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Pivotality and Responsibility Attribution in Sequential Voting*

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Abstract

Are people blamed for being pivotal if they implement an unpopular outcome in a sequential voting process? We conduct an experimental voting game and analyze how pivotality affects responsibility attribution by parties who can be negatively affected by the voting outcome. We measure responsibility attribution by assigned punishment points and find that pivotal decision makers are blamed significantly more than non-pivotal decision makers. Moreover, we find that some voters avoid being pivotal by voting strategically to delegate the pivotal vote to subsequent decision makers.

Keywords: Pivotality, voting, responsibility attribution, blame, delegation, experiment

JEL-Classification: C91, C92, D63, D71, D72

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"As soon as a majority has voted for it, it is declared passed, and the member who voted last is given credit for having passed it." – Shapley and Shubik[1]

1. Introduction

Are people blamed for being pivotal if they implement an unpopular decision in a sequential voting process? Shapley and Shubik (1954) assume that the pivotal voter in a committee decision "is given credit," i.e., is taken to be responsible for having passed the decision. Consequently, Shapley and Shubik's definition of the "power" of a committee member depends on the member's chance of being pivotal. In this paper, we test experimentally whether pivotality indeed increases responsibility attribution by subjects who are affected by a committee's voting decision.

The question of how people attribute responsibility, i.e. blame or credit, in group decision making is important because many political and economic decisions are taken by groups, for instance in monetary policy committees or company boards. Levy (2007) reports that such decision-making bodies are becoming increasingly transparent as indicated by, e.g., the publication of U.S. Federal Reserve Open Market Committee minutes or the deliberations of the US Supreme Court Justices. The Bank of England's Monetary Policy Committee also reveals voting decisions by its members and explicitly states that the "decision goes to the majority and there is no attempt to arrive at a consensus: members are individually accountable for their decisions" (Bank of England, 2005).[2] The examples show that individual committee members' decisions are often observable and can thus be subject to the attribution of responsibility by people who are affected by the committee decisions.

[1] Shapley and Shubik (1954), p. 788.

[2] Both the Monetary Policy Committee and the Federal Reserve Open Market Committee publish individual votes, and the latter reveal also the order of votes, namely: first chairman, than vice chairman, then the other members in alphabetical order (see also Gerlach-Kristen and Meade, 2011).

Our paper provides the first incentivized experimental test on whether pivotality affects responsibility attribution in a sequential voting decision. In our experiment, there are groups of six subjects. Three subjects have voting rights and decide sequentially and publicly observable on whether to implement an equal or unequal allocation of money among themselves and the other three subjects, who have no voting rights. The unequal allocation of money favors the subjects with voting rights. After the vote, subjects without voting rights can assign costly punishment points to the voters. We interpret the assignment of punishment points as a measure of responsibility attribution. Our main finding is that subjects attribute significantly more responsibility to the pivotal voter than to the other voters. Our experiment further shows that about one fifth of voters who reveal to prefer the unequal allocation when their vote is decisive, vote strategically when they have the possibility to delegate the pivotal decision to subsequent voters.

Besides confirming Shapley and Shubik's (1954) assumption that the pivotal voter in a committee decision "is given credit," the results of our study advance the literature on the importance of pivotality in markets and organizations (see e.g. Falk and Szech, 2013a, Falk and Szech, 2013b) as well as the literature on delegation of unpopular decisions (e.g., Hamman et al. 2010 and Bartling and Fischbacher, 2012). Falk and Szech (2013b) analyze how the perception of pivotality affects the likelihood of taking an immoral decision (the decision to kill a mouse) in a trading environment. In their Baseline treatment, each subject decides between option A, receiving 10 Euro and killing a mouse, and option B, receiving no money but saving the mouse's life. In their Diffused-Pivotality treatment, choosing option A yields 10 Euro and choosing option B yields nothing. In contrast to the Baseline treatment, however, eight subjects simultaneously choose between option A and B, and eight mice are killed even if only one of the eight subjects decides to take the 10 Euro. Thus, in the Baseline treatment, it is clear ex-ante that the decision of each subject is pivotal for the life or death of the mouse. In the Diffused-Pivotality treatment, however, it is unclear whether or not a subject's decision will be pivotal. Falk and Szech find that the likelihood of killing is monotone in the subjects' perceptions of pivotality and that many more mice are killed in the Diffused-Pivotality treatment. Our study complements the findings by Falk and Szech because we show that that not only the perception of the pivotality of the own decision matters for choice. We show that subjects who are affected by the outcome of a group decision attribute more responsibility and blame to pivotal than to non-pivotal decision makers, which in turn can affect the decision makers' choices.

Bartling and Fischbacher (2012) show that it is possible to shift the blame for an unpopular decision by delegating the choice to another person, and that many people do so. Our main result on punishment and pivotality shows that also in the context of group decision making it is possible, to some extent, to shift the blame, and our result on voters' decisions shows that about 20 percent of subjects who reveal to prefer the unequal allocation "delegate" the pivotal choice by voting strategically in order to shirk the responsibility for implementing the unequal allocation.

The results of our study add also to the discussion of responsibility attribution in the political science literature, where the attribution of credit or blame has been related to the power of decision makers (see e.g. Banzhaf, 1964; Penrose, 1946; Shapley and Shubik, 1954), the number of veto players (Tsebelis, 2011) as well as governing party size (see e.g. Anderson, 1995; Lewis-Beck, 1990), and to the extent unified control of policymaking by the incumbent government (Powell and Whitten, 1993). The finding that pivotality matters for responsibility attribution relates in particular to work by Finer (1975), Alesina (1997), Lijphart (2012) and Franzese Jr (2002), who argue that coalition governments provide less potential for electoral accountability than single party governments, as well as to evidence from Duch and Stevenson (2008), who report that voters are more likely to attribute economic outcomes to single-party majority cabinets than to coalition governments.

The remainder of the paper is organized as follows. Section 2 explains the experimental design and procedures. Section 3 summarizes the punishment predictions of standard behavioral models based on “outcome,” “choice,” “intention,” and the interaction of “outcome” and “intention,” as well as the prediction of the punishment motive “pivotality.” Section 4 reports our experimental results. Section 5 concludes.

2. Experimental Design

We implemented a sequential voting game with punishment. Three “voters” and three “receivers” form a group. The voters decide on the allocation of a total of 30 points among the six group members, using a simple majority rule. There are two possible allocations. The unequal allocation gives 9 points to each of the voters and only 1 point to each of the receivers (9,9,9;1,1,1). The equal allocation distributes the 30 points evenly among the six group members (5,5,5;5,5,5). Importantly, the voters cast their votes sequentially and each decision is observable by the other voters and receivers of the group. First, Voter 1 votes for one of the two allocations. Then Voter 2 observes the vote of Voter 1 and votes herself. Finally, Voter 3 casts her vote, knowing the choices of Voters 1 and 2. Abstentions are not possible. Figure 1 illustrates the decision tree.

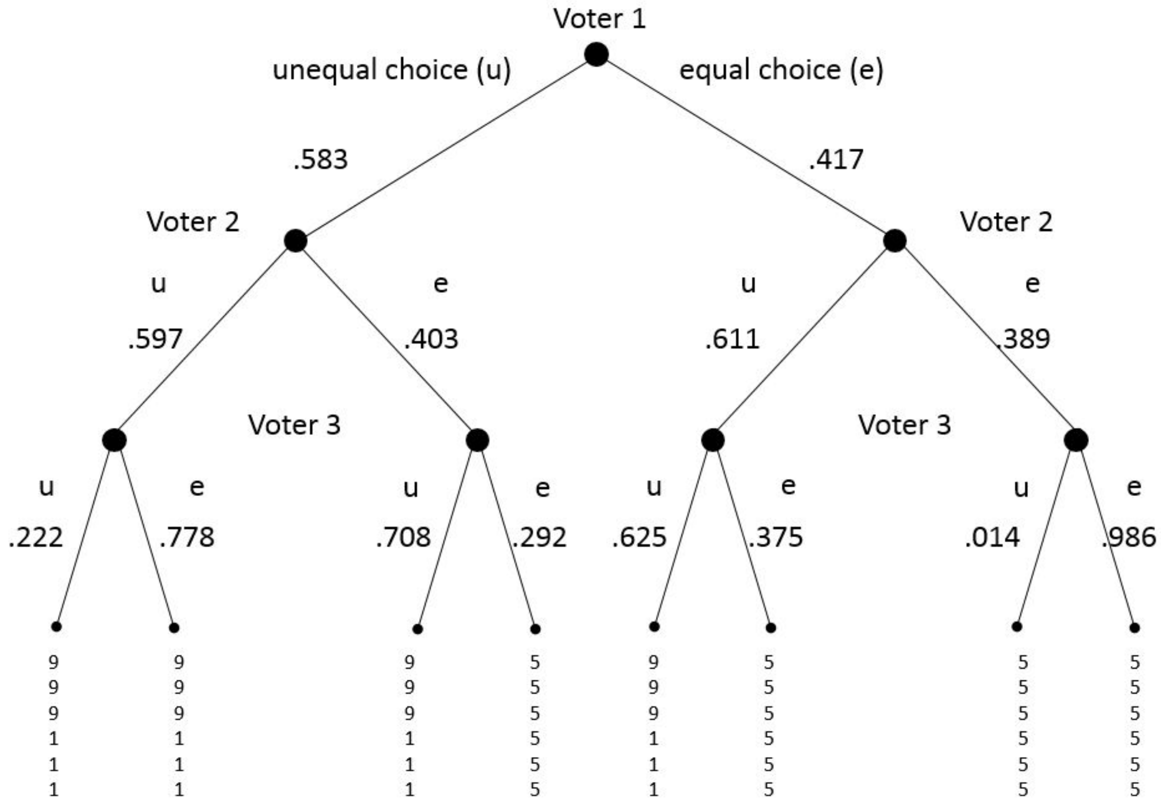

Figure 1: Voters' Choices and Resulting Allocations

The three receivers observe the sequence of the votes and thus also the voting outcome. One randomly selected receiver then has the option to punish individual voters by deducting points. Punishing is costly for the receivers. A receiver incurs a fixed cost of one point to be able to deduct up to seven points from the voters. The seven punishment points can be assigned to a single voter or to two or all three voters, but it is not possible to reduce a voter's payoff below zero.

