Principals, Power and Delegation: An Experiment

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Abstract

Although delegation of morally questionable decisions is prevalent, principals often have limited power over the agents to whom they delegate decisions. An important but uninvestigated question is whether an agent will accommodate a principal's selfish preference when the principal lacks perfect power over the agent. We shed light on this question using a modified dictator game where the amount to allocate to receivers is delegated by principals to agents (Hamman et al., 2010). We identify principals' power with the probability that they are able to terminate their relationship with the agent. Among four experiment treatments, principals can fire their agents with probability varying from zero to one. Strikingly, we find agents' allocation decisions do not significantly differ, and all favor principals' selfish preferences, as long as principals can terminate the relationship with the agent with positive probability. In contrast, when principals have no ability to fire, we find that agents exhibit significantly greater generosity towards receivers.

Key words: Power, delegation, fairness preference, sanction

JEL Codes: C91, D01

1. Introduction

Delegation is prevalent in social and business environments, despite principals' inability to control delegates' actions perfectly. For example, upper level management may delegate unethical decisions to lower-level managers (Hamman et al., 2010), yet be only imperfectly able to sanction violations of such requests. Similarly, companies that outsource unethical (and lower cost) production activity may invest substantial resources in the outsourcing arrangement, leaving the relationship difficult to terminate even if the delegate firm did not fully comply with the principal firm's selfish preferences. Indeed, the imperfect ability to control an agent's decision is often an advantage for principals who wish to separate themselves from morally questionable decisions others take on their behalf. Little research has explored, however, how an agent's willingness to support their principal's selfish preferences changes as the principal's power to sanction a non-complying agent varies. This paper is an effort to fill that gap. We report data from a laboratory experiment with a delegation game that differs in a principal's power to terminate an employment relationship with an agent.

Building from Hamman et al. (2010), participants play a three-person dictator game for 12 rounds. In each round, a principal must hire one of the agents to split an endowment between the paired recipient and herself. Both the principal's and passive recipient's payoffs are determined by the agent's chosen allocation. If a principal is dissatisfied with an agent, they may try to end the employment relationship. The probability that they succeed in doing so varies across experimental conditions. Because the payoff of an agent increases with the number of principals who delegate to the agent, principals have power over agents and this could impact agent behavior[1]. Importantly, agents' preferences may conflict with principals' desires. The reason is that agents may be more interested in equity in outcomes while principals may want to maximize their own earnings.

We draw from Fehr & Schmidt's (1999) model of inequity aversion to model behavior in this game. We assume agents care about their monetary payoffs, as well as the psychological benefit from creating equitable outcomes. While allocating a larger share of the endowment to the principal(s) helps to avoid termination and ensure their own higher monetary payoffs, the resulting inequity can decrease the agent's psychic payoff. Our model predicts that when termination is possible, the amount that agents allocate to principals increases in the objective probability that they are terminated should the principal try to do so. Consequently, absent the possibility of being fired, our model predicts that agents choose to divide the endowment equally between the principal and their corresponding recipient.

Consistent with our model, we find that when principals are not able to fire agents, agents are most likely to choose to allocate equal amounts to the principal and the recipient. However, once principals have power over the agents, we find that agents allocate the majority of the endowment to their principals. Indeed, the probability of termination does not significantly impact agents' allocation decisions.

Our findings resonate with a large literature showing people display less sensitivity than standard theory predicts to changes in the objective probability of a sanction (Anderson &

[1] In fact, according to French et al. (1959), firing can be categorized as coercive power, as firing is the most powerful sanction that empowers the principals to impact their agents' monetary payoffs. This is consistent with management practice in which the power of superiors originated from having the ability to make decisions regarding firing, promotion and wage hikes.

Stafford, 2003; Block & Gerety, 1995; Engel & Nagin, 2015; Friesen, 2012, Laske et al., 2018), and that prosocial preferences are fragile and easily crowded out by monetary incentives (Gneezy & Rustichini, 2000a; Li et al., 2009). The implication is that principals can have confidence that agents will work to satisfy principals' selfish preferences in order to maintain their own benefits, even when they can be only imperfectly monitored and sanctioned.

This remainder of the paper is organized as follows. The next section introduces the related literature. Section 3 presents the theoretical model and hypotheses. Section 4 and Section 5 present the experiment design and results. The last Section concludes.

2. Related Literature

2.1 Impact of Power on Individual Decisions in Delegation

Selfish use of power can emerge due to feelings of entitlement, moral identity, and/or fairness concerns (DeCelles et al., 2012; Guinote, 2017; Tripp, 1993). Psychological findings suggest that powerful people are less likely to care about others (Fiske & Berdahl, 2007; Galinsky et al., 2006). Similarly, they are less fair toward others (Blader & Chen, 2012), more egocentric, and moral hypocritical (Galinsky et al., 2008; Handgraaf et al., 2008; Lammers et al., 2010). In experimental economics with monetary incentives, it has been shown that those with high levels of power are prone to give less in bargaining, despite caring about fairness (Rode & Le Menestrel, 2011; Tripp, 1993). Using a modified ultimatum game where the responder has varied power to reject a proposal, Mallucci et al. (2019) also found that changes in power impact perceptions of fairness and influence distributive outcomes.

Existing experiments on power in delegation focus on principals' responses to power. Principals who possess power or decision authority are usually reluctant to delegate their decision-making rights (Bartling et al., 2014; Bobadilla-Suarez et al., 2017; Fehr, Herz et al., 2013). For example, Fehr et al. (2013) investigated the response to power in an authority-delegation game where delegating the decision power was optional. They showed that principals with decision power are often reluctant to delegate, even when it benefited their material interest. This indicates that power has nonpecuniary utility. With a delegation–communication game, Lai & Lim (2012) likewise found that subjects in the role of principals almost always under-delegate to retain their power and authority.

One issue that remains largely uninvestigated is how a principal's power practically impacts their agents. In their pioneering paper, Hamman et al. (2010) experimentally found that when agents knew their principals could dismiss them at will, they would fulfill their principals' profit-maximizing preference at the expense of a passive third party. It's also worth noting that there is a strand of delegation research concerning the hidden cost that results from the deliberate step of intervening to control and restrict an agent's choice set (Falk & Kosfeld, 2006; Friebel & Schnedler, 2011). However, power differs from deliberate control in that power does not necessarily require taking proactive measures to control (an action which may signal distrust).

