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The value of decision-making power in social decisions ☆

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ABSTRACT

People differ in whether they like to be in control of a decision or whether they would happily delegate a decision. We explore the heterogeneity and the underlying factors of the participants' values of decision-making power in an allocation choice between a fair and an unfair option. This allocation decision affects the outcomes of the deciding person and three other people in different ways. We find that people differ in their preference for keeping this social decision, and more than 85% never pay for delegating the choice. The value for keeping the decision-making power is affected by the strength, but not the direction of social preferences, and relates to the preference for keeping a useless decision, i.e. selecting the winning number of a lottery. The value of decision-making power is reflected in response times and both eye- and mouse-tracking.

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1. Introduction

People often make decisions which not only affect the own outcome but also the outcome of others. These decisions are prevalent in many areas, e.g. choosing a vacation destination/ restaurant/ leisure activity for a group of friends, firms deciding whether to move to a new city, athletes taking the decisive shot, or representatives opting in or out of committees. Some people might strive to be in control in these decisions while others see these decisions as a burden and would prefer to give up the decision-making power (analogous to "decision attitude" by Beattie et al. (1994)). In this study, we explore whether people differ in their valuation of decision-making power in social decisions and which factors could explain these differences. We develop a decision paradigm in which a person (decision-maker) decides whether to keep the decision-making power or to delegate it to another person (potential delegatee). We elicit every person's value of decision-making power by offering different bonus or malus points for the delegation. The person with the final decision power subsequently has to decide between two possible options of how to allocate points between the two of them and two other receivers: One option favors the decision-maker and potential delegatee at the cost of the two other receivers, and the second option is an equal split among all four people.

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Some studies investigate the value of keeping control of tasks such as choosing a project or answering knowledge questions. The usual finding is that the person in charge often keeps the decision-making power beyond a cost-benefit optimum (Bartling et al., 2014; Bobadilla-Suarez et al., 2017; Fehr et al., 2013; Owens et al., 2014). However, when people have to choose between a fair and an unfair allocation, the valuation of decision-making power can be affected by a multitude of factors such as the own distributive preferences, the own outcome or the belief about the potential delegatee's preference. There is also evidence that some people become responsibility averse even when the payoffs within a group are aligned (Edelson et al., 2018). It could be that this responsibility aversion is even stronger when the allocation choice could result in unequal outcomes across people. This aversion to having the decision-making power would counteract the under-delegation found in the other studies. Until now, only few studies looked at delegation choices in which the preference about different allocations plays a role (Bartling and Fischbacher, 2011; Coffman, 2011; Eisenkopf and Fischbacher, 2011; Oexl and Grossman, 2013). These studies found that the person in charge strategically delegates the decision-making power to circumvent punishment or keeps control to receive rewards, but they did not look at the value of keeping the decision-making power.

Our novel design allows investigating the value of decision-making power and its' relation to two aspects of social preferences: the direction and the strength of social preferences. Regarding the direction of social preferences, the literature on delegation in dyads shows that people solely responsible behave more pro-socially (Charness, 2000; Gawn and Innes, 2019). The other side of this effect is that people become less pro-social when another party is (partially) responsible for an outcome or that people use a "moral wiggle room" to behave more selfishly (Dana et al., 2007). Thus, we could expect that subjects who would choose the fair option if forced to make a choice, have a lower value of the decision-making power as delegating yields the benefit of a higher chance to get the higher own outcome without having to choose the unfair option oneself. This holds true especially if the potential delegatee is more likely to decide in their favor (Coffman, 2011; Ezquerra and Kujal, 2019; Fershtman and Gneezy, 2001; Gawn and Innes, 2019; Hamman et al., 2010; Sutan and Vranceanu, 2016). On the other hand, it could be that the strength of social preferences is more important in these allocation decisions. It seems natural to assume that strictly selfish or strictly fair people value keeping the decision-making power more as they want to make sure that their preferred allocation is chosen, while subjects which are more or less indifferent between the fair and unfair option value keeping the decision-making power less.

Another preference that could affect the heterogeneity in keeping the decision-making power in social decisions, is a preference for simply making a choice oneself (Bartling et al., 2014; Bobadilla-Suarez et al., 2017; Egan et al., 2010; Owens et al., 2014; Sharot et al., 2010). In order to avoid any influence of other preferences or capabilities, some studies also look at delegation behavior in useless decisions (Sloof and von Siemens, 2017). In these tasks, people can choose a side of a coin or let another person do so. Even in this setup, some people still pay to choose the side of the coin themselves. Thus, we include a second (useless) decision in our experiment in which the decision-maker can select three numbers on a six-sided die or delegate the selection of the three numbers to the potential delegatee. With this additional task, we can study whether the value for keeping the decision-making power in the useless decision is connected to the value of keeping the decision-making power in the social decision, despite previous findings of no correlation between these two types of tasks (Bartling et al., 2014). This second task further helps to differentiate between people attaching a high value on keeping the decision-making power in both tasks and people who only value the decision-making power when it is not useless.

Delegating a choice or task can yield benefits in terms of time, expertise, motivation or knowledge, but all these benefits come at the cost of losing control (Aghion and Tirole, 1997; Burdin et al., 2018; Charness et al., 2012; Fehr et al., 2013; Omiya et al., 2017). Thus, the decision-maker's value for keeping the decision-making power can be influenced by her belief about the potential delegatee, i.e. if the preferences are assumed to be aligned, the decision-maker should value the decision-making power less and delegate more often. Accordingly, we elicit the decision-maker's belief about the action of the delegatee if the social decision would be delegated.

In our experiment, we offer subjects different malus and bonus points if they choose to delegate the decision-making power. In our social decisions, we find strong evidence for a willingness to pay to keep the decision-making power, but no consistent willingness to pay to delegate the decision. Further, there is a large heterogeneity in the value of keeping the decision-making power. The strength of the preferences in the social decision plays an important role as subjects with no clear preference for the fair or unfair outcome delegate more often, while the direction of the preference has not a large effect. This means that particularly selfish as well as particularly non-selfish subjects are willing to pay to keep the decision-making power. Further, we find that delegating the social decision is positively correlated with delegating the useless decision.

Choosing several times whether to keep a decision not only allows pinning down the value of keeping decision-making power, but also allows inspecting whether people approach and process the decision differently dependent upon the offered points for delegation. We calculate each subjectś "window of indifference", e.g. an interval in which the subject switches from keeping to delegating, and the point of indifference lies within. In order to better understand the underlying cognitive processes, we analyze response times, and simultaneous eye- and mouse-tracking. Stemming from previous literature, we expect these measures to evince the location of the "window of indifference" (Edelson et al., 2018; Fehr and Rangel, 2011; Freeman et al., 2011; Jiang et al., 2016; Konovalov and Krajbich, 2019; Krajbich et al., 2010; Ratcliff, 1978; Ratcliff and McKoon, 2008; Stewart et al., 2016; Stillman et al., 2018). Indeed, we find response times to peak near indifference, attention (eye-tracking) shifts between the available options, and the trajectory of the cursor (mouse-tracking) is most pronounced when people are close to indifference.