The players' payoff functions are summarized as follows. A voter either receives nine or five points, depending on the allocation that was voted for, possibly minus punishment points by the randomly chosen receiver. The randomly chosen receiver gets either one or five points, depending on the chosen allocation, minus the cost of punishment (one point) if he deducts at least one point from the voters. The two other receivers get a payoff of either five or one point, depending on the chosen allocation.

The game was played one-shot and we used the strategy method for both, receivers and voters. Each receiver decided for each of the eight possible voting histories (see the eight end-nodes in Figure 1) how to punish the individual voters. Only after the receivers made all eight decisions, each receiver learned whether or not she was the randomly selected receiver who could punish, and she knew that her punishment decisions for the realized situation were binding.[3] Voters decided at seven decision nodes, namely as Voter 1, Voter 2, and Voter 3. In the role of Voters 2 and 3, subjects make decisions for every possible pre-play history (see the seven decision nodes in Figure 1). Voters knew that their choices were binding and that they were randomly assigned the role of Voter 1, Voter 2 or Voter 3 after completing their decisions. Voters learned their assigned role as Voter 1, Voter 2, or Voter 3 only after they decided for all seven decision nodes.[4]

2.1 General Procedures

Before the subjects entered the lab, they randomly drew a place card that specified at which computer terminal to sit. The terminal number determines both a subject's role (voter or receiver) and the group matching. After entering the lab, subjects received paper copies of the instructions at their assigned computer terminals. The subjects' instructions included comprehension questions that had to be answered correctly before the experiment could begin. We used a neutral framing for voters and receivers (Players A and B), as well as for punishment (deduction points), and for the labeling of the two

[3] Brandts and Charness (2011) survey the effect of the use of the strategy method on punishment decisions in experiments and find no case were a treatment effect that is detected using the strategy method vanishes when the direct response method is used. The use of the strategy method can thus be considered as the more conservative test in our context.

[4] Although we used the strategy method, we made the sequential voting procedure very clear. For each of the possible situations, each voting decision was reflected by an individual update of the computer screen. For example, the third voter was informed about the preceding voters' decisions in the sequential order and had to confirm the receipt of each piece of information by clicking a button. Equivalently, a receiver had to click through a sequence of screens showing the sequential order of the three voters' decisions (i.e., the path through the game tree) before making his or her punishment decision for a given voting outcome. See the experimental instructions in the appendix for more details.

allocations (Allocations 1 and 2). An English translation of the original German instructions can be found in the appendix. A summary of the instructions was read aloud before the experiment started to ensure common knowledge.

The data were collected in 4 sessions in two consecutive weeks in November and December 2012. 144 subjects participated in total. Each subject participated only once. The sessions took place at the decision laboratory of the Department of Economics at the University of Zurich. Participants were students from the University of Zurich and the Swiss Federal Institute of Technology in Zurich. The experiment was conducted using z-Tree (Fischbacher, 2007) and the online recruiting system ORSEE (Greiner, 2004).

The experiment took about one hour and 15 minutes. Each experimental point was exchanged into 3 CHF at the end of the experiment. The subjects earned about 26.30 CHF (about 28$ at the time of the experiment), which includes a show-up fee of 12 CHF. Earnings were paid privately to ensure the anonymity of the decisions.

3. Punishment Motives

In this section we discuss potential punishment motives. Note first that if all subjects are purely self-interested, then the receivers will never incur the cost to punish, irrespective of the resulting allocation and the voting sequence. There is ample evidence, however, that the behavior of many subjects is not accurately predicted by the pure self-interest model. In the following we consider the punishment motives "outcome unequal," "choice unequal," "intention unkind," the interaction "outcome unequal & intention unkind," and—being the focus of this paper—the potential punishment motive "pivotality."

3.1. Outcome-based models of social preferences

Outcome based models of social preferences, e.g., Fehr and Schmidt (1999) or Bolton and Ockenfels (2000), assume that some people dislike unequal allocations. Inequality-averse receivers might thus be willing to incur the cost of punishment to reduce payoff differences. This model class predicts no punishment if the equal allocation prevails but predicts positive punishment otherwise. Importantly, the predicted punishment neither depends on individual choices (votes) nor on the sequence of voting.

3.2. Choice of the unequal allocation

Voting for the unequal allocation could be perceived as a stated preference for the unequal allocation and thus as blameworthy. This would predict no punishment for a voter who opted for the equal allocation but some punishment for a voter who opted for the unequal allocation. Note that the punishment motive "choice" can be considered as a naïve version of the punishment motive "intentionality," which we discuss next.

3.3. Intention-based models of social preferences

Intention-based models of social preferences, e.g., Rabin (1993) or Dufwenberg and Kirchsteiger (2004) assume that people are willing to incur costs to punish unkind actions, irrespective of the resulting allocation. In these models the unkindness of an action is measured by comparing the chosen action with the possible alternative actions. In our game, voting for the unequal allocation is an intentionally unkind action if a voter is still able to affect the outcome of the voting process. If the vote is already decided by Voters 1 and 2, the vote of Voter 3 is irrelevant and therefore classified as a neutral action, i.e. as neither kind nor unkind. Voting for the equal allocation, while still being able to affect the outcome, is a kind action. For neutral or kind voters, the notion of intention based reciprocity predicts no punishment.

3.4. Outcome and intention

Falk and Fischbacher (2006) combine the punishment motives "outcome" and "intention." In their model, people are willing to punish decision makers who implement unequal allocations, and punishment is even stronger if the decision maker's action is intentional.

In our context, punishment is thus predicted only if both, the unequal allocation results and a voter's intention is unkind.

3.5. Pivotality

The central hypothesis in our paper is that being pivotal is regarded as carrying special responsibility for the resulting voting outcome. Therefore, the prediction of the notion of pivotality is that the pivotal voter will be punished more than the other voters, given the unequal outcome results.

4. Results

4.1. Pivotality and Punishment

Our main research question is whether receivers blame the pivotal voter more than the non-pivotal voters. We investigate this question using the punishment pattern as a measure of the assignment of blame. Table 1 shows the average punishment levels for the first, second, and third voter separately for each of the eight possible voting outcomes. The table shows that in all four situations in which the unequal allocation is chosen, average punishment is higher for the pivotal voter (shown in boldface) than for the non-pivotal voters. For example, the first row of Table 1 shows the Situation "u-u-u," in which all voters opted for the unequal allocation. Voter 2 is the pivotal voter and he is punished by 1.85 points on average. Voter 1, the first intentionally unkind voter, is punished by 1.5 points and Voter 3, whose vote could not make a difference, is punished by 0.86 points on average. The two columns on the right hand side of Table 1 show the significance levels of the comparison of the punishment for the pivotal voter and the non-pivotal voters, either considering the average of both other voters as the comparison group ("all voters") or the other intentionally unkind voter only ("unkind voter"). The table shows that the difference in punishment between the pivotal and the average of the two non-pivotal players is significant in all four situations. While average punishment for the pivotal voter is higher than for the non-pivotal unkind voter in all four situations, the difference in average punishment between the pivotal voter and the intentionally unkind voter is significant only in the two situations in which the pivotal voter is the last voter.

Table 1: Average punishment in the eight possible situations.

		Average punishment			Pivotal vs. Non-Pivotal	
Allocation	Situation	Voter 1	Voter 2	Voter 3	all voters	unkind voter
unequal	u-u-u	1.5	**1.85**	0.86	$p<0.001$	$p=0.294$
	u-u-e	1.86	**1.92**	0.26	$p<0.001$	$p=0.960$
	u-e-u	1.68	0.07	**2.39**	$p<0.001$	$p=0.006$
	e-u-u	0.11	1.83	**2.33**	$p<0.001$	$p=0.012$
equal	u-e-e	1.33	0.10	0.08	-	-
	e-u-e	0.17	1.43	0.08	-	-
	e-e-u	0.06	0.03	0.92	-	-
	e-e-e	0.08	0.07	0.03	-	-

Notes: The punishment of the pivotal voter is written in boldface. The two right columns show p-values of Wilcoxon signed rank tests comparing the punishment of the pivotal voter to the punishment of both other voters (all voters) or to the punishment of the other intentionally unkind voter only (unkind voter).

In Figure 2, we show the average punishment for all voters aggregated over the four situations in which the unequal allocation is chosen. The bars show the average punishment of the following groups of voters: (1) the voters who voted for the equal allocation, (2) the voters who could not affect the outcome but voted for the unequal allocation, (3) the non-pivotal voters who intentionally voted for the unequal allocation and (4) the pivotal voters. Average punishment is lowest for the voters who vote for the equal allocation. It amounts to 0.15 points and is highly significantly different from the other three groups (Wilcoxon signed rank test based on average punishment per subject, N= 72, $p<0.001$). The voters who chose the unequal allocation but could not affect the outcome any longer (because Voters 1 and 2 opted for the unequal allocation already) were punished by 0.86 points on average, which is also highly significantly different from the other groups (Wilcoxon signed rank test based on average punishment per subject, N= 72, p<0.001). Finally, non-pivotal but intentionally unkind voters are punished on average by 1.72 points, while pivotal voters are punished by 2.12 points on average. Also this difference is statistically different (Wilcoxon signed rank test based on average punishment per subject, N= 72, p=0.032). We summarize our findings in the following:

> ***Result 1 (Pivotality and Punishment):*** *On average, the pivotal voter is punished the most.*

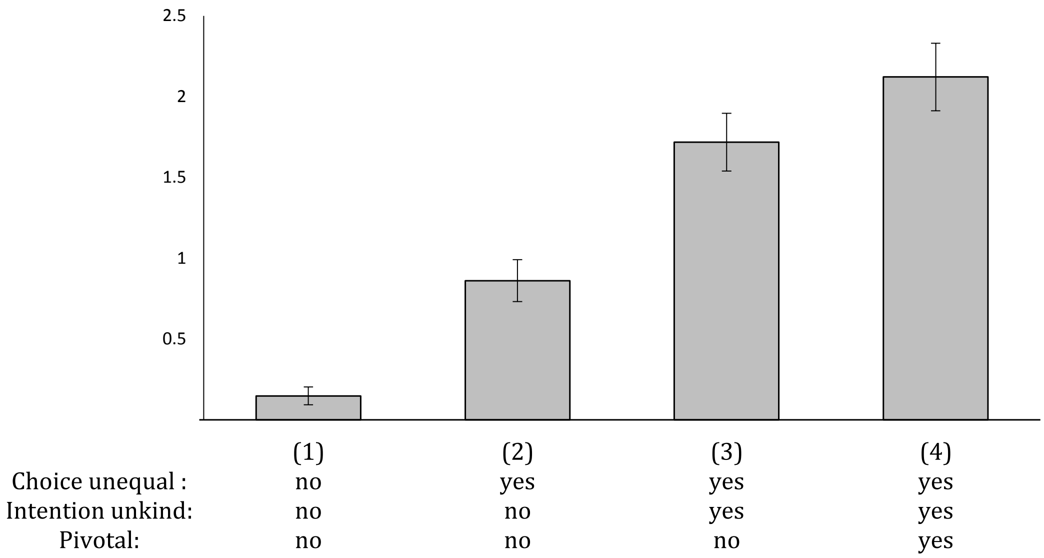

Figure 2: Average punishment for voters if the outcome is unequal. The bars show the average punishment for (1) voters who voted for the equal allocation, (2) voters who voted for the unequal allocation but could not affect the outcome as it was decided already, (3) non-pivotal voters who intentionally voted for the unequal allocation, and (4) pivotal voters. The error bars show standard errors of the means.

