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WHAT'S OURS IS OURS: AN EXPERIMENT ON THE EFFICIENCY OF BARGAINING OVER THE FRUITS OF JOINT ACTIVITY

Lian Xue

Stefania Sitzia

Theodore Turocy

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What's ours is ours:
An experiment on the efficiency of bargaining over the fruits of joint activity[1]

Lian Xue
Wuhan University

Stefania Sitzia
University of East Anglia

Theodore Turocy
University of East Anglia

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Abstract

We use experimental methods to test the effects of joint endowment on coordination success in tacit bargaining games. It has been well established that people use existing focal points to facilitate coordination and the power of such cues declines as payoff becomes increasingly unequal. We conducted an experiment in which two players jointly engaged in an interactive team building activity and together earned the stakes over which they bargain. In the team building exercise, two players jointly complete a shortest route task in a metaphor of a treasure hunt. After the two treasure hunters complete the journey, they independently decide how to divide their rewards using a tacit bargaining table. We find that when participants bargain over the fruits that result from joint activity, they are more likely to coordinate the focal point equilibrium.

JEL classification: C72; C91; C92

Keywords: Team building; Joint production; Group identity; Tacit bargaining; Focal point

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1. Introduction

The Treaty of Hong Canal is an influential event in the history of China. Chu and Han were two kingdoms who challenged the authority of the incumbent Qin dynasty. After a long military campaign, they were successful in deposing the Qin, before falling into contention with each other. In 203BC they reached a cease-fire agreement known as the Treaty of Hong Canal. They agreed that areas west of the canal would belong to Chu, and those to the east of it to Han. Although ultimately Han prevailed and formed the next imperial dynasty in China, the story became an influential allegory for conflict and agreement. It appears in the layout of Chinese chess board, in which the starting positions of the players are divided by the "river," which is a stylised depiction of the Hong Canal and refers to the Chu-Han conflict.

The Hong Canal may have served as a kind of focal point (Schelling 1960) in resolving, at least temporarily, the conflict between Chu and Han. Since Schelling, it has been established that players can coordinate using 'cues' that classical game theory considers irrelevant. Experimental evidence, including Mehta et al. (1994), Isoni et al. (2014), Crawford et al. (2008), Bacharach and Bernasconi (1997), and Bardsley et al. (2010) have shown that participants in coordination games are able to use salient relational cues or distinct labels to achieve high rates of successful coordination.

The backstory of the Treaty of Hong Canal presents another interesting feature that might have influenced the outcome of the negotiations. Chu and Han had collaborated in the revolution against Qin, and they came to control the region through their joint activity of fighting together against the Qin Dynasty. Was the Treaty of Hong Canal successfully agreed in part because it was implicitly a bargain struck dividing territories which had been gained by previous joint activity?

Schelling (1980) explained that people can, and in some cases do, use focal points to facilitate coordination, because the players recognise that they have a common interests, and that the focal point cue can serve as an equilibrium selection device. The two players can reason in a parallel way without any explicit communication about how to coordinate. Schelling's intuition has been developed further in a family of theories of *team reasoning*. Team reasoning was first proposed by Hodgson (1967) and expanded by Sugden (1993, 2000, 2005) and Bacharach (1995, 1997). Intuitively, a player is said to engage in team reasoning if she works out what strategy profile is best for the team as a whole, and then carries out her component of that strategy profile (Bacharach 2006).

Bargaining games offer an additional complexity relative to games of pure coordination, because the two players may have conflicts of interest in who can get the larger surplus. For example, the Hong Canal almost surely did not divide the conquered territories into two parts of equal value. Schelling (1980) argued that tacit bargaining games are essentially the same as coordination games, and that both players would be better off if they could set aside the issue of payoff asymmetry in the outcome and focus on coordination. In a game with a salient focal point cue, if that focal point happened to suggest a lower payoff to a certain player, then 'beggars cannot be choosers about the source of their signal (Schelling, 1980; pp. 66)'. Of course, when the payoff asymmetry suggested by such a focal point is large, the player who is unfavoured in the suggested outcome might be less

inclined to accept Schelling's argument of the primacy of coordination, an intuition which has been demonstrated experimentally by e.g. Crawoford et al (2007) and Isoni et al. (2013).

One factor which might encourage the use of team reasoning, even in the face of large asymmetry in payoffs, is identification with the other player. This could arise because the two players identify as being part of the same group. Charness at al. (2014), for example, have shown that an interactive team-building activity can enhance group identity. Bargaining can also be influenced by the origin of the potential surplus to be bargained over (e.g., Karagozoglu and Riedl, 2015).

We report a laboratory experiment which leverages the bargaining table design by Isoni et al. (2013). The bargaining table is a graphical representation of a bargaining situation between two players. There is a 9x9 grid of squares, with each player having a "base" on one side. Discs worth amounts of money are placed at locations on the table; the players face the problem of how to divide the discs between them. We use layouts of the discs from Isoni et al.'s design in which a possible efficient division of the discs is suggested by a cue derived from the physical locations of the discs on the table. Some layouts suggest a rule of claiming the disc(s) which are closer to one's own base (the cue of *closeness*). Other layouts suggest a rule of claiming discs based on a close visual grouping (the cue of *accession*). Both types of cue indicate divisions of discs which leave an unbroken region of empty cells in the middle of the bargaining table grid, which region echoes the Hong Canal and the river on the Chinese chessboard.

Our key contribution is to incorporate a prior activity which occurs before bargaining takes place on the bargaining table. We vary whether this activity is carried out separately by each participant, or jointly by the two participants who will subsequently engage in bargaining. When the prior activity is joint, we also vary whether the discs on the bargaining table are presented as having been collected as a result of the prior activity, or whether the prior activity is unrelated to the bargaining problem.

We find that participants are more successful at coordinating their claims in the bargaining game when the discs being bargained over are motivated as being a result of the prior activity. By comparing the two joint activity treatments against the separate activity baseline, we conclude that this improved performance can be attributed mainly to having obtained the discs from the joint activity and only in part to the fact that participants had a prior interaction; the linkage between the prior activity and the bargaining problem is also significantly important in improving efficiency.

Compared with existing studies of examining team reasoning and Level-K theories as an explanation of coordination games (e.g. Bardsley et al. 2005), our design allows for a robustness check for using team reasoning theory as an explanation for the high coordination rates often observed in tacit bargaining games. This study also contributes to the literature examining the effect of induced group identity in strategic games. Many existing studies induce common identity either by priming natural identity based on gender or country of origin (Shih et al. 1999; Benjamin et al. 2007), or identity based on existing group identity as students in the same university or members of the same organization (Attansai et al. 2016). Others use a minimal group paradigm, where groups are generated based on, for example, one's stated preference between two works of art (Tajfel et al. 1971; Yamagashi and Turner 1986; Chen and Li 2009). Our approach is more in

the spirit of studies which use team-building activities to induce common identity (Eckel and Grossman, 2005; Charness et al. 2014), but in which we can distinguish between the case in which the team-building has led to a bargaining situation over assets derived from the previous joint activity, versus the case in which the team-building exercise is separate.

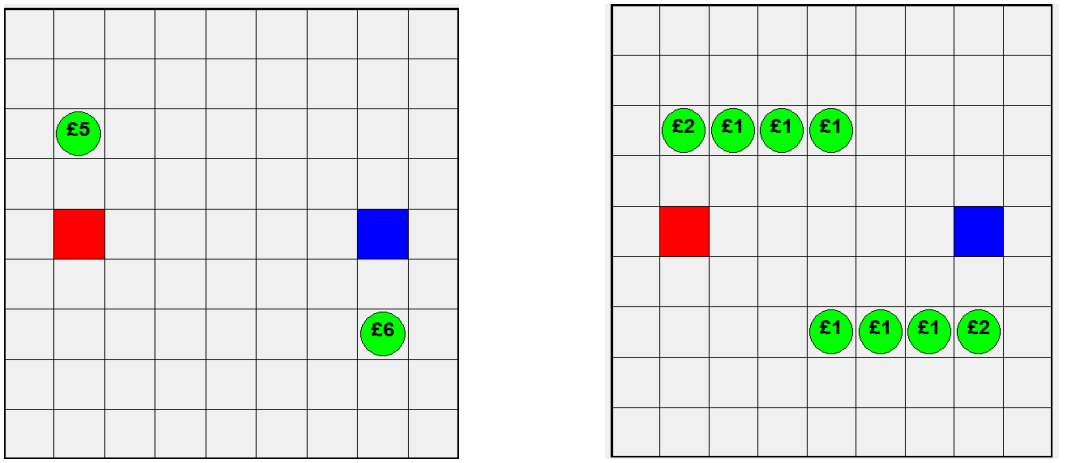
The rest of this paper is structured as follows. Section 2 describes the experimental design. Section 3 presents the main hypotheses. Section 4 presents the data and results. Section 5 concludes with a discussion.