2. Methods

Our experiment consists of two different parts that we refer to as the "social decision" (part 1) and the "useless decision" (part 2). The experiment was approved by the local Ethics Committee and all participants provided written informed consent.

2.1. Experiments

Fig. 1a shows the schematic setup of the "social decision" (part 1). In the social decision, 200 points have to be allocated within a group of four players (A, B, C, and D) with two possible options: *Allocation 1* (Unfair - players A and B receive 90 points each, and players C and D receive 10 points each) and *Allocation 2* (Fair - players A, B, C and D receive 50 points each). Player A (the decision-maker; called DM) can choose to either decide between the two possible allocations herself or delegate this decision to player B (the potential delegatee) whose payoffs are aligned. In addition, if the DM decides to delegate, only she would receive either of the following bonus/ malus points: −20, −10, −5, −1, 0, +1, +5, +10, or +20. Therefore, the DM decides nine times whether to keep or delegate the decision (see Fig. 1b for a choice with 0 points for delegation). Every time the DM decides to keep the decision-making power, she subsequently has to make the choice between the fair and unfair allocation.[1] We further elicit the belief of the DM about the likelihood of player B choosing the unfair allocation (un-incentivized). Player B makes only one representative choice between the two allocations to circumvent that player B could make any inferences about the DM's type (see Fig. 11 in the Appendix for screenshots of the experiment).

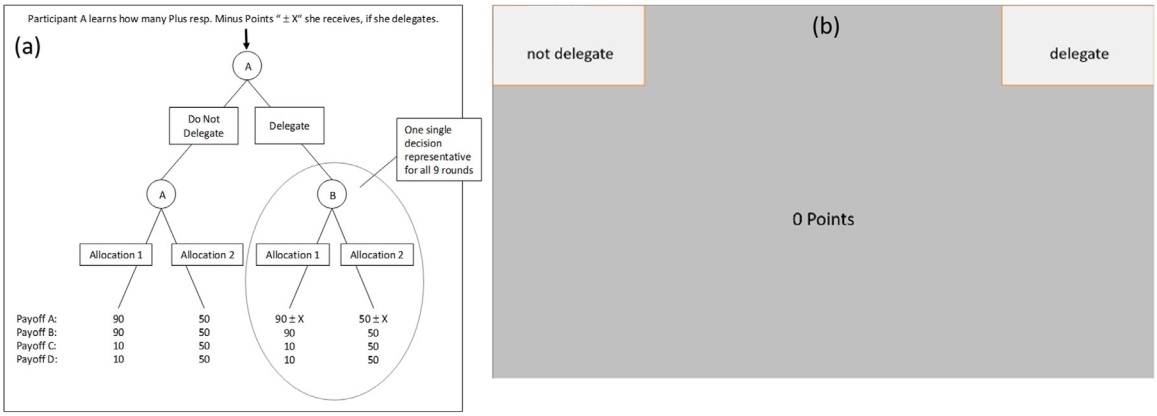

Fig. 1. (a) Schematic representation of the task. Player A can choose herself or delegate the choice to player B. She makes this choice nine times for difference bonus/ malus points (the X in the schematic representation). Player B makes only one choice irrespective of the bonus/ malus points of player A and player A's choice. This representation is also given to the participants. (b) An example screenshot of the delegation choice. The middle of the screen provides the information on the points for delegation. The top left or top right corner contain the choice buttons. The social and useless decision do not differ in the basic setup or the main decision screen.

In the "useless decision" (part 2), the deciding player (player A or player B in case of delegation) has to select three numbers on a six-sided die. If the chosen number is rolled later, the unfair allocation is implemented; otherwise, the fair allocation is implemented. This choice yields no actual benefit.

It should be noted that we employ a "partial" strategy method. First, at the beginning of the experiment, subject were only partially informed about their type. Half of the subjects had a 50:50 chance to be player A or C, the other half could be B or D. Because C and D had no decision to take, the first half had to decide in the role of A and the other half had to decide in the role of B. At the end of the experiment, a die roll decides on the actual roles within each group (A or C, and B or D). In addition, each player A faces the nine social decisions in an individually randomized order and the nine useless decision in the same random order. At the end of the experiment, die rolls determine the relevant period of the social decision and the relevant period of the useless decision. Further, participants receive a show-up fee of 20 CHF for participating.

2.2. Software, hardware and questionnaires

The experiment was programmed in Z-tree (Fischbacher, 2007), while we used R (Team, 2017) and STATA (StataCorp, 2015) for the analyses. We used Tobii 4C eye-trackers recording at 90 Hz. The screen size was 21.5 inches

[1] Even though the allocation decision did not vary across the situations, we wanted to force people to make a decision because keeping the decision-making power means one has to carry out the task.

(1920×1080 pixel) and screens were roughly 62 cm apart from the participants' eyes. These eye-trackers do not allow a calibration above 1.5°. The three parts of information on the screen were in the middle and the top corners with a large enough distance to not misidentify gaze on a wrong area of interest (see Orquin et al. (2016)). The location of the two choices (delegation or no delegation) were counterbalanced between subjects. In the eye-tracking analysis, we had to exclude two subjects due to low data quality or missing data. We used the DBSCAN (Ester et al., 1996) algorithm to determine the clusters of fixations for the eye-tracking data with a minimum time of 100 milliseconds and a threshold for the distance between points of 50 pixel. We recorded the cursor's position at 90 Hz using the Tobii software. To analyze the cursor movement, we used MouseTrap (Kieslich et al., 2019). The participants had to fill out two questionnaires online, Desirability of Control (Burger and Cooper, 1979) and the Motivation to Lead (Chan and Drasgow, 2001) as used in the HFÜMO (Felfe et al., 2012), one week after the experiment using Qualtrics (Qualtrics, 2018).

2.3. Participants

76 participants (M_{age} = 23.2, SD_{age} = 2.37, female = 63.1%) acted as decision-makers (76 other participants took part as potential delegatees). In order to control for understanding of the task, we had several control questions. In addition, we excluded subjects with inconsistent decisions.[2] This rule allowed for some type of mistakes but punished severe mistakes and resulted in the exclusion of six subjects.[3]

3. Results

3.1. Delegation behavior

For the behavior analysis of the social decision, we analyze the data of 70 DMs. Fig. 2a shows the percentage of "keep-choices" for all levels of bonus and malus points offered for delegation. Some subjects have non-monotonic delegation patterns, i.e. they delegate for some amount of extra points but do not delegate for some higher amounts. Therefore, we use the count of how often a subject keeps the decision-making power as a proxy for the value of decision-making power, which ranges between never and 9 times (Fig. 2b). For example, a DM that keeps the decision only for points below +5, keeps the decision-making power 6 times or, put differently, has a willingness to pay for keeping control between 1 and 5. As Fig. 2a shows, very few subjects pay to delegate and Fig. 2b shows that these subjects show inconsistent patterns as no subject keeps the decision-making power less than 4 times (which would indicate a willingness to pay for delegation). Fig. 2b also shows the heterogeneity in the number of keep-choices. Approximately half of the subjects (51%) keep the decision-making power at least 6 times which means that they are willing to pay at least 1 point for keeping control. On the upper end, 7% always keep the decision-making power, which means that they are willing to pay at least 20 points for keeping control. This translates into giving up at least half of the possible gain from the allocation choice.