In this paper, we extend the above by experimentally studying agents' behavioral changes brought about by varying the magnitude of principals' power over agents.

2.2 Delegated Decisions Made by Agents

Principals can delegate to improve decision quality, especially when agents have advantages in resources, time or knowledge (Aghion & Tirole, 1997; Bolton & Dewatripont, 2005; Kockesen & Ok, 2004; Schelling, 1980). Also, delegation may serve as a way for principals to shift responsibility for ethically questionable outcomes (Hamman et al., 2010). The reason is that delegating to agents usually leads to outcomes that favor the principals but are less socially desirable. In scenarios that may impose negative externalities on third parties, agents are hired to take self-interested or immoral actions on behalf of their principals when the principals are reluctant to take those actions directly.

There is a small but growing literature investigating decisions made by agents for their principals that have negative externalities. This literature suggests that delegation might benefit the principals at the cost of others. Using an experiment where principals can delegate to the agent by “selling” the dictator game, both Coffman (2011) and Collins et al. (2018) showed that including agents can greatly reduce the amount of money allocated to the recipient. In an experiment with options of fair or unfair allocation for the third party, Bartling & Fischbacher (2012) found that when punishment is not available, the fraction of fair choices is almost halved if the choice decision is delegated to an agent, as compared to the case where the principal makes the choice. Further evidence is provided by Gawn & Innes (2019), who used a classroom experiment to demonstrate that delegation increases the propensity for deception. Importantly, it seems that not all subjects are willing to increase their principal’s interest at the expense of a third party (Sutan & Vranceanu, 2016). Indeed, a nonnegligible fraction of potential agents refuse to act as the accomplice of a dishonest principal despite it being in their monetary interest.

2.3 Response to the Risk of Potential Sanction

Our paper also contributes to studies of how individuals interpret and respond to sanction risk. People often respond more to a sanction's severity than to its probability (Anderson & Stafford, 2003; Block & Gerety, 1995; Engel & Nagin, 2015; Friesen, 2012, Laske et al, 2018). Consequently, deterring undesired behaviors may depend more on the severity of punishment than the likelihood of punishment.

3. Theory and Hypotheses

3.1 The Theory Model

We model principal and agent behavior in a model with compulsory delegation. In our model, agents' fairness preferences are misaligned with their principals' selfish preferences to maximize earnings. Following Hamman et al., (2010), we consider an agent market in which each of six principals must each select one of three agents to make an allocation decisions on their behalf. This selection decision is made in each of 12 rounds[2]. Each agent can be selected by multiple principals. Specifically, the agent is delegated to distribute a fixed amount of endowment ￥60 between the principal and a passive third party (thus determining their earnings). After learning of the agent's chosen allocation, the principal can decide whether to fire the agent.

[2] In this paper, we make slight changes to the experiments design of Hamman et al., (2010). We amplify their parameters proportionally to ensure enough monetary incentive for our Chinese subjects. In addition, the agents are paid by their payments in a randomly chosen round, instead of the accumulated payments in all rounds as in Hamman et al., (2010).

We focus on the allocation behavior of agents. In our model, following Hamman et al (2010), agents incur a fixed cost of 21.6 to provide the service of making decisions on behalf of their principals. They also start with a fixed earning of 30 and a constant marginal earning of 10.8 for every principal who selects them as their agent. Suppose x represents the amount of endowment allocated to a principal. Thus, the action set of the agent is $x \in [0, 60]$. Let integer $n \in [0, 6]$ denote the number of principal(s) selecting a given agent after allocating x to previous principal(s). Thus, net earnings for this agent can be expressed as $\pi_a = 30 - 21.6 + 10.8E[n|x]$. Accordingly, earnings of the principal and the third party are $\pi_p = x$ and $\pi_r = 60 - x,$ respectively.

Our main treatments vary in the principals' ability to fire their agents after learning of the allocation outcomes. Agents are informed before making the allocation decision that the principal can fire them and choose another agent. Importantly, agents are also aware that their principals only have limited power to fire them, which is denoted by an objective firing probability p. That is, a principal who tries to fire an agent is successful in doing so with probability p.

Only the probability p varies across treatments. In the full-power treatment (hereafter called FPT), principals can fire their agents with a probability of 1 if they are not satisfied with the allocation outcome. In contrast, principals can only successfully fire agents with a probability of 0.5 in the half-power treatment (hereafter called HPT). That is, if the principal tries and fails to fire an agent, they will end up with the same agent. In the 0.1 low power treatment (hereafter called LPT), principals can successfully fire agents with a probability of 0.1. In the zero-power baseline treatment (hereafter called ZPT), principals can never fire agents. Importantly, all failed firing attempts are not revealed to the agents in HPT and LPT.

In the treatments above, agents who are not successfully terminated are not informed that their principal attempted to terminate them. We conduct an additional treatment that reveals this information. The revealed low power treatment (RLPT) is the same as LPT, except that agents are informed of the failed firing attempts of the principals. That is, agents in RLPT receive information about their principal's attempt to fire them. This may help them internalize the probability of termination, while also leaving it easier to infer their principal's expectations of them.

3.2 Prediction and Hypotheses

Two conflicting motives can drive agents' distribution behavior. The first is a principal's power to influence the agent's monetary earnings. To maximize earnings, an agent would allocate with the goal of avoiding being fired. A second motive is to diminish the psychological utility loss due to inequality aversion when agents disadvantage the recipient with an unequal allocation.

We build from Fehr & Schmidt (1999) to model these conflicting motives. For ease of exposition, we assume that the principal and agent share the same guilt and envy coefficients. The guilt/envy coefficients are β_1, β_2 and γ_1, γ_2 for the principal and the agent, and the recipient and the agent, respectively. More specifically, β_1, γ_1 denote the disadvantageous inequality, while β_2, γ_2 denote advantageous inequality where $\beta_2 < \beta_{1,}\ 0 < \beta_2 < 1$ and $\gamma_2 < \gamma_{1,}\ 0 < \gamma_2 < 1$. Then, the utility function for the agents is given by:

$$U_a = 30 + (-21.6 + 10.8E[n|x]) - \beta_1 \, max\{x - (30 + (-21.6 + 10.8E[n|x])), 0\}$$
$$- \beta_2 \, max\{(30 + (-21.6 + 10.8E[n|x])) - x, 0\} \quad (1)$$
$$- \gamma_1 \, max\{(60 - x) - (30 + (-21.6 + 10.8E[n|x])), 0\}$$
$$- \gamma_2 \, max\{(30 + (-21.6 + 10.8E[n|x])) - (60 - x), 0\}$$