4.2. An Econometric Comparison of Different Punishment Motives

In this subsection we provide an econometric comparison of the punishment motives that we discussed in Section 3. We first compare the explanatory power of the different motives in isolation. We then consider all motives simultaneously to analyze if pivotality has explanatory power on top of the other punishment motives.

First, if punishers care about the outcome then punishment should be higher if the unequal allocation is chosen compared to the situation in which the equal allocation is chosen. The two top bars in Figure 3 show the average punishment for voters if the unequal allocation results (1.39) and if the equal allocation results (0.36). Regression (1) in Table 2 reveals that this difference is significant. Note that the regression coefficients correspond to the difference of the size of the respective bars in Table 3. Second, the figure shows that those voters who vote for the unequal allocation are punished on average by 1.66 points, while those who vote for the equal allocation are punished by 0.09 points only. Regression (2) shows that the difference is significant. Third, a voter with an unkind intention is punished on average by 1.76 points. Figure 3 shows that this compares to 0.21 points for voters with a neutral or kind intention. Regression (3) reveals that this difference is significant. Forth, the figure shows that the punishment for intentionally unkind voters who were successful in implementing the unequal allocation amounts to 1.92 points on average, while all other voters receive an average punishment of 0.36 points. Regression (4) again reveals that this difference is significant. Finally, Figure 3 shows the punishment for pivotal voters who chose the unequal allocation (2.12 points) in comparison to the punishment of non-pivotal voters, where the latter category also includes all voters in the situations in which the equal allocation is chosen (0.61 points).[5] Regression (5) in Table 2 reveals that this difference is significant.

[5] Throughout the paper, we only consider being pivotal *for the unequal allocation* and thus neglect the fact that the second voter who opts for the equal allocation is pivotal *for the equal allocation*. We have shown above that little punishment occurs in case of the equal allocation, and we do not find that voters who are pivotal for the equal allocation are again punished significantly less than the other voters.

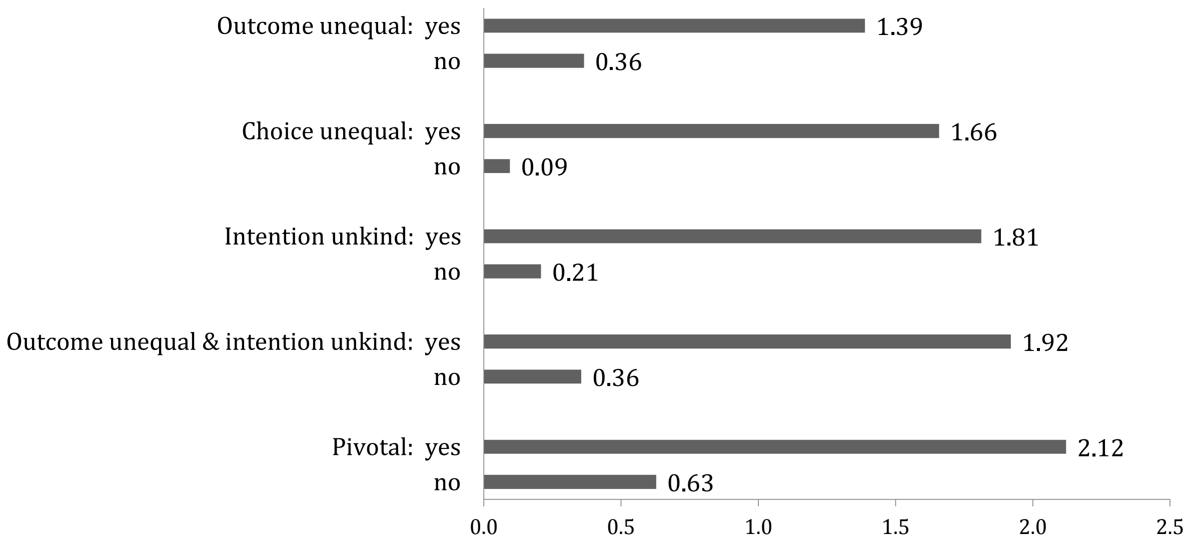

Figure 3: Punishment and fairness motives. The bars shows punishment levels averaged over all situations and voters for which the indicated criteria apply. For example, the top bar shows the punishment of all voters averaged over all for situations in which the unequal allocation is chosen; the bar below shows the punishment for voters averaged over all four situations in which the equal allocation is chosen.

The main insight provided by Figure 3 is that all five punishment motives discussed in Section 3 make the qualitatively correct comparative-static prediction with respect to average punishment levels. To compare the explanatory power of the different motives, we can directly compare the R^2 in models (1) to (5). This is meaningful because the models have all just one parameter. Comparing all punishment motives in isolation, we find that the predictive power of the punishment motive "pivotal" (R^2=0.124 in regression 5) is higher than the predictive power of the motive "outcome unequal" (R^2=0.105 in regression 1). However, the predictive power of the motives that take choice or intentions into account is higher, and it is highest for the motive "Intention unkind" (R^2=0.250 in regression model 3).

Table 2: An econometric comparison of different punishment motives

OLS	(1)	(2)	(3)	(4)	(5)	(6)
Outcome unequal	1.024***					0.048
	(0.126)					(0.070)
Choice unequal		1.564***				0.782***
		(0.154)				(0.137)
Intention unkind			1.604***			0.517**
			(0.161)			(0.196)
Outcome unequal				1.565***		0.289
x Intention unkind				(0.169)		(0.232)
Pivotal					1.494***	0.403**
					(0.180)	(0.155)
Constant	0.365***	0.095***	0.208***	0.355***	0.628***	0.083**
	(0.067)	(0.033)	(0.041)	(0.055)	(0.065)	(0.037)
Observations	1,728	1,728	1,728	1,728	1,728	1,728
R^2	0.105	0.244	0.250	0.217	0.124	0.281

Notes: The dependent variable is punishment points for voters. Outcome is a dummy variable which equals 1 if the unequal allocation is chosen. Intention is a dummy variable equal to 1 if the respective voter opted for the unequal allocation and no majority was achieved before her vote. Pivotality is a dummy equal to 1 if the unequal allocation is chosen occurred and the respective voter was the second voter opting for the unequal allocation. OLS, standard errors clustered on 72 individuals in parentheses. *** p<0.01, ** p<0.05, * p<0.1

We finally analyze whether the punishment motive "pivotal" has an explanatory power on top of the other motives by combining all five punishment motives in one regression. Regression (6) in Table 3 reveals that the motives "choice unequal", "intention unkind", and "pivotal" all contribute to the explanation of the punishment pattern. In particular, the dummy variable "Pivotal" remains significant, showing that being pivotal matters for the assignment of blame even when controlling for other punishment motives. We summarize our results in the following:

> ***Result 2 (Pivotality vs. Standard Punishment Motives):*** *The punishment motive "pivotal" has a significant explanatory power for average punishment even if we control for the standard motives "outcome unequal", "choice unequal", "intention unkind", and the interaction "outcome unequal & intention unkind."*

4.3. Voting Behavior

We conclude the results section with a brief analysis of the voting behavior. Figure 1 shows the voting behavior of Voters 1, 2 and 3 at each possible decision node. It can be seen, e.g., that 58 percent of the voters who decide first opt for the unequal allocation. Overall, we find that the unequal allocation resulted in 67.4 percent of the cases.

An interesting question arises as a result of our finding that pivotality increases the blame for the unequal allocation: Do voters strategically avoid being pivotal? In our game, in case Voter 1 opts for the unequal allocation, do Voters 2 "delegate" the pivotal vote by strategically opting for the equal allocation?

Recall that we used the strategy method for voters. This allows us to address the above question as we can compare the voters' decisions across decision nodes. In particular, we are interested in the voters who opt for the unequal decision as Voter 3 in situations in which Voters 1 and 2 opted for different allocations. In these two decision nodes the last voter is decisive (and pivotal), and observing her choice allows us to elicit this voter's preference over the two allocations. If a subject opts for the unequal allocation even when this means being pivotal (and thus being blamed most) reveals a clear preference for the unequal allocation. Among our 72 voters, 43 always chose the unequal allocation as Voter 3 when their choice was decisive.[6] Among these voters, 21 percent (9 of 43) opted for the equal allocation as Voter 2, given Voter 1 voted for the unequal allocation.[7] That is, 21 percent of the voters who could secure the unequal allocation as Voter 2—which they clearly revealed to prefer as Voter 3—delegate the pivotal choice to the subsequent voter, probably in the hope that he last voter will secure the unequal allocation and take the blame. We summarize this finding in the following:

[6] Note that the choice of Voter 3 is decisive at two decision nodes. As a conservative measure, we consider only the 43 voters who revealed twice and thus consistently that they prefer the unequal allocation at these decision nodes.

[7] Ten voters opted only once for the unequal allocation in the role of the decisive Voter 3. If we took them into account, the fraction would slightly increase to 23 percent (12 out of 53).

Result 3 (Pivotality and Voting Behavior): *About one fifth of the voters who reveal to prefer the unequal allocation avoid being pivotal for the unequal allocation as the second voter and strategically delegate the pivotal choice to the last voter.*

Note that delegating the pivotal choice increased Voter 2's expected payoff in our experiment. On average, Voter 2 received a payoff of 7.75 points if she voted for the equal allocation subsequent to a vote for the unequal allocation by Voter 1, but she received a payoff of 7.10 points only if she voted for the unequal outcome in that case. The reduction in punishment thus overcompensated for the loss of control that results from delegating the pivotal choice as Voter 3 might opt for the equal allocation.

