dictators who randomize in two or more lines of the Individual condition choice list.

Aggregation-related statistic / *Classification scheme*	Aggregator (indicator)		Size of admissible preference set	
	One-line	Two-line	One-line	Two-line
	(1)	(2)	(3)	(4)
Individual choice behaviour				
CE_{Ind}	0.12 ($p = 0.26$)	0.15 ($p = 0.16$)	0.03 ($p = 0.86$)	-0.08 ($p = 0.65$)
Randomizer (indicator)	0.14 ($p = 0.19$)	0.14 ($p = 0.19$)	0.26^{*} ($p = 0.10$)	0.36^{**} ($p = 0.02$)
Randomization frequency	0.05 ($p = 0.66$)	0.10 ($p = 0.35$)	0.23 ($p = 0.15$)	0.28^{*} ($p = 0.08$)

Notes. The cells of columns (1) through (4) report Spearman correlation coefficients. The sample of subjects used in columns (1) and (2) of the first row (second and third rows) consists of subjects in the Standard (Randomization) treatment who never make a dominated individual choice; columns (3) and (4) further restrict this sample to aggregators. The randomizer indicator equals one when a dictator randomizes in at least two lines in the Individual condition. Randomization frequency is the number of lines in which a dictator randomizes in the Individual condition. * signifies $p \leq 0.10$, ** signifies $p \leq 0.05$ and *** signifies $p \leq 0.01$.

Table 4: Relationship between Individual Choice Behaviour and Aggregation

Table 4 reports correlations between individual choice behaviour and measures of the extensive and intensive margins of preference aggregation. For subjects in the Standard treatment (the sample used in the first row), I find no significant correlation between one's certainty equivalent and any form of aggregation behaviour. For subjects in the Randomization treatment (the sample used in the second and third rows), while randomization is not significantly correlated with the extensive margin of preference aggregation, it is correlated with the intensive margin. As shown in columns (3) and (4) of the second row, aggregators who randomize tend to admit a larger set of preferences than non-randomizing aggregators. Furthermore, columns (3) and (4) of the third row indicate that randomizing in a larger set of decision problems is associated with admitting a larger set of risk preferences. However, the correlation is only significant when aggregators are identified using the two-line classification scheme. Thus, while aggregation is not concentrated among dictators with a particular risk preference, aggregators with incomplete individual preferences appear to admit a larger set of preferences.

4 Discussion and Conclusion

This paper introduced a novel experimental framework for identifying a dictator's set of admissible preferences in two-person social choice problems. As these choices frequently involve alternatives with different relative degrees of risk, I used this task to investigate the aggregation of risk preferences. However, social choices may additionally or alternatively involve trade-offs between present and future, or the group's own versus others', consumption. Consider, for example, a climate policymaker designing an emissions abatement policy. While a less stringent policy may be desirable in the short term and less costly to the present generation of consumers, it may yield significant negative long-term impacts, most of which will be borne by future generations. Future research may thus wish to apply this framework to explore the aggregation of intertemporal and social preferences.

Social choices are often made in contexts where small changes in uncertainty attitudes have economically significant effects, such as changes in the value of emissions abatement (Millner et al., 2013; Berger et al., 2017) and the stringency of pandemic mitigation measures (Berger et al., 2021). The main finding of the present experiment suggests that social choices are highly context-dependent: dictators are, on average, willing to aggregate relatively large sets of risk preferences. Stated otherwise, recipients' risk preferences appear to heavily influence how dictators adjust the risks they take in individual versus social choice settings. Beyond shedding light on the mixed findings regarding the direction of responsibility effects in decisions under risk (Polman and Wu, 2020), this result implies that social choice may have significantly different impacts on recipients' welfare depending on whether the choice dampens or exacerbates extreme individual preferences.