In equilibrium, assume that principals have a minimum expectation x^* about how much money their agents allocate to them. As the game is symmetric in structure, each agent follows the same strategy in equilibrium. Suppose a principal will attempt to fire their agent if $x < x^*$, and will not try to fire if $x \geq x^*$. In equilibrium, each agent allocates $x = x^*$ to the principal and it is reasonable to assume at least half of the endowment is allocated to the principal, i.e., $x^* \geq 60/2 = 30$. Principals do not fire their agents in equilibrium. The reason is that if they fire their current agent, they will find an agent who splits exactly the same as the current one. Since there are 6 principals and 3 agents, in equilibrium the expected number of principals who select each agent is $E(n|x^*) = 6/3 = 2$. As a result, in equilibrium the utility agents earn is given by:

$$U_a = 30 - \beta_1(x^* - 30) - \gamma_2(x^* - 30) = 30 - (\beta_1 + \gamma_2)(x^* - 30) \quad (2)$$

Next, we consider the condition where agents deviate from equilibrium. Note that an agent with fairness concerns will never choose to split $x > x^*$, as they know they will not be fired if they split $x = x^*$. However, if agents deviate by decreasing x, they will choose $x = 30$. Since they will be fired anyway, they will choose to minimize their psychological lose.

Recall that agents are faced with the risk that their principals may punish them by switching to another agent if they fail to satisfy them, with objective probability p. When agents have to make endowment allocations, we assume that they use such objective probability p to calculate their expected utility. Then, we have $E(n|x) = (1-p)E[n|x^*] = 2(1-p)$. Thus, the simplified utility function of agents when deviating is:

$$U'_a = 30 - 21.6p(1 + \beta_1 + \gamma_1) \quad (3)$$

An agent will not deviate if $U_a = U'_a$. So, we have:

$$x^* = 30 + 21.6Cp \in (30, 60) \quad where\ C = \frac{1+\beta_1+\gamma_1}{\beta_1+\gamma_2} > 1 \quad (4)$$

Apparently, the equilibrium allocation amount x^* is a linear increasing function of the objective probability p. Therefore, the model implies the following two hypotheses:

Hypothesis 1: When firing is impossible ($p = 0$), agents will equally allocate the endowment between their principals and the paired recipients.

Hypothesis 2: When firing is possible ($p > 0$), the amount that an agent allocates to the principal is linearly and positively correlated to the objective probability that an attempt to fire them is successful.

4. Methods and Experiment Design

Our game extends Hamman et al., (2010). In that paper's design, principals have full power to fire their agents. Our design differs in that principals have only limited firing power over agents. Specifically, as described in Section 3.1 and Table 1, the experiment consists of four main treatments in which principals' power to fire their agents varies. That is, principals are successful in their attempts to fire their current agent probabilities of 1, 0.5, 0.1, or 0, in FPT, HPT, LPT and ZPT, respectively. To rule out the possibility that agents might not fully understand the firing probability, we include a fifth treatment where failed firing attempts by principals are disclosed to the agents before they make allocation decisions.

Table 1. Description of the experiment by treatments

Treatment	Probability of successful firing	Failed firing attempt disclosed to agents	No. of sessions	No. of observations(agents)
FPT	1	NO	16	48
HPT	0.5	NO	15	45
LPT	0.1	NO	15	45
RLPT	0.1	YES	12	36
ZPT	0	NO	9	27

The experiment consists of two similar tasks in each session: 12 rounds of allocation in Task 1, followed by another 12 rounds in Task 2[3]. In each task, 15 subjects were randomly assigned a fixed role during the task by a computer: six as principals, three as agents and the other six as recipients. Before role assignment, at the start of the experiment, participants received instructions which were also read aloud[4]. Then subjects took a quiz on the instructions. Afterward, the randomly assigned roles and experiment IDs were displayed privately on each computer screen: A1 to A6, B1 to B3 and C1 to C6 for the principals, the agents, and the recipients, respectively.

3 Given that subjects were not informed of what they were going to do in Task 2 before finishing Task 1, Task 2 should have no impact on decisions in Task 1.

4 For full instructions, see Appendix B.

In each round, the principles and the recipients were randomly paired and knew each other's experiment IDs. At the beginning of each round (other than the first round and ZPT), principals had to select an agent to divide an endowment of ￥60 between them and the paired recipients, in ￥1 increments. In the first round only, each agent was randomly matched with two principals to ensure that all agents started with an equal endowment of allocation decisions. In other rounds in treatments other than ZPT, the principals selected their agent by clicking that agent's ID. While in subsequent rounds of ZPT treatment, each delegate is randomly matched with two principals and makes allocation decisions for the two principals. Each selected agent then made a decision for their principal(s) about the amount of the endowment to be allocated to the paired recipient. Those agents not currently selected saw a waiting screen. Once all allocations had been made, the results were revealed to the corresponding principals and recipients. Importantly, the principals were only informed of the allocation results of the agents they selected. Additionally, each principal's agent selection decisions in the current round were revealed to all agents.

Then the experiment proceeded to the next round. In all treatments except ZPT, the principals who were unsatisfied with the allocation could fire their current agent by selecting a new agent for the next round. However, they had varied probability of being able to do so successfully. The outcome (success or failure) of their effort to fire their agent was displayed on their screen. If they succeeded, the selected new agents would make allocation decisions for them. If they failed, their current agents would continue to make allocation decisions for them.

All subjects were told they would receive their earnings in cash at the end of the experiment. They were further told that one round of the experiment would be randomly chosen and subjects would be paid an amount equal to the earnings in that round, plus a￥10 show-up fee. Principals and recipients shared the endowment as their earnings in each round. More specifically, each recipient earned the amount allocated to her while the rest of the endowment belonged to the paired principal. The earnings of the agents, however, consisted of two parts in each round. One part consisted of ￥30 fixed earning, and the other part was determined by the following payoff function:

$$\pi_i = -21.6 + 10.8 * n_i$$

where n_i denotes the endowment of principals selecting agent i. This payoff function was not directly shown to agents. Instead, they were told that they would earn ￥7.2 for each principal choosing the agent, and lose ￥3.6 for each principal who did not choose the agent. Following Hamman et al.(2010), we used this payoff structure to induce agents' monetary incentive in each round. When Task 1 was finished, each subject learned of their earnings for all rounds.

