Receiving Credit

Argenton, Cedric; Potters, Jan; Yang, Yadi

Publication date:
2022

Document Version
Early version, also known as pre-print

Link to publication in Tilburg University Research Portal

Citation for published version (APA):
Argenton, C., Potters, J., & Yang, Y. (2022). *Receiving Credit: On Delegation and Responsibility*. (CentER Discussion Paper; Vol. 2022-004). CentER, Center for Economic Research.

CentER

Discussion Paper

No. 2022-004

RECEIVING CREDIT: ON DELEGATION AND RESPONSIBILITY

By

Cédric Argenton, Jan Potters, Yadi Yang

17 February 2022

ISSN 0924-7815
ISSN 2213-9532

TILBURG UNIVERSITY

Receiving credit: On delegation and responsibility*

Cédric Argenton[1], Jan Potters[1†], Yadi Yang[2]

[1] Department of Economics, CentER, Tilburg University; Tilburg, Netherlands.
[2] Economics Experimental Lab, Nanjing Audit University; Nanjing, China.

February 16, 2022

Abstract

Evidence has shown that blame for a "bad" decision can be shifted by delegating the decision to someone else. We conduct experiments to examine whether the reverse is also true: Does one receive credit for taking a "good" decision as compared to delegating the decision to someone else? Our results indicate that the answer is affirmative. A person receives higher rewards when she makes a fair decision herself than when a delegate does. This indicates that responsibility attribution is a double-edged sword that applies to both bad and good outcomes.

JEL code: C92, D90
Keywords: Delegation, Reward, Responsibility

*We are grateful for valuable comments received from Alex Possajennikov, Randolph Sloof, Sigrid Suetens, Wieland Müller, as well as from participants of the ESA global round-the-clock virtual meeting 2020. The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in the paper. Yadi Yang gratefully acknowledges financial support received through a grant from Qualcomm Inc. to the Tilburg Law and Economics Center (TILEC). The ideas and opinions expressed in the paper are exclusively the authors'.

†Corresponding author: Jan Potters, j.j.m.potters@uvt.nl; Warandelaan 2, 5037AB, Tilburg University, Tilburg, the Netherlands.

1 Introduction

The notion that the responsibility for unattractive decisions can be shifted to others has a long tradition. "Princes ought to leave affairs of reproach to the management of others," Machiavelli (1532) wrote in The Prince (Chapter XIX). The effectiveness of blame-shifting is illustrated, *inter alia*, in economic experiments by Bartling and Fischbacher (2012). They show that decision-makers can avoid being punished for an unfair decision by delegating the decision to another person. Machiavelli (1532) also proposed that favorable decisions should not be delegated: "Princes ought to keep affairs of grace in their own hands". In the current paper, we study the effectiveness of this latter strategy. Do decision-makers receive more credit when making favorable decisions themselves rather than delegating them to others?

To address this question we conduct an economic experiment with a four-player delegated dictator game as implemented by Bartling and Fischbacher (2012). The first player (the dictator) can decide between an equal (fair) and an unequal (unfair) allocation that determines the payoffs of four players. Instead of making the decision herself, she can also pass the decision to the second player (the delegate) who then chooses between the two allocations. The monetary payoffs of the first and second players are perfectly aligned. The fair allocation divides the total amount equally among all four players, whereas the unfair allocation gives higher payoffs to the dictator and the delegate but lower payoffs to the other two players (the receivers). In Bartling and Fischbacher (2012) the receivers can decide to punish the dictator or the delegate, or both. In our experiments, we allow the receivers to choose to reward, rather than punish, the dictator or the delegate, or both. This allows us to explore whether credit taking is symmetric to blame avoidance.

Bartling and Fischbacher (2012) propose a model of responsibility attribution to explain how the receivers punish the dictator, the delegate, or both, in case the unfair allocation is chosen and how this depends on who made the final decision. We show that the model naturally extends to the case of rewards. If the fair allocation is chosen, responsibility is attributed in proportion to which player—dictator or delegate—contributed more to this outcome occurring. The model predicts that the dictator will be rewarded more when choosing the fair allocation herself as compared to the case where the fair allocation is chosen by the delegate. The model also predicts that in the latter case the delegate is rewarded more than the dictator. One can say that the responsibility-shifting model predicts that the rewards in response to fair allocations are a mirror image of the punishments in response to unfair allocations.

Whether this symmetry (or mirroring) of rewards and punishments will hold empirically is less obvious than it may seem. There is evidence that punishment in response to "bad" behavior is stronger and more prevalent than rewards in response to "good" behavior (Offerman, 2002; Croson and Konow, 2009; Kube et al., 2013). It cannot be ruled out that responsibility attribution also exhibits asymmetric patterns and causes the incentives to shift blame to be different from those to take credit. In fact, in political science, it is often argued that politicians and legislators have much stronger incentives to avoid blame than to claim credit. This is sometimes attributed to a "negativity bias" on the part of voters and public opinion which is rooted in the asymmetric treatment of gains and losses (Weaver, 1986). Our experiment allows us to explore any asymmetric patterns of responsibility attribution.

We find evidence in support of the responsibility attribution model in the presence of rewards. In our main treatment with rewards, the dictator receives a lower reward if the dictator delegates and the delegate chooses the fair allocation instead of the dictator directly choosing the fair allocation. Also on other accounts the responsibility model organizes the pattern of rewards well. The main departure is that both the dictator and the delegate get a positive reward even in case the unfair allocation is chosen. We show, however, that once a "baseline" level of rewards is accounted for, departures from that level, which can then be interpreted as either rewards or punishments, are in line with responsibility attribution.

Several experimental studies show that individuals often choose to delegate decisions which may be considered to be unfair. This has been documented for allocation decisions in the dictator game (Hamman et al., 2010; Coffman, 2011; Bartling and Fischbacher, 2012; Choy et al., 2016; Gawn and Innes, 2019b) and the ultimatum game (Fershtman and Gneezy, 2001), but also for other types of unfavorable decisions such as communicating bad information (Garofalo and Rott, 2018), lying (Erat, 2013; Kandul and Kirchkamp, 2018; Gawn and Innes, 2019a), or bribing (Drugov et al., 2014). A key finding in these games is that delegation is often effective in diverting punishment. For example, in dictator games with a punishment possibility, the principal receives a lower punishment in case an unfair allocation is chosen by a delegate rather than by the principal (Coffman, 2011; Bartling and Fischbacher, 2012; Oexl and Grossman, 2013). Similarly, in ultimatum games unfair offers are found to be accepted more frequently in case they are made by a delegate than in case they are directly made by the principal (Fershtman and Gneezy, 2001; Choy et al., 2016).

Our paper contributes to the literature by examining reward behavior in response to the delegation of (fair) decisions. The literature has focused on punishments and there are few studies on rewards. One exception is Coffman (2011) who conducts a framed field experiment and finds that rewards of a charitable behavior (donating mosquito nets) decrease in case the role of an intermediary (a charity) is made more salient. Closer to our study is Eisenkopf and Fischbacher (2015) who study trust (investment) games in which an investor can directly transfer money to a trustee or delegate the decision to another investor. Delegation of the investment decision also generates an efficiency gain or loss which varies across treatments. The results show that the investor who makes the actual investment decision is rewarded more by the trustee. Trustees, however, fail to take the (in)efficiency of delegation into account and do not display a more sophisticated reward behavior that takes people's responsibility into account.

Our paper is also related to experiments papers studying responsibility attribution in gift-exchange games. These studies investigate the worker's effort provision in gift-exchange games when the wage-setting decision is made by the employer or delegated to either a neutral agent, a random device, or an agent whose payoff is related to the employer's. Charness (2000) finds that workers in a gift-exchange game respond to identical levels of wages with lower efforts when the wages are set by a neutral agent than when the wages are determined by a random device, suggesting a possible "responsibility-alleviation" effect. Charness (2004) and Maximiano et al. (2013) find that workers respond with lower efforts when a low wage is "intentionally" set by the employer than when it is delegated to either a random device or a neutral agent, which is similar to "punishing" unfavorable wages when they are directly made by the employer than when they are delegated. They also find that workers' effort provision in response to high levels of wages is higher when the wage is set by the employer than when it is delegated. Similar results are observed when the agent's payoff is proportional to the employer's payoff instead of being purely neutral (Maximiano et al., 2013).

The rest of the paper is organized as follows. Section 2 explains the experimental design and procedural details. Section 3 predicts reward and punishment patterns based on the responsibility attribution model. Section 4 reports the behavioral patterns in reward and punishment as well as the delegation and allocation decisions. Section 5 provides explanations for the observed deviations from predictions in treatments with reward. Section 6 provides concluding remarks.

2 Experimental Design

In the experiment, we conduct a delegated dictator game with a similar design as Bartling and Fischbacher (2012). There are three roles in the game: dictator (Player A), delegate (Player B), and recipient (Player C). Four players are matched together to form one group comprising one A, one B, and two Cs. A decides the allocation of 20 points among the four players by choosing between two different allocation options[1]: 1) assigning 5 points to each player (the fair allocation) and 2) assigning 9 points each to A and B and 1 point each to both Cs (the unfair allocation). A has the option to delegate the allocation decision to B. If A chooses to delegate, B makes the allocation decision on behalf of A. The material interests of A and B are aligned and opposite to Cs'.

In the baseline treatment (*Baseline*), we implement the delegated dictator game without reward or punishment. Cs cannot make any decisions once A or B has chosen the allocation. In order to study responsibility attribution, we run a treatment with the option for Cs to reward A and/or B in the same delegated dictator game (*D&R*). The design of the *D&R* treatment is similar to the punishment set-up in Bartling and Fischbacher (2012): Cs are given the option to increase the payoffs of A and B by assigning extra points. They can choose to assign up to a total of seven points to either A, B, or both. One of the two reward plans is randomly selected to be implemented. There are two differences from the way punishment is implemented by Bartling and Fischbacher (2012). First, rewarding is monetarily costless in our experiment. Unlike punishments in response to an unfair allocation, rewards in response to a fair allocation move the outcome away from an equal distribution, which can already be deemed costly even if not in monetary terms. Second, the selected C cannot choose to assign points to the other C player. We wanted to prevent that Cs reward each other in order to re-balance the allocation since such a motivate is also absent in case of punishments.

In order to compare the reward of delegated decisions with that of pure allocation decisions, we include a treatment with the reward option but no delegation (*NoD&R*). In this treatment, A chooses between the two allocations, while B does not make any decision. After C players have decided whether and how to assign extra points to either A, B, or both, using the same rewarding mechanism as in the *D&R* treatment, one of them is randomly selected for implementation.

We conduct two additional variants of the *D&R* treatment: *Asymmetric* and *Random*, which mirror the ones in Bartling and Fischbacher (2012). In the *Asymmetric* treatment, if A chooses not to delegate, she can only choose the unfair allocation. If A delegates the decision, B can choose between the fair and the unfair allocations. In this treatment, delegation by A can unambiguously be interpreted as a 'kind' action by A. In the *Random* treatment, instead of delegating to B, A can choose to delegate to a die which selects between the two allocations with the same probability as the Bs do in the *D&R* treatment. The goal of these two treatments is to 1) check whether other reward motives than responsibility attri-

[1]The two options are referred to as the fair option and the unfair option respectively by Bartling and Fischbacher (2012).

bution might be at play, and 2) offer a parallel comparison with the corresponding treatments with punishment in Bartling and Fischbacher (2012). The details are discussed in Section 3.