Note finally that our results on punishment suggest that a Voter 3 should not opt for the unequal allocation if the allocation is already determined by Voters 1 and 2. If Voters 1 and 2 chose the equal allocation, we indeed observe that all but one Voter 3 voted for the equal allocation. If Voters 1 and 2 chose the unequal allocation, however, 22 percent of Voters 3 (16 of 72) voted for the unequal allocation. This latter finding is surprising because the low-cost theory of expressive voting (see e.g. Brennan and Lomasky, 1993) suggests that all Voters 3 whose choices are inconsequential opt for the socially more desirable equal allocation. The findings on the behavior of Voters 3 are however consistent with experimental results by Tyran (2004), who shows that many voters "bandwagon," i.e. vote for the option that they expect (or know) others to vote for, hence that not all voters use the opportunity for expressive voting in situations where doing so comes at a low cost, i.e., where it does not affect the voting outcome.

5. Conclusion

In this paper we asked whether people are blamed for being pivotal if they implement an unpopular outcome in a sequential voting process. We measured responsibility attribution by assigned punishment points in an experimental voting game. Our main result is that pivotal decision makers are blamed significantly more than non-pivotal decision makers. This finding confirms Shapley and Shubik's (1954) assumption that the pivotal voter in a committee decision "is given credit" for having passed a decision. Our result has further implications for the theoretical work on committee decisions, because it questions, for example, the equivalence of transparent sequential and simultaneous voting procedures (see e.g. Levy, 2007).

Our experiment also showed that about one fifth of voters who revealed to prefer the unequal allocation when voting last, vote for the equal allocation as the second voter when the first voter voted for the unequal allocation. This suggests that some voters strategically delegate the pivotal decision to subsequent voters. This result extends the experimental findings by, e.g., Hamman et al. (2010) and Bartling and Fischbacher (2012) who show that many subjects shirk the responsibility for unpopular decisions by delegating the decision right. Our data suggests that also in the context of group decision making some voters "delegate" the pivotal choice by voting strategically to shirk the responsibility for implementing the unequal allocation. Finally, our results complement the findings by Falk and Szech (2013b) who show that the diffusion of pivotality leads to more immoral outcomes. Our study shows that not only the own perception of being pivotal matters for decision makers but that the attribution of responsibility for being pivotal by affected parties can, in turn, affect decision makers.

Pivotality is very transparent in sequential voting procedures. The way in which pivotal voters are blamed for unpopular outcomes may however extend to less transparent and simultaneous voting procedures. Consider a situation where the preferences of some decision makers are publicly known. For example, some decision makers are known to be either clearly right or left winged, while others are located more centrally in the political spectrum. In the context of our game, suppose it is publicly known that voter "U" always favors the unequal allocation and that voter "E" always favors the equal allocation. There is also a voter "P" but it is publicly known only that he is neither of type E nor of type U. Suppose further a committee of three voters consists of one U, one E, and one P. Even with a secret and simultaneous vote, it is clear that P is the pivotal voter who determines the outcome. Suppose the unequal allocation results. Then, on the one hand, U might be considered to be the most blameworthy "type" as it is known that he has a clear preference for the unequal allocation. While the voting outcome reveals that P tends more towards the unequal than towards the equal allocation, he is nevertheless not U and thus a less blameworthy "type." Social preference models of "type-based" reciprocity (e.g. Levine, 1998) would thus predict higher punishment for U than for P. On the other hand, the notion of pivotality predicts higher punishment for P than for U. The example shows that in future research it will be interesting to further explore the implications of the effect of pivotality on responsibility attribution in various voting procedures.

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Appendix: English version of the original German Instructions

We present a full translation of the instructions for participants A and indicate the respective differences with respect to instructions for participants B with *"[ ]"*.

General Information

We cordially welcome you to this economic study.

If you read the following instructions carefully, you will be able to earn money in addition to the 12 Swiss Francs that you receive for participating in this study. The actual amount you will earn depends on your decision and others decisions. Therefore it is important that you read the instructions carefully. If you have any questions, please let us know.

During the study you are not allowed to talk to any other participant. If you break the no communication rule we may exclude you from the experiment and payments.

In the experiment we do not talk about Swiss Francs, we talk about Points. The numbers of points you earn in the experiment are converted into Swiss francs with the following exchange rate.

1 Point = 3 Swiss Francs

After the study is finished you will receive the number of points earned in the experiment converted into Swiss Francs plus 12 Swiss Francs for participating in **cash**.

The following pages will explain the experiment in detail.

The Study

At the beginning 5 other participants of this study are randomly and anonymously assigned to you. You will not learn the identity of these participants, neither before nor after the study. Also, no other participant will learn your identity. The study consists of one round. This means every participant makes her decisions once.

There are two types of participant, Type A and Type B.

You are Type A. *[B]*

Every group consists of three participants A and three participants B. Thus, you have been assigned two *[three]* participants A and three *[two]* participants B.

In this study, the three participants A decide by majority rule, how 30 points are allocated between the three participants A and the three participants B.

Participants A have to decide between two possible allocations of points:

- **Allocation 1:** Participants A receive 9 points each and participants B receive 1 point each.
- **Allocation 2:** Participants A and participants receive 5 points each.

The following table shows the two allocations between which participants A have to decide.

	A	A	A	B	B	B
Allocation 1	9	9	9	1	1	1
Allocation 2	5	5	5	5	5	5

The allocation which receives the majority of votes will be implemented. This means if two or three participants A vote for allocation 1, allocation 1 will be implemented. If two or three participants A vote for allocation 2, allocation 2 will be implemented.

Abstention is not possible. Each participant A hast to choose either allocation 1 or allocation 2.

The voting procedure:

Participants A vote one after another.

1. The Participant A, who decides first, is called **A1**.

2. The participant A, who votes second, is called **A2**. Before Participant A2 decides, she observes the decision of participant A1

3. The participant A, who votes last, is called **A3**. Before Participant A3 decides, she observes the decision of participant A1 and A2.

The allocation for which at least two participants A voted is implemented.

The voting result is known, as soon as two participants A have voted for the same allocation.

Decisions by Participants B:

Participants B do not only observe the result of the vote but also how each participant A has decided. This means participants B observe, how the first voter A1 decided, then how the second voter A2 decided and finally how the third voter A3 decided.

Then participants B have the possibility to deduce points from the payoffs of participants A1, A2 and A3. One participant B will be randomly determined and may deduce up to 7 points in total from participants A.

Deducing points causes a cost: If participant B wants to deduce points from participants A, she hast o give up 1 point to deduce up to a 7 points.

It is possible to deduce between 0 and 7 points (integers only). As soon as at least on point is deducted, participant B incurs the cost of 1 Point. **Deduction costs are 1 point, independent of the number of points deduced.**

For example, if participant B deduces 7 points from participant A3, A3's payoff is reduced by **7 points** but also participant B's payoff is reduced by **1 point**.

If participant B deduces **5 points** from participant A1 and 1 point from participant A2, A1's payoff is reduced by **5 points** and A2's payoff is reduced by 1 point but also participant B's payoff is reduced by **1 point,** although participant B deduced only 6 points in total.

The only restrictions with respect to the deduction of points is that participant B can never deduce more than 7 points in total and that given the implemented allocation the payoff of participant A can never be reduced by more points than participant A owned. If for instance the implemented allocation is allocation 1 (9, 9, 9; 1, 1, 1), participant B cannot deduce more than 7 points from a participant A. If the implemented allocation is allocation 2 (5, 5, 5; 5, 5, 5), participant B can deduce in total 7 points but never deduce more than 5 points from a participant A.

Three examples:

<u>Example 1</u>:

Participant A1 chooses Allocation 1 (9, 9, 9; 1, 1, 1).

Participant A2 observes A1's decision and then chooses Allocation 2 (5, 5, 5; 5, 5, 5).

Participant A3 observes A1's and A2's decisions and then chooses Allocation 1 (9, 9, 9; 1, 1, 1).

Hence, the voting result is Allocation 1 (9, 9, 9; 1, 1, 1).

All Participants B observe which allocation was chosen as well as the individual voting decisions by A1 A2 and A3

Participant B1 is randomly selected and can deduce points from participants A.

B1 deduces participant A1 **2 Points**, Participant A2 **5 Points** and Participant A3 **0 Points**.

This results in the following payoffs:

	Decisions by participants A	Allocation 1 is implemented	Deduction points	Deduction cost	Payoffs
A1	Allocation 1	9	2	–	7
A2	Allocation 2	9	5	–	4
A3	Allocation 1	9	0	–	9
B1	–	1	–	1	0
B2	–	1	–	0	1
B3	–	1	–	0	1

<u>Example 2</u>:

Participant A1 chooses die Allocation 2 (5, 5, 5; 5, 5, 5).

Participant A2 observes A1's decision and then chooses Allocation 2 (5, 5, 5; 5, 5, 5).

Hence, the voting result is Allocation 2 (5, 5, 5; 5, 5, 5).

Participant A3 observes A1's and A2's decisions and chooses Allocation 1 (9, 9, 9; 1, 1, 1).

All Participants B observe which allocation was chosen as well as the individual voting decisions by A1 A2 and A3

Participant B2 is randomly selected and can deduce points from participants A.

B1 deduces participant A1 **2 Points**, Participant A2 **1 Points** and Participant A3 **2 Points**.

This results in the following payoffs:

	Decisions by participants A	Allocation 2 is implemented	Deduction points	Deduction cost	Payoffs
A1	Allocation 2	5	2	–	3
A2	Allocation 2	5	1	–	4
A3	Allocation 1	5	2	–	3
B1	–	5	–	0	5
B2	–	5	–	1	4
B3	–	5	–	0	5

<u>Example 3</u>:

Participant B3 is randomly selected and can deduce points from participants A.

Participant B3 deduces no points from any participant A. Participant B3 thus incurs no deduction cost.

Thus, the points resulting from the implemented allocation are equivalent to the payoffs.

[This page appeared only in instructions for participants A]

Your decisions as Participant A:

Before you learn whether you are participant A1, A2 or A3 we ask you to state how you would decide in each possible situation in the role of participant A1, in the role of participant A2 and in the role of participant A3.