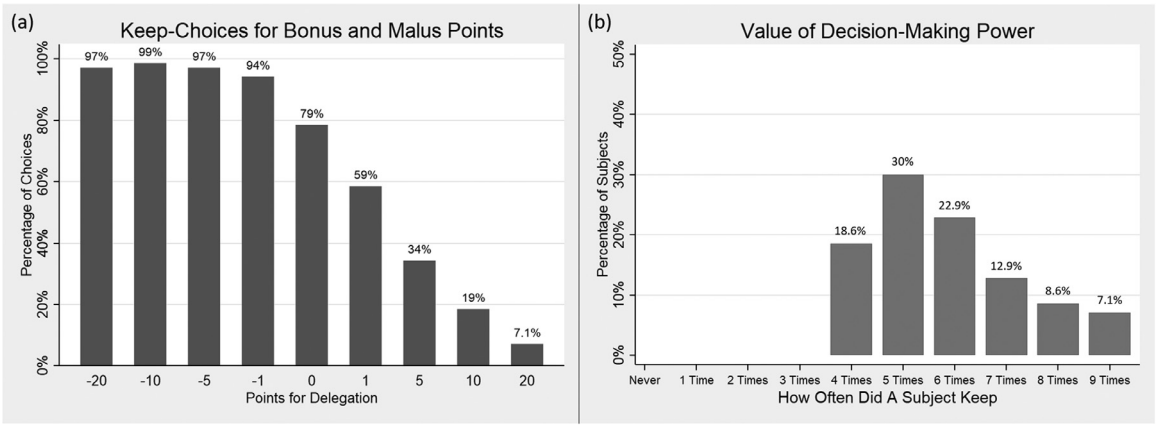

Fig. 2. (a) Percentage of keep-choices for the different bonus and malus points for delegation. (b) Number of keep-choices in the social task.

[2] In order to assess consistency, we calculated probit regressions which predict delegation for the points (negative or positive) of delegation. We consider subjects as inconsistent if i) delegation increased when it was more expensive and ii) if the difference of the estimated delegation probability between the highest and lowest amount is less than 0.5 (see Figure 12 in Appendix for the estimated probability to delegate at the bonus/ malus points for each subject using a probit regression).

[3] In case more participants failed to show up than extra participants invited, research assistants participated. They went through the experiment in the same way as normal participants and received the earned points as payment. These occasions are already excluded in the mentioned number of participants.

3.2. What affects delegation behavior?

When a DM decides to keep the decision-making power, she subsequently has to choose between the fair and the unfair allocation. Fig. 2b shows that every person decides at least 4 times to keep the decision-making power. Therefore, we have at least four choices (maximum is nine choices) between the fair and unfair allocation per subject. People with strong preferences for the fair or unfair allocation should always choose the same allocation. On the other hand, if a subject is indifferent between the two allocations, she could mix between choosing the fair and the unfair allocation. Fig. 3 shows the relationship between the number of keep-choices and the percentage of unfair choices. Clearly, people vary in the strength of their social preferences, i.e. only 57% always choose the same allocation. In the same figure, we also added a quadratic fit for the relationship between the percentage of unfair choices and the number of keep-choices which has its minimum at approximately 0.5 ($F(2,69)=5.45$, $p = 0.007$, with all presented F-statistics being based on clustered standard errors on the subject level, see also models 1 and 2 in Table 1). This suggests that subjects mixing between the fair and unfair allocation are less likely to keep the decision-making power, while subjects always choosing the same allocation value the decision-making power more. In addition, we do not find a significant difference between number of keep-choices of strictly selfish and strictly fair subjects (Wilcoxon rank-sum test of the number of keep-choices of strictly fair and strictly unfair subjects yields $p = 0.277$). Further, subjects being strictly fair show a larger heterogeneity: This group includes all subjects that keep the decision-making power in all nine decisions, but also subjects which keep the decision-making power least often.

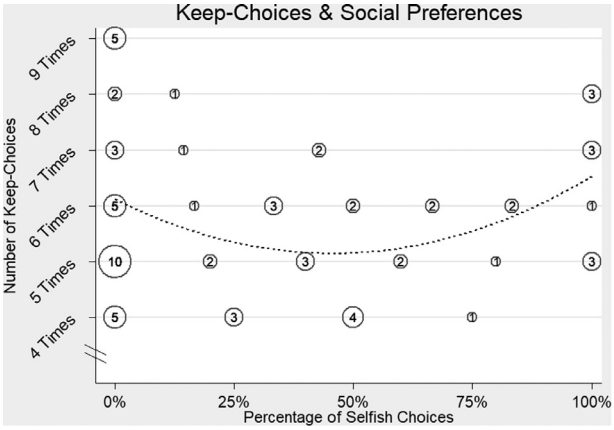

Fig. 3. Number of keep-choices and percentage of selfish choices. The dashed line represents an estimated quadratic fit, while the number inside the circle indicates the number of subjects within that circle.

What other factors could affect the value of the decision-making power? As already mentioned, we asked the DMs to estimate the likelihood of the potential delegatee choosing the unfair option. We find that the estimated social preference of the potential delegatee has no effect on the value of keeping the decision-making power (correlation = 0.13, regression yields $F(1,69)=1.00$, $p = 0.320$). However, it could be that a very selfish DM values the decision-making power less if she thinks that the delegatee is also selfish, and a fair DM values the decision-making power less if she thinks that the delegatee is also fair. Therefore, the perceived alignment of the own type and the believed type of the delegatee should matter. We find that the perceived alignment of the DM's and delegatee's social preference has no effect on the value for keeping the decision-making power (correlation = 0.16, regression yields $F(1,69)=1.63$, $p = 0.206$).[4] Here, we find that the own social preferences correlate with the belief about the preferences of the potential delegatee (correlation = 0.561) and that selfish subjects estimate the other person to be more similar than fair subjects (correlation = −0.517, Wilcoxon rank-sum $p = 0.000$), which is driven by the more fair people estimating the delegatee to be less similar. Even though DMs assume the delegatee to be similar, the perceived alignment between the own and the delegateeś social preference does not seem to affect the value of keeping the decision-making power.

As already mentioned in the Introduction, it could be that some people simply value making a decision themselves. To this end, we introduced the useless decision in which the deciding player selects three numbers of a six-sided die that determine the allocation. Fig. 4a and Fig. 4b show the raw choices and number of keep-choices respectively. In contrast to the social decision, subjects keep the useless decision less often. More specifically, no subject keeps the decision-making power always, only 27.2% keep the decision at least 6 times and 25.7% keep the decision-making power only 4 times. In contrast to the social decisions, the social preferences does not seem to affect the number of keep-choices in the useless

[4] The perceived alignment is the absolute difference between the own fraction of selfish choices and the belief of the other person being selfish. If we use own fraction of selfish choices minus the belief of the other person being selfish, the correlation becomes weaker (0.093).

decisions (see Table 1 model 3 and Fig. 9 in the Appendix which shows the number of keep-choices in the useless task and the percentage of selfish choices from the social decision).