2. Experimental Design

The experiment consisted of 12 different scenarios. For each scenario, participants were assigned into pairs and they will not be matched with the same participant in two consecutive periods. Each scenario consisted of two stages. In all treatments, Stage 1 was a task involving finding a route around 10 points on a map. In Stage 2, the two participants played a tacit bargaining game. Across treatments we varied the linkage between the Stage 1 and Stage 2 activities, and whether Stage 1 was completed individually or as a pair.

1) Stage 2: The tacit bargaining game

The Stage 2 bargaining game was implemented using the "bargaining table" design of Isoni et al. (2013). Figure 1 shows two of the tables used in our experiment.



Game 2; Asymmetric Payoffs; Cue: Closeness; Game 10; Symmetric Payoffs; Cue: Accession;

Figure 1 Example of bargaining. (The square on the left was coloured red; the square on the right was coloured blue.)

In the table, each participant had a base, represented by either a red square or a blue square. The colour and location of the base for each participant were the same in all scenarios[2]. On the table were two, four, or eight discs, worth monetary amounts. Players could claim as many or as few discs as they wished, by clicking on the discs they wanted to claim. Players made these claims without knowing the choice of their counterpart. An agreement occurred if the claims of the two

[2] The protocol followed Isoni et al. (2013)'s design, to avoid position or colour effects. The location of discs and bases permutated to ensure subjects see the same table.

players had no discs in common; in this case, each participant would earn an amount equal to the total value of the discs they claimed. However, if any disc was claimed by both participants there was no agreement: neither participants got any discs and earned nothing from the scenario.

We used a subset of the tables from Isoni et al. These tables were designed such that the layout of discs on the table suggested a way to coordinate the claims to avoid disagreement. Our tables use one of two relational cues designed by Isoni et al:

- Closeness: Discs are positioned so as to be clearly closer to one base or the other, suggesting a rule to claim discs which are closer to one's own base. Game 2 in Figure 4 is an example of a game with a closeness cue.
- Accession: Discs are positioned in two groups, suggesting a rule to claim discs which are in the group which comes closest to one's own base. Game 10 in Figure 4 is an example of a game with an accession cue.

Table 1. A summary of all bargaining tables.

Payoff allocations	Spatial cue[a]	2 discs	4 discs	8 discs
5: 5	C	G1= 5||5[b]	G5=3,2||2,3	G9=2,1,1,1||1,1,1,2
	A	-	G6=(3|2)(2|3)[c]	G10=(2,1,1|1)(1|1,1,2)
6: 5	C	G2=5||6	G7=3,3||2,3	G11=2,2,1,1||1,1,1,2
	A	-	G8=(3|3)(2|3)	G12=(2,2,1|1)(1|1,1,2)
8: 3	C	G3=3||8	-	-
10: 1	C	G4=1||10	-	-

a. C: closeness; A: accession;
b. ||denotes the central column that separates the table into two parts;
c. ( ) denotes block of discs;
d. The two bars inside the round brackets indicate the number and value of discs that are placed in the central column.

Table 1 summarizes the 12 scenarios we selected from Isoni et al.. The scenarios are grouped by the most equal payoff allocation possible, which cue is present (closeness or accession), and how many discs are on the table (2, 4, or 8). We label as *symmetric games* the games in which a payoff allocation of £5 to each participant is possible and efficient. In the remaining games, which we label *asymmetric games*, equal and efficient payoffs to each participant could not be obtained. Symmetric games always have payoff allocation of 5:5; payoff allocations for asymmetric games are 6:5, 8:3 to 10:1. In games with 2 discs, closeness and accession are equivalent.

The notation of the games, as shown in Table 1, followed Isoni et al. (2013). The two vertical lines represent the central column in the table that separates the two players' sides. For example, G5: 3,2||2,3 means that on the left side of the table there are two discs valued £3 and £2 and on the right hand side there are another two worth £2 and £3 respectively. The round brackets represent blocks of discs. For example, G10: (2,1,1|1)(1|1,1,2) means that there are two blocks of discs each with four discs valued £2, £1, £1 and £1. Between the two vertical lines there are two numbers, these represent discs worth £1 that lie in the central column of the table. The full set of tables we employed can be found in Appendix A.

2) Stage 1: The Shortest Route Task

The Stage 1 task involved finding a route which visited 10 points laid out on a two-dimensional map. We call this the Shortest Route Task (SRT for short). An example of a typical map can be seen in Figure 1.

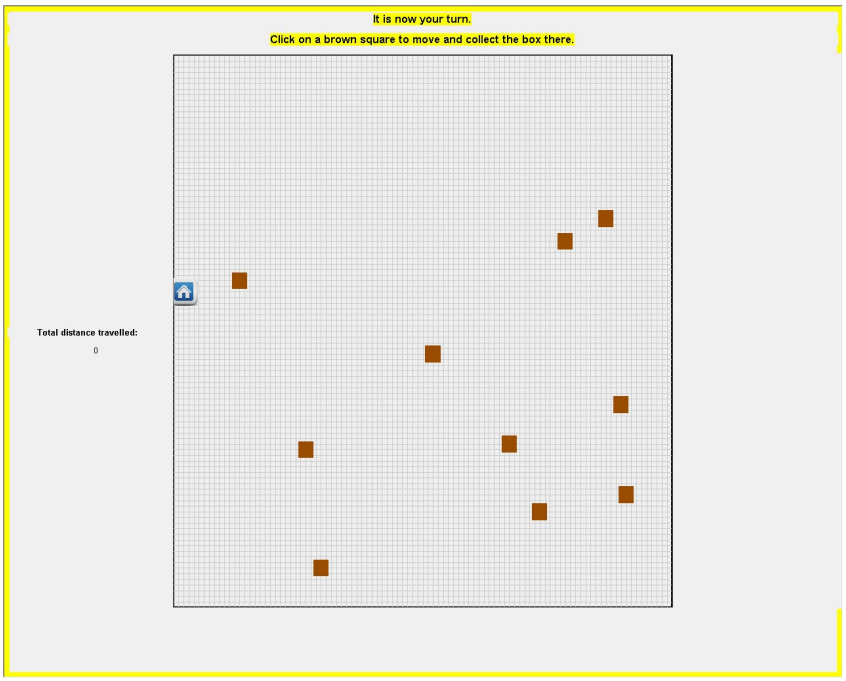


Figure 2 An example of a typical map.

Participants started from the home location, indicated by the icon of a house, and traveled around the map collecting boxes, represented by the brown squares. A participant selected the next box to collect by clicking on it with her mouse. After she clicked on it, a line connecting the box to the previous location would appear on the map.[3] The brown square turned grey, and an icon representing the collected box appeared on the right side of the screen. Once the tenth and final box was collected, the route was completed automatically by returning to the home location. Figure 3 shows an example of a completed route.

While moving around the map collecting boxes, the total distance traveled so far was reported at the left of the screen. After the bargaining in Stage 2 was completed, participants learned how the total length of their route compared to the routes constructed by other participants, with a feedback screen as in Figure 4.

[3] All distances were represented as if the boxes were on a grid, and travel was only along the up-down and left-right directions on the grid; that is, all distances used the "taxicab" or "Manhattan" metric. This allowed us to make all distances exact integers, as well as to be able to draw the paths so a path never overlapped itself.