There are **seven** possible situations in which a participant A may decide:

If you are participant A1, you will

1. Decide whether you choose Allocation 1 or Allocation 2.

If you are participant A2, you will

2. decide <u>for the case in which participant A1 has chosen Allocation 1</u> whether you choose Allocation 1 or Allocation 2.

3. decide <u>for the case in which participant A1 has chosen Allocation 2</u> whether you choose Allocation 1 or Allocation 2.

If you are participant A3, you will

4. decide <u>for the case in which A1 and A2 have both chosen Allocation 1</u> whether you choose Allocation 1 or Allocation 2.

5. decide <u>for the case in which A1 and A2 have both chosen Allocation 2</u> whether you choose Allocation 1 or Allocation 2.

6. decide <u>for the case in which A1 has chosen Allocation 1 and A2 has chosen Allocation 2</u> whether you choose Allocation 1 or Allocation 2.

7. decide <u>for the case in which A1 has chosen Allocation 2 and A2 has chosen Allocation 1</u> whether you choose Allocation 1 or Allocation 2.

In this study we ask you to state for each of the seven situations how you would decide!

[This page appeared only in instructions for participants A]

If you (and the other participants A) have decided for each situation, participants A will be randomly assigned the role of A1, A2 and A3.

The allocation which results from the decisions stated by the three participants A will be implemented.

Thus if you are assigned the role A1, the decision you stated as A1 will be implemented.

If you are assigned the role A2, the decision you stated as A2 for the relevant case will be implemented. Which of the two decisions you stated as A2 will be implemented depends on the decision of the participant who was assigned the role of A1.

If you are assigned the role A3, the decision you stated as A3 for the relevant case will be implemented. Which of the four decisions you stated as A3 will be implemented depends on the decisions of the participants who were assigned the roles of A1 and A2.

Hence, each of the seven decisions can be decisive for your payoffs at the end of the study.

Since the study has only one round, you make each decision only once.

Thus carefully think about your decisions in each situation!

[This page appeared only in instructions for participants A]

After you made your decisions as participant A:

After all participants A have made their decisions and after it has been randomly determined which participant A acts as A1 A2 and A3, the relevant decisions are implemented.

All participants B are asked how they will decide if they can deduce points from participants A. Participants B see which decision participant A1 has made, which decision was made thereafter by participant 2 (given A1's decision) and finally which decision participant A3 has made (given the decisions by A1 and A2).

After all participants B made their decision, one participant B is randomly selected in each group, whose decisions are implemented. Deducing points causes deduction costs for this selected participant B. The costs for this participant B will amount to 1 point if the participant chose to deduce at least 1 point from a participant A and 0 points if the participant chooses not to deduce points. The other two participants B cannot deduce any points and therefore incur no deduction cost.

After all participants B made their decisions the study ends. The points you earned in the experiment will then be converted into Swiss Francs and paid in cash to you in addition to the 12 Swiss Francs, which you receive for showing up for the experiment.

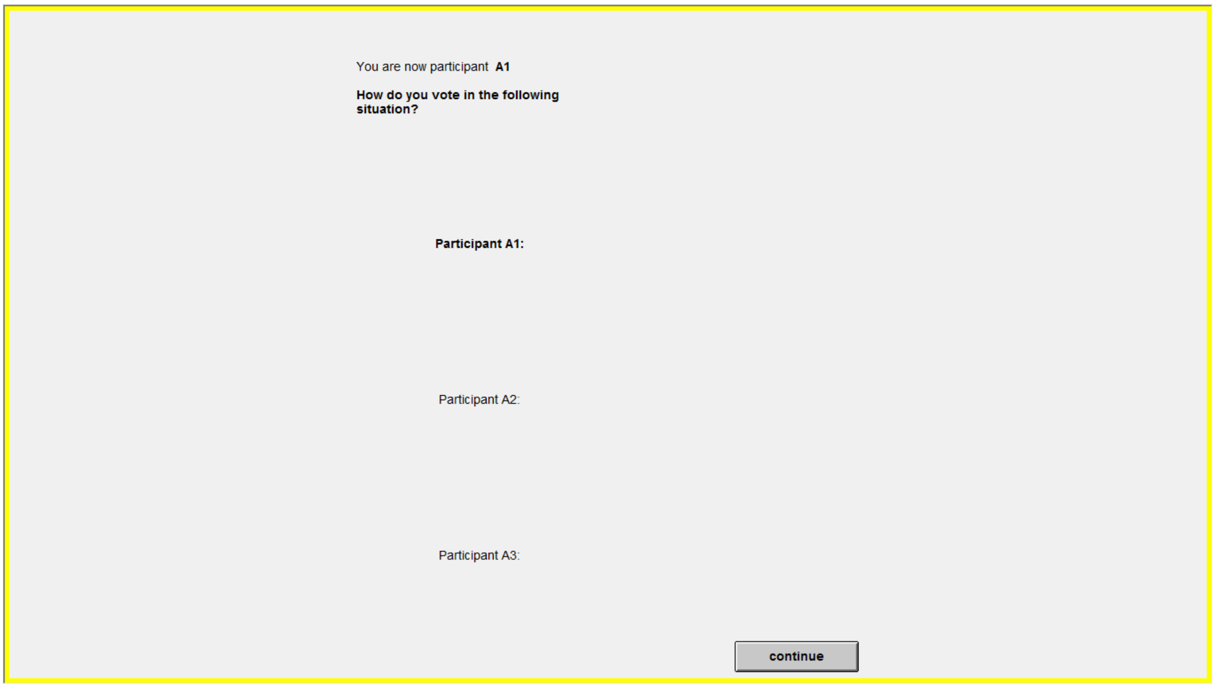
[This page appeared only in instructions for participants A]

The procedure on your computer screen:

The screens in which you make your decisions are structured as follows.

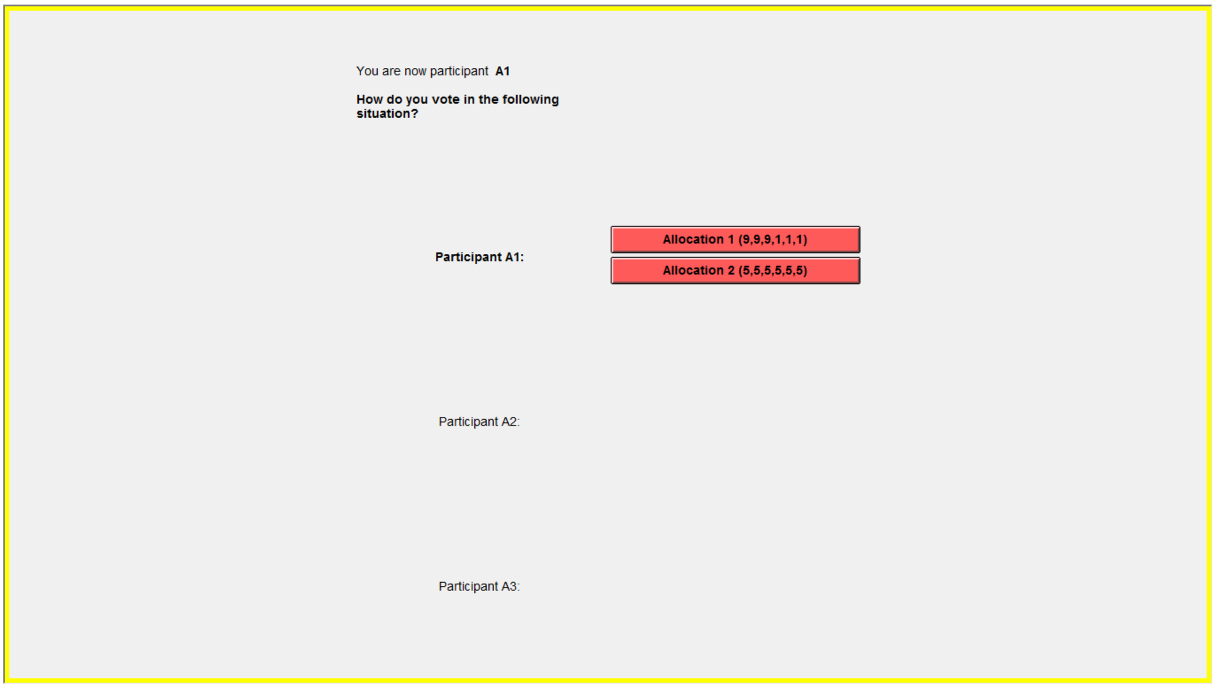
In the upper row you always see for which Role – A1, A2 or A3 you are deciding on the current screen. First you decide as participant A1.

In the example screen below you are deciding in the role of participant **A1**:



[This page appeared only in instructions for participants A]

After you have clicked “continue”, you can decide between Allocation 1 and Allocation 2. Please click on the field you want to choose using the mouse.



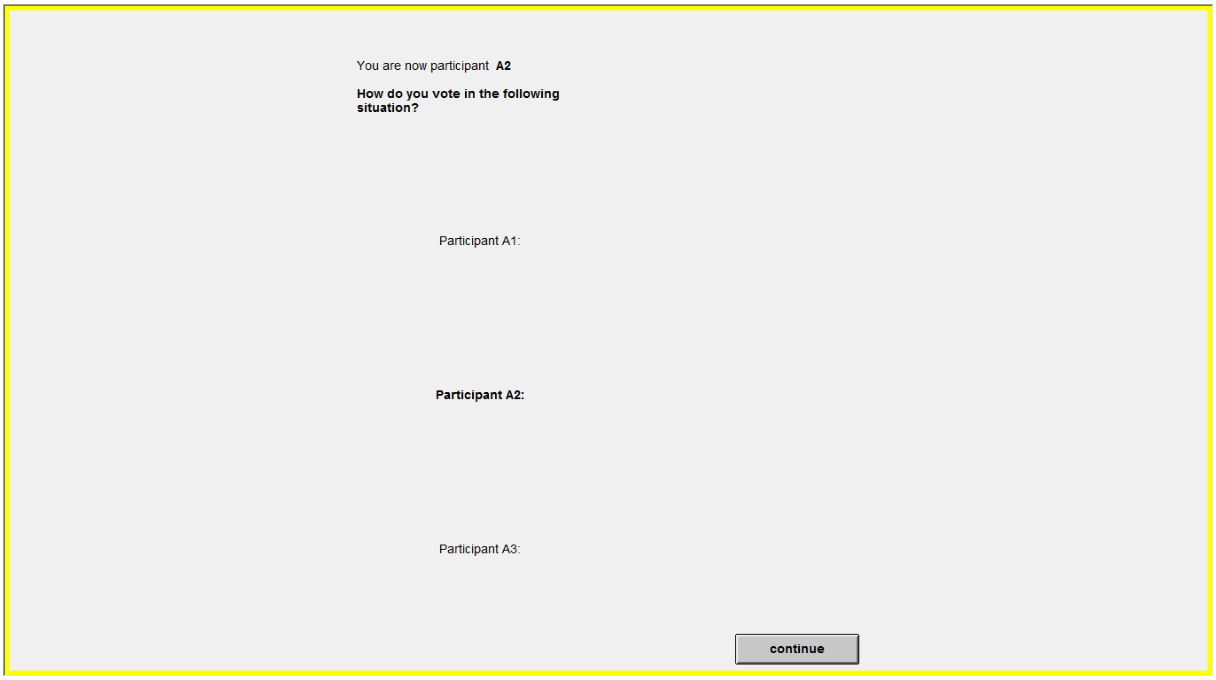
After you have clicked the button for Allocation 1 or Allocation 2, you advance to the next Situation. In the next situation you are allocate a role again.