A summary of all five treatments is shown in Table 1.[2]

Table 1: Summary of treatments

	Delegate option	C can reward	A can be fair	Subjects
Baseline	To B	No	Yes	202
D&R	To B	Yes	Yes	201
NoD&R	No	Yes	Yes	201
Asymmetric	To B	Yes	No	200
Random	To die	Yes	Yes	204

The experiment was conducted using the strategy method. In each treatment, Bs have to decide which allocation to choose before they know whether A has chosen to delegate or not. Both Cs have to decide on how many reward points (if any) to assign for all possible scenarios before they know the decisions of A or B and before they know whether their decisions are selected to be implemented. In the *NoD&R* treatment, there are two possible scenarios: A choosing the fair allocation or A choosing the unfair allocation. In treatments with delegation (the *D&R*, *asymmetric*, and *random* treatments), there are four possible scenarios: A choosing the fair allocation and not delegating, A choosing the unfair allocation and not delegating, A choosing to delegate and B choosing the fair allocation, and A choosing to delegate and B choosing the unfair allocation.

The experiment was pre-registered at the AEA RCT Registry (AEARCTR-0006036) and approved by the Tilburg University School of Economics and Management Institution Review Board (IRB EXE 2020-011). The experiment was conducted as an online experiment on Prolific (Palan and Schitter, 2018) in June 2020. The *Baseline*, *D&R*, and *NoD&R* treatments were conducted first. The *asymmetric* and *random* treatments were conducted after we finished collecting data for the above treatments, so that the average probability of Bs choosing between the fair and the unfair allocation in the *D&R* treatment could be implemented for the die in the *Random* treatment. In order to keep the demographic features of subjects as similar as possible to those of Bartling and Fischbacher (2012) (who dealt with university students), we imposed the following restrictions on the subject pool: subjects' age should be between 18 and 30, subjects should

[2]We also ran a treatment with punishment options identical to the one in Bartling and Fischbacher (2012). In this *D&P* treatment, C players can reduce the payoffs of the A player, the B player, or both. The punishment patterns we find replicate those in Bartling and Fischbacher (2012) and support the predictions of the responsibility attribution model. Details can be found in Appendix A.1

be students, and the highest level of education completed should be at least high school. Moreover, we only recruited US residents as subjects. We took measures to minimize the gap in control between an online experiment and a lab experiment. To this effect, we implemented an additional recruitment criterion that the subject's past submissions on the Prolific platform should receive an approval rate of at least 90%.[3] We kept our instructions as close as possible to those of Bartling and Fischbacher (2012), with modifications based on design differences and adjustments for the online implementation. Subjects were requested to complete the same set of practice questions as in Bartling and Fischbacher (2012) to improve their understanding of the instructions. The questions were changed into multiple-choice questions to adapt to online submissions. Subjects were only allowed to proceed if they chose the correct answer at the first attempt. The instructions for the three roles in the *D&R* treatment are shown in Appendix A.3. The experiment took around 15 minutes on average. The experimental points were converted to US dollars using the exchange rate of 5 points = \$1.[4] In addition, each subject also received a fixed participation fee of \$1.1. For the *Baseline*, *D&R*, *D&P*, and *NoD&R* treatments, the average payment was around \$1.96. For the *asymmetric* and *random* treatments, the average payment was around \$2.03.

3 Hypotheses

Our primary interest lies in the reward behavior of the C players. We base our hypotheses on the measure of responsibility proposed by Bartling and Fischbacher (2012). The measure assigns most responsibility for an outcome to a player whose actions had the largest impact on the probability that the outcome occured. Bartling and Fischbacher (2012) find that this measure is a good predictor for the punishments that C players administer to A and B players in case of an unfair outcome. We hypothesize that it also predicts the rewards that C players assign to A and B players in case of a fair outcome. Moreover, we hypothesize that C players will not reward A or B in case of an unfair outcome.

In the *NoD&R* treatment, A is the only player who affects the allocation, and A is assigned full responsibility for a fair outcome. In the other three treatments with delegation and reward (*D&R*, *Asymmetric*, and *Random*), a player (A and B) who is perceived to have increased the probability that the fair allocation is chosen will be held responsible and will receive a corresponding reward. The stronger the

[3]Submissions on the Prolific platform are rejected if the researcher has valid reasons indicating the subject was being negligent, *e.g.* the completion time was exceptionally short, crucial questions were skipped, or the subject failed attention checks.

[4]The payment was transferred to the subjects via the Prolific system. The final payment was in British pounds using the exchange rate automatically adopted by the system.

responsibility, the higher the reward.

More precisely, let C's belief about the probability that A and B choose the fair allocation be denoted by α^+ and β^+, respectively, and let the belief about the probability that A delegates be denoted by δ. In the *D&R* treatment, the *ex ante* probability of the fair allocation is $\alpha^+ + \delta\beta^+$. If A delegates, the *ex post* probability of the fair allocation is β^+. If $\alpha^+ + \delta\beta^+ < \beta^+$, both A and B are responsible for increasing the probability. A's share of contribution to the probability increase is $R^+_{A1} = (\beta^+ - \alpha^+ - \delta\beta^+)/(1 - \alpha^+ - \delta\beta^+)$ and B's share $R^+_{B1} = (1 - \beta^+)/(1 - \alpha^+ - \delta\beta^+)$. If $\beta^+ < (1 + \alpha^+)/(2 - \delta)$, B has a larger impact on the probability increase than A, and *vice versa*. If $\alpha^+ + \delta\beta^+ > \beta^+$, A reduces the probability of a fair outcome by delegating and should not be held responsible, while B is fully responsible since B becomes the only one increasing the probability of the fair outcome.

Table 2: Theoretical responsibility of A and B in treatments with rewards

	A fair	A delegates B fair	
		$\alpha^+ + \delta\beta^+ < \beta^+$	$\alpha^+ + \delta\beta^+ > \beta^+$
D&R			
Responsibility of A	1	R^+_{A1}	0
Responsibility of B	0	R^+_{B1}	1
Asymmetric			
Responsibility of A	-	R^+_{A2}	0
Responsibility of B	-	R^+_{B2}	1
Random			
Responsibility of A	1	1	
Responsibility of B	0	0	

Note: $R^+_{B1} > R^+_{A1}$ if $\beta^+ < (1 + \alpha^+)/(2 - \delta)$; $R^+_{B2} > R^+_{A2}$ if $\beta^+ < 1/(2 - \delta)$; $R^+_{A2} > R^+_{A1}$; $R^+_{B2} < R^+_{B1}$

In the *Asymmetric* treatment, since A can only choose the unfair allocation if she does not delegate, the *ex ante* probability of the fair outcome is $\delta\beta^+$. If A delegates and B chooses the fair allocation, A's share in the probability increase is $R^+_{A2} = (\beta^+ - \delta\beta^+)/(1 - \delta\beta^+)$ and B's responsibility is $R^+_{B2} = (1 - \beta^+)/(1 - \delta\beta^+)$. If $\beta^+ < 1/(2 - \delta)$, B is more responsible for the probability increase than A, and *vice versa*. A's responsibility is always no less than the corresponding case in the *D&R* treatment, while B's responsibility is always no more than the corresponding case in the *D&R* treatment. In the *Random* treatment, following Bartling and Fischbacher (2012)'s assumption that an individual's responsibility is not affected by moves of nature, if A delegates to the die which results in the fair allocation, only A takes full responsibility. The predicted responsibility of A and B in the three treatments with delegation and reward as represented by their influence on the probability of the fair outcome is shown in Table 2.

Let $r_i(j, x)$ denote the reward for i in the *D&R* treatment when the direct allocator who chooses the allocation is j and the chosen allocation is x, with $i, j = A, B$, $x = f, u$. Based on how Cs attribute responsibility for the fair outcome, we have the following predictions about the reward pattern.

Hypothesis 1. $r_A(\cdot, u) = r_B(\cdot, u) = 0$. *The reward for both players is zero when the outcome is unfair, independently of who made the decision.*

Hypothesis 2. $r_A(A, f) > r_A(B, f)$, $r_B(B, f) > r_B(A, f)$. *When the chosen allocation is fair, player i receives a higher reward in case she is the direct allocator than in case she is not.*

Hypothesis 3.

1. $r_A(A, f) > r_B(A, f) = 0$. *If A does not delegate and directly selects the fair allocation, only A is rewarded.*
2. $r_A(B, f) \geq 0$, $r_B(B, f) > 0$; $r_A(B, f) > r_B(B, f)$ *if* $\alpha^+ + \delta\beta^+ < \beta^+$ *and* $\beta^+ > (1 + \alpha^+)/(2 - \delta)$, $r_B(B, f) > r_A(B, f)$ *otherwise. If A delegates and B selects the fair allocation, B receives a higher reward than A for some combinations of probabilities.*
3. $r_A(B, f) \geq r_B(A, f)$, *equality holds if* $\alpha^+ + \delta\beta^+ \geq \beta^+$. *Whether delegation completely reduces the reward for A depends on the specific combinations of probabilities.*

Let $r_i^{AS}(\cdot, \cdot)$ denote the reward for player i in the *Asymmetric* treatment, and $r_i^{RD}(\cdot, \cdot)$ denote the reward for player i in the *Random* treatment. We have the following additional predictions comparing the three treatments.

Hypothesis 4. $r_A^{RD}(A, f) = r_A^{RD}(die, f) > 0$, $r_B^{RD}(A, f) = r_B^{RD}(die, f) = 0$. *In the random treatment, delegating to a die does not affect the reward for any of the players.*

Hypothesis 5. $r^{\cdot}_A(A, f) = r_A^{RD}(die, f) > r_A^{AS}(B, f) \geq r_A(B, f) \geq 0$, *the last two equality hold if* $\alpha^+ + \delta\beta^+ \geq \beta^+$; $r_B(B, f) \geq r_B^{AS}(B, f) > r_B^{RD}(B, f) = 0$, *the first equality holds if* $\alpha^+ + \delta\beta^+ \geq \beta^+$. *If A delegates and the outcome is fair, A's reward in the Random treatment is the highest among all three treatments. A's reward in the Asymmetric treatment is no less than in the D&R treatment. B's reward in the D&R treatment is no less than in the Asymmetric treatment.*

The attribution of responsibility for an outcome to players is not the only possible motive for rewards and punishments. Other motives include a preference for an equal payoff distribution (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000), or a preference to reciprociate behavior which is perceived to be (un)kind (Rabin, 1993; Charness and Rabin, 2002; Dufwenberg and Kirchsteiger, 2004; Falk and Fischbacher, 2006). In some cases the predictions of these alternative models overlap with those of responsibility attribution, in other cases they conflict. We will point out specific instances when we go over the results.