In Task 2, subjects were told that everything would remain the same as in Task 1, but their roles might change. Specifically, Task 1 recipients became principals in Task 2 and three of the principals in Task 1 were randomly selected to become agents. The goal of this was to control for any order effect. After Task 2, subjects completed a questionnaire about their fairness preferences and demographic information. Then, one subject was randomly invited to throw a 12-sided die twice to randomly determine the payoff round. If the first endowment thrown was smaller than seven, one of the 12 rounds in Task 1 was randomly selected to determine their payoff. Otherwise, one round in Task 2 was selected. The second die toss determined the paying round.

After announcing the payoff round subjects received their payment privately.

We conducted the experiment at Central South University (CSU)[5]. All participants were recruited from a representative subject pool [6]. As a between-subject design, there were 15 subjects in a session and each received a ￥10 show-up fee, plus additional earnings from the experiment, which lasted for about 1.5 hours. In total, 1005 subjects participated in 67 sessions of our experiment. The average earnings were￥40. All sessions was conducted at the behavioral decision laboratory at Central South University, using z-Tree software (Fischbacher, 2015).

5. Results

5.1 Endowment Allocation of Agents

In this section, we present a statistical comparison of allocation decisions between treatments. While our experiment consisted of two tasks, here we drop the data in Task 2 due to potential order effects. To eliminate concerns regarding correlation among observations, data are analyzed on the aggregated rather than round level. Specifically, we treat the average amount an agent allocated to the principal in the rounds 1 to 11 and the rounds 4 to 11 as an observation[7]. As a result, we have 48, 45, 45 and 27 observations in FPT, HPT, LPT and ZPT respectively.

Figure 1 shows the mean allocation to principals in rounds 1-11, by treatment. It is clear that

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[5] Informed consent was obtained for experimentation with human subjects from IRB of George Mason University (IRB No. 1309999-1).

[6] Subjects in this pool are primarily undergraduate students at CSU, covering about 6% of the undergraduate students at school.

[7] The agents seem to compensate the recipients by giving significantly less to principals in the last round. The reason might be agents' guilt toward the recipient (Hamman et al., 2010), which is largely distinct from the driving motivation in previous rounds. As a result, we do not include data from Round 12 in our analysis. In addition, principals seem to try every agent in the first 3 rounds to find the best agent. Thus, we also analyze the data in a way that excludes the first 3 rounds.

allocation to the principals in the baseline ZPT treatment declines over rounds. Consistent with Hypothesis 1, the amount allocated to the principals is greater than half the endowment (30). In contrast, allocations increase over rounds in other three treatments. This suggests that to keep their principals, the agents increased amounts allocated to principals over rounds.

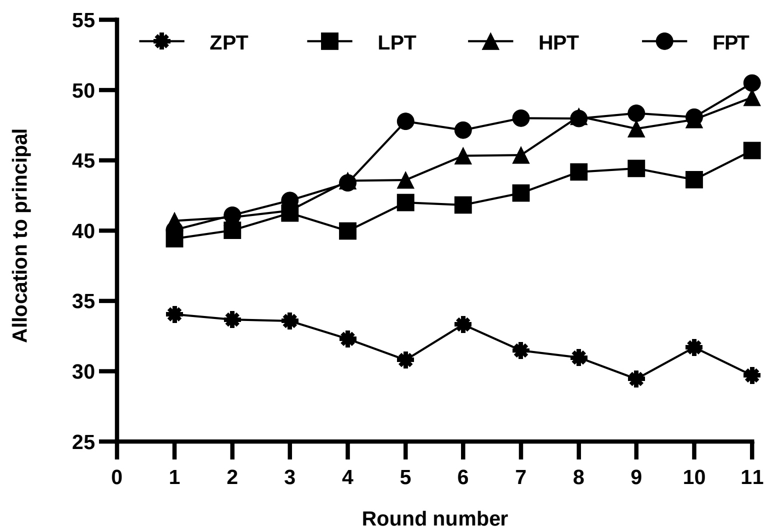

Figure 1. Average allocation to principals in each round.

In line with Hypothesis 2, the amount allocated to the principals in the FPT is greatest among the four treatments mentioned above, followed by HPT. Interestingly, the marginal positive impact of power over the amount allocated to the principals seems to diminish as power increases. The gap between allocations in LPT and HPT is larger than the gap between HPT and FPT, indicating a seemingly nonlinear effect of power on allocations. An even larger gap between ZPT and LPT further supports this inference.

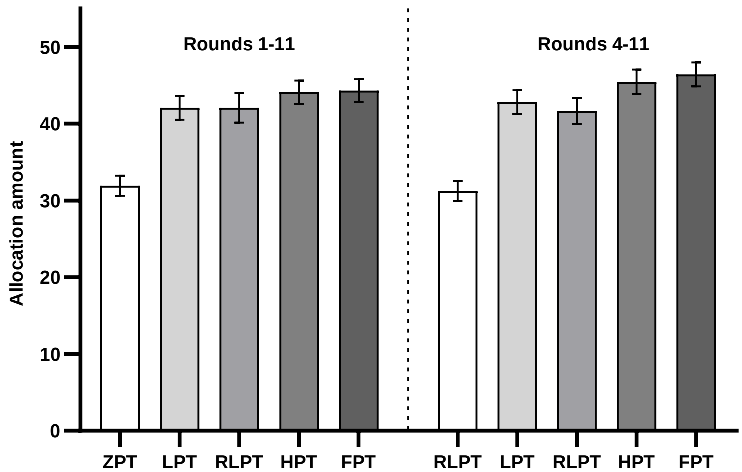

Figure 2. Mean allocation to the principals among treatments. Error bars are ±1 SE.

The aggregated data support our Hypothesis 1. In the aggregated rounds 1 to 11 and 4 to11 of ZPT, agents allocated a mean amount of 31.92 and 31.23 to their principals, respectively[8], as shown in Figure 2. Results of the one-Sample t-Test comparing the mean amount allocated to the principals and the half of the endowment show that there is no significant difference in either rounds 1 to 11 ($p = 0.1525$) or rounds 4 to 11 rounds ($p= 0.3507$), respectively. Although splitting the endowment equally is not earnings maximizing for principals, the private fairness preference of the agents seems to dominate when principals lack the power to terminate the agent.