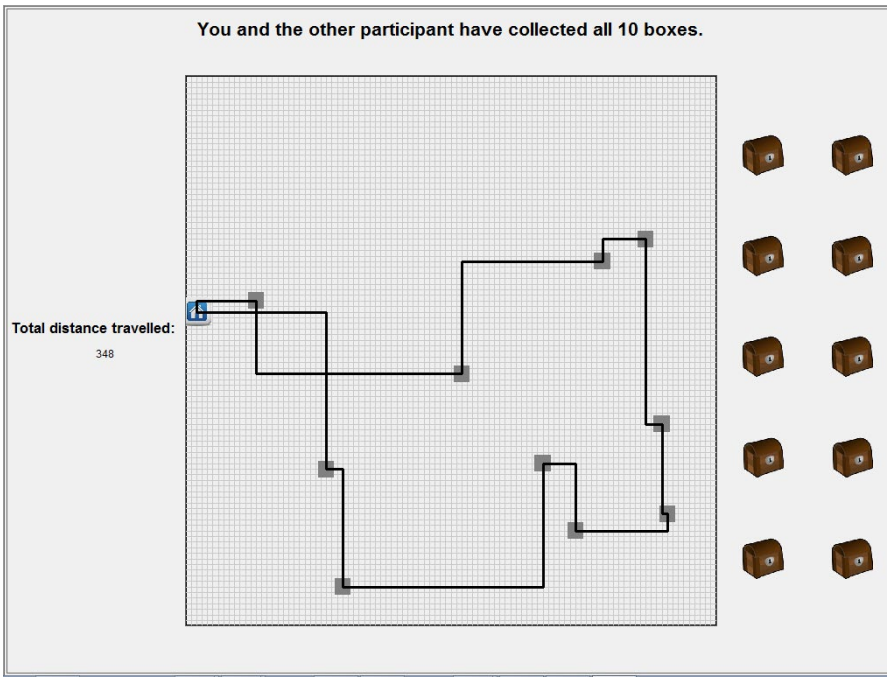


Figure 3 Shortest route in the sample SRT

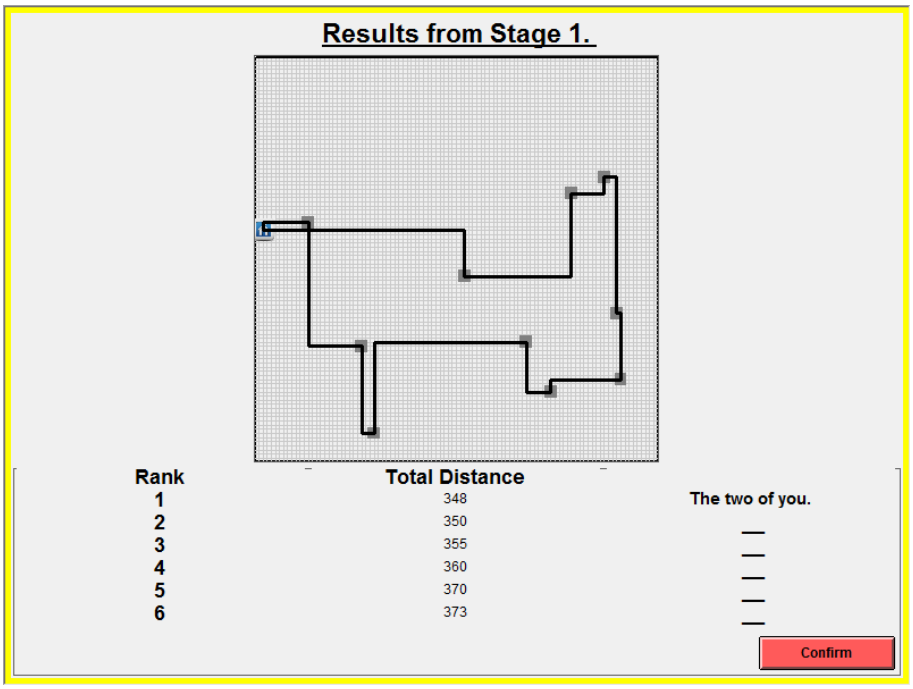


Figure 4 An example of a ranking table.

Participants were encouraged to find a short route in the SRT, and the relative ranking report could provide some (additional) intrinsic motivation to find a short route. We did not provide financial incentives based on the SRT, as we did not want to introduce possible wealth effects to confound the bargaining process.

The SRT is an instance of the traveling salesman problem (hereafter refers to as TSP) which is a classical combinatoric optimization problem. The game describes a situation in which a salesman must travel between N cities and return where he starts. There are increasing costs associated with the distance he traveled, so he wants to keep the total distance as short as possible. The task is typically regard as a "hard" optimization problem[4], and has intrigued mathematicians and computer scientists for decades (Hoffman and Wolfe 1985; Applegat et al. 2006; Cook 2011). Psychologists (e.g. MacGregor and Ormerod, 1996; Ormerod and Chronicle, 1999; MacGregor et al. 2006) have studied the performance of humans in solving TSPs. The results suggest that in problems of size similar to the ones we used, humans do a good, but not perfect, job of finding short routes. More importantly, there is no evidence significant heterogeneity in skill levels: a participant who finds a good solution to one instance of the problem is not significantly more likely to find a good solution to another instance.

We selected the maps for the SRT based on informal piloting with colleagues. In particular, we chose maps in which the naïve heuristic of always moving to the next uncollected box would not yield a good solution. We hinted this to participants by writing in the instructions, "the route with the shortest total distance is not necessarily the one which always moves to the next closest box. Instead it may sometimes be useful to select a more distant box first to set up shorter moves later on."

3) Treatment design: Connecting the stages

In the Treaty of Hong Canal, the parties needed to decide how to divide gains they had gained jointly. We are interested in whether bargaining is different when the possible gains are obtained by joint action. There are two channels through which the joint gains could have an effect on the bargaining outcome. It could be important that the bargaining is over those joint gains; or, it might simply be enough that the parties have some prior interaction, even if that interaction is not linked directly to the gains to be bargained over. We conduct three treatments to attempt to separate out these explanations.

Treatment JE (Joint Endowment).

In Stage 1, the participants in a pair constructed a path in the SRT by taking turns selecting the next box to visit. One participant was chosen at random to collect the first box; after that, the other participant chose the second box to collect, and so on, until all 10 boxes were collected. Each participant was therefore responsible for clicking on 5 of the boxes in defining the route.

[4] Computer scientist classify the TSP as NP-hard problem; meaning that if one tries to find the optimal solution by breaking the problem into smaller component problems, the components are at least as complex as the original one.

Once all 10 boxes were collected, the closed boxes would be opened. It was explained that some of the boxes contained a disc, and the others were empty. Figure 5 presents an example of the screen used to display the opened boxes.

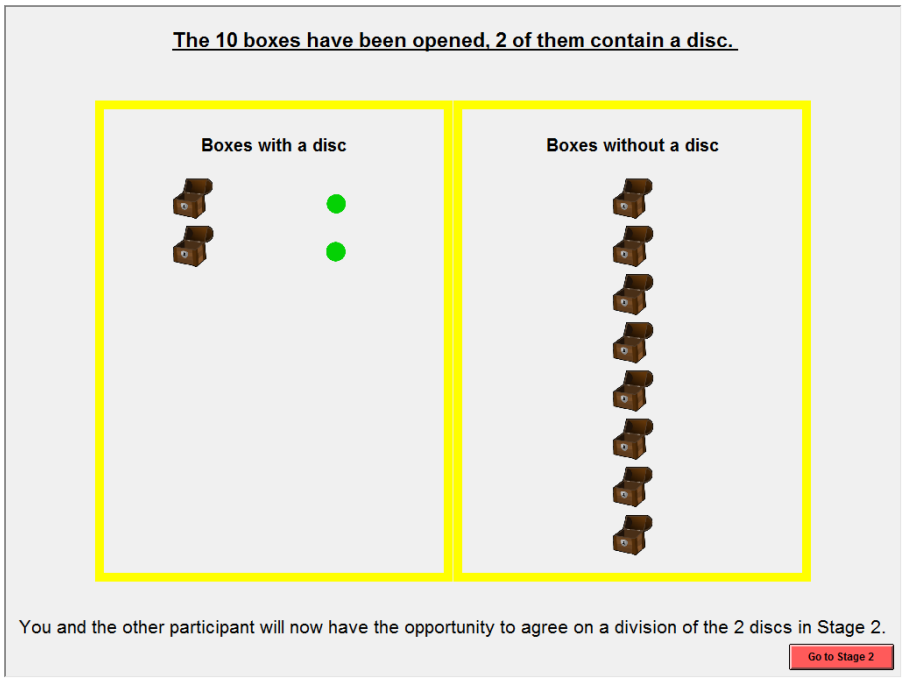


Figure 5 Opened box in sample SRT

In this example, two of the 10 boxes collected in Stage 1 contained a disc, while the rest were empty. The screen pooled boxes that contained a disc together and those without a disc together, so there was no way to link any box to any location on the map. After the screen in Figure 5, participants moved to the Stage 2 bargaining table. Here participants saw the layout of the discs on the table and their values, but with no way to link those discs back to the previous screen.

The structure of this treatment presents the discs on the bargaining table as having been obtained by joint action. Using a combinatoric optimization problem means the quality of the solution found cannot be allocated meaningfully between the choices of the two players. While the task is easy to explain, evidence suggests there are not systematic differences in ability at solving the problem. Therefore, performance on finding a short route should not suggest a participant deserves a greater or smaller portion of the discs to bargain over. Also, because the link between the boxes on the map and the tokens on the bargaining table is obfuscated, bargaining cannot be based on which participant happened to "find" certain discs. We therefore control for entitlement effects, which previous studies have shown can influence players' bargaining positions. (Oxoby and Spraggon 2008; Price and Sheremeta, 2015; Karagozoglu and Riedl, 2016)

Treatment JA (Joint activity).

While **JE** presents the discs on the bargaining table as having been obtained by a joint activity, it may be that it is the joint activity itself that is important in affecting bargaining strategies, rather

than the link between the bargaining problem and the activity. To control for this, treatment **JA** differs from **JE** only in that no link is made between the Stage 1 and Stage 2 activities. The linking screen in Figure 5 was not used, and instructions were adjusted accordingly to remove any linkage between Stage 1 and Stage 2; in the experiment, participants moved directly from Stage 1 to Stage 2.