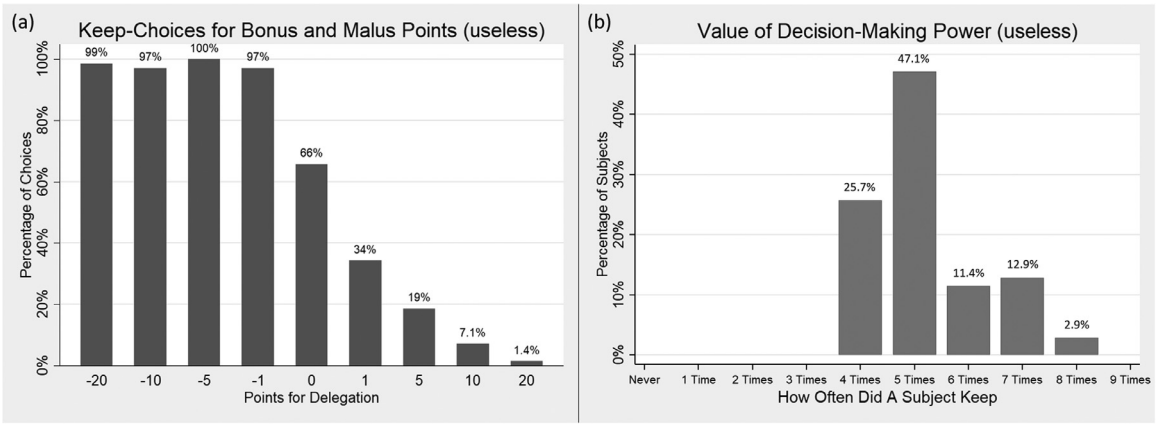

Fig. 4. (a) Percentage of (useless) keep-choices for the different bonus and malus points for delegation. (b) Number of keep-choices in the useless task.

It could be that some people simply value having the decision-making power irrespective of the decision environment. In this case, the number of keep-choices in both tasks should be correlated. Fig. 5 shows the number of keep-choices for the useless and the social decision.

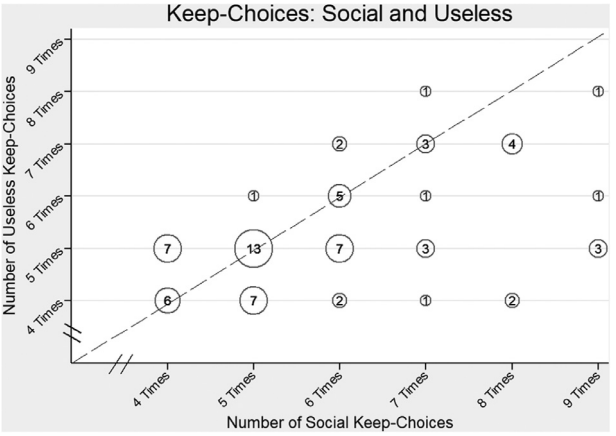

Fig. 5. Number of keep-choices across both tasks with the 45° line representing same number of keep-choices in both decisions.

We find a positive correlation between the number of keep-choices in the social and useless decision (correlation = 0.496) as 47% keep at most 5 times in both parts and 13% keep at least 7 times in both tasks. In total, we find 38.6% of subjects keep equivalently in both decisions, while 45.7% keep the social decision more often, and the remaining 15.7% keep the useless decision more often. Given the correlation of the behavior in the two decision environments, we also include the number of keep-choices in the useless decision into the regression from Fig. 3, in which we try to explain the number of keep-choices in the social decision with the strength of social preferences (see Table 1). First, we find that the choices in the useless decision have explanatory power and that the strength of social preferences is robust to this inclusion (model 4 and 5 of Table 1). Further, the proportion of variance explained by the behavior in the useless decision and the strength of social preferences is nearly perfectly additive indicating that both the strength of social preferences and the value for making a useless decision oneself affect the value of decision-making power in social decisions.[5]

[5] Table 3 in the Appendix shows the correlation matrix of the number of keep-choices in either task and the attitudes towards the desirability of control (Gebhart and Brosschot, 2002) and the motivation to lead including avoidance to lead and conditional leadership (Felfe et al, 2012). The desire to relinquish control (desire to leave actions to others) is negatively correlated with the value for keeping the useless decisions and the normative motivation to lead (leading due to a sense of duty) is negatively related to the value for keeping the social decision.

Table 1
Regressions on the number of keep-choices.

VARIABLES	(1) Social Keep- Choices	(2) Social Keep-Choices	(3) Useless Keep-Choices	(4) Social Keep-Choices	(5) Social Keep-Choices
Fraction of Selfish Choices	0.0347	−4.275**	−0.449		−3.972**
	(0.485)	(1.467)	(1.197)		(1.263)
(Fraction of Selfish Choices)^2		4.682**	0.398		4.414**
		(1.442)	(1.275)		(1.293)
Useless Keep-Choices				0.689***	0.673***
				(0.123)	(0.101)
Constant	5.831***	6.120***	5.252***	2.259**	2.583***
	(0.268)	(0.303)	(0.188)	(0.692)	(0.622)
Observations	70	70	70	70	70
R-squared	0.000	0.107	0.002	0.246	0.341

Note: The fraction of selfish choices is 0 if all choices were fair and 1 if all choices were unfair. Linear regression with robust standard error in parentheses; ***$p<0.001$, **$p<0.1$, *$p<0.05$.

3.3. Processing measures

We recorded the decision time of every decision. Stemming from the evidence-accumulation literature and recent evidence (Edelson et al., 2018; Fehr and Rangel, 2011; Konovalov and Krajbich, 2019; Krajbich et al., 2010; Ratcliff, 1978; Ratcliff and McKoon, 2008), we expected that decision times are highest when subjects are closest to indifference. Again, we use the number of keep-choices to proxy for the value of decision-making power. This allows us to define an interval in which a subject switches from keeping to delegating, i.e. a subject keeping 7 times, delegated at +20 and +10, but not at +5. We call this interval, i.e. [+5; +10], the "window of indifference" and the point of indifference lies within this window. Based on the actual decisions, the windows of indifference are: [−1,0], [0,1], [1,5], [5,10], [10,20], and [20, ∞]. Similar to the relation between decision times and the window of indifference, we expect that attention (eye-tracking) and cursor trajectory (mouse-tracking) should be especially telling when the conflict between keeping and delegating is highest.

3.4. Decision time

Fig. 6 shows transformed decision times conditional on the number of keep-choices (categories) and bonus/ malus points for delegation (x-axis). We transformed the decision to the geometric mean as decision times are positively skewed. The

Fig. 6. Geometric mean of decision times within each category of keeping behavior conditional on the bonus and malus points. The dark bars indicate the ends of the window of indifference. As response times are positively skewed, we used e^(mean(log(decision times)) within each bar.

Table 2
Regressions of processing measures and the distance to the window of indifference.