Furthermore, the design of the present experiment may understate the prevalence and degree of preference aggregation. Recall that sessions were conducted remotely, the roles of dictator and recipient were exogenously assigned, and pairings were anonymous. However, in standard dictator games and other similar games, dictators display greater altruism towards physically or socially proximate recipients (Charness and Gneezy, 2008; Charness et al., 2007; Bohnet and Frey, 1999; Hoffman et al., 1996), recipients that have elected them to choose on their behalf (Kocher et al., 2013) and in-group recipients (Chen and Li, 2009). Previous work thus suggests that the present estimates of the proportion of aggregators, as well as the size of admissible preference sets, may be lower bounds. That said, exploring the impacts of group identity, physical proximity and election methods on preference aggregation may be a fruitful avenue for future research.

The analysis also shed light on the factors that determine whether a dictator aggregates others' preferences, and if so, the set of preferences they admit. Many aggregators set the risk-neutral certainty equivalent as the upper or lower bound of their set of admissible preferences, but aggregate preferences that are both more and less extreme than their own. These trends, as well as the tight association between individual and admissible preferences, provide a clearer picture of the decision rules aggregators use to determine the preferences they admit. Aggregators appear averse to admitting preferences that are sufficiently different from their own relative to a neutral preference cutoff, rather than averse to admitting preferences that are more extreme than their own. Future work may wish to investigate why aggregators set this sharp cutoff; for instance, do they view preferences beyond the neutral value to be irrational? Finally, randomizers' willingness to admit larger sets of preferences implies that dictators whose own preferences are incomplete are more easily influenced by others'. However, more research is required to determine how the influence of preference incompleteness compares to that of standard social preferences with regards to impact on preference aggregation behaviour.

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Appendix

A Experiment instructions

Below is a transcription of the instructions and tasks faced by dictators who completed the Individual condition before the Social condition. Any instructions specific to the Standard or Randomization treatment are indicated by text boxes.

Welcome to the experiment!

Welcome. This is an experiment in the economics of decision-making. If you pay close attention to the instructions which follow, you can earn a significant amount of money that will be paid to you at the end of the experiment.

The amount that will be paid to you depends on your choices. Note that there are no correct choices: your choices depend on your preferences and beliefs, so different participants will usually make different choices. Irrespective of your choices during the experiment, you will receive a fixed payment of $5.00.

The experiment consists of two parts. You will receive detailed instructions prior to every part. One decision problem from one of the two parts has been randomly selected to count for payment, but the chosen problem will only be revealed to you at the end of the experiment. This protocol of determining payments suggests that you should make each of your choices, in each part of the experiment, as if it is the only choice problem that determines your payment.

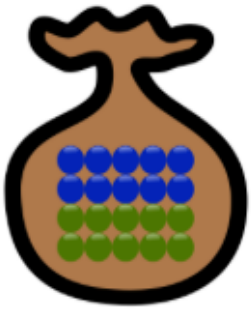
Click the “next" button once you are ready to proceed.

Instructions - The Decision Problems

You will face a series of decision problems. Each involves a choice between two payment options.

Option A

Option A involves a bet on the colour of a ball drawn from a bag. The bag contains 20 balls, 10 of which are blue and 10 of which are green. If you choose Option A in a given decision problem, you receive $10.00 if a blue ball is drawn from the bag, and $0.00 if a green ball is drawn. The number of balls of each colour in this bag remains the same in each decision problem, in all parts of the experiment.



Option A pays $10.00 if a blue ball is drawn from this bag, and $0.00 if a green ball is drawn from it.

Option B

Option B involves receiving an amount of money, which we'll denote as X, for sure. The value of X will increase in 25-cent increments from one decision problem to the next.

Randomization

Your task

In each decision problem, you will use a slider to make a choice. If you wish to receive one Option for sure, you would move the slider all the way to the left (to select Option A) or to the right (to select Option B). A checkmark (✓) will then appear in the cell adjacent to your chosen Option. If instead you wish to have a chance of receiving each Option, you would use the slider to indicate this. For example,

- If you wanted a 9 in 10 chance of receiving Option A (and thus a 1 in 10 chance of receiving Option B), you would adjust the slider such that "9/10" is written in the column under A and "1/10" is written in the column under B
- If you wanted a 8 in 10 chance of receiving Option A (and thus a 2 in 10 chance of receiving Option B), you would adjust the slider such that "8/10" is written in the column under A and "2/10" is written in the column under B
- ... and so on.