4 Results

4.1 Reward behaviors

We summarize the average reward for each player under all four possible scenarios in each treatment with reward in Table 3. Figure 1 shows the average reward for A and B in all possible scenarios in the *D&R* treatment (Figure 1a) and in the no-delegation benchmark *NoD&R* treatment (Figure 1b). Figure 2 provides more detailed information about individual reward decisions in the four scenarios in the *D&R* treatment. Figure 3 shows the average reward for A and B in all possible scenarios in the *Asymmetric* treatment (Figure 3a) and the *Random* treatment (Figure 3b).

Table 3: Average reward for A and B in treatments with reward

	A unfair		B/die unfair		A fair		B/die fair	
	To A	To B	To A	To B	To A	To B	To A	To B
D&R	0.53	1.67	1.67	0.57	3.24	2.05	2.13	3.16
	(1.19)	(2.33)	(2.21)	(1.17)	(1.90)	(1.43)	(1.36)	(1.86)
NoD&R	0.63	2.45	-	-	3.36	2.28	-	-
	(1.23)	(2.78)	-	-	(1.52)	(1.24)	-	-
Asymmetric	0.59	2.01	2.36	0.81	-	-	2.78	3.1
	(1.22)	(2.51)	(2.65)	(1.45)	-	-	(1.26)	(1.36)
Random	1.01	1.87	1.24	1.79	3.01	1.89	2.76	2.56
	(1.71)	(2.42)	(1.71)	(2.18)	(1.95)	(1.39)	(1.66)	(1.56)

Note: Column 2 ("B/die unfair") and Column 4 ("B/die fair") refers to scenarios in which A delegates and B makes the allocation decision. In Column 2 and Column 4 of the last two rows, average reward when A delegates and the die gives the unfair/fair outcome is shown respectively. Standard errors are shown in parenthesis.

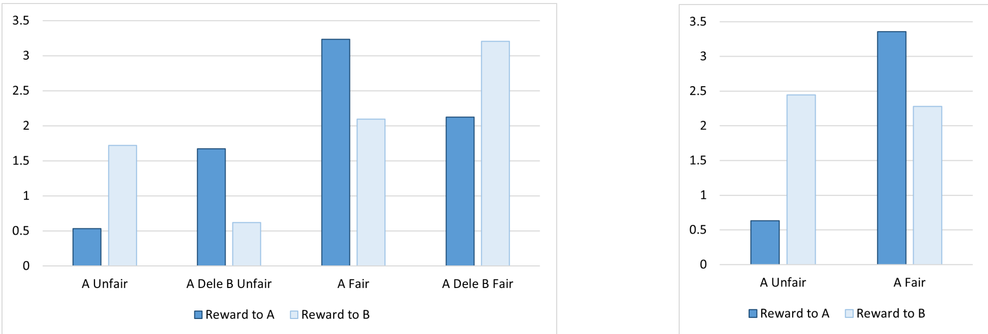
From Table 3, one sees that the reward for both A and B is typically higher after a fair allocation than after an unfair allocation. The only exceptions are the rewards for B in the *NoD&R* treatment and the *Random* treatment. At the same time, in all four treatments, and contrary to Hypothesis 1, both A and B receive a positive reward in each of the four possible scenarios, that is, even if the allocation is unfair and irrespective of whether A or B is the direct allocator. This is not in line with responsibility attribution which predicts a reward to occur only when the outcome is fair and when a player has affected the likelihood of the fair outcome. We will come back to this in Section 5.

Result 1. $r_A(\cdot, u) > 0$, $r_B(\cdot, u) > 0$. *Both players receive a positive reward if the chosen allocation is unfair, regardless of who is the direct allocator.*

This being said, our *D&R* treatment shows a reward pattern across conditions which is in line with responsibility attribution. As predicted by Hypothesis 2, when the outcome is fair, a player receives a significantly higher reward when she is the direct allocator than when she is not. As shown in the last two columns of the first panel in Table 3, A receives a reward of 3.24 when A directly selects the fair allocation, while she only receives a reward of 2.13 when she delegates and the fair allocation is chosen by B. Similarly, B's reward is 2.05 when A directly selects the fair allocation, while it is 3.16 when A delegates and B chooses the fair allocation. Both pairwise comparisons are statistically significant, supported by a two-sided Wilcoxon signed-rank tests with $p < 0.01$

Result 2. $r_A(A, f) > r_A(B, f)$, $r_B(B, f) > r_B(A, f)$. *When the outcome is fair, player i receives higher rewards when she is the direct allocator than when she is not.*

Figure 1: Average reward in *NoD&R* and *D&R* treatment



(a) *D&R* treatment (b) *NoD&R* treatment

The comparisons of rewards between A and B in the *D&R* treatment also exhibit a pattern consistent with Hypothesis 3. If A directly selects the fair allocation, A's reward (3.24) is significantly higher than B's reward (2.05); if A delegates and B selects the fair allocation, B's reward (3.16) is also significantly higher than A's reward (2.13)($p < 0.01$ in a two-sided Wilcoxon signed-rank test for both comparisons). With our observed delegation and allocation decisions of A and B as shown in Table 4 in Section 4.2, we estimate the probability of A being fair to be $\hat{\alpha}^+ = 0.63$, the probability of B being fair to be $\hat{\beta}^+ = 0.66$, and the probability of delegation to be $\hat{\delta} = 0.16$. Since $\hat{\alpha}^+ + \hat{\delta}\hat{\beta}^+ = 0.73 > \hat{\beta}^+$, the comparisons of the corresponding reward between A and B are consistent with Hypothesis 3.2.

We find that A's average reward (2.13) when A delegates and B selects the fair allocation is not significantly different from B's average reward (2.05) when A directly selects the fair allocation ($p = 0.94$ in a two-sided Wilcoxon signed-rank test). Similarly, A's average reward (3.24) when A directly selects the fair allocation is also similar with the reward for B (3.16) when B is the direct allocator for the fair allocation. This pattern can be seen more clearly in Figure 1a. The reward patterns for A and B when A direct selects the fair allocation mirror the reward patterns for B and A when A delegates and B selects the fair allocation. With our estimated $\hat{\alpha}^+$, $\hat{\beta}^+$, and $\hat{\delta}$, since $\hat{\alpha}^+ + \hat{\delta}\hat{\beta}^+ = 0.73 > \hat{\beta}^+$, these comparisons are consistent with Hypothesis 3.3.

Result 3. *1. $r_A(A, f) > r_B(A, f)$. If A does not delegate and directly selects the fair allocation, A receives more reward than B.*

2. $r_B(B, f) > r_A(B, f)$. If A delegates and B selects the fair allocation, B receives more reward than A.

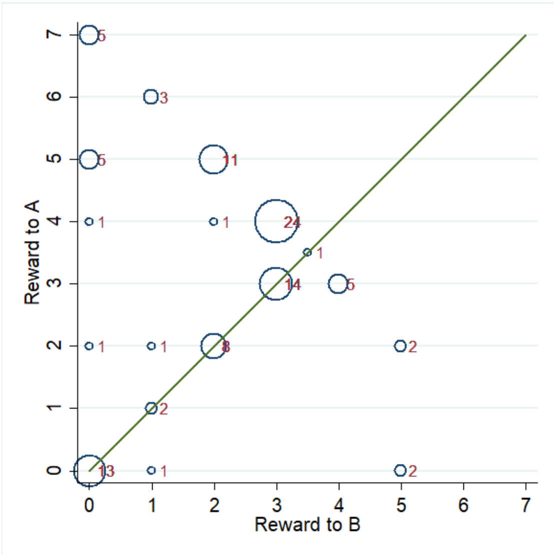
3. $r_A(B, f) = r_B(A, f)$. Given the allocation result, the indirect allocator in the two different scenarios receives the same level of reward.

To summarize our findings in the *D&R* treatment, when looking at pairwise comparisons, we find confirming evidence for our predictions based on responsibility attribution. However, in that treatment, A and B subjects receive a positive reward even when the outcome is unfair, and B receives a positive reward when A does not delegate and B does not make any (consequential) decision.

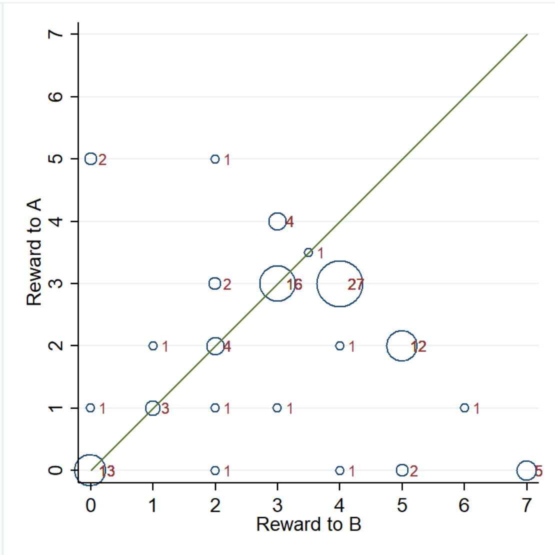
That said, in the *D&R* treatment, these rewards when the outcome is unfair also exhibit a clear and intuitive patterns: 1) $r_A(A, u) < r_A(B, u)$, $r_B(B, u) < r_B(A, u)$. When the outcome is unfair, a player receives a significantly lower reward when she is the direct allocator than when she is not. 2) $r_A(A, u) < r_B(A, u)$. If A does not delegate and directly selects the unfair allocation, A receives less reward than B. 3) $r_B(B, u) < r_A(B, u)$. If A delegates and B selects the unfair allocation, B receives less reward than A. 4) $r_A(B, u) = r_B(A, u)$. When the outcome is unfair, we also find that the indirect allocator receives similar levels of reward. The rewards when the outcome is unfair exhibit a mirror image to the reward pattern when the outcome is fair as summarized in Results 2 and 3.

To rule out that these average patterns result from some coincidental aggregation of heterogeneous decisions, we also have a brief look at the distribution of the individual reward decisions. Figure 2 shows the distribution of each individual C's reward assignment decisions in the *D&R* treatment. The upper two panels show the two scenarios when the fair allocation is chosen. The horizontal axis denotes the reward points assigned to B and the vertical axis denotes the reward points to A. In the upper two panels, a number of reward assignments fall on the 45 degree line, indicating that a fraction of Cs assign the same level of reward to both A and B as long as the outcome is fair, regardless of who directly makes the final allocation decision. Other than that, most Cs assign more rewards to A than to B when A directly selects the fair allocation (Panel 2a) and more rewards to B than to A when A delegates and B selects the unfair allocation (Panel 2b). This confirms that the majority of Cs' decisions when the chosen allocation is fair are in line with the predictions of responsibility-attribution model: the direct decision maker receives a higher reward.