Statistical comparisons between treatments regarding the amount allocated to the principals reveal a different allocation pattern than suggested by Hypothesis 2. In aggregated rounds 1 to 11, as shown in Figure 2 and the last two columns of Table 1 in Appendix[9], the amount allocated to the principals in ZPT, LPT, HPT and FPT is 31.92, 42.09, 44.10 and 44.31, respectively.

[8] To calculate the aggregated amount allocated to principals, take 1 to 11 rounds for example, we firstly calculate the average amount each agent allocated to all her principal(s) in each of the 11 rounds separately. Since we treat the mean allocation an agent made in aggregated level as an observation, we measure it using Arithmetic mean of the average amount an agent allocated to her principal(s) in 1-11 rounds.

[9] Analyzing data in each separate round, we reach very similar results as found at aggregated level in all rounds except the first two. For more details, see Table 1 in Appendix.

Strikingly, compared to the allocation outcomes in ZPT, the agents allocated a significant 31.86% more to the principals in LPT, despite principals having only limited power to fire them (Mann-Whitney, p=0.000). However, while the amount distributed to the principals rose slightly as the principals' power to fire increased, there was no significant difference between LPT, HPT and FPT. For example, compared to the allocation in LPT, the mean amount distributed to the principals increased by about ￥2 in FPT, and this increase is not statistically significant (Mann-Whitney, p=0.3115). In addition, these results hold with aggregated rounds 4 to 11 data and single round data, as shown in Appendix Table 1.

In Table 2, the regression analysis controls for demographic variables and further indicates that the agents behave differently than suggested by Hypothesis 2. In the regression, the mean of each agents' allocation to the principals at the aggregate level are treated as observations. Regressions (2) and (4) control for major demographic characteristics, such as age, gender, ethnic group and religious belief. In the regression, LPT, HPT and FPT are dummy variables which equal 1 if the agent belonged to corresponding treatments. Compared to the allocation in LPT, agents in ZPT allocated significantly less to the principals. In contrast, there is no significant difference in the allocation in LPT and the other two higher power treatments, which deviates from Hypothesis 2. Regression results also suggest that agents of Han nationality give significant less to principals compared to agents of other ethnic groups, suggesting a greater preference for fairness.

Table 2. OLS regression on agents' mean allocation to principals in aggregated rounds

	(1) Rounds 1-11	(2) Rounds 1-11	(3) Rounds 4-11	(4) Rounds 4-11
ZPT	-10.171***	-10.719***	-11.580***	-12.120***
	(2.388)	(2.403)	(2.465)	(2.484)
HPT	2.006	2.438	2.652	3.030
	(2.068)	(2.148)	(2.135)	(2.220)
FPT	2.212	2.431	3.634*	3.660*
	(2.035)	(2.097)	(2.112)	(2.179)
Age		0.447		0.406
		(0.442)		(0.458)
Male		-0.374		-0.004
		(1.578)		(1.636)
Han		-8.730***		-8.639***
		(2.604)		(2.692)
Religious		-1.256		0.642
		(3.655)		(3.779)
Constant	42.094***	41.155***	42.807***	42.362***
	(1.462)	(8.883)	(1.510)	(9.191)
Adj R^2	0.155	0.196	0.203	0.238
N	165	157	164	156

Note: Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Male, Han, Religious are dummy variables which have the value 1 if an agent is a male, is Han nationality, is religious, respectively.

In addition, similar results are reached when comparing the fraction of 30 or 60 allocations to the principals. Figure 3 compares the fraction dividing 30 or 60 in rounds 1 to 11 among treatments. The fraction of 30 allocated to the principals in ZPT, for instance, is 58.8%. In other treatments, this fraction is much smaller, at about 18%. In terms of allocating 60 to the principals, this fraction rises as power increases, from 6.6% in ZPT to 26.4% in FPT. Equally allocating the endowment indicates a strong fairness preference, while allocating 60 to the principals suggests the opposite. As shown in Figure 3, the agents seem to display a binary response to whether they might be fired, as allocating 30/60 significantly decreases/increases once there is some probability they might be fired. However, there is no significant difference as to the fraction of 30/60 allocations among treatments that include the possibility to terminate agents.

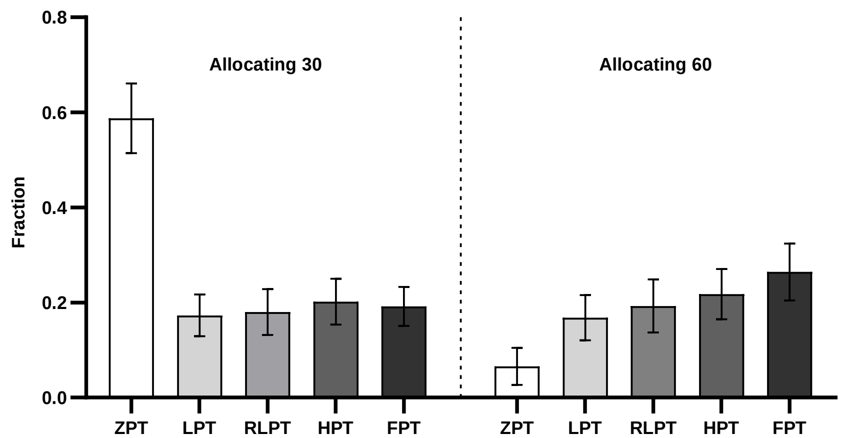

Figure 3. Fraction of allocating 30/60 to the principals among treatments. Error bars are ±1 SE.

In general, we find that agents only respond to the fact that they might be fired, rather than the increasing certainty that they might be fired. This is largely inconsistent with our Hypothesis 2 prediction. In contrast to Hypothesis 2, agents appear to be insensitive to the probability that they might be fired.

5.2 Awareness of Objective Firing Probability of Agent

Finally, we investigate whether agents might behave differently if they were aware that their principal was trying to fire them, even when these attempts are unsuccessful. One reason behavior might change is that this information gives agents a clearer sense of the probability of termination, helping to narrow any gap between objective and subjective probabilities. As shown in Figure 2, however, there is no significant difference in the amount allocated to principals in LPT and RLPT across either rounds 1-11 (p=0.9242) or rounds 4-11 (p=0.8715).

6. Discussion and Conclusion

Delegation is prevalent in human social interactions, despite principals and agents often having misaligned preferences, and principals typically retaining only limited post-delegation power over their agents. While substantial research seeks to understand principals' delegation behaviors, ours is the first to focus on how delegates' decisions change with changes in principals' power to terminate employment relationships with agents.