VARIABLES	(1) Decision Time (log)	(2) Dwell-Time on Points	(3) Maximum Deviation
Distance to Window of Indifference	−0.0531*** (0.00961)	−55.63** (19.05)	−0.0318*** (0.00872)
Constant	0.860*** (0.0536)	1025*** (94.83)	0.395*** (0.0289)
Observations	630	612	585
R-squared	0.037	0.018	0.024

Notes: Regression with robust standard error at the individual level in parentheses. (1) uses the logarithm of decision times of all chocies, while (2) uses the dwell-time in ms on the points for all trials with eye-data, and (3) uses the maximum deviation above the curve of all subjects adhering to the mouse-tracking protocol: ***$p<0.001$, **$p<0.01$, *$p<0.05$.

darker bars indicate the associated location of the window of indifference. Clearly, the transformed decision times are longest for each category at the window of indifference. Here, the untransformed mean of the decision time is 3.4 s, while it is at most 2.48 s for any other category. A regression of the logarithm of decision time on the distance to the window of indifference yields a negative coefficient (see Table 2 model 1). Further, the bars for subjects that keep all decisions are on average the lowest (a pairwise Wilcoxon rank-sum comparison between the average of bar-heights from Fig. 6 of subjects who keep all decisions against the other groups is always in the correct direction with a maximum $p<0.18$). The general pattern is also true for the useless decision (see Fig. 10 in Appendix) except for the two subjects who keep the useless decision 8 times. Further, subjects that always keep the decision-making power show little difference between the bonus and malus points (SD = 0.2 for subjects keeping all decisions, and at least 0.3 for any other category).

3.5. Eye-tracking

We also recorded eye movements in order to assemble a broader conception of the decision process (two subjects had to be excluded due to insufficient data). We only include fixations that are on one of the three areas of interest (AOI): the button for delegation, the button for no delegation and the information of the points for delegation. Further, two consecutive fixations on the same AOI count as one fixation (since the text for keeping was longer and says “not delegating”). In order to get a better insight, we look at two different measures in Fig. 7. The first measure is the proportion of fixations on the delegation button in relation to the no delegation button (dark gray bars). Here, we find that this proportion crosses the

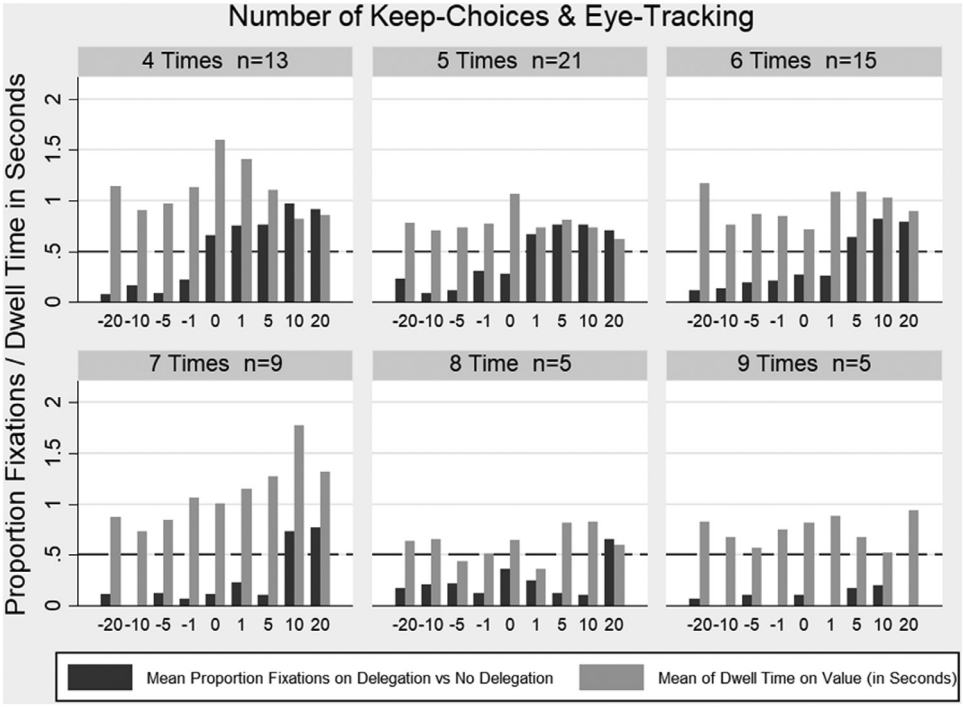

Fig. 7. Proportion of fixations on the “delegation”-button vs “no delegation”-button & time spent on the bonus/ malus points. The dark bars (0–1) indicate the proportion, and we included a line at a 0.5 proportion as a visual aid to identify when more attention is on the delegation button. The light bars represent the dwell-time in seconds on the value information.

50%-line always within the window of indifference for every category except for subjects that always keep the decision-making power. For these subjects, the proportion on the delegation-button is also never higher than 20% and they often do not look at the delegation button at all.

Our second measure is the time spent on the information of bonus/ malus points (light gray bars). We find that the mean dwell-time on the points is mostly highest at the window of indifference. The picture becomes even clearer if we pool all groups together and use the distance to the window of indifference. Regressing the dwell-time on the distance to the window of indifference, we find a negative effect (see Table 2 model 2) indicating that subjects spend most time on the points information if they are near their window of indifference. Further, we find that the two groups that delegate least often also have the highest share of choices in which the information of points is not even looked at.

3.6. Mouse-tracking

We designed the decision screen such that we could analyze the trajectory of the cursor during the decision (see Fig. 11a and 11b in the Appendix). Every subject knows where the two options, e.g. “delegation”-button and “no delegation”-button, are located at as they have five trial rounds with feedback before the first part. The locations of the two buttons are always in the top corners and counterbalanced across subjects. Before every decision, subjects have to click a start-button located at the bottom middle of the screen. The number of bonus/ malus points for delegation appear only after they pressed this button. This information is displayed in the middle of the screen. Five subjects did not move the mouse according to our instructions (did not move in a continuous way or took too much time to initiate mouse-movement) such that we drop these subjects in this analysis. For the analysis, we will use the measure maximum deviation above the curve (see Fig. 8a). This measure is constructed by plotting the mouse-trajectory of a subject and calculating how far it deviates from a straight line connecting the start-button and the button of the chosen option. The coordinates are normalized such that the start