On the next pages we explain another example.

[This page appeared only in instructions for participants A]

After you have decided as participant A1 you decide in the role of participant A2.

In the example screen below you are deciding in the role of participant **A2**

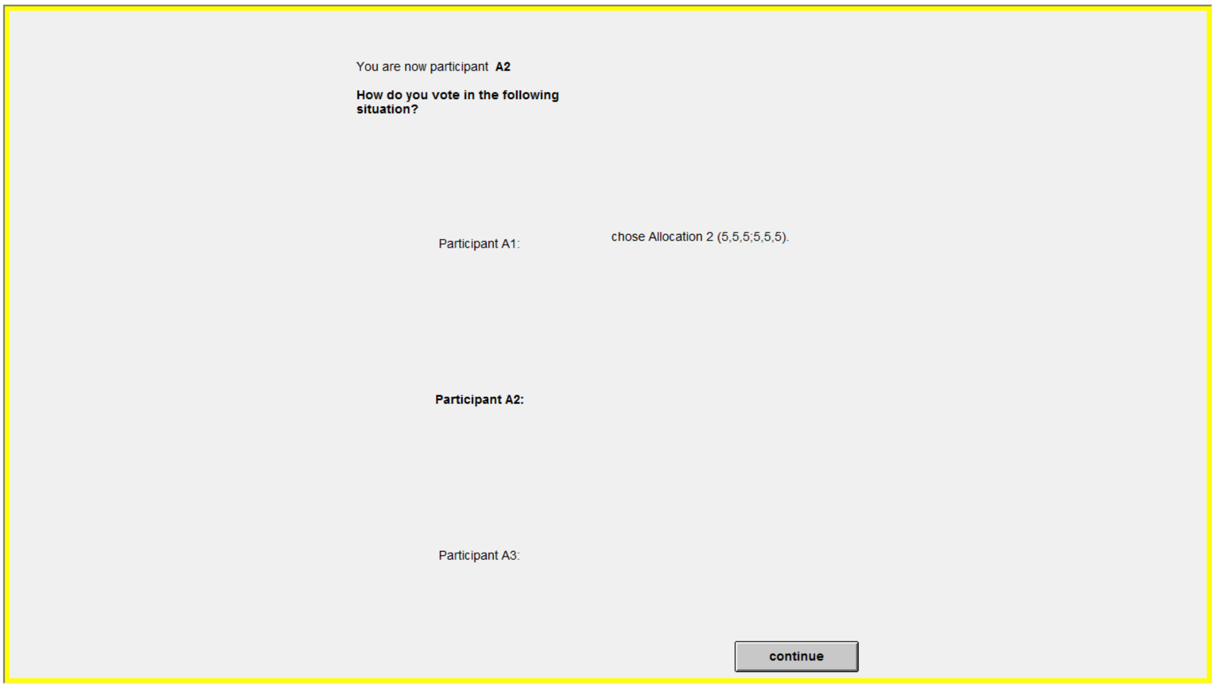


Again, you confirm that you have seen in which role you are deciding by clicking the "continue" button. :

[This page appeared only in instructions for participants A]

After you have clicked “continue”, you see first which decision was chosen by participant A1.

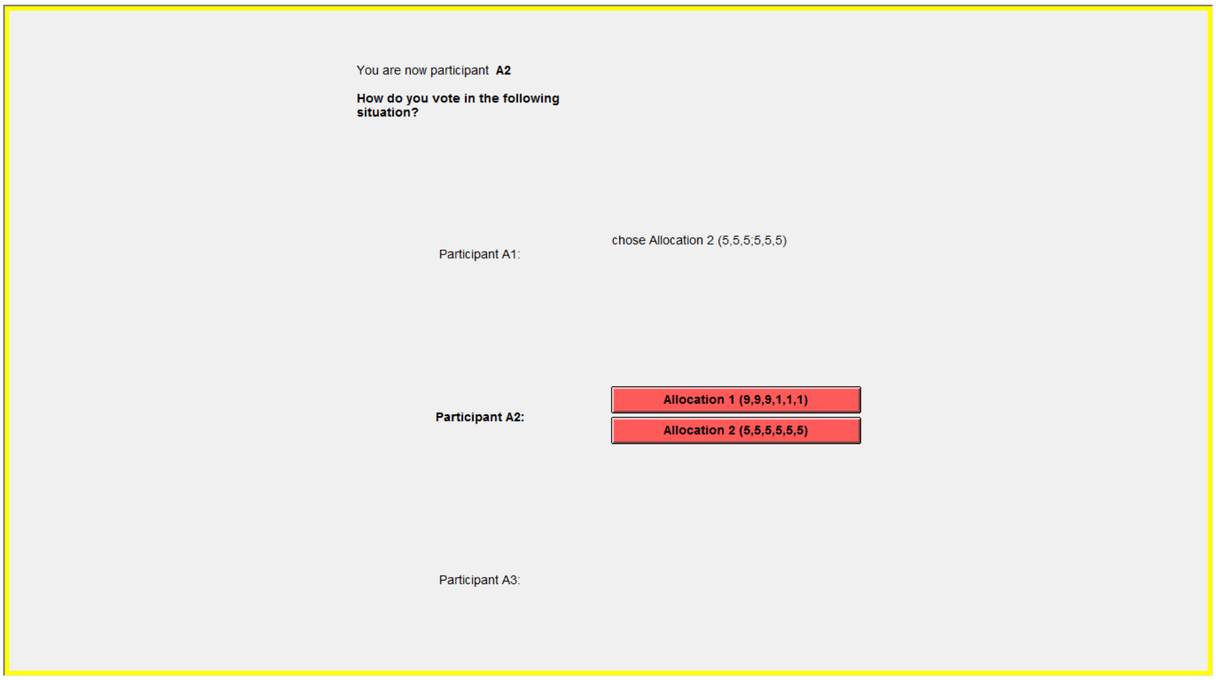
In the example below, participant A1 has chosen Allocation 2 (5,5,5;5,5,5).



You confirm that you have seen the decision by participant A1 by clicking the “continue” button. :

[This page appeared only in instructions for participants A]

After you have clicked "continue", you can decide. You can now – given the decision of Participant A1 – decide between Allocation 1 and Allocation 2. Please click on the field you want to choose using the mouse.



After you have clicked the button for Allocation 1 or Allocation 2, you advance to the next Situation. Thus, if you decide in the role of participant A2 or A3, you will first learn the decisions by participant(s) deciding before you (i.e. A1 and if so A2). Only after you learned the decisions you can choose yourself.

You decide **once** in the role of participant A1, **twice** in the role of A2 and **four times** in the role of A3 (see also page 7 of the instructions).Please note that you will first decide as participant A1, then as participant A2 and finally as participant A3. However, the order of the different situations in the role of A2 and A3 is random (the order does not necessarily correspond to the order on page 7). **Please always be aware for which situation you are currently deciding.**

Do you have any questions? Please raise your hand we will come to your cubicle.

Comprehension Questions:

Please answer the following comprehension questions. The questions ensure that you are familiar with the procedures of the study. **Decisions and Numbers in the question section (as well as in all examples in the instructions) were chosen randomly.** Your answers to the comprehension questions do not affect you payoff at the end of the study.

1. Assume the following decisions by participants A and that the decisions of participant B1 are implemented.

	As' Decision	**Resulting points?**	Deduction points by B1	**Deduction cost?**	**Payoffs?**
A1	Allocation 1		0	–	
A2	Allocation 2		2	–	
A3	Allocation 1		5	–	
B1	–		–		
B2	–		–		
B3	–		–		

Please fill in the points resulting from the implemented allocation as well as deduction cost for B1 and payoffs for all 6 participants.

2. Assume the following decisions by participants A and that the decisions of participant B2 are implemented.

	As' Decision	**Resulting points?**	Deduction points by B2	**Deduction cost?**	**Payoffs?**
A1	Allocation 2		2	–	
A2	Allocation 1		0	–	
A3	Allocation 2		1	–	
B1	–		–		
B2	–		–		
B3	–		–		

Please fill in the points resulting from the implemented allocation as well as deduction cost for B2 and payoffs for all 6 participants.

3. Assume the following decisions by participants A and that the decisions of participant B3 are implemented.

	As' Decision	**Resulting points?**	Deduction points by B3	**Deduction cost?**	**Payoffs?**
A1	Allocation 1		0	–	
A2	Allocation 2		0	–	
A3	Allocation 2		0	–	
B1	–		–		
B2	–		–		
B3	–		–		

Please fill in the points resulting from the implemented allocation as well as deduction cost for B2 and payoffs for all 6 participants.

4. In question "3." Participant B3 chose to deduce 0 points.

   a. How many points could have been deduced by participant B3 in total?

   b. How many points could have been deduced by participant B3 for each individual participant A?

   c. How many points would have been received by participant B3 if she deduced at least 1 point (given the implemented allocation)?

[Participants B were asked an additional question:]

5. In the experiment, you have to enter 24 decisions about deducing points (8 situations with three possibilities to deduce points).

   a. For how many of the 8 situations are your decisions implemented?

   b. Which deduction cost do you incur if you are the randomly chosen participant B who can deduce points and you deduced at least one point from one of the participants A?

After we have checked you answers it is reasonable to consider already how you will decide in this study.