Note that you cannot make your choice by leaving the slider in its default position; you may only proceed to the following stage of the experiment once checkmarks or chances appear for each decision problem.

Example of the decision problems

Here is an example of how the decision problems will be presented to you:

Standard

Decision problem	Option A	A	B	Option B
	Receive $10.00 if a blue ball is drawn from a bag containing 10 green and 10 blue balls (and nothing otherwise).			Receive X for sure, where the value of X is:
1		○	○	$0.00
2		○	○	$0.25
...				
41		○	○	$10.00

Randomization

Decision problem	Option A	A		B	Option B
	Receive $10.00 if a blue ball is drawn from a bag containing 10 green and 10 blue balls (and nothing otherwise).				Receive X for sure, where the value of X is:
1					$0.00
2					$0.25
...					
41					$10.00

Switching between options

Standard

Notice that, once you switch from Option A to Option B, it makes sense to continue to choose Option B in all consecutive decision problems. This is because X - the sure amount associated with Option B - increases from one decision problem to the next. So, in the list of decision problems, it makes sense to switch either never or only once from Option A to Option B.

If you want, you can fill in the list by clicking the lowest line in which you wish to select Option A. By doing so, all the lines above it will automatically select Option A. In addition, by clicking on the first line in which you wish to select Option B, all lines below it will automatically select Option B.

Randomization

Notice that, once you choose some positive chance of receiving Option B, it makes sense to choose to receive Option B with at least that chance in subsequent decision problems. This is because X - the sure amount associated with Option B - increases from one decision problem to the next.

If you want, you can fill in the list by moving the slider all the way to the left in the lowest line in which you wish to choose Option A. By doing so, all the lines above it will automatically select Option A. In addition, by moving the slider all the way to the right in the first line in which you wish to choose Option B, all lines below it will automatically select Option B.

Next, you will be asked some comprehension questions to ensure you have understood these instructions. When you are ready to proceed, click the “next" button.

Comprehension Quiz

If you answer the question correctly, you will be taken to the next page. If you answer the question incorrectly, an error message will pop up and ask you to try again.

Question 1

The composition of the bag in Option A [changes/stays the same] from one decision problem to the next. The value of X in Option B [increases/decreases/stays the same] from one decision problem to the next.

a. Changes, Increases
b. Changes, Decreases

c. Changes, Stays the same
d. Stays the same, Increases
e. Stays the same, Decreases
f. Stays the same, Stays the same

Question 2

Standard

How many times does switching from Option A to Option B make sense?
a. At least twice
b. Never or once

Randomization

In each line, your chosen chance of receiving Option B should be [smaller than/at least as large as] that in the previous line.
a. Smaller than
b. At least as large as

Randomization

Question 3

Consider the choices shown below. The choice in decision problem 18 indicates a desire to receive Option A. The choice in decision problem 19 indicates a desire to have a positive chance of receiving both Options A and B, with a greater chance of receiving Option B than Option A.

Decision problem	Option A	A		B	Option B
	Receive $10.00 if a blue ball is drawn from a bag containing 10 green and 10 blue balls (and nothing otherwise).				Receive X for sure, where the value of X is:
...					
18		✓			$4.25
19		4/10		6/10	$4.50
...					

a. True
b. False

Instructions - Part 1

In Part 1 of the experiment, you will complete the decision problems described in the General Instructions. You may click the button below for a reminder of those instructions. This button will also be available while you complete the decision problems.

Reminder: payment from your choices

One decision problem in the experiment has been randomly selected for payment. You will be paid according to your choice in that problem. This protocol of determining payments suggests that you should choose in each problem as if it is the only problem that determines your payment.

Click the “next" button once you are ready to proceed.

Part 1

Please make a choice in each line.