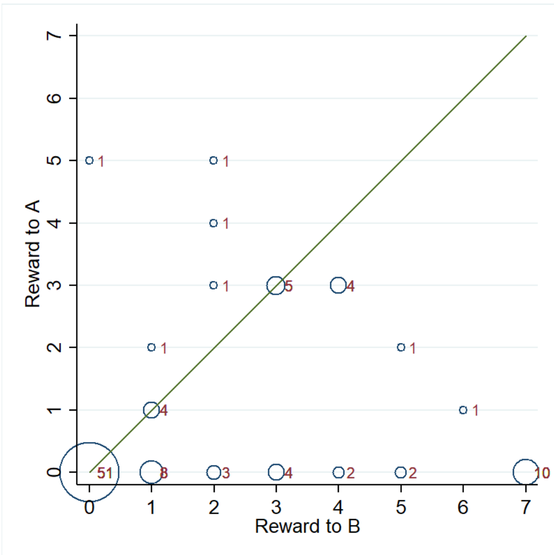
Figure 2: Distribution of individual rewards in *D&R* treatment



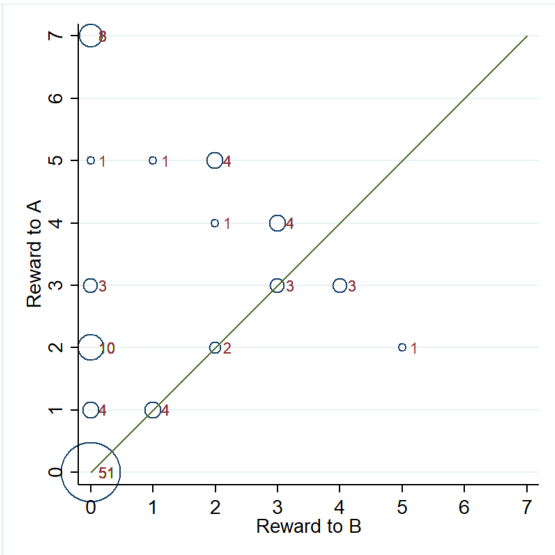
(a) A fair



(b) A delegates B fair



(c) A unfair

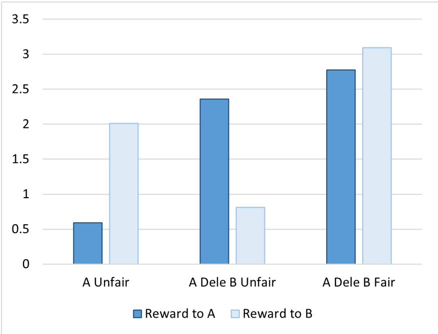


(d) A delegates B unfair

The lower two panels shows the two scenarios when the chosen allocation is unfair. Either when A directly selects the unfair allocation (Panel 2c) or when A delegates and B selects the unfair outcome (Panel 2d), around half of the Cs assign zero reward to both A and B. However, another half of Cs still assign a positive reward even when the unfair allocation is chosen. In Panel 2c, when A does not delegate and directly selects the unfair allocation, a considerable fraction of Cs only assigns a positive reward to B, as can be seen on the horizontal axis. This can be regarded as a “bystander” reward to B for not contributing to the unfair outcome.

In Panel 2d, when A delegates and B chooses the unfair allocation, a large fraction of Cs only rewards A with a positive amount, as shown on the vertical axis. Apart from the "bystander" reward motive, a C player might also reward A if C believes that A could reasonably expect B to choose the fair allocation upon delegation.

Figure 3: Average reward in *Asymmetric* and *Random* treatment



(a) *Asymmetric* treatment

(b) *Random* treatment

In order to further explore the predictions of the responsibility attribution model we now turn to the additional treatments we implemented. In the *Asymmetric* treatment (Figure 3a) and the *Random* treatment (Figure 3b), we observe a pattern reminiscent of the one in *D&R* treatment, as well as some new findings. In the *Asymmetric* treatment, each player receives a significantly lower reward when she directly selects the unfair allocation than when she is not the direct allocator ($p < 0.01$ in one-sided Wilcoxon signed-rank tests). The reward for A and B when A directly selects the unfair allocation mirrors the reward for B and A when A delegates and B selects the unfair allocation. A's reward when A delegates and B selects the unfair allocation (2.36) is slightly higher than the reward for B when A directly selects the unfair allocation (2.01), but the difference is not statistically significant ($p = 0.18$ in a Wilcoxon signed-rank test). Comparing the *Asymmetric* treatment with the *D&R* treatment, A receives 2.78 points of reward when A delegates and B selects the fair allocation in the *Asymmetric* treatment, which is significantly higher than in the *D&R* treatment (2.13) ($p < 0.01$ in a one-sided Mann Whitney u test). A's reward (2.36) when A delegates and B selects the unfair allocation in the *Asymmetric* treatment is also mildly significantly higher ($p < 0.1$ in a one-sided Mann Whitney u test) than in the *D&R* treatment (1.67). This points to the fact that A's action space tends to affect the reward she receives. Cs take into account the fact that delegating is the only possibility to reach the fair outcome and raise the reward for A if A delegates. This pattern is predicted by the responsibility attribution model. It is also compatible with intention-based reciprocity. However, it clearly violates any outcome-based theory of retribution.

Result 4. $r_A^{AS}(B,\cdot) > r_A^{AS}(A,u)$. $r_A^{AS}(B,\cdot) > r_A(B,\cdot)$. *In the Asymmetric treat-*

ment, delegation increases A's reward, compared with the case when A does not delegate.

In the *Random* treatment, A receives a significantly higher reward when the outcome is fair than when the outcome is unfair, both when A directly makes the allocation decision and when A delegates ($p < 0.01$ in one-sided Wilcoson signed-rank tests). Being the direct allocator does not have a significant impact on the level of rewards in the *Random* treatment. When the final allocation is unfair, the reward for A does not differ significantly if A directly makes the decision (1.01) or if A delegates the decision (1.24) ($p = 0.16$ in a two-sided Wilcoxon signed-rank test). When the final allocation is fair, the reward for A if A delegates and B selects the fair option is as high as 2.76, also not significantly different from A's reward (3.01) if A directly selects the fair option ($p = 0.22$ in a two-sided Wilcoxon signed-rank test). In addition, when A delegates and the fair allocation is subsequently selected, A receives a significantly higher reward in the *Random* treatment (2.76) than in the *D&R* treatment (2.13) ($p < 0.01$ in a one-sided Mann-Whitney u test). This provides confirming evidence for our prediction that delegating to a random device does not dilute A's responsibility.

Result 5. $r_A^{RD}(A, x) = r_A^{RD}(die, x), x = u, f$. *Given the allocation result, delegating to a random device does not have a significant impact of the level of reward for A.*

4.2 Delegation and allocation decisions

Table 4 summarizes the delegation and allocation decisions of A and B in all treatments. A large proportion of both As and Bs choose the fair allocation, which is consistent with the common finding from previous dictator games (Engel, 2011). Compared with previous binary choice dictator games, our subjects exhibit a higher degree of generosity, though. In the treatments where B is asked to choose between the two allocations, the fraction of Bs who choose the fair allocation ranges between 66% and 76%. In the treatments where As are asked to choose among the two allocations and delegation, the fraction of As who select the fair allocation ranges between 44% and 60%.

We do not find a significant effect of adding a reward option on the delegation and allocation decisions. Around 10% of As choose to delegate in the *Baseline* treatment, and this fraction increases to 16% in the *D&R* treatment. However, this difference is not significant ($p = 0.62$ with a Fisher's exact test). Compared with the delegation rate of 17% in the no punishment treatment and 55% in the *D&P* treatment of Bartling and Fischbacher (2012), the rate of delegation is relatively low in our experiment. It is also low compared to other studies on delegated dictator games (38% in Oexl and Grossman (2013), 40% in Hamman et al. (2010), and 22.2% in Gawn and Innes (2019b)) and delegated ultimatum games (73% in Fershtman and Gneezy (2001) and 38% in Choy et al. (2016)).

Table 4: Delegation and allocation decisions of A and B

	Unfair (%)	Fair (%)	Delegate (%)	Observations
Baseline				
A	31	60	10	52
B	34	66	-	50
D&R				
A	31	53	16	51
B	34	66	-	50
NoD&R				
A	28	72	-	50
Asymmetric				
A	28	-	72	50
B	24	76	-	50
Random				
A	28	56	16	50

In our treatments with rewards, the low level of delegation is consistent with our finding that delegation decreases A's reward when the outcome is fair and that the majority of A and B choose the fair allocation. Still, on the basis of treatment averages, in *D&R*, A pockets 8.24 if she directly chooses the fair allocation, while she can expect about 8.31 if she delegates. The same applies to the *Random* treatment, where A's expected payoff is 8.01 if she chooses the fair allocation and 8.58 if she delegates. However, in all treatments, directly selecting the unfair allocation gives the highest expected payoff for A (9.53 in *D&R*, 9.59 in *Asymmetric*, 10.01 in *Random*). Clearly, the majority of subjects in our experiment are not maximizing expected payoff (as, of course, is often found in dictator games).

In the *NoD&R* treatment where there is no delegation option and A can only choose between the two allocations, around 72% of A chooses the fair allocation. In the *Asymmetric* treatment where A can only choose between directly selecting the unfair allocation and delegating, around 72% of A choose to delegate. This amount coincides with the sum of the fractions of As who directly choose the fair allocation and who choose to delegate in the three treatments where the delegation option is available (*i.e.* *Baseline*, *D&R* , and *Random*). This is therefore consistent with the possibility that dictators who delegate are those who would choose the fair allocation if that were an option. A similar pattern is observed when comparing a direct dictator game and a delegated dictator game in Gawn and Innes (2019b).

5 Discussion

Our findings offer considerable support for the predictions of the responsibility-attribution model. In the *D&R* treatment, the direct allocator receives more reward for a fair outcome. Delegation followed by a fair choice by B leads to a higher reward for B, but A is still held partially responsible for the outcome. The fact that the reward pattern is affected by the change in A's strategy set in our *Asymmetric* treatment and, in particular, the fact that A gets a higher reward when delegating to an unfair B in that treatment than in the *D&R* treatment, is consistent with both responsibility attribution and intention-based reciprocity. However, our observation that the reward for A is similar whether A makes the decision herself or delegates to a random die in the *Random* treatment provides supporting evidence for the responsibility-attribution argument.

One important deviation from predictions in our treatments with reward is that, on average, both players receive a positive reward regardless of whether the outcome is fair or unfair. Outcome-based inequality aversion does not provide sufficient motives for reward, as any reward to A and/or B distorts the allocation further away from equality with both the fair or unfair outcome. Neither the responsibility attribution model nor the intention-based reciprocity model provides an explanation for this. Positive rewards for both players when A directly selects the fair outcome can be considered as an indication of C's preference for fairness. However, this cannot explain why both A and B are also rewarded even when the outcome is unfair.