[This page appeared only in instructions for participants B]

Your decision as Participant B:

Before you know whether you will be randomly selected to be the Participant B who may deduce points from participants A we ask you to state **for each possible situation** how you would decide as the randomly chosen participant B.,

There are **eight** possible situations, for which you have to decide how many points you would like to deduce from the participants A.

The eight situations the eight possible decision combinations of participants A: The following table shows the situations at one glance.

Sequence of decisions →

Situation	**Participant A1 chooses**	**Participant A2 chooses**	**Participant A3 chooses**
1	Allocation 1	Allocation 1	Allocation 1
2	Allocation 1	Allocation 1	Allocation 2
3	Allocation 1	Allocation 2	Allocation 1
4	Allocation 2	Allocation 1	Allocation 1
5	Allocation 1	Allocation 2	Allocation 2
6	Allocation 2	Allocation 1	Allocation 2
7	Allocation 2	Allocation 2	Allocation 1
8	Allocation 2	Allocation 2	Allocation 2

How to understand the table: Each row shows one situation. In situations 1 to 4 the implemented allocation is allocation 1. For example, Situation 3 means that Participant A1 decided for Allocation 1, then participant 2 decided for Allocation 2 und finally Participant 3 decided for Allocation 1. As another example, Situation 7 means that A1 decided for Allocation 2, then Participant A2 decided for Allocation 2 and finally Participant A3 decided for Allocation 1.

[This page appeared only in instructions for participants B]

Thus in this study we ask you to indicate <u>for each of the eight situations</u> how many points you want to deduce from A1, A2 and A3.

Please note: After you have stated for all eight situations how many points you want to deduce, one of the three participants B in your group will be randomly chosen and her decision for the actual situation will be implemented. **Only this Participant B incurs a cost of 1 Point for the deduction of points (if she chose to deduce points).**

Based on the decisions of participants A one of the eight situations occurs. If you are then randomly chosen to be the participant B who may deduce points from participants A your deduction decisions for that situation will be implemented.

To summarize:

In each group one participant B will be randomly selected, who can deduce points. Only the points of this randomly selected Participant B will be implemented for exactly that situation that actually occurred due to the decisions of Participants A1, A2 und A3 (of the respective group). In each group, only the randomly selected Participant B incurs a cost of 1 Point (if she decided to deduct points).

Since you do not know which situation will result and whether you are randomly selected, your decisions for each of the eight possible situations can be relevant for the payoffs at the and of the study.

Since the study lasts only one round, you make every decision just once.

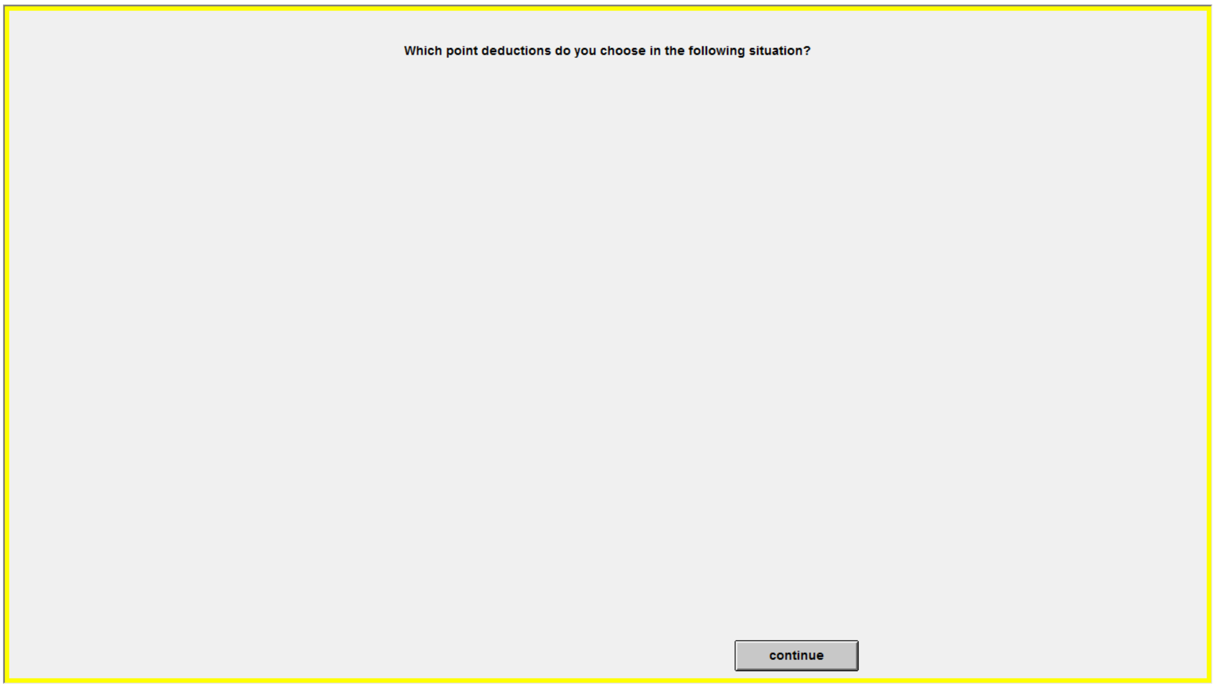
Thus, please carefully think about your decisions for all situations.

[This page appeared only in instructions for participants B]

The procedure on your computer screen:

The screens in which you make your decisions are structured as follows.

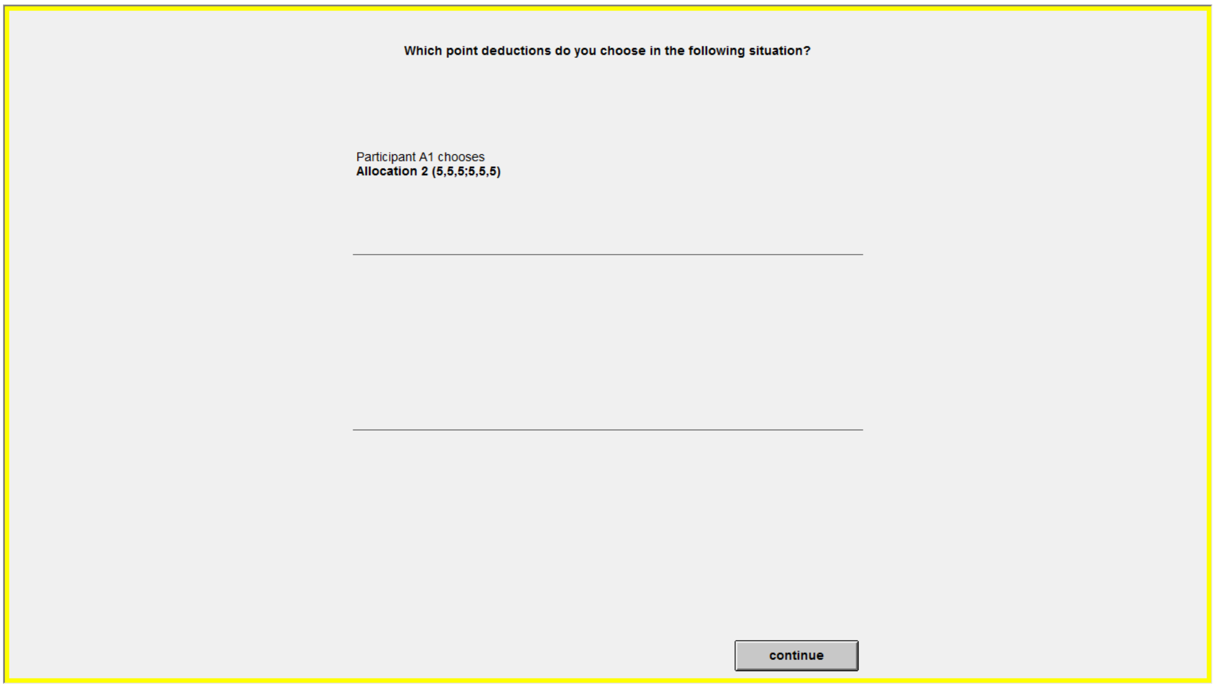
First, you will see the following screen.



If you hit continue, you will observe how participant A1 decided.

[This page appeared only in instructions for participants B]

After you clicked „continue“, you observe how Participant A1 decided.

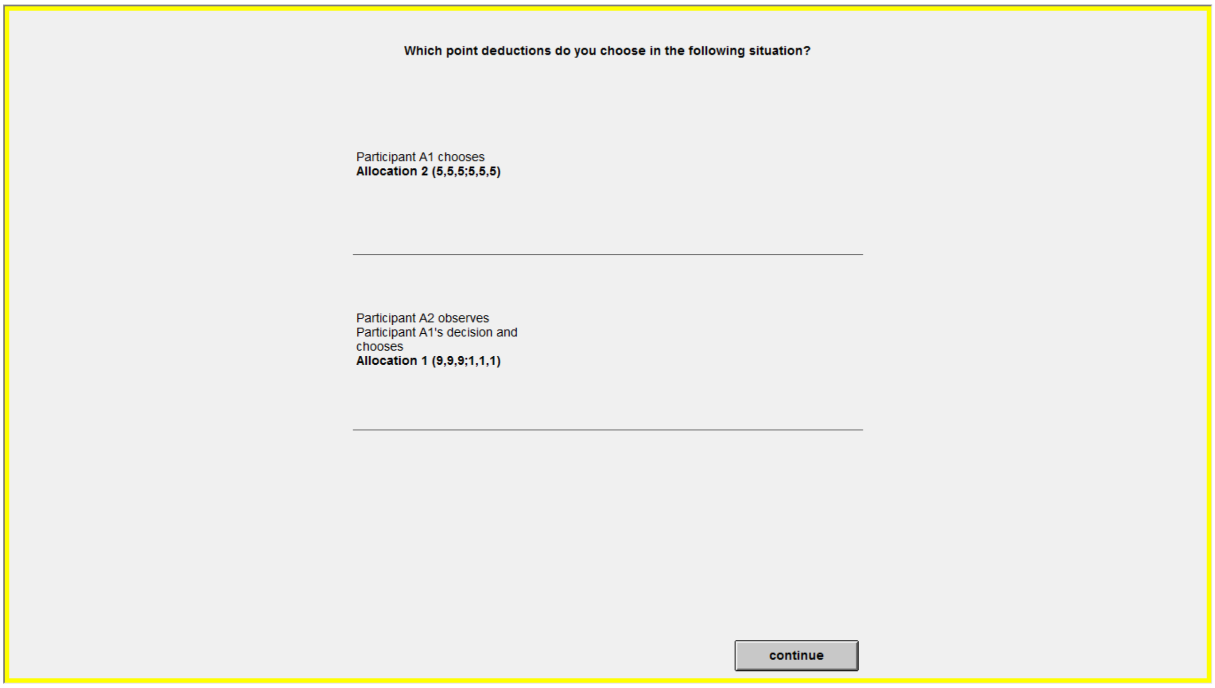


In the example Participant A1 has chosen Allocation 2.