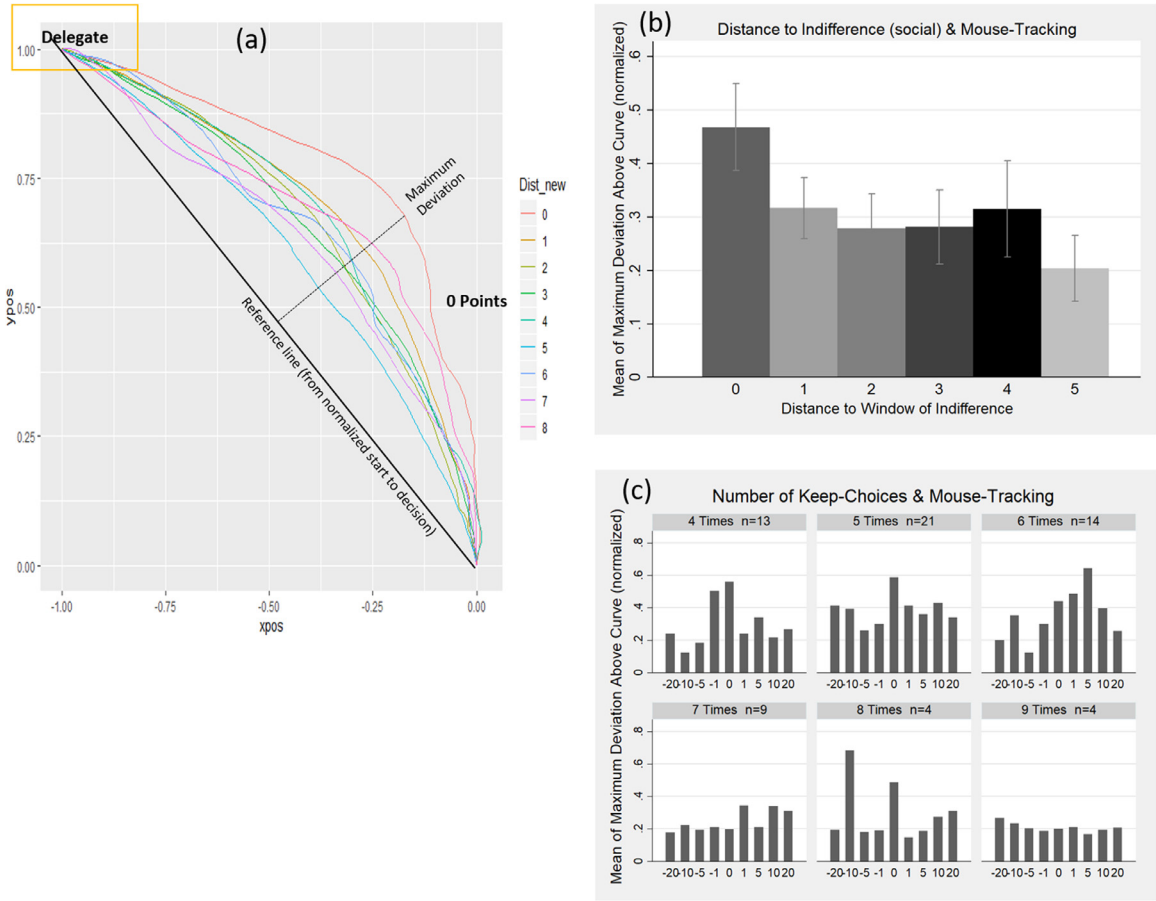

Fig. 8. (a) Example screen of the mouse-tracking data. The solid black line connects the start of the mouse movement and the end (left-right corrected). We included the dashed line for visualizing the maximum deviation for the 0-distance group. All maximum deviations are color-coded. (b) Mean of the maximum deviation above the curve for each distance to the gap of indifference, only distances below 6. (c) Mean of maximum deviation above the curve for each class and bonus/ malus points.

position is always at the (0,0) coordinate and final position at (−1,1) while the time is normalized into 101 steps. This measure has been shown to provide insights into the level of conflict between the options.

In line with our other processing findings, we expect that the maximum deviation above the curve to be largest for the decisions at the gap of indifference. Fig. 8b shows the maximum deviation above the curve dependent on the distance to the window of indifference. Further, 33 out 65 subjects had the maximum distance highest at zero distance to the gap of indifference (also see Table 2 model 3). Fig. 8c shows the maximum deviation for each category of keeping behavior and the respective bonus/ malus points for delegation (similar to the dwell-time on the value information in Fig. 7). Here, we also find the maximum deviation to be highest next to the gap of indifference for subjects that keep at most 6 decisions. These groups consisted of more subjects and therefore are less affected by the randomized order. Interestingly, we see again that subjects which keep all decisions seem to be rather unaffected by the extra points.

4. Discussion

We investigate the value of decision-making power in a decision that has monetary consequences not only for the deciding person but also for other people. We find that people differ in their valuation for keeping the decision-making power: Some subjects are not willing to give up any points to decide themselves, others are willing to pay points to keep the decision-making power, and a third group lies in between. We do not find any consistent subject willing to pay for delegating the decision.[6] This is somewhat surprising as (Bartling et al., 2014) even write "*For example, if decision rights involve the choice between fair and unfair outcomes, some people might prefer not making these decisions…*" and Edelson et al. (2018) find different levels of responsibility aversion when deciding for a group.

As our decision task featured a social decision, we explored to what extent social preferences play a role. We find that it is not the direction, but rather the strength of the social preferences that matters. More specifically, people who are more or less indifferent between choosing a fair or an unfair outcome are less likely to make the allocation decision themselves, while subjects with strong preferences for the fair or unfair option are more likely to keep the decision-making power, i.e. subjects with strong preferences are willing to spend more points to make sure that their preferred outcome is implemented (as seen in Fig. 3). Former studies (Gawn and Innes, 2019; Hamman et al., 2010; Oexl and Grossman, 2013) find that otherwise generous subjects use delegation as a tool to obtain higher outcomes for themselves. We find no subject willing to pay to use delegation as a tool to achieve a higher outcome,[7] but we find larger heterogeneity in the value of decision-making power in the strictly fair subjects compared to strictly selfish subjects. In particular, fair subjects keep the decision most and least often. However, there is no significant difference between strictly fair or strictly selfish people in the level of delegation.

When we zoom in on the people with the highest value of decision-making power, we see that they seem to approach the decisions in a different manner, as they seem to be unaffected by the incentives stemming from delegation as evidenced in the process data. They do not have a conflict between keeping and delegating and can thus decide the same way across all decisions. Accordingly, they spend a similar amount of time on every choice, pay little attention to the delegation option, and the mouse-trajectory is roughly equal irrespective of the points offered for the delegation of the decision. We do not find these stable patterns for subjects that delegate at least once. These subjects switch from keep to delegate at some point and all three process measures suggest that the conflict of the decision is a crucial part of how subjects process a decision. To be more specific, using the values of the different bonus and malus points offered for a delegation, we can determine when a person switches from keeping the decision-making power to delegating the power to the delegatee. We coined this interval the "window of indifference". We find that subject have the longest response times, highest maximum deviation above the curve (mouse-tracking), have the longest dwell-time on the points (eye-tracking) and switch to looking more at the delegation button (eye-tracking) at the window of indifference, i.e. when the conflict between keeping and delegating is highest. The processing measures further allow investigating whether people act due to confusion, not paying attention or struggling between options. The observed processing patterns which all relate to being close to indifference suggest that subjects understood the task at hand and cared about the points that they could receive if they delegate the decision.

We also investigate other channels that could explain the different levels of the value of decision-making power. The first channel concerns what the person in charge thinks about the potential delegatee. The value of decision-making power should be affected by the alignment of the preferences of the dictator and delegatee, i.e. the DM should keep a decision less often, only if she believes that the delegatee chooses in the same manner. However, we do not find any evidence for this relationship, nor do we find any influence of the estimated social preference of the delegatee. The second channel affecting the value of decision-making power concerns a more general value of making a choice oneself. The literature points towards that some people simply prefer making a decision themselves even though the choice itself is useless. Accordingly, we designed a second decision environment in which the decision is useless to identify people that like to make a decision for no obvious reason. We find that 27% of subjects are willing to pay at least some points in order to make a useless choice. This is in line with other studies and speaks for some valuation of keeping the decision-making power. When we relate the keeping

[6] Also the inconsistent subjects did not delegate on average in the sense that no subject kept the decision less than 4 times.