The experiment presented here, a dictator game where the dictator (principal) delegates the division decision to an agent, shows that agents act in the principal's interest if the principal has even limited power to terminate their relationship with the agent. In sharp contrast, when principals do not have any power to terminate the relationship, agents generally treat the principal and recipient equally. Thus, it appears that agents hold a binary view of a principal's power to implement severe sanctions. As long as a principal has some power to impose a severe sanction, agents will follow the principal's selfish preference. Otherwise, they will follow their private preference.

Our results are in line with Laske et al.(2018), who argues that the insensitivity to variations in objective probabilities could be driven by decision heuristics which largely depend on the severity of punishment. In addition, there is literature on punishment suggesting that the deterrence of undesired behaviors is dominated by the severity of a sanction rather than the objective sanction probability (Anderson & Stafford, 2003; Block & Gerety, 1995; Engel & Nagin, 2015; Friesen, 2012). The potential termination is a severe sanction that does not change across treatments, though the probability of receiving it does. Our participants seem only to respond to the presence of a possible sanction, regardless of the probability with which it is enforced. An explanation for insensitivity to the probability of punishment is that the presence of a possible sanction can crowd-out prosocial attitudes (Gneezy & Rustichini, 2000a, 2000b; Li et al., 2009). In our study, agents might make allocation decisions in a "social" frame when they cannot be fired. However, once firing incentives are introduced, they shift to a "business" frame in which prosocial attitudes are extinguished regardless of the probability with which one can be terminated. This is consistent with the lack of responsiveness to changes in the probability of being fired we observe in our data.

Our study is limited in several ways. One is that, in real-world economic contexts, there may be a greater number of agents willing to work with the principal. Greater competition among agents for positions with principals would seem to increase their incentive to do the principals' bidding. More importantly, in natural environments a recipient who is unfairly treated might try to punish either the principal or agent. Future research in this direction would be profitable.

A message of our study is that when principals have even limited ability to fire, agents will accommodate principals' selfish interests. However, in some circumstances, principals would like their agents to consider both the recipient's preferences as well. For example, in high-tech companies, the board (principal) would prefer that managers (agent) care about workers' benefits. Reasons include that more satisfied workers may be more productive, innovative, and less likely to engage lawsuits against the company(Judge, Thoresen, Bono, & Patton, 2001; Koys, 2001; Shipton, West, Parkes, Dawson, & Patterson, 2006). In view of this, our results are convergent evidence for the importance of clearly communicating to delegates the desires of principals. Failing to do so may lead to unintended decisions that are both welfare-reducing and ethically questionable.

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Appendix A: Analysis of allocation between treatments by round

Table 1. Statistic test of mean amount allocated to principals between treatments by round

	Mean allocation to principal				Statistical comparison between treatments							
					ZPT VS LPT		LPT VS HPT		LPT VS FPT		HPT VS FPT	
Round(s)	ZPT (N=27)	LPT (N=45)	HPT (N=45)	FPT (N=48)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
1	34.06	39.43	40.71	40.05	0.0327	0.0106	0.6086	0.7410	0.8032	0.9287	0.7866	0.6251
2	33.69	40.04	40.97	41.12	0.0290	0.0009	0.7449	0.9453	0.7111	0.8136	0.9610	0.8921
3	33.59	41.27	41.43	42.15	0.0045	0.0023	0.9557	0.8732	0.7448	0.8565	0.7962	0.6623
4	32.32	39.99	43.57	43.41	0.0022	0.0003	0.1848	0.3487	0.2207	0.3336	0.9514	0.8938
5	30.82	42.02	43.61	47.79	0.0002	0.0001	0.5689	0.6703	0.0441	0.0515	0.1052	0.1033
6	33.33	41.84	45.33	47.15	0.0019	0.0007	0.2119	0.2275	0.0536	0.0604	0.4723	0.3551
7	31.48	42.68	45.38	48.03	0.0001	0.0000	0.3449	0.4078	0.0443	0.0422	0.3227	0.3498
8	30.98	44.19	48.13	47.99	0.0000	0.0000	0.1030	0.0848	0.1136	0.1058	0.9547	0.9716
9	29.46	44.43	47.25	48.37	0.0000	0.0000	0.2575	0.2353	0.1089	0.1038	0.6623	0.6643
10	31.72	43.63	47.91	48.09	0.0000	0.0004	0.1457	0.0970	0.1257	0.0693	0.9514	0.6601
11	29.70	45.72	49.49	50.50	0.0000	0.0000	0.1461	0.2468	0.0600	0.0732	0.6774	0.4751
1-11	31.92	42.09	44.10	44.31	0.0000	0.0000	0.3600	0.3285	0.3040	0.3115	0.9229	0.8534
4-11	31.23	42.81	45.46	46.44	0.0000	0.0000	0.2404	0.1903	0.1041	0.0770	0.6623	0.5199

Notes: (a) P value of two-tailed t test; (b) P value of Mann-Whitney rank-sum test. In ZPT, LPT, HPT and FPT, if the principals select other agents, the probability they succeed is 0, 0.1, 0.5, 1 respectively. In the table, Bonferroni-corrected critical value is 0.00465 when original critical value is 0.05 in aggregated Periods 1-11 and 4-11.

Appendix B: Instructions

■ Instructions for Full-power treatment

General Instructions

Thank you for participating in today's experiment! You have already gained a ￥10 participation fee. In the experiment, you may earn more payoff, depending on your decision. After the experiment, the experimenter will pay the corresponding payoffs in cash.

In this experiment, you will be involved in two experimental tasks, each for 12 rounds of decision making. When all tasks are finished, one of the participants will *randomly select one period in one of the experimental tasks to pay*. All participants will only receive the payment in this round and will not be paid for other rounds. *The payoff you receive in this round plus the participation fee is your total payoff in this experiment*. Since you can't know which round of experiment task will be chosen to pay before the end of the experiment, please take each round of experiment seriously.

During the experiment, please do not talk, communicate with other participants. Participants who intentionally violate the rules will be disqualified from participating and will not receive any experiment payoff.

To ensure that the experiment is carried out in an orderly manner, the experimenter will temporarily keep your mobile phone. Please mute your phone (cancel the alarm if you have an alarm) and put it in the envelope on the table. After the experimenter takes away the envelope, you will get the instruction for task 1. Please read the lab instructions carefully to understand how to participate in today's lab tasks. In the experiment, if you have any questions, please raise your hand and the experimenter will come to answer.