An interesting observation is that B receives a significantly higher reward than A when A directly selects the unfair allocation. When A does not delegate, B is a pure bystander who does not make any decision. This seems to indicate that B is rewarded as a bystander for doing nothing when A selects the unfair allocation. This cannot be explained by intention-based reciprocity (B does not do anything) or outcome-based social preferences (B already enjoys a high payoff when the unfair allocation is chosen and rewarding him makes the allocation even more unequal). It seems like B is rewarded for *not* being (held) responsible for an unfavorable outcome. A possible interpretation is that Cs use the different levels of reward as means to implement *both* rewards and punishments. By taking a benchmark level of reward as a reference point, a reward below this level can be regarded as a punishment while a reward above this level can be regarded as an actual reward. A possible candidate for such a baseline is the average reward for B when A does not delegate both when the outcome is fair and unfair in the *D&R* treatment, *i.e.* 1.91.[5] Figure 4 shows the adjusted "punishment" with the unfair outcome and the

[5]The selection of this baseline level is speculative with the data we collected from our current

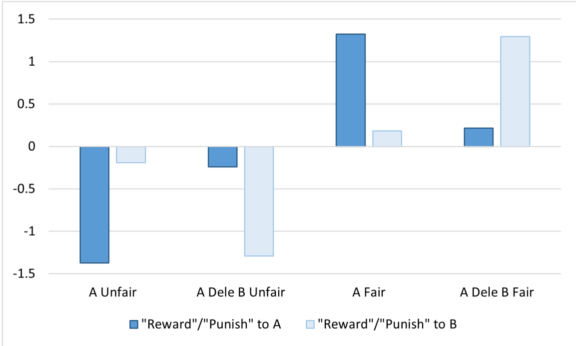


Figure 4: Adjusted "reward" and "punishment" in the *D&R* treatment

adjusted "reward" with the fair outcome for each player, subtracting the reference value 1.91 from the average reward as shown in Figure 1a. One can see that the direct allocator receives a higher "reward" than the other player when the outcome is fair and is more severely "punished" than the other player when the outcome is unfair. The "reward" patterns with the fair outcome are a mirror image of the "punishment" patterns with the unfair outcome. These results indicate that when using the different levels of reward for both punishing and rewarding, delegation reduces both punishment and reward in line with responsibility attribution.

To further explore this possibility, we can again use the responsibility to generate predictions for such rewards and "punishments". Responsibility for the fair allocation (r^+) depends on each player's contribution to the increase in the probability of the fair allocation being selected, while responsibility for the unfair allocation (r^-) depends on each player's contribution to the increase in the probability of the unfair allocation being selected. We calculate the values for r^+ and r^- according to the observed share of A and B's choices of fair, unfair, and delegation decisions in each treatment. The calculations can be found in Appendix A.2.

We run regressions of C's individual rewards for a player (A or B) on the responsibility measures, pooled across fair and unfair outcomes and pooled across treatments. The results are in Table 5. Rewards correlate positively with the responsibility of a player (A or B) for a fair outcome (r^+), and negatively with the responsible for an unfair outcome (r^-). The constant term can be interpreted as the baseline level of reward we discussed above. By construction, the responsibility variables r^+ and r^- are correlated with whether the outcome is fair or unfair. Controlling for the outcome, the results in column (2) show that this reward pattern is robust.[6]

experiment. We do not rule out the possibility of choosing other baseline levels. Other reasonable examples of such a level include the average reward for B in the *NoD&R* treatment, 2.36. Choosing other values of the reference point does not alter the main directions of our exercise.

[6] A regression including additional controls (demographic variables such as age, gender, and education) is shown in Table A6 in Appendix A.2. It does not affect the main results.

Table 5: Regression of reward on responsibility

	(1)	(2)
r^+	1.088***	0.926***
	(0.101)	(0.110)
r^-	-1.321***	-1.204***
	(0.0888)	(0.118)
Fair		0.267**
		(0.117)
Constant	2.102***	1.985***
	(0.0785)	(0.115)
Observations	2,620	2,620
Number of Subjects	403	403

Note: Dependent variable is C's each reward assignment decision. This table presents regression results using a random-effect model. Random effects are clustered by each individual. Standard errors are shown in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

It is intuitive and appealing to think of C-players as using a baseline level of reward to be able to administer both (extra) rewards and punishments. However, this interpretation is speculative and our experiment is not designed to test that hypothesis.

6 Conclusion

We conduct online experiments implementing a delegated dictator game where recipients can reward the principal or the delegate (or both). We find that the dictator receives a higher reward when directly choosing the fair allocation than when the delegate does it on her behalf (and conversely). In that sense, delegation in the presence of rewards dilutes credit-taking in the same way as delegation in the presence of punishments dilutes blame-taking. The predictions of the extension of a simple responsibility attribution model put forward by Bartling and Fischbacher (2012) are confirmed, with one exception: rewards are systematically given, even when the outcome is unfair and even to players who do not make any decision and thereby do not contribute to the realization of the outcome.

We find, however, that, once low and high rewards are seen as deviations from a baseline level and re-interpreted as actual punishments and actual rewards, respectively, delegation reduces both rewards and punishments for the dictator in the case of a fair or unfair outcome, respectively.

In line with responsibility attribution, recipients also take the action space of the principal into account when assigning rewards and delegating to a random device does not produce a distancing effect. Our results on delegation decisions are consistent with the possibility that subjects who delegate are those who would be fair in the absence of the delegation option.

Our results indicate that delegation reduces the credit associated with positive outcomes and the blame associated with negative outcomes by shifting the responsibility from the indirect allocator to the direct allocator. However, the credit-alleviation and the blame-shifting effect of delegation do not lead dictators strategically to use delegation in our experiment.

We observe a lower proportion of delegation decisions compared with previous studies with delegated allocation games and essentially no change in the delegation rate in the presence of rewards or punishments. The high proportion of subjects directly choosing the fair allocation in our environment may play a role. However, we think this calls for further investigation of the robustness of the strategic blame-shifting delegation phenomenon. In our view, the fact that subjects may use a reward system as a way to avail themselves the possibility of (indirectly) punishing other players should also be investigated as matter of priority.

References

Bartling, B. and Fischbacher, U. (2012). Shifting the blame: On delegation and responsibility. *The Review of Economic Studies*, 79(1):67–87.

Bolton, G. E. and Ockenfels, A. (2000). Erc: A theory of equity, reciprocity, and competition. *American Economic Review*, 90(1):166–193.

Charness, G. (2000). Responsibility and effort in an experimental labor market. *Journal of Economic Behavior & Organization*, 42(3):375–384.

Charness, G. (2004). Attribution and reciprocity in an experimental labor market. *Journal of Labor Economics*, 22(3):665–688.

Charness, G. and Rabin, M. (2002). Understanding social preferences with simple tests. *Quarterly Journal of Economics*, 117(3):817–869.

Choy, A. K., Hamman, J. R., King, R. R., and Weber, R. A. (2016). Delegated bargaining in a competitive agent market: an experimental study. *Journal of the Economic Science Association*, 2(1):22–35.

Coffman, L. C. (2011). Intermediation reduces punishment (and reward). *American Economic Journal: Microeconomics*, 3(4):77–106.

Croson, R. and Konow, J. (2009). Social preferences and moral biases. *Journal of Economic Behavior and Organization*, 69(3):201–212.

Drugov, M., Hamman, J., and Serra, D. (2014). Intermediaries in corruption: an experiment. *Experimental Economics*, 17(1):78–99.

Dufwenberg, M. and Kirchsteiger, G. (2004). A theory of sequential reciprocity. *Games and Economic Behavior*, 47(2):268–298.

Eisenkopf, G. and Fischbacher, U. (2015). Naïve responses to kind delegation. *Managerial and Decision Economics*, 36(7):487–498.

Engel, C. (2011). Dictator games: A meta study. *Experimental Economics*, 14(4):583–610.

Erat, S. (2013). Avoiding lying: The case of delegated deception. *Journal of Economic Behavior & Organization*, 93:273–278.

Falk, A. and Fischbacher, U. (2006). A theory of reciprocity. *Games and Economic Behavior*, 54(2):293–315.

Fehr, E. and Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *Quarterly Journal of Economics*, 114(3):817–868.

Fershtman, C. and Gneezy, U. (2001). Strategic delegation: An experiment. *RAND Journal of Economics*, 32(2):352–368.

Garofalo, O. and Rott, C. (2018). Shifting blame? experimental evidence of delegating communication. *Management Science*, 64(8):3911–3925.

Gawn, G. and Innes, R. (2019a). Lying through others: Does delegation promote deception? *Journal of Economic Psychology*, 71:59–73.

Gawn, G. and Innes, R. (2019b). Who delegates? evidence from dictator games. *Economics Letters*, 181:186–189.

Hamman, J. R., Loewenstein, G., and Weber, R. A. (2010). Self-interest through delegation: An additional rationale for the principal-agent relationship. *American Economic Review*, 100(4):1826–1846.

Kandul, S. and Kirchkamp, O. (2018). Do i care if others lie? current and future effects when lies can be delegated. *Journal of Behavioral and Experimental Economics*, 74:70–78.

Kube, S., Marechal, M., and Puppe, C. (2013). Do wage cuts damage work morale? evidence from a natural field experiment. *Journal of the European Economic Association*, 11(4):853–870.

Machiavelli, N. (1532). *The prince*. Indianapolis: Hackett Publishing, 2008.

Maximiano, S., Sloof, R., and Sonnemans, J. (2013). Gift exchange and the separation of ownership and control. *Games and Economic Behavior*, 77(1):41–60.

Oexl, R. and Grossman, Z. J. (2013). Shifting the blame to a powerless intermediary. *Experimental Economics*, 16(3):306–312.

Offerman, T. (2002). Hurting hurts more than helping helps. *European Economic Review*, 46:1423–1437.

Palan, S. and Schitter, C. (2018). Prolific. ac—a subject pool for online experiments. *Journal of Behavioral and Experimental Finance*, 17:22–27.

Rabin, M. (1993). Incorporating fairness into game theory and economics. *American Economic Review*, 83(5):1281–1302.

Weaver, R. K. (1986). The politics of blame avoidance. *Journal of Public Policy*, 6(4):371–398.

A Appendix

A.1 Treatment with delegation and punishment

We conducted a treatment of the baseline delegated dictator game with punishment option (*D&P*) to replicate the corresponding treatment of Bartling and Fischbacher (2012). Cs are given the option to reduce the payoffs of other players at a fixed cost and one of their plans is randomly selected to be implemented. C can choose to reduce the payoffs of either A, B, the other C, or all three players. If the selected C chooses to reduce payoffs, one point is deducted from his own payoff. The total number of points to be deducted from the three players must not exceed seven. The final payoff of any player should not be below zero.

Formally, following Bartling and Fischbacher (2012)'s annotation, let C's belief about the probability of A and B choosing the unfair allocation be denoted by α^- and β^- respectively, and the probability of A delegating the decision by δ. Thus, the *ex ante* probability of the unfair allocation is $\alpha^- + \delta\beta^-$. If the fair allocation is chosen, nobody increases the probability of the unfair allocation. In the case of punishments, responsibility is only attributed if the unfair allocation is selected. If A does not delegate and directly chooses the unfair allocation, A is the only player taking an action and responsible for all the probability increase. If A delegates and B chooses the unfair allocation, the post-decision probability of the unfair allocation is β^-. If $\alpha^- + \delta\beta^- < \beta^-$, both players contribute to the probability increase. A's share of the probability increase is $R_A^- = (\beta^- - \alpha^- - \delta\beta^-)/(1 - \alpha^- - \delta\beta^-)$, and B's share of the probability increase is $R_B^- = (1 - \beta^-)/(1 - \alpha^- - \delta\beta^-)$. If $\beta^- < (1 + \alpha^-)/(2 - \delta)$, B is more responsible than A, and *vice versa*. If $\alpha^- + \delta\beta^- > \beta^-$, by delegating, A reduces the probability of the unfair allocation and should not be held responsible, while B is fully responsible. The predicted responsibility of A and B in the *D&P* treatment as represented by their share of influence on the probability of the unfair outcome is shown in Table A1.