[7] Bartling and Fischbacher (2011) find that delegation is used to shift responsibility, and thus avoid punishment. It would not be surprising if people would be willing to pay to delegate in this environment. Note also that in an environment with punishment, the more selfish people are expected to delegate in addition to the more indifferent people.

behavior in the useless decision to the keeping behavior in the social decision, we find a positive correlation that was not present in other studies. We find that most people value keeping the decision-making power either similarly or value the decision-making power in the social decision more. Only a small fraction of subjects values the useless decision more. In total, our results show that people with strong social preferences are more likely to keep a decision affecting many people.

Declaration of Competing Interest

None.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jebo.2020.06.018.

Appendix

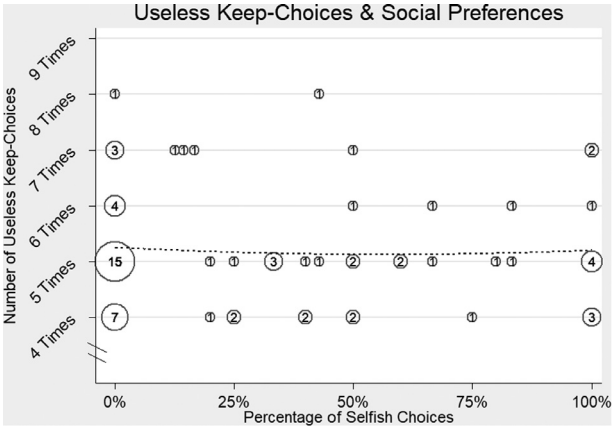

Fig. 9. Number of useless keep-choices and percentage of selfish choices. The dashed line represents an estimated quadratic fit, while the number inside the circle indicates the number of subjects within that circle.

Table 3
Correlations between number of social and useless keep-choices and subgroups of the desirability of control and motivation to lead questionnaires.

	Social Keeps	Useless Keeps	Control Others	Relinq. Control	Control Self	Affect Lead	Calc. Lead	Norm. Lead	Avoid. Lead	Cond. Lead
Social Keeps	1									
Useless Keeps	0.4956 (0.0000)	1								
Control Others	−0.0542 (0.6556)	0.0146 (0.9047)	1							
Relinq. Control	−0.0104 (0.9317)	−0.296 (0.0128)	−0.2879 (0.0157)	1						
Control Self	−0.056 (0.645)	0.0575 (0.6362)	0.5396 (0.0000)	−0.1921 (0.1112)	1					
Affect. Lead	−0.1412 (0.2436)	−0.016 (0.8952)	0.74 (0.0000)	−0.343 (0.0037)	0.4482 (0.0001)	1				
Calc. Lead	−0.0846 (0.4863)	−0.1209 (0.3187)	0.2629 (0.0279)	0.1083 (0.3722)	0.3214 (0.0067)	0.3697 (0.0016)	1			
Norm. Lead	−0.2474 (0.039)	−0.1647 (0.1731)	0.319 (0.0071)	−0.197 (0.1021)	−0.0372 (0.7598)	0.5038 (0.0000)	−0.0255 (0.8343)	1		
Avoid. Lead	−0.1301 (0.2831)	−0.1822 (0.1312)	−0.5235 (0.0000)	0.4552 (0.0001)	−0.2345 (0.0507)	−0.4451 (0.0001)	0.0541 (0.6565)	−0.0955 (0.4315)	1	
Cond. Lead	−0.0178 (0.8839)	0.0861 (0.4783)	−0.156 (0.1973)	0.033 (0.7863)	−0.2341 (0.0511)	−0.07 (0.5646)	−0.0098 (0.9358)	0.2364 (0.0488)	0.1618 (0.1807)	1

Notes: The first number is the correlation and the p-value is in parentheses. The number of keep-choices in the social and useless decision range from 0 to 9 (left of the vertical line), while the scores of the subgroups in the desirability of control questionnaire (Control Others, Relinquish Control and Control Self) are averages from 1 to 7 Likert scale items, and the scores of the subgroups of the motivation to lead questionnaire (affective motive, calculative motive, normative motive, avoidance to lead, conditional motive) are averages from 1 to 5 Likert scale items.

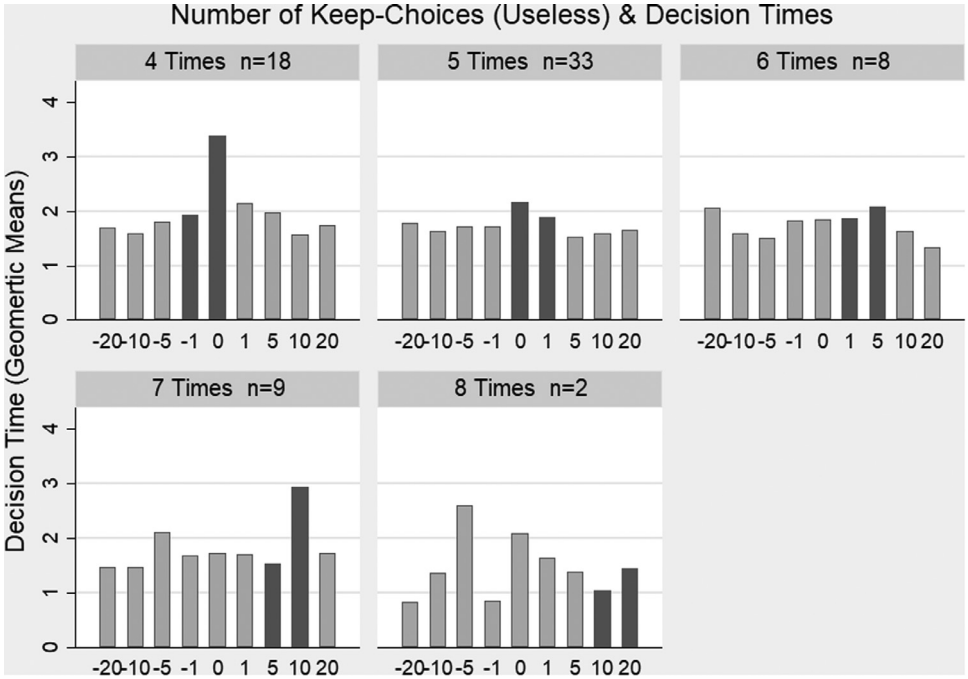

Fig. 10. Geometric mean of decision times within each category of keeping behavior conditional on the bonus and malus points in the useless decisions. The dark bars indicate the ends of the window of indifference. As response times are positively skewed, we used e^(mean(log(decision times)) within each bar.