Instructions

Role and experiment ID

In this experiment, you will be randomly divided into one of the three roles A, B, and C. Among the 15 participants, the number of participants divided into role A will be 6 and the experiment ID will be A1 to A6 respectively. The number of participants divided into role C also will be 6 and the experiment ID will be C1 to C6 respectively; The number of participants divided into role B will be 3 and the experiment ID will be B1 to B3 respectively. Your role and experiment ID remain the same in the experiment.

Decision task and payoff

The experiment consists of 12 rounds of decision making. At the start of each round, each participant A will randomly form a group with a participant C. Participant A in each group will start with an initial endowment of ￥60 and can give some money from the initial endowment to the group partner C. Each A will select one of the three participants B to split for their group, and each B can be selected by multiple As. B will decide the amount allocated to C, and the remaining amount will belong to A, which determines the payoff of A and C in this round.

In a round, B’s payoff consists of two parts. At the start of each round, B will receive a fixed payoff of ￥30. In addition, each B will earn or lose an extra payoff, depending on the number of As that have selected a given B as the group allocator. For each A who has selected a given B as group allocator, this B will earn ￥7.2; For each A who has not selected a given B as group allocator, this B will lose ￥3.6. For example: suppose there are 2 As who choose a given B in a round. Since there are 6 As in total, the extra payoff B earns in this round is 7.2×2=￥14.4, the payoff participant B loses in this round is 3.6 × (6-2)) = ￥14.4. Thus, this B's payoff in this round is 30 + (14.4-14.4) = 30+0 = ￥30.

Each round consists of three steps. A detailed description of each step is as follows:

- Step 1: Determining the allocators

In first round, the computer will randomly select one B as the allocator for each group. In rounds other than the first, each A will select the group allocator by clicking the experiment number of B on the screen.

- Step 2: B allocate for As

Firstly, each B's will see the number of As who select him/her as group allocator on their screen. Then, each B will enter the amount allocated to C (￥0-￥60, including ￥0 and ￥60) for each group sequentially to determine how to allocate ￥60 between A and C in the corresponding group.

- Step 3: Show payoffs in a given round

Once all Bs have made their allocation decision, your payoff in this round will be shown on your screen. For each B, you will also see your allocation results as well as the allocator selection decision of each A.

■ Instructions for Half Power Treatment (p=0.5)

General Instructions

Thank you for participating in today's experiment! You have already gained a ￥10 participation fee. In the experiment, you may earn more payoff, depending on your decision. After the experiment, the experimenter will pay the corresponding payoffs in cash.

In this experiment, you will be involved in two experimental tasks, each for 12 rounds of decision making. When all tasks are finished, one of the participants will *randomly select one period in one of the experimental tasks to pay*. All participants will only receive the payment in this round and will not be paid for other rounds. *The payoff you receive in this round plus the participation fee is your total payoff in this experiment*. Since you can't know which round of experiment task will be chosen to pay before the end of the experiment, please take each round of experiment seriously.

During the experiment, please do not talk, communicate with other participants. Participants who intentionally violate the rules will be disqualified from participating and will not receive any experiment payoff.

To ensure that the experiment is carried out in an orderly manner, the experimenter will temporarily keep your mobile phone. Please mute your phone (cancel the alarm if you have an alarm) and put it in the envelope on the table. After the experimenter takes away the envelope, you will get the instruction for task 1. Please read the lab instructions carefully to understand how to participate in today's lab tasks. In the experiment, if you have any questions, please raise your hand and the experimenter will come to answer.

Instructions

Role and experiment ID

In this experiment, you will be randomly divided into one of the three roles A, B, and C. Among the 15 participants, the number of participants divided into role A will be 6 and the experiment ID will be A1 to A6 respectively. The number of participants divided into role C also will be 6 and the experiment ID will be C1 to C6 respectively; The number of participants divided into role B will be 3 and the experiment ID will be B1 to B3 respectively. Your role and experiment ID remain the same in the experiment.

Decision task and payoff

The experiment consists of 12 rounds of decision making. At the start of each round, each participant A will randomly form a group with a participant C. Participant A in each group will start with an initial endowment of ￥60 and can give some money from the initial endowment to the group partner C. Each A will select one of the three participants B to split for their group, and each B can be selected by multiple As. B will decide the amount allocated to C, and the remaining amount will belong to A, which determines the payoff of A and C in this round.

In a round, B's payoff consists of two parts. At the start of each round, B will receive a fixed payoff of ￥30. In addition, each B will earn or lose an extra payoff, depending on the number of As that have selected a given B as the group allocator. For each A who has selected a given B as group allocator, this B will earn ￥7.2; For each A who has not selected a given B as group allocator, this B will lose ￥3.6. For example: suppose there are 2 As who choose a given B in a round. Since there are 6 As in total, the extra payoff B earns in this round is 7.2×2=￥14.4, the payoff participant B loses in this round is 3.6 × (6-2)) = ￥14.4. Thus, this B's payoff in this round is 30 + (14.4-14.4) = 30+0 = ￥30.

Each round consists of three steps. A detailed description of each step is as follows:

- Step 1: Determining the allocators

In first round, the computer will randomly select one B as the allocator for each group. In rounds other than the first, each A will select the group allocator by clicking the experiment number of B on the screen. There is a 50% chance that A's decision to select a B as the group allocator in a round will take effect. Then, whether A's allocator selection decision has taken effect or not will be shown to A. Two possible outcomes are as follows:

Outcome 1: The allocator selection decision has taken effect and the selected B will become the group allocator in this round.

Outcome 2: The allocator selection decision has not taken effect and the allocator from the group that A belong to in previous round will continue to be the allocator for the group that A belong to in current round.

- Step 2: B allocate for As

Firstly, each B's will see the number of As who select him/her as group allocator on their screen. Then, each B will enter the amount allocated to C (￥0-￥60, including ￥0 and ￥60) for each group sequentially to determine how to allocate ￥60 between A and C in the corresponding group.

- Step 3: Show payoffs in a given round

Once all Bs have made their allocation decision, your payoff in this round will be shown on your screen. For each B, you will also see your allocation results as well as the allocator selection decision of each A.

- Instructions for (Revealed) Low Power Treatment (p=0.1)

General Instructions

Thank you for participating in today's experiment! You have already gained a ￥10 participation fee. In the experiment, you may earn more payoff, depending on your decision. After the experiment, the experimenter will pay the corresponding payoffs in cash.