Table A1: Theoretical responsibility of A and B in the *D&P* treatment

	A unfair	A delegates B unfair	
		$\alpha^- + \delta\beta^- < \beta^-$	$\alpha^- + \delta\beta^- > \beta^-$
Responsibility of A	1	R_A^-	0
Responsibility of B	0	R_B^-	1

Note: $R_B^- > R_A^-$ if $\beta^- < (1 + \alpha^-)/(2 - \delta)$

Let $p_i(j, x)$ denote the punishment for i when the direct allocator who chooses the allocation is j and the chosen allocation is x, with $i, j = A, B$, $x = f$ for the fair allocation, and $x = u$ for the unfair allocation. We derive the following predictions regarding the punishment in the *D&P* treatment based on the responsibility attribution.

Hypothesis P 1. $p_A(\cdot, f) = p_B(\cdot, f) = 0$. *Punishment for both players is zero when the outcome is fair, independently of who made the decision.*

Hypothesis P 2. $p_A(A, u) > p_A(B, u)$, $p_B(B, u) > p_B(A, u)$. *When the chosen allocation is unfair, player i receives higher punishment when she is the direct allocator than when she is not.*

Hypothesis P 3.

1. $p_A(A, u) > p_B(A, u) = 0$. *If A does not delegate and directly selects the unfair allocation, only A is punished.*
2. $p_A(B, u) > p_B(B, u)$ *if* $\alpha^- + \delta\beta^- < \beta^-$ *and* $\beta^- > (1+\alpha^-)/(2-\delta)$, $p_B(B, u) >= p_A(B, u)$ *otherwise. If A delegates and B selects the unfair allocation, B is punished more severely than A for some combinations of probabilities.*
3. $p_A(B, u) \geq p_B(A, u)$, *equality holds if* $\alpha^- + \delta\beta^- \geq \beta^-$. *Whether delegation completely reduces the punishment for A depends on the specific combinations of probabilities.*

The average punishment for each player under all four possible scenarios in the *D&P* treatment are shown in Table A2. The punishment patterns provide supporting evidence for our predictions based on the responsibility attribution model. Players are only substantially punished when the outcome is unfair. When punishment occurs, the direct allocator is most severely punished. Delegation effectively shifts responsibility and decreases A's punishment. The main findings of punishment patterns in the corresponding treatment of Bartling and Fischbacher (2012) are successfully replicated in our experiment.

Table A2: Average punishment in the *D&P* treatment

	A unfair	A delegate B unfair	A fair	A delegate B fair
A	1.96 (2.70)	1 (1.74)	0.14 (0.57)	0.13 (0.55)
B	0.64 (1.24)	1.69 (2.44)	0.19 (0.70)	0.13 (0.55)
Other C	0.05 (0.22)	0.05 (0.22)	0.12 (0.50)	0.05 (0.05)

Note: Standard errors are shown in parenthesis.

Punishment for all three players is close to zero when the outcome is fair. The other C, who has no impact on the final allocation, receives almost zero punishment regardless of the outcome. Consistent with our Hypothesis P1, the punishment for both A and B whenever the unfair allocation is selected is substantially above zero.

Result P 1. $p_A(\cdot, f) = p_B(\cdot, f) = 0$. *Both A and B only receives substantial punishment when the final outcome is unfair.*

When the outcome is unfair, we find that a given player receives higher punishment when she is the direct allocator who selects the allocation than when she is not, consistent with Hypothesis P2. A receives an average punishment of 1.96 points if she directly selects the unfair allocation, but receives only around 1 point when she delegates and B chooses the unfair allocation. Similarly, B receives an average punishment of 0.64 points if A directly selects the unfair allocation, but the punishment for B increases to 1.69 if the allocation is selected by B. Both differences are statistically significant, supported by a two-sided Wilcoxon signed-rank test with $p < 0.01$.

Result P 2. $p_A(A, u) > p_A(B, u)$, $p_B(B, u) > p_B(A, u)$. *When the outcome is unfair, player i's punishment is higher when she is the direct allocator than when she is not.*

Comparisons of the punishment levels between A and B exhibit a pattern that is consistent with Hypothesis P3. If A directly selects the unfair allocation, A's punishment (1.96) is significantly higher than B's punishment (0.64); if A delegates and B selects the unfair allocation, B's punishment (1.69) is significantly higher than A's punishment (1) ($p < 0.01$ in a two-sided Wilcoxon signed-rank test for both comparisons). We also find that the punishment for A (1) if A delegates and B chooses the unfair allocation is significantly higher than the punishment for B (0.64) if A directly chooses the unfair allocation ($p < 0.01$ in a two-sided Wilcoxon signed-rank test). Moreover, the punishment for B (1.69) if A delegates and B chooses the unfair allocation is not significantly different from the punishment for A (1.96) if A does not delegate and selects the unfair allocation himself ($p = 0.37$ in a two-sided Wilcoxon signed-rank test). Assuming that Cs anticipate the average decision rates, we can calculate the *ex ante* probabilities of the fair and unfair outcomes to determine the hypothesized responsibility attributed to A and B. With our observed delegation and allocation decisions of A and B as shown in Table 4 in Section 4.2, we estimate the probability of A being unfair to be $\hat{\alpha}^- = 0.5$, the probability of B being unfair to be $\hat{\beta}^- = 0.24$, and the probability of delegation to be $\hat{\delta} = 0.12$. The comparisons of the corresponding punishment between A and B provide confirming evidence for our Hypothesis P3.2 and P3.3, with these observed probabilities[7].

Result P 3.

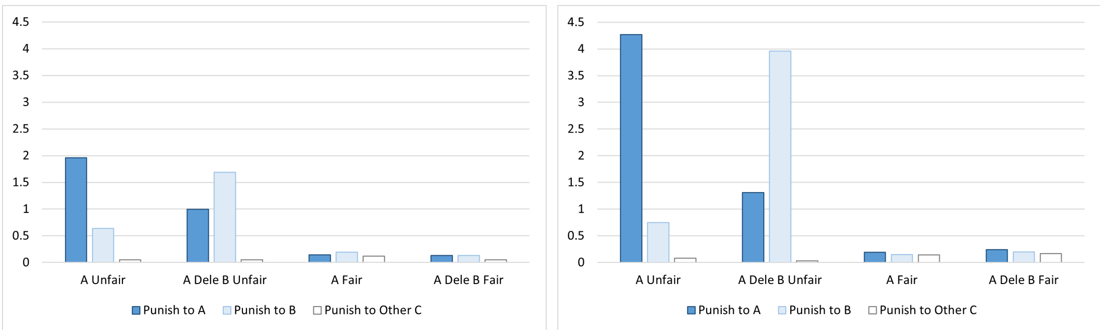
1. $p_A(A, u) > p_B(A, u) > 0$. *If A does not delegate and directly selects the unfair allocation, A receives more punishment than B.*
2. $p_B(B, u) > p_A(B, u)$. *If A delegates and B selects the unfair allocation, B receives more punishment than A.*

[7] $\hat{\alpha}^- + \hat{\delta}\hat{\beta}^- = 0.59 < \hat{\beta}^-$, $(1 + \hat{\alpha}^-)/(2 - \hat{\delta}) = 0.8 > \hat{\beta}^-$.

3. $p_A(B, u) > p_B(A, u) > 0$*. If A delegates and B selects the unfair allocation, A is still partly responsible for the unfair outcome.*

Our observations of punishment for A in the *D&P* treatment provide supporting evidence for the predictions based on responsibility attribution. Punishment for A decreases when she delegates compared to when she directly chooses the allocation. On the other hand, when A directly chooses the unfair allocation, B in our experiment still receives an average punishment of 0.64 point. This positive punishment for B when A directly chooses the unfair allocation cannot be explained by the responsibility attribution model, since B does not take any action and thus should not be attributed any responsibility. With the same logic, intention-based reciprocity does not provide an explanation either. This punishment can be partly explained by a desire to rectify the unfair outcome.

Figure A1: Average punishment in the *D&P* treatment



(a) Our experiment

(b) Bartling and Fischbacher (2012)

Figure A1 shows the comparison between our observations and Bartling and Fischbacher (2012). The punishment pattern in our experiment as summarized above mimics the one in the corresponding treatment of Bartling and Fischbacher (2012). The only difference is that the level of punishment in our *D&P* treatment is generally lower than that in the corresponding treatment of Bartling and Fischbacher (2012). The highest level of average punishment is below 2 points in our experiment, while that in their corresponding treatment is almost as high as 4 points. Fewer Cs are willing to incur a cost to assign punishment points in our experiment, and those who choose to punish also assign lower punishment on average. As mentioned in Section 2, our subjects are 18-30 year-old US nationals who are currently students and who have completed at least high school. We imposed these restrictions with the goal to approach the demographic characteristics of the university undergraduate subjects of Bartling and Fischbacher (2012) as closely as possible. However, two big differences still remain: 1) our subjects are US nationals currently residing in the US, while subjects of Bartling and Fischbacher (2012) resided in Switzerland; 2) Our experiment was conducted online while Bartling and Fischbacher (2012) ran the experiment in the laboratory. This difference in the level of average punishment could be a result of these differences.[8]

Our main observations of punishment behaviors in the *D&P* treatment provide confirming evidence for the predictions based on the responsibility-attribution model. Punishments are only (substantially) assigned when the unfair allocation is selected. The direct allocator receives more punishment. Delegation shifts some responsibility from A to B, but A is still held partially responsible for delegating to a B who selects the unfair final outcome. The only deviation from the responsibility-attribution model is that B gets punished when A directly chooses the unfair allocation. Such a deviation is also observed in Bartling and Fischbacher (2012). Neither responsibility attribution nor intention-based reciprocity provides a reasonable explanation for this pattern. One possible explanation is that this is due to outcome-based social preferences, as punishing B may reduce the inequality of the payoff allocation. However, in our experiment as in Bartling and Fischbacher (2012), the payoff of C goes down by 1 upon punishing, whereas B's payoff is reduced by less than 1 on average. All in all, the findings in the *D&P* treatment provide supporting evidence for the responsibility attribution model, but also point to some possible residual role for outcome considerations. Other possible explanations include an "angry-at-the-world" state of mind on the receivers' side, which may create a lower bound of punishment when Cs are put in an unfavorable situation, *i.e.* receive the lower payoff in the unfair allocation. However, this deviation does not affect our main observations which are based on the comparison of punishment between A and B.

Table A3 shows the delegation and allocation decisions of A and B in the *D&P* treatment. Compared with the delegation rate of 17% in the no punishment treatment and 55% in the *D&P* treatment of Bartling and Fischbacher (2012), the rate of delegation is relatively low in our experiment.