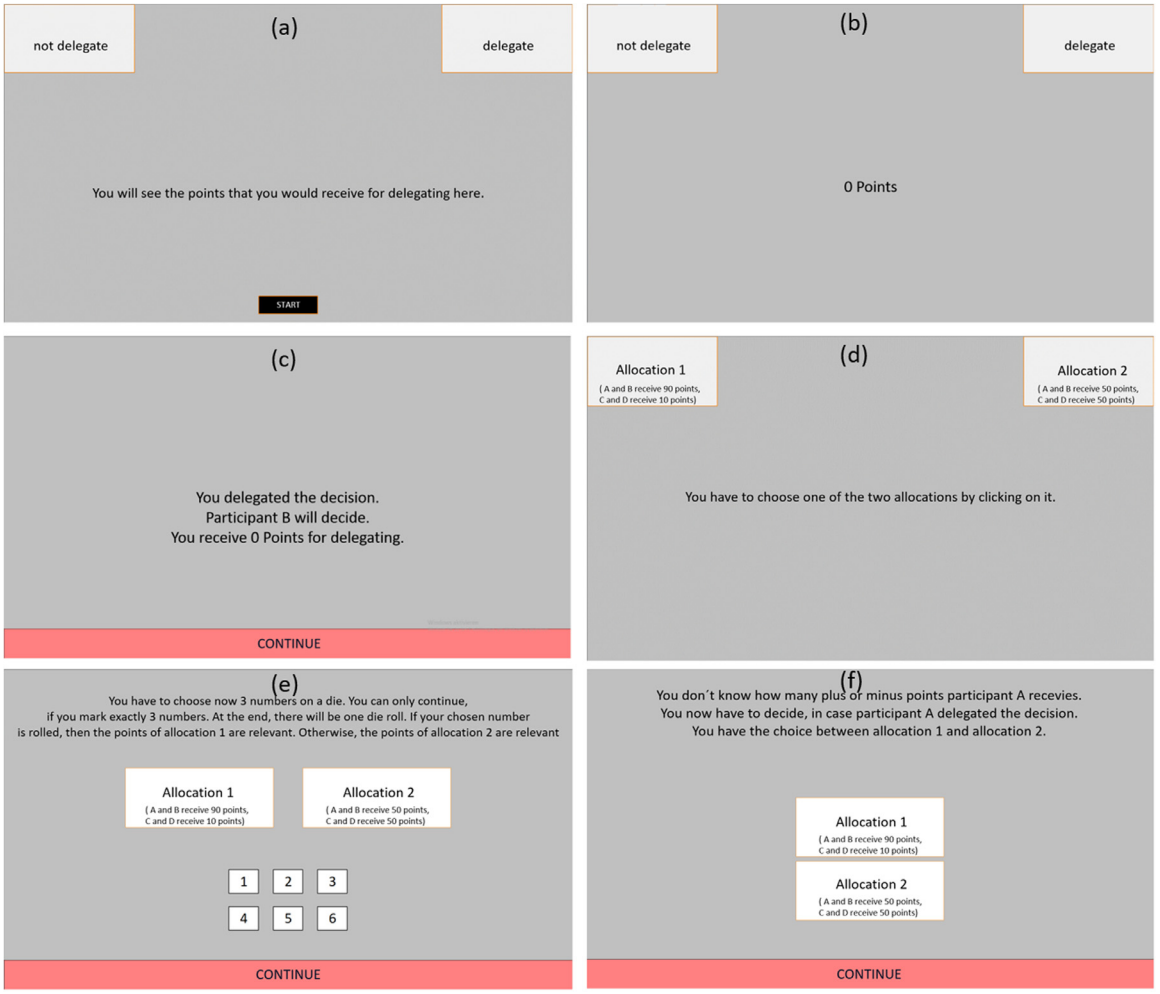

Fig. 11. Decision screens of the experiment. The first four screens (a-d) are social decisions and show the screen before the bonus/ malus points are revealed; the points revealed; the decision screen if the decision-making power was kept; and the information if the decision was delegated. The bottom left picture shows the decision screen if the decision-making power was kept in the useless task. The bottom right picture shows the decision screen for the potential delegatee.

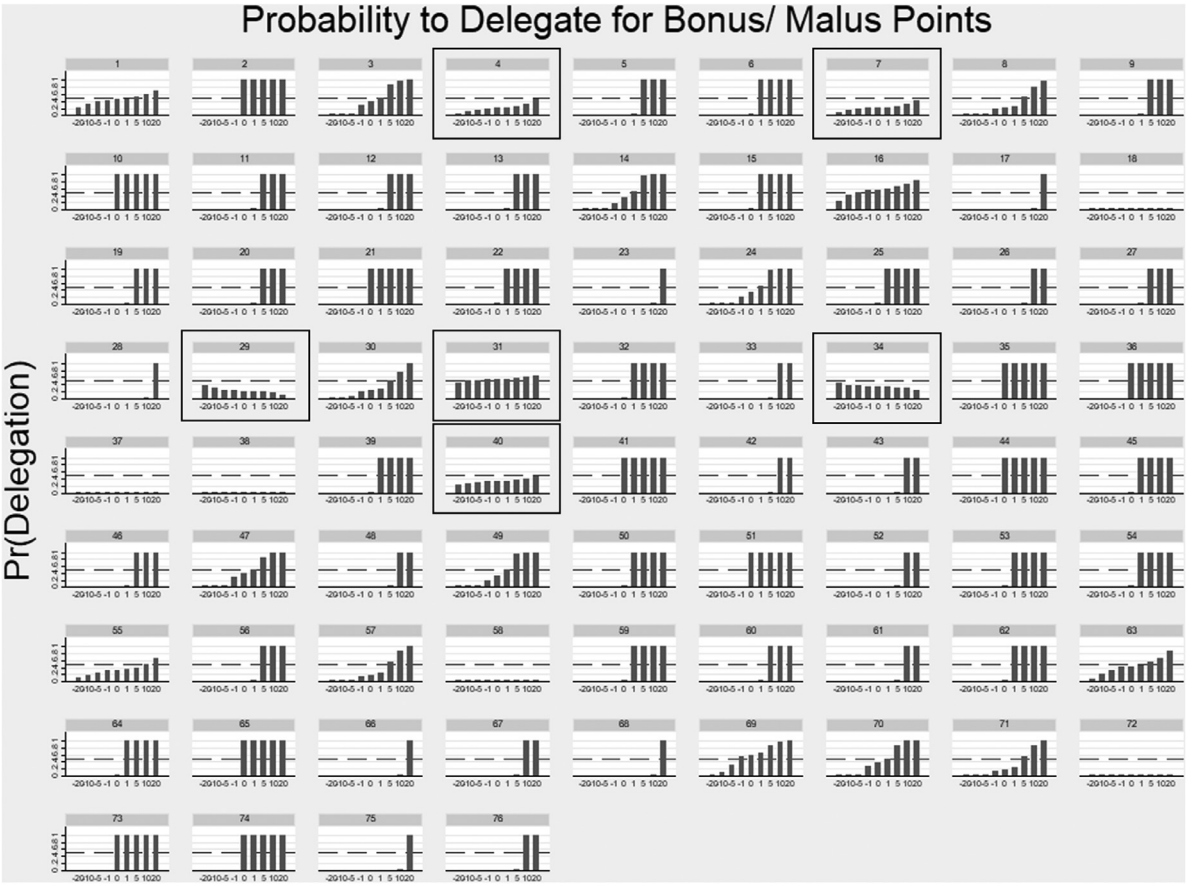

Fig. 12. Results from probit regressions on the individual level for the probability of delegation for the bonus/ malus points. We highlighted the six subjects, which failed to have a positive slope or where the probability difference between the lowest and highest probability was less than 50% points.

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