If you hit “continue”, you will observe how participant A2 decided.

[This page appeared only in instructions for participants B]

After you clicked „continue“, you observe how Participant A2 decided.

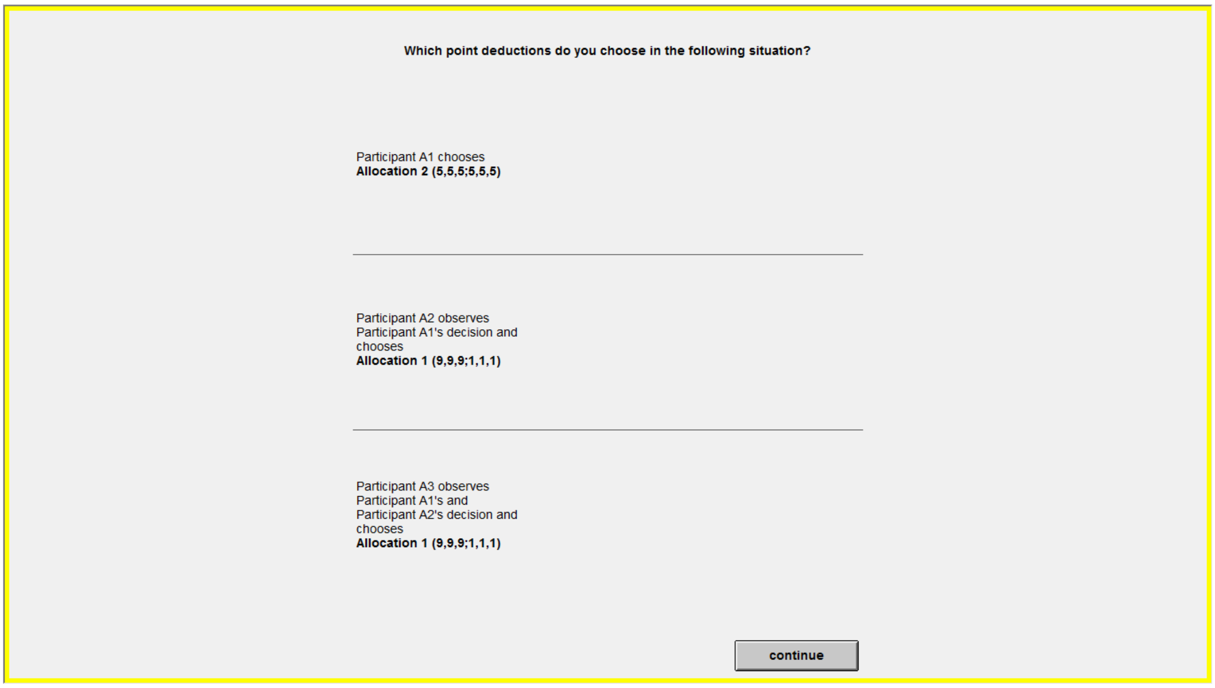


In the example Participant A2 chose Allocation 1 (after Participant A2 observed Participant A1’s decision).

If you hit “continue”, you will observe how participant A3 decided

[This page appeared only in instructions for participants B]

After you clicked „continue“, you observe how Participant A3 decided.

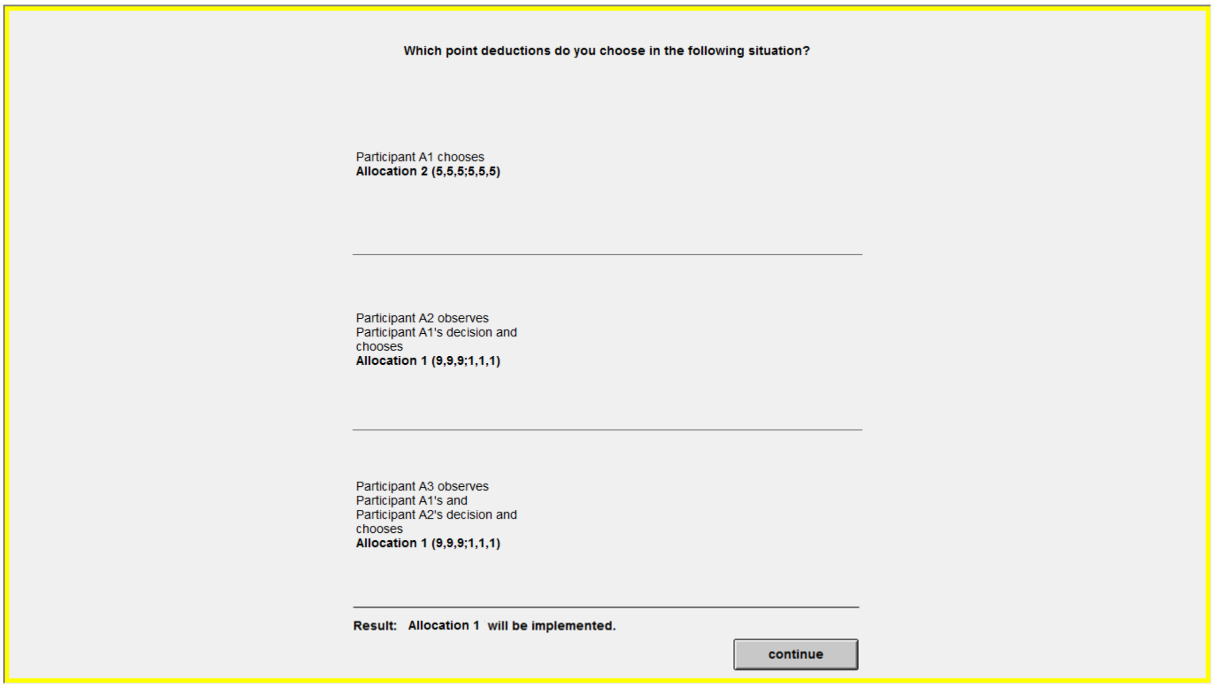


In the example Participant A3 chose Allocation 1 (after Participant A3 observed A1's and A2's decision).

If you hit "continue", you will see which allocation results from participants As' decisions.

[This page appeared only in instructions for participants B]

After you clicked “continue”, you will see which allocation results from participants As’ decisions.

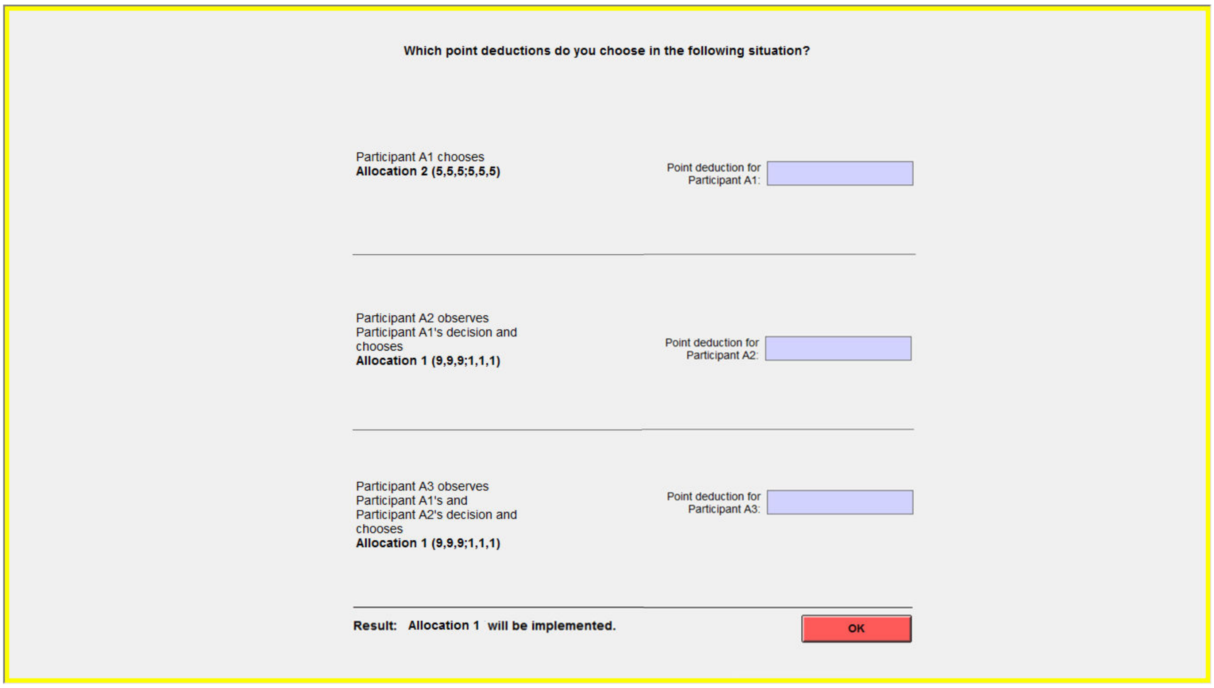


In the example, Allocation 1 is implemented.

If you click “continue”, the fields in which you can enter the number of points you want to deduce will appear.

[This page appeared only in instructions for participants B]

After you clicked "continue", the following screen appears.



In case you are randomly selected as the participant B who can deduce points from participants A please...
…fill in the number of points you want to deduct from Participant A1 in the upper field,
…fill in the number of points you want to deduct from Participant A2 in the middle filed,
and fill in the number of points you want to deduct from Participant A3 in the lower field.

If you do not want to deduce points from a Participant A, you enter "0" in the respective field(s). If you have made your decisions, click the OK- Button on the lower right. As long as you have not clicked that button you may change your input in the fields.

The screens for the other seven situations are similar to the one situation described in the example. Please note: The eight possible situations are displayed in **random order**! (The sequence thus has not to be as indicated on page 7.) **Thus please be aware for which situation you are deciding!**

Do you have any questions? Please raise your hand and we will come to your cubicle to help you.

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