In this experiment, you will be involved in two experimental tasks, each for 12 rounds of decision making. When all tasks are finished, one of the participants will *randomly select one period in one of the experimental tasks to pay*. All participants will only receive the payment in this round and will not be paid for other rounds. *The payoff you receive in this round plus the participation fee is your total payoff in this experiment*. Since you can't know which round of experiment task will be chosen to pay before the end of the experiment, please take each round of experiment seriously.

During the experiment, please do not talk, communicate with other participants. Participants who intentionally violate the rules will be disqualified from participating and will not receive any experiment payoff.

To ensure that the experiment is carried out in an orderly manner, the experimenter will temporarily keep your mobile phone. Please mute your phone (cancel the alarm if you have an alarm) and put it in the envelope on the table. After the experimenter takes away the envelope, you will get the instruction for task 1. Please read the lab instructions carefully to understand how to participate in today's lab tasks. In the experiment, if you have any questions, please raise your hand and the experimenter will come to answer.

Instructions

Role and experiment ID

In this experiment, you will be randomly divided into one of the three roles A, B, and C. Among the 15 participants, the number of participants divided into role A will be 6 and the experiment ID will be A1 to A6 respectively. The number of participants divided into role C also will be 6 and the experiment ID will be C1 to C6 respectively; The number of participants divided into role B will be 3 and the experiment ID will be B1 to B3 respectively. Your role and experiment ID remain the same in the experiment.

Decision task and payoff

The experiment consists of 12 rounds of decision making. At the start of each round, each participant A will randomly form a group with a participant C. Participant A in each group will start with an initial endowment of ￥60 and can give some money from the initial endowment to the group partner C. Each A will select one of the three participants B to split for their group, and each B can be selected by multiple As. B will decide the amount allocated to C, and the remaining amount will belong to A, which determines the payoff of A and C in this round.

In a round, B's payoff consists of two parts. At the start of each round, B will receive a fixed payoff of ￥30. In addition, each B will earn or lose an extra payoff, depending on the number of As that have selected a given B as the group allocator. For each A who has selected a given B as group allocator, this B will earn ￥7.2; For each A who has not selected a given B as group allocator, this B will lose ￥3.6. For example: suppose there are 2 As who choose a given B in a round. Since there are 6 As in total, the extra payoff B earns in this round is 7.2×2=￥14.4, the payoff participant B loses in this round is 3.6 × (6-2)) = ￥14.4. Thus, this B's payoff in this round is 30 + (14.4-14.4) = 30+0 = ￥30.

Each round consists of three steps. A detailed description of each step is as follows:

- Step 1: Determining the allocators

In first round, the computer will randomly select one B as the allocator for each group. In rounds other than the first, each A will select the group allocator by clicking the experiment number of B on the screen. There is a 10% chance that A's decision to select a B as the group allocator in a round will take effect. Then, whether A’s allocator selection decision has taken effect or not will be shown to A. Two possible outcomes are as follows:

Outcome 1: The allocator selection decision has taken effect and the selected B will become the group allocator in this round.

Outcome 2: The allocator selection decision has not taken effect and the allocator from the group that A belong to in previous round will continue to be the allocator for the group that A belong to in current round.

- Step 2: B allocate for As

Firstly, each B's will see the number of As who select him/her as group allocator on their screen. *(“Meanwhile, if A has failed to replace the B being selected in last round, this B will also see A’s failed attempt on the screen”: this only appear in RLPT, but not in LPT)* Then, each B will enter the amount allocated to C (￥0-￥60, including ￥0 and ￥60) for each group sequentially to determine how to allocate ￥60 between A and C in the corresponding group.

- Step 3: Show payoffs in a given round

Once all Bs have made their allocation decision, your payoff in this round will be shown on your screen. For each B, you will also see your allocation results as well as the allocator selection decision of each A.

■ Instructions for No-power treatment

General Instructions

Thank you for participating in today's experiment! You have already gained a ￥10 participation fee. In the experiment, you may earn more payoff, depending on your decision. After the experiment, the experimenter will pay the corresponding payoffs in cash.

In this experiment, you will be involved in two experimental tasks, each for 12 rounds of decision making. When all tasks are finished, one of the participants will *randomly select one period in one of the experimental tasks to pay*. All participants will only receive the payment in this round and will not be paid for other rounds. *The payoff you receive in this round plus the participation fee is your total payoff in this experiment*. Since you can't know which round of experiment task will be chosen to pay before the end of the experiment, please take each round of experiment seriously.

During the experiment, please do not talk, communicate with other participants. Participants who intentionally violate the rules will be disqualified from participating and will not receive any experiment payoff.

To ensure that the experiment is carried out in an orderly manner, the experimenter will temporarily keep your mobile phone. Please mute your phone (cancel the alarm if you have an alarm) and put it in the envelope on the table. After the experimenter takes away the envelope, you will get the instruction for task 1. Please read the lab instructions carefully to understand how to participate in today's lab tasks. In the experiment, if you have any questions, please raise your hand and the experimenter will come to answer.

Instructions

Role and experiment ID

In this experimental, you will be randomly divided into one of the three roles A, B, and C. Among the 15 participants, the number of participants divided into role A will be 6 and the experiment ID will be A1 to A6 respectively. The number of participants divided into role C also will be 6 and the experiment ID will be C1 to C6 respectively; The number of participants divided into role B will be 3 and the experiment ID will be B1 to B3 respectively. Your role and experiment ID remain the same in the experiment.

Decision task and payoff

The experiment consists of 12 rounds of decision making. At the start of each round, each participant A will randomly form a group with a participant C. Participant A in each group will start with an initial endowment of ￥60 and can give some money from the initial endowment to the group partner C. Each B will be randomly selected by the computer to split the endowment for two groups. B will decide the amount allocated to C, and the remaining amount will belong to A, which determines the payoff of A and C in this round.

In a round, each B will receive a fixed payoff of ￥30.

Each round consists of three steps. A detailed description of each step is as follows:

- Step 1: Determining the allocators

  In each round, the computer will randomly select one B as the allocator for each group.

- Step 2: B allocate for As

  Each B will enter the amount allocated to C (￥0-￥60, including ￥0 and ￥60) for each group sequentially to determine how to allocate ￥60 between A and C in the corresponding group.

- Step 3: Show payoffs in a given round

Once all Bs have made their allocation decision, your payoff in this round will be shown on your screen. For each B, you will also see your allocation results.