Table A3: Delegation and allocation decisions of A and B in *D&P*

	Unfair (%)	Fair (%)	Delegate (%)	Observations
A	44	44	12	52
B	24	76	-	50

[8] Our experiment was conducted in June 2020, amid the Covid-19 pandemic, which could have impacted subjects' behavior.

A.2 Calculation of the responsibility measure

The responsibility attribution model argues that C assigns a responsibility factor to A and B according to each players' contribution to the increase in probability of an outcome. Responsibility for the fair allocation (r^+) depends on each player's contribution to the increase in the probability of the fair allocation being selected. $r^+ = 0$ when the unfair allocation is chosen, as no one contributes to the fair outcome. When A does not delegate and directly chooses the fair allocation, only A is fully responsible, and thus the $r^+ = 1$ for A and $r^+ = 0$ for B. If A delegates and B chooses the fair allocation, r^+ depends on C's respective beliefs of A being fair (α^+), B being fair (β^+), and A delegating (δ). In the same way, responsibility for the unfair allocation (r^-) depends on each player's contribution to the increase in the probability of the unfair allocation being selected. $r^- = 0$ when the outcome is fair, as no one contributes to the unfair outcome. $r^- = 1$ for A and $r^- = 0$ for B when A does not delegate and directly chooses the unfair allocation. If A delegates and B chooses the fair allocation, r^- depends on C's respective beliefs of A being unfair (α^-), B being unfair (β^-), and A delegating (δ). Assuming that Cs hold "correct" beliefs about A and B, we construct C's beliefs of A and B being fair or delegating from our observed share of A and B's choices in each treatment as shown in Table A4.

Table A4: Delegation and allocation decisions of A and B

	Unfair (%)	Fair (%)	Delegate (%)	α^+	β^+	α^-	β^-	δ
D&R								
A	31	53	16	0.63	0.66	0.37	0.34	0.16
B	34	66	-					
NoD&R								
A	28	72	-	0.72	-	0.28	-	—
Asym								
A	28	-	72	-	0.76	0.28	0.24	0.72
B	24	76	-					
Rand								
A	28	56	16	0.67	-	0.33	-	0.16

We calculate r^+ and r^- for different scenarios in each treatment in Table A5, based on the above constructed values of α^+, β^+, α^-, β^-,and δ.

A regression of each C's reward decisions on the responsibility parameters including various demographic control variables are shown in Table A6.

Table A5: Constructed responsibility of A and B

	A fair	A delegates B fair	A unfair	A delegates B Unfair
D&R				
r_A^+	1	0	0	0
r_B^+	0	1	0	0
r_A^-	0	0	1	0
r_B^-	0	0	0	1
NoD&R				
r_A^+	1	-	0	-
r_B^+	0	-	0	-
r_A^-	0	-	1	-
r_B^-	0	-	0	-
Asymmetric				
r_A^+	-	0.47	0	0
r_B^+	-	0.53	0	0
r_A^-	0	0	1	0
r_B^-	0	0	0	1
Random				
r_A^+	1	1	0	0
r_B^+	0	0	0	0
r_A^-	0	0	1	1
r_B^-	0	0	0	0

Note: In our *D&R*, when A delegates, $\alpha^+ + \delta\beta^+ > \beta^+$, A reduces the probability of the fair allocation by delegating, thus B is fully responsible for choosing the fair allocation; similarly, $\alpha^- + \delta\beta^- > \beta^-$, B is also fully responsible for choosing the unfair allocation when A delegates.

Table A6: Regression of reward on responsibility with controls

	(1)	(2)	(3)	(4)
r^+	1.088***	1.091***	0.926***	0.928***
	(0.101)	(0.101)	(0.110)	(0.110)
r^-	-1.321***	-1.314***	-1.204***	-1.198***
	(0.0888)	(0.0890)	(0.118)	(0.118)
Fair			0.267**	0.268**
			(0.117)	(0.117)
Age		0.0325*		0.0322
		(0.0197)		(0.0197)
Female		-0.138		-0.137
		(0.112)		(0.112)
Postgrad		-0.292		-0.290
		(0.266)		(0.266)
Undergrad		-0.124		-0.122
		(0.127)		(0.127)
Constant	2.102***	1.530***	1.985***	1.417***
	(0.0785)	(0.410)	(0.115)	(0.417)
Observations	2,620	2,612	2,620	2,612
Number of Subjects	403	402	403	402

A.3 Instructions in the *D&R* treatment

Instructions for player A, B, and C in the *D&R* treatment, our main treatment are shown below. For each role, the instructions include five sections: Introduction, Instructions, Practice questions, Decision, and End of experiment. The Introduction, Practice questions, and End of experiment sections for all three roles are the same, and thus we only report them in Appendix A.3.1. In Appendix A.3.2 and A.3.3, only the respective Instructions and Decision sections are reported.

A.3.1 Instructions for A

Introduction

Welcome!

The aim of this study is to understand people's decision making.

The estimated time to complete this study is 10 minutes. You will be asked to make a number of choices regarding a scenario on the next page. You will receive $1.1 for completing this study. In addition, you will receive a bonus payment that will be determined by your choices and other participants' choices in the study, within the range of $0 to $3.2, depending on the scenario.

Your responses will remain CONFIDENTIAL and will be used for scientific purposes only. If you have any questions regarding this study, please contact the researcher using the message function on Prolific. Thank you!

You will be matched with three other participants in this study. You will never learn of the identity of the three participants matched with you, nor will the three participants matched with you learn of your identity.

There are three types of participants in this study: participants A, B, and C. ONE participant A, ONE participant B, and TWO participants C will be matched together. You will be randomly assigned as one of the three roles. Your bonus payment depends on your decisions and the decisions of the other three participants matched with you in this study.

In the study, your payment will be calculated in points. The total number of points you earn during the study will be converted to dollars when we calculate your bonus payments. The following conversion rate applies: 5 Points = $1.

_____ I understand and agree with these instructions and would like to participate in this study.

_____ I do not agree with these instructions and would not like to participate.

Instructions

Please read the following instructions carefully. You can earn a bonus payment, depending on your decisions and those of the other participants, in addition to the

$1.1 you receive for completing this study. It is thus very important that you read these instructions carefully.

You are a **participant A**.

The three other persons assigned to you are one participant B and two participants C.

In this study, either participant A or participant B decides how 20 points will be distributed among the four participants.

In distributing the points, participant A or B must decide between two possible allocations:

- Allocation 1: Participants A and B receive 9 points each and the two participants C receive 1 point each.
- Allocation 2: Participant A, participant B, and both participants C receive 5 points each.

As a participant A, you can either choose between allocations 1 and 2 yourself or to delegate the decision to participant B. If you choose to not delegate, your decision between allocations 1 and 2 will be implemented and relevant for the final points. If you choose to delegate, you cannot choose between the two allocations. In this case, participant B's decision between allocations 1 and 2 will be implemented and relevant for the final points.

The table below provides an additional summary of the two allocations which either you or—if you delegate the decision—participant B must decide.

	Your points	B's points	One C's points	Other C's points
Allocation 1	9	9	1	1
Allocation 2	5	5	5	5

After you or—if you decide to delegate the decision—participant B has decided on the allocation of the 20 points, both participants C learn the following:

- whether participant A delegated the decision to participant B or not, and
- the implemented allocation.

Following this, one of the two participants C will be chosen randomly. The randomly chosen participant C has the possibility of assigning a total of up to 7 extra points at her discretion to you and/or participant B. The chosen participant C can also decide to not give the extra points or assign less than 7 points in total.

Example 1

Allocation 1 is chosen (by you or participant B). The randomly chosen participant C decides to assign 3 points to you and 4 points to participant B. The following payments then result:

Your points	B's points	One C's points	Other C's points
9+3=12	9+4=13	1	1

Example 2

Allocation 2 is chosen (by you or participant B). The randomly chosen participant C decides to assign 3 points to you and 2 points to participant B. Note that the chosen participant C does not opt to assign all 7 extra points. The following payments result:

Your points	B's points	One C's points	Other C's points
5+3=8	5+2=7	5	5

Example 3

The randomly chosen participant C does not choose to assign extra points. The points shown in the following table will then result, depending on the chosen allocations.

	Your points	B's points	One C's points	Other C's points
Allocation 1	9	9	1	1
Allocation 2	5	5	5	5

Practice questions

Before you proceed to make the actual decision, please answer eight practice questions. They serve to make you more acquainted with the study. You can go back to the previous page to refer to the instructions. If you fail to give correct answers to practice question 2 or practice question 8, the study terminates for you. You will not proceed to the decision stage and thus will not be able to earn the bonus payment. For other practice questions, you will receive a warning message if you answer incorrectly. You should correct them before you proceed.

The decisions and numerical values in the practice questions are chosen on a purely random basis and are not to be considered as a hint or suggestion as to how you should decide in the decision stage.

Practice Question 1

Participant A chooses to delegate. Whose decision is relevant for the bonus payment at the end of the study?

- Participant A
- Participant B

Practice Question 2

Participant A chooses to NOT delegate. Whose decision is relevant for the bonus payment at the end of the study?

- Participant A
- Participant B

<u>Practice Question 3</u>

Allocation 1 is implemented. The randomly chosen participant C decides to assign the points according to the table below.

	A's points	B's points	One C's points	Other C's points
Allocation 1	9	9	1	1
Assigned points	0	3		
Final points				

What are the respective final points of each participant to be filled in the last row of the table?

- 5, 5, 5, 5
- 9, 12, 1, 1
- 9, 9, 1, 1

<u>Practice Question 4</u>

Allocation 2 is implemented. The randomly chosen participant C decides to assign the points according to the table below.

	A's points	B's points	One C's points	Other C's points
Allocation 2	5	5	5	5
Assigned points	1	2		
Final points				

What are the respective final points of each participant to be filled in the last row of the table?

- 5, 5, 5, 5
- 9, 9, 1, 1
- 6, 7, 5, 5

<u>Practice Question 5</u>

Allocation 2 is implemented. The randomly chosen participant C decides to assign the points according to the table below.

	A's points	B's points	One C's points	Other C's points
Allocation 2	5	5	5	5
Assigned points	6	3		
Final points				

Is this possible?

- No, it is not possible.
- Yes, the resulting points are 11, 8, 5, 5.

Practice Question 6

Allocation 2 is implemented. The randomly chosen participant C decides to assign the points according to the table below.

	A's points	B's points	One C's points	Other C's points
Allocation 2	5	5	5	5
Assigned points	7	0		
Final points				

What are the respective final points of each participant to be filled in the last row of the table?

- 5, 5, 5, 5
- 12, 5, 5, 5
- 9, 9, 1, 1

Practice Question 7

Allocation 1 is implemented. The randomly chosen participant C decides to assign the points according to the table below.

	A's points	B's points	One C's points	Other C's points
Allocation 1	9	9	1	1
Assigned points	0	0		
Final points				

What are the respective final points of each participant to be filled in the last row of the table?

- 5, 5, 5, 5
- 9, 9, 1, 1
- 8, 13, 1, 1

Practice Question 8

Allocation 2 is implemented. The randomly chosen participant C decides to assign the points according to the table below.

	A's points	B's points	One C's points	Other C's points
Allocation 2	5	5	5	5
Assigned points	0	5		
Final points				

What are the respective final points of each participant to be filled in the last row of the table?