Standard

Decision problem	Option A	A	B	Option B
	Receive $10.00 if a blue ball is drawn from a bag containing 10 green and 10 blue balls (and nothing otherwise).			Receive X for sure, where the value of X is:
1		○	○	$0.00
2		○	○	$0.25
3		○	○	$0.50
4		○	○	$0.75
5		○	○	$1.00
6		○	○	$1.25
7		○	○	$1.50
8		○	○	$1.75
9		○	○	$2.00
10		○	○	$2.25
11		○	○	$2.50
12		○	○	$2.75
13		○	○	$3.00
14		○	○	$3.25
15		○	○	$3.50
16		○	○	$3.75
17		○	○	$4.00
18		○	○	$4.25
19		○	○	$4.50
20		○	○	$4.75
21		○	○	$5.00
22		○	○	$5.25
23		○	○	$5.50
24		○	○	$5.75
25		○	○	$6.00
26		○	○	$6.25
27		○	○	$6.50
28		○	○	$6.75
29		○	○	$7.00
30		○	○	$7.25
31		○	○	$7.50
32		○	○	$7.75
33		○	○	$8.00
34		○	○	$8.25
35		○	○	$8.50
36		○	○	$8.75
37		○	○	$9.00
38		○	○	$9.25
39		○	○	$9.50
40		○	○	$9.75
41		○	○	$10.00

Figure A.1: Individual Condition Choice List - Standard Treatment

Randomization

Decision problem	Option A	A		B	Option B
	Receive $10.00 if a blue ball is drawn from a bag containing 10 green and 10 blue balls (and nothing otherwise).				Receive X for sure, where the value of X is:
1					$0.00
2					$0.25
3					$0.50
4					$0.75
5					$1.00
6					$1.25
7					$1.50
8					$1.75
9					$2.00
10					$2.25
11					$2.50
12					$2.75
13					$3.00
14					$3.25
15					$3.50
16					$3.75
17					$4.00
18					$4.25
19					$4.50
20					$4.75
21					$5.00
22					$5.25
23					$5.50
24					$5.75
25					$6.00
26					$6.25
27					$6.50
28					$6.75
29					$7.00
30					$7.25
31					$7.50
32					$7.75
33					$8.00
34					$8.25
35					$8.50
36					$8.75
37					$9.00
38					$9.25
39					$9.50
40					$9.75
41					$10.00

Figure A.2: Individual Condition Choice List - Randomization Treatment

Instructions - Part 2

In this part of the experiment, you will be completing the decision problems described in the first set of instructions. However, the choices you make in this part determine not only your own payoff, but also the payoff of another participant, who we will refer to as the recipient.

Your recipient has already indicated their preferred bet in each decision problem, and you will have the possibility of accommodating these preferences. Specifically, you will complete a list of decision problems similar to the one described in the first set of instructions, but which allows you to make different choices based on your recipient's preferences. Note that you do not need to make different choices; you simply have the option of doing so.

Randomization

Furthermore, in each decision problem, your recipient has either indicated that they prefer to receive Option A for sure or Option B for sure.

Example

Suppose the following decision problem is chosen to count:

Standard

Decision problem	Option A	*Your choice if recipient prefers Option A*		*Your choice if recipient prefers Option B*		Option B
	You and your recipient receive $10.00 if a blue ball is drawn from a bag containing 10 green and 10 blue balls (and nothing otherwise).	**A**	**B**	**A**	**B**	You and your recipient receive X for sure, where the value of X is:
...						
9		○	○	○	○	$2.00
...						

Randomization

Decision problem	Option A	*Your choice if recipient prefers Option A*			*Your choice if recipient prefers Option B*			Option B
	You and your recipient receive $10.00 if a blue ball is drawn from a bag containing 10 green and 10 blue balls (and nothing otherwise).	**A**		**B**	**A**		**B**	You and your recipient receive X for sure, where the value of X is:
...								
9			─○─			─○─		$2.00
...								

Consider the following scenarios.

- Scenario 1. You choose to receive Option A if your recipient prefers Option A, and Option B if your recipient prefers Option B. That is, you choose to match your recipient's choice in decision problem 9.

Standard

- Scenario 2. You choose Option A if your recipient prefers Option A, and also choose Option A if your recipient prefers Option B. That is, you choose Option A regardless of what your recipient prefers in decision problem 9.

Randomization

- Scenario 2. You choose a 7/10 chance of receiving Option A if your recipient prefers Option A, and also choose a 7/10 chance of receiving Option A if your recipient prefers Option B. That is, you choose a 7/10 chance of receiving Option A regardless of what your recipient prefers in decision problem 9.