Treatment SA (Separate activity).

Because we use bargaining table layouts which appeared in Isoni et al (2013), we can use their results as one baseline. However, our protocol does differ from theirs, in that our participants see fewer tables (12 instead of 24), and alternate the SRT and bargaining table tasks. To ensure that the SRT itself does not change bargaining behavior, we conducted **SA**, in which the two participants complete the SRT individually in Stage 1, before moving on to Stage 2. As in **JA**, there is no linkage between the Stage 1 and Stage 2 tasks.

The experiment was conducted in the laboratory of the Centre for Behavioural and Experimental Social Science (CBESS) at the University of East Anglia. Participants were recruited from the lab's standing pool of participants, which is managed using the hRoot system (Bock et al., 2012). Only participants who had no prior experience in focal point types of experiment were recruited. All tasks in the experiment were computerized using zTree (Fischbacher, 2007). We pre-divided the pool of eligible participants into three sub-pools (JE, JA, and SA) at random and recruited all sessions of a treatment from the corresponding sub-pool; this ensures there were no selection effects due to the order in which sessions were conducted. Sessions were run between April 2016 to October 2016. Sessions lasted from 45 minutes to 1 hour.

3. Research Hypotheses

Team reasoning theory suggests that successful resolution to bargaining problems will be more likely if the parties are more likely to see themselves as sharing some kind of identity with their counterpart. In our stylised representation of a conflict like the one between Chu and Han, this identification can arise through two distinct, but related, channels. The participants may be more inclined to engage in team reasoning if they have had some previous interaction with the counterpart. This may be even more likely if the bargaining situation has some link with that previous interaction. Both channels are present in the Chu-Han conflict leading up to the Treaty of Hong Canal; our distinction between **JA** and **JE** treatments allows us to draw a distinction between the two channels. In contrast, standard game theory makes no prediction about how any prior interaction would affect the likelihood of an equilibrium being selected.

Main Hypothesis 1

*Bargaining will be most efficient in **JE**, followed by **JA**, followed by **SA**. Higher efficiency will be underpinned by participants following the focal point cues more often.*

It is well established that focal point cues are less effective in the face of conflicting interests, even when the conflict is small (e.g. Crawford et al. 2008; Isoni et al. 2013; Isoni et al. 2014). Our interpretation of team reasoning theory suggests that while prior joint activity will make it more likely that a participant will prioritise the overall outcome of the team, it will not always overwhelm the tension of conflict in interest, in particular when the difference in payoffs is large. Therefore we expect to see effects of changing the degree of conflict in interest across all our treatments.

Main Hypothesis 2

In each treatment, as the payoff allocation suggested by the focal point cue becomes increasingly unequal, participants are less likely to choose according to the focal point.

4. Results

We report a total of 145 pairs of observations; 49 pairs participated in treatment **JE**, 48 in treatment **JA** and 48 in treatment **SA**. Table 2 provides a breakdown of the total claims by participants in each game. For games in which the claims suggested by the focal solution would result in asymmetric payoffs, we distinguish between the claims of the player who would obtain a higher payoff (the *favoured* player) and the player who would obtain a lower payoff (the *unfavoured* player). We do observe systematic differences between the patterns of claims between the favoured and unfavoured players in these games.

We next look at the resulting rates of agreement. Table 3 reports three measures of agreement. The first column reports the proportion of pairs whose claims did not conflict, and therefore resulted in an agreement. The second column specialises this to the case of efficient agreement, that is, in which each disc was claimed by exactly one player. The final column reports proportions of pairs in which agreement was obtained, where both players' claims consisted only of discs among the subset suggested by the focal point.

To measure treatment effects, we conduct logit regressions, reported in Table 4, in which the probability of agreement is determined by the game and the treatment, with standard errors clustered at the session level. We report specifications in which the dependent variable is the overall agreement rate, as well as for focal point agreements. We also report separately estimations using all games, and those using only asymmetric games, as it is in asymmetric games where team reasoning may mitigate the tension from the asymmetry in payoffs.

Result 1. There is no significant treatment effect in overall agreement rate. However, agreement consistent with the solution suggested by the focal point is significantly more frequent in **JE** than in **JA** or **SA**.

Support. The regression in Table 4 shows a positive point estimate for the coefficient on **JE** on overall agreement rate for both all games and for asymmetric games only, but the coefficient is not significantly different from zero. Looking at the rate of agreements consistent with the focal point

solution, the coefficient on **JE** is significantly greater than zero. In all regressions the coefficient on **JA** is small.

One account of these results is that claims in **JE** are more predictable and systematic, in that they are consistent with the solutions suggested by the focal point. The effect on the overall agreement rate is less, however, because some of the pairs who agree along focal point lines in **JE** might have wound up in agreement by chance in **JA** or **SA**. This could occur, for example, if players in **JA** or **SA** would play a mixed strategy equilibrium, resulting in agreement with a positive probability but not with certainty, or if they used reasoning similar to level-k and happened to submit a pair of claims that did not conflict.

While we observe an increase in focal point agreements in **JE**, we do not observe the same in **JA**. This suggests that the linkage between the Stage 1 and Stage 2 tasks is important. This is remarkable because the only difference between the two treatments, at the level of implementation in the experiment, is that **JA** omits the one screen which "opens" the boxes and counts out the number of discs. This is a rather light-touch manipulation.

To investigate this in more detail, we drill down to the level of individual players' claims. Table 2 illustrates that players who are unfavoured by the outcome suggested by the focal point do tend to claim less in total. The size of the asymmetry in suggested payoffs is different among 2-disc, 4-disc, and 8-disc games, so we look at each of these groups of games separately.

Figure 6 compares, for 2-disc games, individual players' rates of making claims consistent with the focal point suggestion. Figure 7 does the same for 4-disc games, and Figure 8 for 8-disc games.

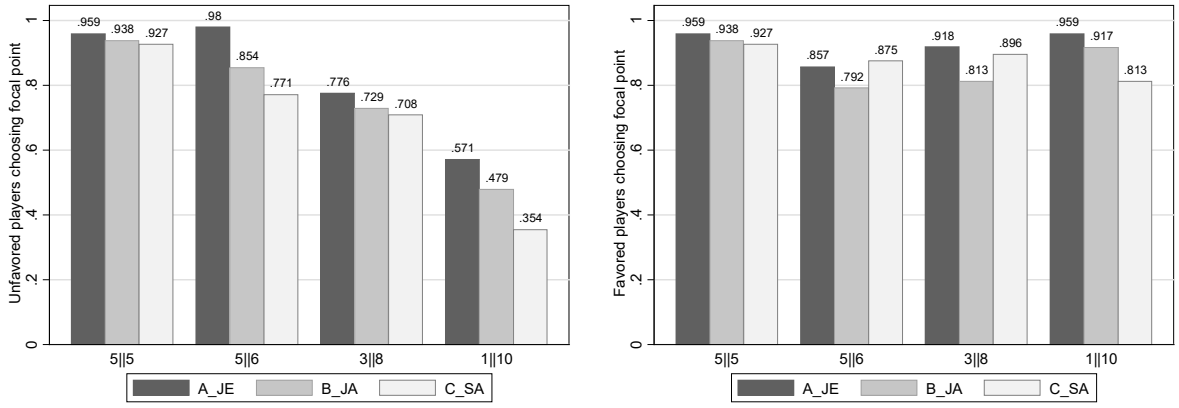


Figure 6. Proportion of players making claims consistent with the focal point suggestion in 2-disc games. Left panel: Unfavoured players. Right panel: Favoured players.

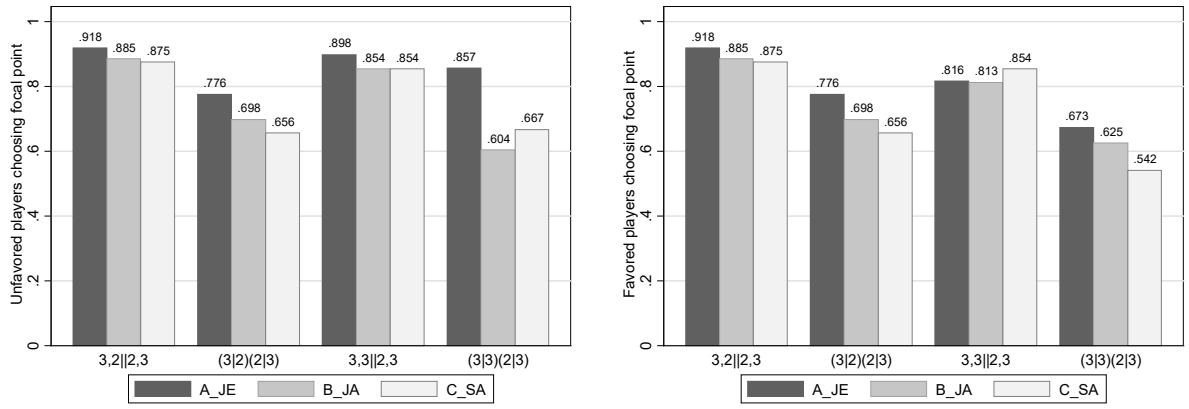


Figure 7. Proportion of players making claims consistent with the focal point suggestion in 4-disc games. Left panel: Unfavoured players. Right panel: Favoured players.