- 9, 9, 1, 1
- 5, 5, 5, 5
- 5, 10, 5, 5

Decision

It is now time to make the decision. Once you have made the decision and clicked the button in the lower right corner to continue, the study will be over and your decision will be recorded.

You decision, together with the decisions of the other three participants matched with you, determine your final bonus payment. Please make the decision carefully.

You, as a participant A, are matched with one participant B and two participants C. Either you or participant B must decide between the following two allocations:

	Your points	B's points	One C's points	Other C's points
Allocation 1	9	9	1	1
Allocation 2	5	5	5	5

You can decide whether you would like to choose allocation 1 or allocation 2 yourself, or if you would like to delegate this decision to participant B.

If you choose one of the two allocations yourself, your decision will be relevant for the final points. If you choose to delegate, the decision of participant B will be implemented for the final points. Both participants C learn whether you have chosen to delegate and which allocation is implemented.

Following this, one of the participants C is chosen randomly. The chosen participant C can choose to assign a total of up to 7 extra points to you and/or participant B.

What is your decision?

- Do not delegate and choose Allocation 1 yourself
- Do not delegate and choose Allocation 2 yourself
- Delegate the decision to participant B

End of experiment

This is the end of the study. Thank you for your participation.

Your decision has been recorded. If you are eligible for bonus payment, your final points will be calculated based on your decision and the decisions of the other three participants matched with you in this study. It will be transformed into dollar with the conversion rate 5 points = $1. The bonus payment will be transferred to your Prolific account within 2 weeks.

Please click the button in the lower right corner to finish the study and proceed back to Prolific.

A.3.2 Instructions for B

The Introduction, Practice questions, and End of experiment sections for Participants B are the same as those for Participant A. Only the Instructions and Decision sections are different.

Instructions

Please read the following instructions carefully. You can earn a bonus payment, depending on your decisions and those of the other participants, in addition to the $1.1 you receive for completing this study. It is thus very important that you read these instructions carefully.

You are a **participant B**.

The three other persons assigned to you are one participant A and two participants C.

In this study, either participant A or participant B decides how 20 points will be distributed among the four participants.

In distributing the points, participant A or B must decide between two possible allocations:

- Allocation 1: Participants A and B receive 9 points each and the two participants C receive 1 point each.
- Allocation 2: Participant A, participant B, and both participants C receive 5 points each.

Participant A can either choose between allocations 1 and 2 herself or to delegate the decision to you. If participant A chooses to not delegate, participant A's decision between allocations 1 and 2 will be implemented and relevant for the final points. In this case, your decision will not be relevant for the final points. If participant A chooses to delegate, your decision between the two allocations will be implemented and relevant for the final points.

The table below provides an additional summary of the two allocations which either participant A or—if she delegates the decision—you must decide.

	A's points	Your points	One C's points	Other C's points
Allocation 1	9	9	1	1
Allocation 2	5	5	5	5

After participant A or—if she decides to delegate the decision—you have decided on the allocation of the 20 points, both participants C learn the following:

- whether participant A delegated the decision to participant B or not, and
- the implemented allocation.

Following this, one of the two participants C will be chosen randomly. The randomly chosen participant C has the possibility of assigning a total of up to 7 extra points at her discretion to participant A and/or you. The chosen participant C can also decide to not assign the extra points or assign less than 7 points in total.

Example 1

Allocation 1 is chosen (by you or participant B). The randomly chosen participant C decides to assign 3 points to you and 4 points to participant B. The following payments then result:

A's points	Your points	One C's points	Other C's points
9+3=12	9+4=13	1	1

Example 2

Allocation 2 is chosen (by you or participant B). The randomly chosen participant C decides to assign 3 points to you and 2 points to participant B. Note that the chosen participant C does not opt to assign all 7 extra points. The following payments result:

A's points	Your points	One C's points	Other C's points
5+3=8	5+2=7	5	5

Example 3

The randomly chosen participant C does not choose to assign extra points. The points shown in the following table will then result, depending on the chosen allocations.

	A's points	Your points	One C's points	Other C's points
Allocation 1	9	9	1	1
Allocation 2	5	5	5	5

Decision

It is now time to make the decision. Once you have made the decision and clicked the button in the lower right corner to continue, the study will be over and your decision will be recorded.

You decision, together with the decisions of the other three participants matched with you, determine your final bonus payment. Please make the decision carefully.

You, as a participant B, are matched with one participant A and two participants C. Either participant A or you must decide between the following two allocations:

	A's points	Your points	One C's points	Other C's points
Allocation 1	9	9	1	1
Allocation 2	5	5	5	5

Participant A can decide whether she would like to choose allocation 1 or allocation 2 herself, or if she would like to delegate this decision to you.

If participant A chooses to not delegate, her own decision will be relevant for the final points. If participant A chooses to delegate, your decision will be implemented for the final points. Both participants C learn whether participant A has chosen to delegate and which allocation is implemented.

Following this, one of the participants C is randomly chosen. The chosen participant C can choose to assign a total of up to 7 extra points to participant A and/or you.

Which allocation will you choose?

- Allocation 1
- Allocation 2

A.3.3 Instructions for C

The Introduction, Practice questions, and End of experiment sections for Participants C are the same as those for Participant A. Only the Instructions and Decision sections are different.

Instructions

Please read the following instructions carefully. You can earn a bonus payment, depending on your decisions and those of the other participants, in addition to the $1.1 you receive for completing this study. It is thus very important that you read these instructions carefully.

You are a **participant C**.

The three other persons assigned to you are one participant A, one participant B,and one other participant C.

In this study, either participant A or participant B decides how 20 points will be distributed among the four participants.

In distributing the points, participant A or B must decide between two possible allocations:

- Allocation 1: Participants A and B receive 9 points each and the two participants C receive 1 point each.
- Allocation 2: Participant A, participant B, and both participants C receive 5 points each.

Participant A can either choose between allocations 1 and 2 herself or to delegate the decision to participant B. If participant A chooses to not delegate, participant A's decision between allocations 1 and 2 will be implemented and relevant for the final points. If participant A chooses to delegate, participant B's decision between the two allocations will be implemented and relevant for the final points.

The table below provides an additional summary of the two allocations which either participant A or—if she delegates the decision—participant B must decide.

	A's points	B's points	Your points	Other C's points
Allocation 1	9	9	1	1
Allocation 2	5	5	5	5

After participant A or—if she decides to delegate the decision—participant B has decided on the allocation of the 20 points, both participants C learn the following:

- whether participant A delegated the decision to participant B or not, and
- the implemented allocation.

Following this, one of the two participants C will be chosen randomly. The randomly chosen participant C has the possibility of assigning a total of up to 7 extra points at her discretion to participant A and/or participant B. The chosen participant C can also decide to not assign extra points or to assign less than 7 points in total.

Example 1

Allocation 1 is chosen (by you or participant B). The randomly chosen participant C decides to assign 3 points to you and 4 points to participant B. The following payments then result:

A's points	B's points	Chosen C's points	Other C's points
9+3=12	9+4=13	1	1

Example 2

Allocation 2 is chosen (by you or participant B). The randomly chosen participant C decides to assign 3 points to you and 2 points to participant B. Note that the chosen participant C does not opt to assign all 7 extra points. The following payments result:

A's points	B's points	Chosen C's points	Other C's points
5+3=8	5+2=7	5	5

Example 3

The randomly chosen participant C does not choose to assign extra points. The points shown in the following table will then result, depending on the chosen allocations.

	A's points	B's points	Chosen C's points	Other C's points
Allocation 1	9	9	1	1
Allocation 2	5	5	5	5

Decision

It is now time to make the decision. Once you have made the decision and clicked the button in the lower right corner to continue, the study will be over and your decision will be recorded.

You decision, together with the decisions of the other three participants matched with you, determine your final bonus payment. Please make the decision carefully.

You, as a participant C, are matched with one participant A, one participant B, and one other participant C. Either participant A or participant B must decide between the following two allocations:

	A's points	B's points	One C's points	Other C's points
Allocation 1	9	9	1	1
Allocation 2	5	5	5	5

Participant A can choose to implement her own decision or to delegate the decision to participant B.

If participant A chooses to not delegate, her own decision will be relevant for the final points. If participant A chooses to delegate, participant B's decision will be implemented for the final points Both participants C learn whether participant A has chosen to delegate and which allocation is implemented.

Following this, one of the participants C is chosen randomly. The chosen participant C can choose to give a total of up to 7 extra points to participant A and/or participant B.

We therefore ask you to make your decision for each of the following four cases:

- Participant A does not delegate and decides herself for allocation 1 (9, 9, 1, 1)
- Participant A does not delegate and decides herself for allocation 2 (5, 5, 5, 5)
- Participant A delegates and participant B decides for allocation 1 (9, 9, 1, 1)
- Participant A delegates and participant B decides for allocation 2 (5, 5, 5, 5)

Participant A and/or participant B make their decisions without knowing what you or the other participant C would do in the four cases.

If you are randomly chosen, your decision for that case which actually arises from participant A's decision will be implemented.

Each of your two decisions can therefore be relevant for your payment.

Possible case 1

Participant A delegates the decision, and participant B chooses the following allocation:

A receives 5 point.
B receives 5 points.
Each C receives 5 points.

How much extra points are you willing to assign to participant A and participant B?

(You can also choose to fill in 0 for both blanks. The total points assigned to participant A and participant B must not be higher than 7. Your response will only be approved if the sum is less than or equal to 7.)

_____ Extra points for participant A

_____ Extra points for participant B

Please fill in the sum of the extra points you have filled in above.

_____ Total extra points

Possible case 2

Participant A delegates the decision, and participant B chooses the following allocation:

A receives 9 point.
B receives 9 points.
Each C receives 1 points.

How much extra points are you willing to assign to participant A and participant B?

(You can also choose to fill in 0 for both blanks. The total points assigned to participant A and participant B must not be higher than 7. Your response will only be approved if the sum is less than or equal to 7.)

_____ Extra points for participant A

_____ Extra points for participant B

Please fill in the sum of the extra points you have filled in above.

_____ Total extra points

Possible case 3

Participant A does not delegate the decision, and she chooses the following allocation:

A receives 9 point.

B receives 9 points.

Each C receives 1 points.

How much extra points are you willing to assign to participant A and participant B?

(You can also choose to fill in 0 for both blanks. The total points assigned to participant A and participant B must not be higher than 7. Your response will only be approved if the sum is less than or equal to 7.)

_____ Extra points for participant A

_____ Extra points for participant B

Please fill in the sum of the extra points you have filled in above.

_____ Total extra points

Possible case 4

Participant A does not delegate the decision, and she chooses the following allocation:

A receives 5 point.

B receives 5 points.

Each C receives 5 points.

How much extra points are you willing to assign to participant A and participant B?

(You can also choose to fill in 0 for both blanks. The total points assigned to participant A and participant B must not be higher than 7. Your response will only be approved if the sum is less than or equal to 7.)

_____ Extra points for participant A

_____ Extra points for participant B

Please fill in the sum of the extra points you have filled in above.

_____ Total extra points