Now, suppose your recipient prefers Option B in decision problem 9. Then,

- If you chose according to Scenario 1, you and your recipient will be paid according to Option B; that is, you will both receive $2.00.

Standard

- If you chose according to Scenario 2, you and your recipient will be paid according to Option A; that is, you will both receive $10.00 if a blue ball is drawn from the bag, and $0.00 if a green ball is drawn.

Randomization

- If you chose according to Scenario 2, you and your recipient will have a 7/10 chance of being paid according to Option A, and a 3/10 chance of being paid according to Option B. That is, you will both have a 7/10 chance of receiving the payment resulting from a draw from the bag, and a 3/10 chance of receiving $2.00.

Payment to the recipient

As the number of participants and recipients who end up completing the experiment may not be the same, other participants may be paired with the same recipient as you. If this is the case, one participant among those paired with a given recipient will be randomly selected to have their choice count for the recipient's payment. This payment protocol suggests that you should choose in each decision problem in this part of the experiment as if it determines your and your recipient's payment.

Reminder: payment from your choices

One decision problem in the experiment has been randomly selected for payment. You will be paid according to your choice in that problem. This protocol of determining payments suggests that you should choose in each problem as if it is the only problem that determines your payment.

Next, you will be asked some comprehension questions to ensure you have understood these instructions. When you are ready to proceed, click on the "next" button.

Comprehension Quiz

If you answer the question correctly, you will be taken to the next page. If you answer the question incorrectly, an error message will pop up and ask you to try again.

Question 1

Suppose decision problem 3 from this part of the experiment is chosen to count for payment. What is the result of making the following choices?

Standard

Decision problem	Option A	*Your choice if recipient prefers Option A*		*Your choice if recipient prefers Option B*		Option B
	You and your recipient receive $10.00 if a blue ball is drawn from a bag containing 10 green and 10 blue balls (and nothing otherwise).	A	B	A	B	You and your recipient receive X for sure, where the value of X is:
...						
3		◉	○	◉	○	$0.50
...						

Randomization

Decision problem	Option A	*Your choice if recipient prefers Option A*			*Your choice if recipient prefers Option B*			Option B
	You and your recipient receive $10.00 if a blue ball is drawn from a bag containing 10 green and 10 blue balls (and nothing otherwise).	A		B	A		B	You and your recipient receive X for sure, where the value of X is:
...								
3		✓	○		✓	○		$0.50
...								

a. You and your recipient will be paid according to Option A if your recipient prefers Option A, and Option B if your recipient prefers Option B
b. You and your recipient will be paid according to Option B if your recipient prefers Option A, and Option A if your recipient prefers Option B
c. You and your recipient will be paid according to Option A
d. You and your recipient will be paid according to Option B

Question 2

Suppose decision problem 3 from this part of the experiment is chosen to count for payment. What is the result of making the following choices?

Standard

Decision problem	Option A	*Your choice if recipient prefers Option A*		*Your choice if recipient prefers Option B*		Option B
	You and your recipient receive $$10.00 if a blue ball is drawn from a bag containing 10 green and 10 blue balls (and nothing otherwise).	A	B	A	B	You and your recipient receive X for sure, where the value of X is:
...						
3		◉	○	○	◉	$0.50
...						

a. You and your recipient will be paid according to Option A if your recipient prefers Option A, and Option B if your recipient prefers Option B
b. You and your recipient will be paid according to Option B if your recipient prefers Option A, and Option A if your recipient prefers Option B
c. You and your recipient will be paid according to Option A
d. You and your recipient will be paid according to Option B

Randomization

Decision problem	Option A	*Your choice if recipient prefers Option A*			*Your choice if recipient prefers Option B*			Option B
	You and your recipient receive $10.00 if a blue ball is drawn from a bag containing 10 green and 10 blue balls (and nothing otherwise).	A		B	A		B	You and your recipient receive X for sure, where the value of X is:
...								
3		9/10	○——	1/10	2/10	——○	8/10	$0.50
...								