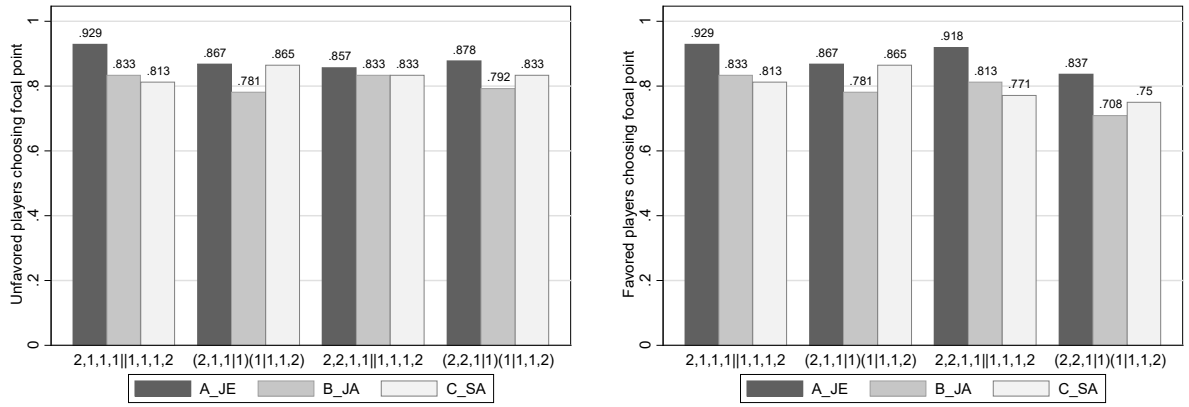


Figure 7. Proportion of players making claims consistent with the focal point suggestion in 8-disc games. Left panel: Unfavoured players. Right panel: Favoured players.

Result 2. In all treatments, as payoffs becomes increasingly unequal, players are less willing to follow focal point.

Support. Table 5 reports the results of a logit regression, with the dependent variable being whether a player's claim was consistent with the focal point suggestion. We report models using all data; symmetric games only; and asymmetric games, distinguishing the claims of favoured and unfavoured players.

When all games are considered, compared with the baseline G1: 5||5, all other games have significantly lower rate for participants to choose focal points, given other controlling factors constant. Claims are significantly more likely to be consistent with the focal point in **JE** than in **SA**.

Considering only symmetric games, relative to the baseline G1: 5||5, players are significantly less likely to make claims consistent with the focal point in other symmetric games such as 3,2||2,3 and (2,1,1|1)(1|1,1,2). As the number of discs increase, focal point cues become less effective.

When payoff allocations suggested by the focal point are unequal, for unfavoured players, compared with the baseline G2: 6||5, higher inequality between payoffs (G3: 8||3; G4: 10||1) results significantly lower rate of choosing focal point. When payoff allocation is the same at 6: 5, compared with baseline treatment G2: 6||5, except for G8: (3|3)(2|3), all other games with the same payoff allocation do not significantly different from the baseline 2 discs game. For favored player, there is no systematic difference across games. Claims are significantly more likely to be consistent with the focal point in **JE** than in **SA** for both favoured and unfavoured players.

Result 3. In treatments **JE** and **JA**, involving jointly solving the SRT before bargaining, participants report more positive feelings towards the other player.

After all participants finished the last scenario, we asked participants to self-evaluate to what extent they would identify with the other player as "we" using the "We Scale" measure (Cialdini et al. 1997). The "We Scale" measure is often used in literature to measure social closeness. And in our experiments, we use it to measure a generalised feeling of closeness with other participants in the experiment. Table 6 presents the results of ordered probit regression models with the dependent variable as participant's self-reported we-scale value, which ranges from 1 to 7. Explanatory variables include treatment dummies and other demographic variables obtained from a standard battery of questionnaire questions at the end of the experiment.

Compared with the baseline treatment **SA**, participants in **JE** and **JA** report significantly higher we-scale identifications. Other demographic variables do not have systematic influence on the measures. The shift in reports in **JE** and **JA** suggest the joint completion of the SRT was effective in inducing conditions under which team reasoning theory would be more likely to apply. Our results are in accordance with Charness et al. (2014)'s finding that team-building exercise (a word formation task) could greatly increase the level of contributions in public goods game regardless of whether one is linked to people from one's team-building exercise. Charness et al. argues that the reason for such results could be that the positive feeling engendered by the group exercise spills over to other participants when these other participants are known to have also participated in a team-building exercise.

Result 4. Pairs who perform better on the SRT are more likely to choose consistent with the focal point cue. In contrast, performance on the individual SRT does not predict the likelihood of focal point choices.

Table 7 shows the results of ordered probit regression.For specifications 1 through 3, the independent variable is the number of players in the pair whose claims were consistent with the focal point cue. For specification 4, the independent variable is whether each individual player chose consistently with the focal point.

For dependent variables, SRT-Diff is the standardized performance in SRT, measured by SRT-Diff$_i$=Mean(SRT)- SRT$_i$/sd(SRT).

The results shown that in the individual treatment, SRT task has no significant correlation with one's tendency to choose focal point; while in treatments in which the SRT is performed jointly, better performance in SRT, as measured by lower SRT-Diff$_i$, is positively correlated with pairs' tendency to make claims consistent with the focal point suggestion.

We note again that participants did not find out their relative ranking on the SRT until after bargaining concluded in a period. Therefore, good feelings arising from a good ranking could not explain the difference in bargaining behaviour in **JE** and **JA**. Because solving out the SRT is not feasible, we expect that different people will use different heuristics to try to construct a good solution. If two people with a similar way of looking at a given SRT meet, then it is likely that, when they alternate moves, the moves each one makes will be compatible with the plan of their coplayer, and therefore result in a good score. On the other hand, if two people have substantially different heuristics in mind, the moves of one player are likely to interfere with the plans of the other, leading to inferior performance. While the players would not know their final ranking, they would experience whether their coplayer tended to make moves which they found expected or unexpected, and this could influence their bargaining decisions in Stage 2.

Such a mechanism would likewise be consistent with team reasoning theory. If two players find in the SRT that they both appear to conceptualise the solution to the SRT in similar ways, this might suggest they will likewise have a similar viewpoint in other interactions. This could then both support an increased likelihood of individuals thinking according to team reasoning on their own, as well as an increased expectation the other player will do the same, enhancing the focality of the team reasoning solution.

5. Conclusion

History tells us that the Treaty of Hong Canal set the boundary between Chu and Han using a geographical reference point. Viewed from the perspective of bargaining theory, one can wonder whether the fact that agreement was reached, and in particular an agreement using such a salient focal point, was more likely because the territory being divided was initially obtained through a joint activity between the two sides.

Because history does not show us alternative what-if scenarios, we construct a bargaining experiment which reproduces some stylised features of the Chu-Han contention. Players bargain over valuable objects (disc) laid out on a two-dimensional field (the bargaining table), with a separating gap (the canal) between them. We vary whether the parties have previous experience in a joint activity prior to bargaining, and whether that prior activity links to the bargaining problem by being the source of the discs being bargained over.

We find that both the prior joint activity and the link between that activity and the bargaining problem are required to change claims in the bargaining problem. Claims are indeed more likely to follow focal point cues in this condition, even, and especially, when the division suggested by the focal point is unequal between the parties. In the terms of the story, our results would say that the fact that the treaty was based on the Hong Canal was more likely because Chu and Han were dividing up territories they had been able to acquire control over through their preceding campaigns.

However, we do not find that agreement rates overall are significantly higher, at least for the scenarios and bargaining rule (simultaneous claims) we consider. Agreements consistent with the focal point largely "crowd out" agreements that would occur by some other rule, or perhaps more likely by chance. This would suggest that Chu and Han would perhaps have been likely to come to some agreement if their dispute had arisen from some other source other than their joint campaign, but that the agreement would be less likely to have occurred using the canal as the border. And, indeed, the treaty was broken the following year by Han, who eventually triumphed and founded the next dynasty to rule China: the fact the gains were obtained jointly and the solution along a focal point did not result, in this case, in a stable long-term agreement.

Table 2 (a). Distribution of claimed values by treatment in 2 disc games.