a. If your recipient prefers Option A, you and your recipient have a 9/10 chance of being paid according to Option A; if your recipient prefers Option B, you and your recipient have a 2/10 chance of being paid according to Option A
b. If your recipient prefers Option A, you and your recipient have a 2/10 chance of being paid according to Option A; if your recipient prefers Option B, you and your recipient have a 9/10 chance of being paid according to Option A
c. You and your recipient will be paid according to Option A
d. You and your recipient will be paid according to Option B

Question 3

Your choices in the decision problems in this part of the experiment will determine:

a. Only your own payoff
b. Your own payoff and your recipient's payoff
c. Only your recipient's payoff

Randomization

Question 4

In each decision problem, your recipient has either chosen to receive Option A for sure or Option B for sure.

a. True
b. False

Part 2

Please make a choice in each line. In any given decision problem, you may make different choices based on your recipient's preferences. Your choices will impact your and your recipient's payoffs.

Standard

Decision problem	Option A	*Your choice if recipient prefers Option A*		*Your choice if recipient prefers Option B*		Option B
	You and your recipient receive $10.00 if a blue ball is drawn from a bag containing 10 green and 10 blue balls (and nothing otherwise).	A	B	A	B	You and your recipient receive X for sure, where the value of X is:
1		○	○	○	○	$0.00
2		○	○	○	○	$0.25
3		○	○	○	○	$0.50
4		○	○	○	○	$0.75
5		○	○	○	○	$1.00
6		○	○	○	○	$1.25
7		○	○	○	○	$1.50
8		○	○	○	○	$1.75
9		○	○	○	○	$2.00
10		○	○	○	○	$2.25
11		○	○	○	○	$2.50
12		○	○	○	○	$2.75
13		○	○	○	○	$3.00
14		○	○	○	○	$3.25
15		○	○	○	○	$3.50
16		○	○	○	○	$3.75
17		○	○	○	○	$4.00
18		○	○	○	○	$4.25
19		○	○	○	○	$4.50
20		○	○	○	○	$4.75
21		○	○	○	○	$5.00
22		○	○	○	○	$5.25
23		○	○	○	○	$5.50
24		○	○	○	○	$5.75
25		○	○	○	○	$6.00
26		○	○	○	○	$6.25
27		○	○	○	○	$6.50
28		○	○	○	○	$6.75
29		○	○	○	○	$7.00
30		○	○	○	○	$7.25
31		○	○	○	○	$7.50
32		○	○	○	○	$7.75
33		○	○	○	○	$8.00
34		○	○	○	○	$8.25
35		○	○	○	○	$8.50
36		○	○	○	○	$8.75
37		○	○	○	○	$9.00
38		○	○	○	○	$9.25
39		○	○	○	○	$9.50
40		○	○	○	○	$9.75
41		○	○	○	○	$10.00

Figure A.3: Social Condition Choice List - Standard Treatment

Randomization

Decision problem	Option A	*Your choice if recipient prefers Option A*			*Your choice if recipient prefers Option B*			Option B
	You and your recipient receive $10.00 if a blue ball is drawn from a bag containing 10 green and 10 blue balls (and nothing otherwise).	A		B	A		B	You and your recipient receive X for sure, where the value of X is:
1								$0.00
2								$0.25
3								$0.50
4								$0.75
5								$1.00
6								$1.25
7								$1.50
8								$1.75
9								$2.00
10								$2.25
11								$2.50
12								$2.75
13								$3.00
14								$3.25
15								$3.50
16								$3.75
17								$4.00
18								$4.25
19								$4.50
20								$4.75
21								$5.00
22								$5.25
23								$5.50
24								$5.75
25								$6.00
26								$6.25
27								$6.50
28								$6.75
29								$7.00
30								$7.25
31								$7.50
32								$7.75
33								$8.00
34								$8.25
35								$8.50
36								$8.75
37								$9.00
38								$9.25
39								$9.50
40								$9.75
41								$10.00

Figure A.4: Social Condition Choice List - Randomization Treatment

Results

Thank you for participating in this experiment. For showing up, you receive $5.00.

Problem 28 from Part 2 was chosen to count. In this problem, your recipient preferred Option B.

Standard

Given your recipient's preference, you chose Option B, which corresponded to a sure payment of $6.75.

Randomization

Given your recipient's preference, you chose a 2/10 chance of receiving Option A and a 8/10 chance of receiving Option B. Based on a draw according to your choices, Option B was determined to count for your payment, which corresponded to a sure payment of $6.75.

You and your recipient have therefore earned $6.75 from the problem that counts.

Your total payment from the experiment is thus $11.75. This amount will be sent to you via e-transfer within a few hours after 6pm EDT.

Thanks for participating!

B Additional Results: Treatment- and Variant-Level Analysis

Sample of subjects	No dominated choices		No dominated choices, displays responsibility effect	
Classification scheme	One-line	Two-line	One-line	Two-line
	(1)	(2)	(3)	(4)
Social choice behaviour				
Preference aggregation	42.7%	36.5%	69.5%	71.4%
Preference spitefulness	1.0%	1.0%	1.7%	2.0%
Social responsibility	10.4%	6.3%	17.0%	12.2%
Social irresponsibility	9.4%	7.3%	15.3%	14.3%

Notes. The cells of columns (1) through (4) report the proportions of subjects that display a given type of social choice behaviour. In columns (1) and (2), these proportions are calculated among the sample of Standard treatment subjects who never make a dominated individual choice ($N = 96$). In columns (3) and (4), for the n-line classification scheme, the sample is further restricted to subjects who display a responsibility effect according to that scheme: that is, their Individual condition switching line is at least n lines above or below their Social condition switching line ($N = 59$ for $n = 1$, $N = 49$ for $n = 2$). To be classified as displaying a given type of behaviour under the n-line classification scheme, a subject must display that behaviour in at least n lines of the choice list. Preference aggregation (spitefulness) refers to matching (choosing the contrary of) the recipient's preferred option. Social responsibility (irresponsibility) refers to having a strictly lower (higher) switching line in both Social condition choice lists, relative to one's Individual condition switching line.

Table B.1: Classification of Social Choice Behaviour in Standard Treatment

Quantities compared	% of aggregators		Distribution of admissible preference set sizes	
Classification scheme	One-line	Two-line	One-line	Two-line
	(1)	(2)	(3)	(4)
Treatments/variants compared				
Std. vs. Rand. (variants pooled)	0.97	0.36	0.32	0.26
Ind. first vs. Soc. first (treatments pooled)	0.64	0.83	0.80	0.83

Notes. The cells of columns (1) through (4) report the p-values associated with two-sided tests comparing proportions or distributions between treatments or variants. Columns (1) and (2) report p-values from χ^2 tests of independence. Columns (3) and (4) report p-values from Kolmogorov-Smirnov tests. The following abbreviations are used to refer to treatments and conditions: "Std." for the Standard treatment, "Rand." for the Randomization treatment, "Ind." for the Individual condition, "Soc." for the Social condition.

Table B.2: Treatment- and Variant-Level Comparisons of Aggregation Statistics - Statistical Tests

Dependent variable	Aggregator		Size of admissible preference set	
Classification scheme	One-line	Two-line	One-line	Two-line
	(1)	(2)	(3)	(4)
Treatment	0.002	0.065	3.642	2.592
	(0.073)	(0.072)	(2.802)	(2.791)
Order	-0.033	-0.013	1.772	1.308
	(0.073)	(0.072)	(2.811)	(2.800)
Constant	0.443	0.371	13.466	15.954
	(0.063)	(0.062)	(2.506)	(2.579)
Observations	189	189	81	75

Notes. This table displays the estimated coefficients from OLS regressions. Robust standard errors, clustered at the subject-level, are in parentheses. The dependent variable "aggregator" is an indicator for a subject being an aggregator, and "size of admissible preference set" is the number of lines of the choice list in which an aggregator aggregates her recipient's preferences. Columns (1) and (3) ((2) and (4)) identify aggregators using the one-(two-)line classification scheme. The independent variables are treatment and variant indicators that respectively take on the value of one for the Randomization treatment and the variant where the Social condition appeared first.

Table B.3: Treatment- and Variant-Level Comparisons of Aggregation Statistics - OLS Regressions