				Number of participants claiming discs worth											
Scenario	Treatment	Player	Mean	£0	£1	£2	£3	£4	£5	£6	£7	£8	£9	£10	£11
G1: 5||5	JE		£4.95	1	-	-	-	-	97	-	-	-	-	0	-
	JA		£4.95	1	-	-	-	-	95	-	-	-	-	0	-
	SA		£5.00	0	-	-	-	-	96	-	-	-	-	0	-
G2: 6||5	JE	Fav	£5.86	0	-	-	-	-	7	42	-	-	-	-	0
		Unfav	£5.02	0	-	-	-	-	48	1	-	-	-	-	0
	JA	Fav	£5.79	0	-	-	-	-	10	38	-	-	-	-	0
		Unfav	£5.15	0	-	-	-	-	41	7	-	-	-	-	0
	SA	Fav	£5.88	0	-	-	-	-	6	42	-	-	-	-	0
		Unfav	£5.33	0	-	-	-	-	37	10	-	-	-	-	1
G3: 8||3	JE	Fav	£7.59	0	-	-	4	-	-	-	-	45	-	-	0
		Unfav	£4.12	0	-	-	38	-	-	-	-	11	-	-	0
	JA	Fav	£6.90	1	-	-	9	-	-	-	-	38	-	-	0
		Unfav	£4.42	0	-	-	35	-	-	-	-	12	-	-	1
	SA	Fav	£7.48	0	-	-	5	-	-	-	-	43	-	-	0
		Unfav	£4.52	0	-	-	34	-	-	-	-	13	-	-	1
G4: 10||1	JE	Fav	£9.84	0	1	-	-	-	-	-	-	-	-	47	1
		Unfav	£4.88	0	28	-	-	-	-	-	-	-	-	20	1
	JA	Fav	£9.04	2	3	-	-	-	-	-	-	-	-	42	1
		Unfav	£5.69	1	22	-	-	-	-	-	-	-	-	24	1
	SA	Fav	£8.31	1	8	-	-	-	-	-	-	-	-	38	1
		Unfav	£6.81	0	17	-	-	-	-	-	-	-	-	31	0

Table 2 (b). Distribution of claimed values by treatment in 4 disc games.

				Number of participants claiming discs worth											
Scenario	Treatment	Player	Mean	£0	£1	£2	£3	£4	£5	£6	£7	£8	£9	£10	£11
G5: 3,2||2,3	JE		£4.88	1	-	1	5	1	88	0	1	-	-	1	-
	JA		£4.80	1	-	2	7	1	82	2	0	-	-	1	-
	SA		£4.92	0	-	5	2	1	84	2	0	-	-	2	-
G6: (3|2)(2|3)	JE		£4.85	0	-	0	9	0	87	1	1	-	-	0	-
	JA		£4.70	0	-	3	11	0	80	2	0	-	-	0	-
	SA		£4.77	0	-	7	7	0	77	3	0	-	-	2	-
G7: 3,3||2,3	JE	Fav	£5.45	1	-	0	6	-	5	36	-	1	0	-	0
		Unfav	£4.88	0	-	1	3	-	42	3	-	0	0	-	0
	JA	Fav	£5.27	0	-	0	10	-	5	33	-	0	0	-	0
		Unfav	£4.94	0	-	0	4	-	41	2	-	1	0	-	0
	SA	Fav	£5.54	0	-	1	5	-	3	39	-	0	0	-	0
		Unfav	£4.81	0	-	1	6	-	37	3	-	1	0	-	0
G8: (3|3)(2|3)	JE	Fav	£5.02	1	-	0	10	-	14	23	-	1	0	-	0
		Unfav	£4.94	0	-	0	5	-	37	7	-	0	0	-	0
	JA	Fav	£5.00	1	-	0	10	-	12	25	-	0	0	-	0
		Unfav	£5.02	0	-	0	7	-	29	11	-	0	1	-	0
	SA	Fav	£5.42	0	-	1	4	-	19	22	-	1	0	-	1
		Unfav	£5.04	0	-	0	5	-	34	8	-	0	1	-	0

Table 2 (c). Distribution of claimed values by treatment in 8 disc games.

				Number of participants claiming discs worth											
Scenario	Treatment	Player	Mean	£0	£1	£2	£3	£4	£5	£6	£7	£8	£9	£10	£11
G9:	JE		£4.89	0	0	0	1	12	83	1	1	0	0	0	-
2,1,1,1||1,1,1,2	JA		£4.72	0	0	3	5	13	72	1	2	0	0	0	-
	SA		£4.77	1	1	3	2	12	70	5	1	0	0	1	-
G10:	JE		£4.80	0	0	0	3	14	81	0	0	0	0	0	-
(2,1,1|1)(1|1,1,2)	JA		£4.73	0	0	4	4	10	74	4	0	0	0	0	-
	SA		£4.78	0	0	2	7	9	75	1	1	0	0	1	-
G11:	JE	Fav	£5.59	1	0	0	0	2	15	30	0	0	0	0	1
2,2,1,1||1,1,1,2		Unfav	£4.88	0	1	0	0	5	40	3	0	0	0	0	0
	JA	Fav	£5.48	0	0	1	2	2	11	32	0	0	0	0	0
		Unfav	£4.83	0	0	0	2	6	39	0	1	0	0	0	0
	SA	Fav	£5.38	0	0	2	3	4	9	27	2	1	0	0	0
		Unfav	£4.96	0	0	2	1	5	35	3	1	0	0	0	1
G12:	JE	Fav	£5.61	0	0	0	1	5	8	33	2	0	0	0	0
(2,2,1|1)(1|1,1,2)		Unfav	£4.90	0	0	0	1	6	39	3	0	0	0	0	0
	JA	Fav	£5.10	0	0	0	6	8	9	25	0	0	0	0	0
		Unfav	£4.81	0	0	0	4	4	37	3	0	0	0	0	0
	SA	Fav	£5.40	0	0	1	3	5	6	33	0	0	0	0	0
		Unfav	£5.02	0	0	2	3	2	37	1	1	0	0	0	2

Table 2 presents an overview of all players' claims in each treatment; classified by number of discs. The first part (a) present the claims in 2 discs games; the second part (b) presents the claims in the 4 disc games; and the third part (c) presents the claims in 8 discs games. In the table, each cell under the corresponding 'claimed value' row has a number, the number is the count number the corresponding claims. For example, in table 2 (a) under claimed value £5 and in the row JE there is a number of 97, meaning that 97 out of 98 participants in JE claimed £5 in G1=5||5. In case of asymmetric payoff cases, we separate record the claims for favored and unfavored players.

Table 3. Agreement rate, efficient agreement rate and rate of focal point agreements.

Scenario	Treatment	Agreement Rate	Efficient Agreement Rate	Focal Point Agreement Rate
G1: 5||5	JE	92%	98%	92%
	JA	92%	98%	90%
	SA	90%	100%	88%
G2: 6||5	JE	84%	100%	84%
	JA	73%	100%	69%
	SA	79%	100%	73%
G3: 8||3	JE	73%	100%	71%
	JA	63%	97%	58%
	SA	77%	100%	69%
G4: 10||1	JE	53%	100%	53%
	JA	40%	84%	40%
	SA	42%	95%	29%
G5: 3,2||2,3	JE	84%	85%	84%
	JA	83%	85%	81%
	SA	81%	87%	77%
G6: (3|2)(2|3)	JE	63%	81%	59%
	JA	60%	72%	50%
	SA	60%	66%	46%
G7: 3,3||2,3	JE	73%	72%	73%
	JA	71%	76%	69%
	SA	73%	74%	71%
G8: (3|3)(2|3)	JE	69%	59%	61%
	JA	56%	56%	42%
	SA	48%	78%	40%
G9: 2,1,1,1||	JE	86%	79%	86%
	JA	75%	83%	73%
	SA	65%	71%	65%
G10: (2,1,1|1)	JE	73%	83%	73%
	JA	73%	86%	69%
	SA	77%	73%	75%
G11: 2,2,1,1||	JE	80%	51%	78%
	JA	73%	69%	71%
	SA	71%	53%	67%
G12: (2,2,1|1)	JE	73%	69%	73%
	JA	65%	68%	58%
	SA	69%	73%	65%

Agreement rate measures the rate of agreement in all the pairs in each treatment; Efficient agreement rate is percentage of efficient agreements out of all agreements. We define an agreement as efficient agreement if the pair take all the values on the table; and efficient agreement is measured by the ratio of efficient agreements to all agreements. Focal point agreement rate is the percentage of agreements following focal point. Focal point agreement is defined as both player follow focal point by choosing only discs on his own side (no matter the number of discs), and not choosing any of the disc on the other player's side.

Table 4. Logit regression with overall agreement rate and focal point agreement rate (for participants as pairs).

VARIABLES	Agreement Rate	Focal Point Agreement	Agreement Rate(Asymmetric)	Focal Point Agreement(Asymmetric)
G2: 6||5	-1.019***	-1.059***		
	(0.313)	(0.242)		
G3: 8||3	-1.426***	-1.500***	-0.408*	-0.441*
	(0.336)	(0.249)	(0.245)	(0.231)
G4: 10||1	-2.537***	-2.564***	-1.522***	-1.509***
	(0.347)	(0.289)	(0.225)	(0.210)
G5: 3,2||2,3	-0.751**	-0.734***		
	(0.346)	(0.262)		
G6: (3|2)(2|3)	-1.862***	-2.112***		
	(0.333)	(0.274)		
G7: 3,3||2,3	-1.357***	-1.273***	-0.339	-0.213
	(0.308)	(0.241)	(0.259)	(0.245)
G8: (3|3)(2|3)	-2.006***	-2.280***	-0.990***	-1.224***
	(0.312)	(0.305)	(0.260)	(0.268)
G9: 2,1,1,1||	-1.214***	-1.096***		
	(0.335)	(0.273)		
G10: (2,1,1|1)	-1.251***	-1.204***		
	(0.306)	(0.260)		
G11: 2,2,1,1||	-1.251***	-1.238***	-0.232	-0.179
	(0.326)	(0.228)	(0.252)	(0.243)
G12: (2,2,1|1)	-1.525***	-1.531***	-0.507**	-0.472*
	(0.311)	(0.273)	(0.245)	(0.252)
JE	0.325	0.534**	0.337	0.548**
	(0.241)	(0.250)	(0.233)	(0.252)
JA	-0.0348	0.0247	-0.123	-0.0394
	(0.221)	(0.298)	(0.268)	(0.286)
Constant	2.230***	1.994***	1.240***	0.954***
	(0.309)	(0.309)	(0.238)	(0.267)
Observations	1,740	1,740	1,015	1,015

Robust standard errors in parentheses; Standard error adjusted for 49 clusters for session. *** p<0.01, ** p<0.05, * p<0.1. Independent variables are games and treatments; in games G1: 5||5 is the baseline; in treatments SA is the baseline. Dependent variables are Agreement rate; Focal point agreement rate; And the last column report results for asymmetric games only.

Table 5. Logit regression results for subjects' tendency to follow focal points.

VARIABLES	Follow focal point	Follow focal point in *symmetric* games	Unfavored players follow focal point in *asymmetric* games	Favored players follow focal point in *asymmetric* games
G2: 6||5	-0.386*			
	(0.233)			
G3: 8||3	-0.734***		-0.869***	0.287
	(0.232)		(0.300)	(0.279)
G4: 10||1	-1.404***		-2.055***	0.494
	(0.256)		(0.285)	(0.323)
G5: 3,2||2,3	-0.734***	-0.733***		
	(0.262)	(0.261)		
G6: (3|2)(2|3)	-2.111***	-2.107***		
	(0.274)	(0.272)		
G7: 3,3||2,3	-0.441*		0	-0.101
	(0.235)		(0.315)	(0.315)
G8: (3|3)(2|3)	-1.500***		-1.009***	-1.217***
	(0.297)		(0.339)	(0.323)
G9: 2,1,1,1||	-1.096***	-1.095***		
	(0.273)	(0.272)		
G10: (2,1,1|1)	-1.204***	-1.202***		
	(0.260)	(0.260)		
G11: 2,2,1,1||	-0.520**		-0.226	-0.0511
	(0.235)		(0.321)	(0.347)
G12: (2,2,1|1)	-0.778***		-0.277	-0.489
	(0.277)		(0.335)	(0.324)
JE	0.551**	0.505*	0.733***	0.493**
	(0.232)	(0.306)	(0.264)	(0.250)
JA	0.0812	0.134	0.100	-0.0186
	(0.287)	(0.372)	(0.280)	(0.297)
Constant	1.969***	1.962***	1.649***	1.527***
	(0.303)	(0.326)	(0.301)	(0.299)
Observations	3,480	1,450	2,030	2,030

Robust standard errors in parentheses; Standard error adjusted for 49 clusters for session. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is whether participants follow focal point. Independent variables are games and treatments; The first column reports results for all games and all subjects; the second column reports only symmetric games and all subjects; the third column reports only asymmetric games and only unfavored players; the fourth column reports only asymmetric games and only favored players' results. If all games are presented or only symmetric games are presented G1: 5||5 is the baseline for game dummies; if only asymmetric games are presented G2: 6||5 is the baseline for game dummies. SA is baseline for treatment dummies.

Table 6. Ordered Probit Regression results of "We Scale" measures

VARIABLES	(1) We Scale	(2) We Scale	(3) We Scale
JE	0.432***	0.419***	0.522***
	(0.155)	(0.158)	(0.159)
JA	0.589***	0.575***	0.474***
	(0.163)	(0.164)	(0.171)
Control for demographic variables			
Gender	No	Yes	Yes
Age	No	Yes	Yes
Native-English Speaker	No	Yes	Yes
Other controlling variables			
University status(Bachelor, Master, Mphil/PhD, Staff)	No	No	Yes
Past participation times in CBESS experiments	No	No	Yes
Observations	287	285	285

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is participants' self-reported measure of "we scale" with the other participant. Independent variables of interests are treatment variables: JE and JA with SA as the baseline treatment; The first column reports results for treatment variables only; the second column reports the results of treatment variables after controlling for demographic variables: Gender, Age and whether the participant is a native-English speaker; the third column in addition controlling for other characteristics of participants as appeared in the questionnaire, the University Status (Bachelor, Master, Mphil/PhD or Staff) and past participation times in CBESS experiments (Never, Less than 5 times, 5-10 times,10-20 times and more than 20 times).

Table 7. Ordered Probit regression results for tendency to follow focal point.

VARIABLES	(1) JE	(2) JA	(3) SA
SRT-Diff	-0.166**	-0.129***	-0.0346
	(0.0655)	(0.0415)	(0.0441)
Num Discs: 4	-0.667***	-0.470***	-0.509***
	(0.126)	(0.115)	(0.0957)
Num Discs: 8	-0.591***	-0.375***	-0.542***
	(0.127)	(0.117)	(0.0956)
Observations	588	576	1,152

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. In specification (1) and (2), dependent variable is the rate of choosing focal point for participants as a pair (the value of the dependent variable ranges from 0 to 2); in specification (3) the dependent variable is a dummy variable measures whether or not participant choose according to focal point. (1) specified in JE treatment, (2) for JA treatment, and (3) for SA treatment. Independent variable of interest is SRT-Diff, which is a standardized measure of participants' performance in SRT. In JE and JA, participants matched in pairs to solve for SRT, thus this variable measured the pair's standardized performance. In SA treatment, participant solved the SRT individually, SRT-Diff measures individual performance. "Num Disc" is a category variable measures numbers of discs in the game, the baseline categories is 2 discs case.

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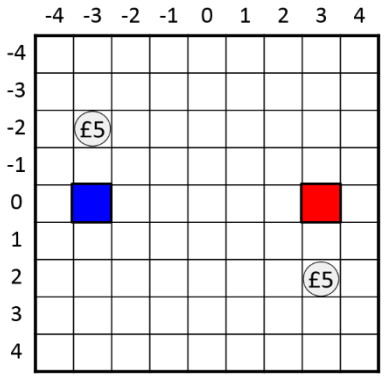
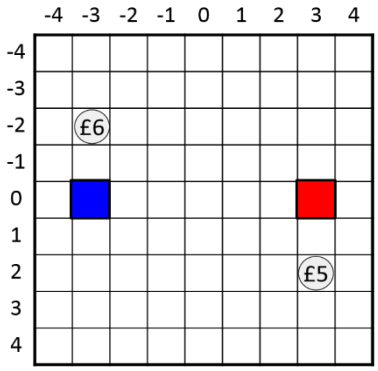
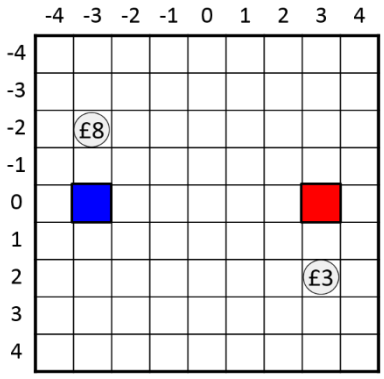
Appendix A. All 12 games in the experiment.



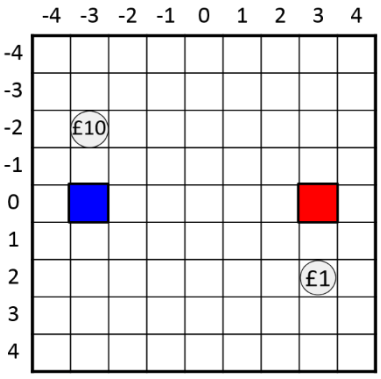
Game 1=5||5
Cue: C



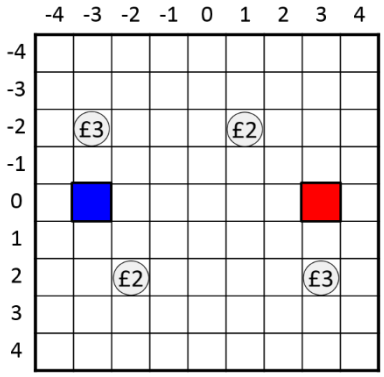
Game 2=6||5
Cue: D



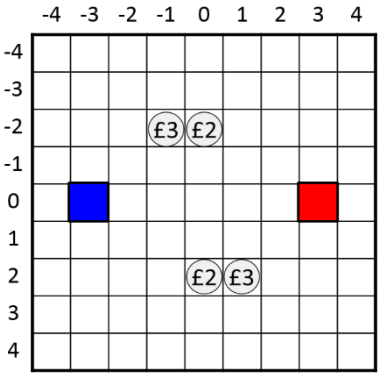
Game 3=8||3
Cue: C



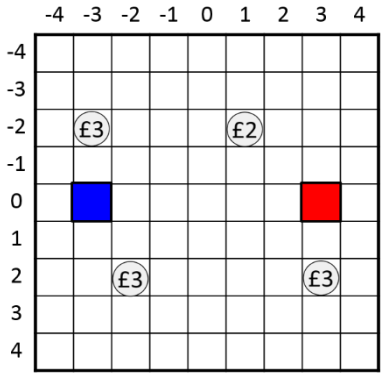
Game 4=10||1
Cue: C



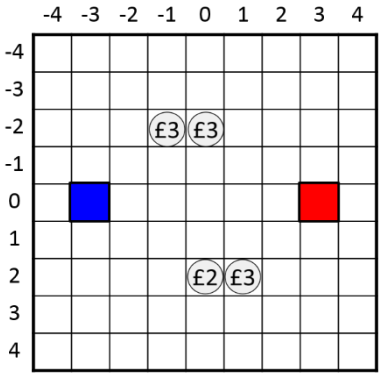
Game 5=3,2||2,3
Cue: C



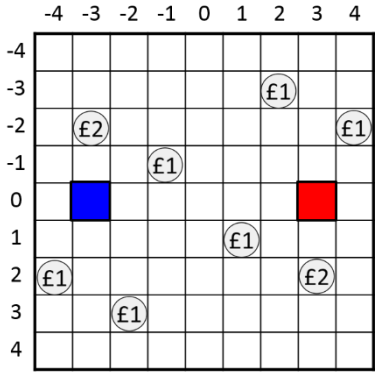
Game 6=(3|2)(2|3)
Cue: A



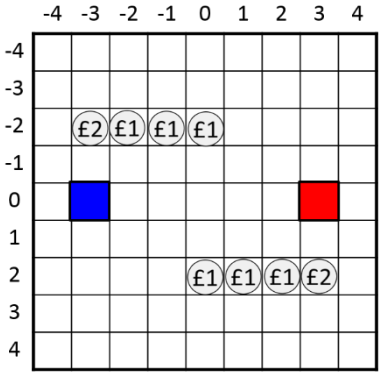
Game 7=3,3||2,3
Cue: C



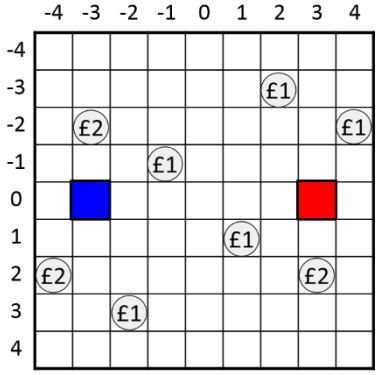
Game 8=(3|3)(2|3)
Cue: A



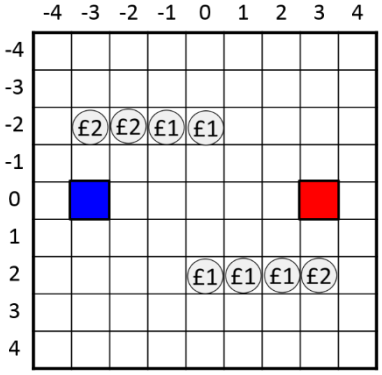
Game 9=2,1,1,1||1,1,1,2
Cue: C



Game 10=(2,1,1|1)(1|1,1,2)
Cue: A



Game 11=2,2,1,1||1,1,1,2
Cue: C



Game 12=(2,2,1|1)(1|1,1,2)
Cue: A

Appendix B. Sample Treatment Instructions

Treatment JE

Introduction

This is an experiment in the economics of decision-making. If you follow the instructions and make appropriate decisions, you can earn an appreciable amount of money. You will receive your earnings for today's session in cash before you leave the laboratory

It is important that you remain silent and do not look at other people's work. If you have any questions, or need assistance of any kind, please raise your hand and an experimenter will come to you. If you talk, laugh, exclaim out loud, etc., you will be asked to leave and you will not be paid. We expect and appreciate your cooperation.

We will now describe the session in more detail. Please follow along with these instructions as they are read aloud.

Everyone in the room is receiving exactly the same instructions.

You will be presented with twelve (12) different scenarios, one after the other. Each scenario consists of two (2) stages. Everyone in the room will make decisions in the same 12 scenarios. Each scenario is an interaction between two participants. For each scenario, you will be matched with another participant in the room. Each match is anonymous: You will never find out with whom you are matched in a scenario. You will not be matched with the same participant in two consecutive scenarios.

At the end of the experiment, one of the scenarios will be randomly selected to determine the earnings for the session. Because you will not know which scenario will be selected until you have made decisions in all of them, you should treat each scenario as if it was the selected one. So, when thinking about each scenario, remember that it could be the selected one and think about it in isolation from the others. Your total earnings for the session will be given by the earnings from the selected scenario, plus a £5 participation payment.

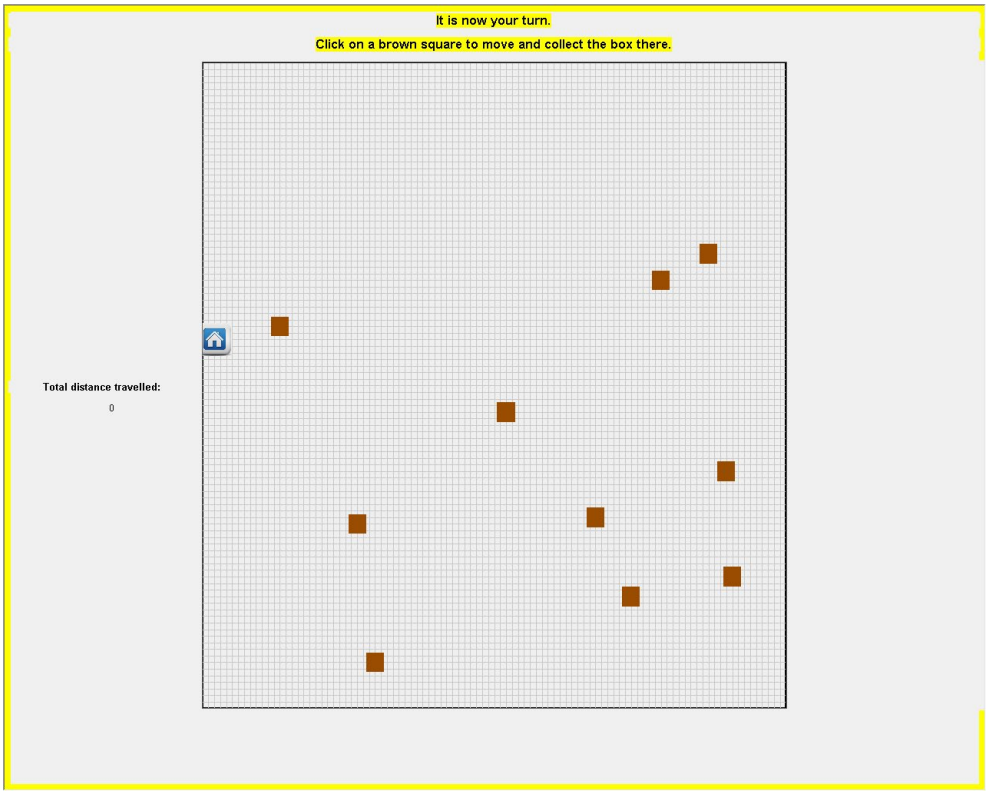
The scenario

Each scenario consists of 2 stages. At the start of the scenario, you will be matched with one other participant. You will remain matched with that participant through the whole scenario, but will be matched with a different participant in the subsequent scenario.

Stage 1

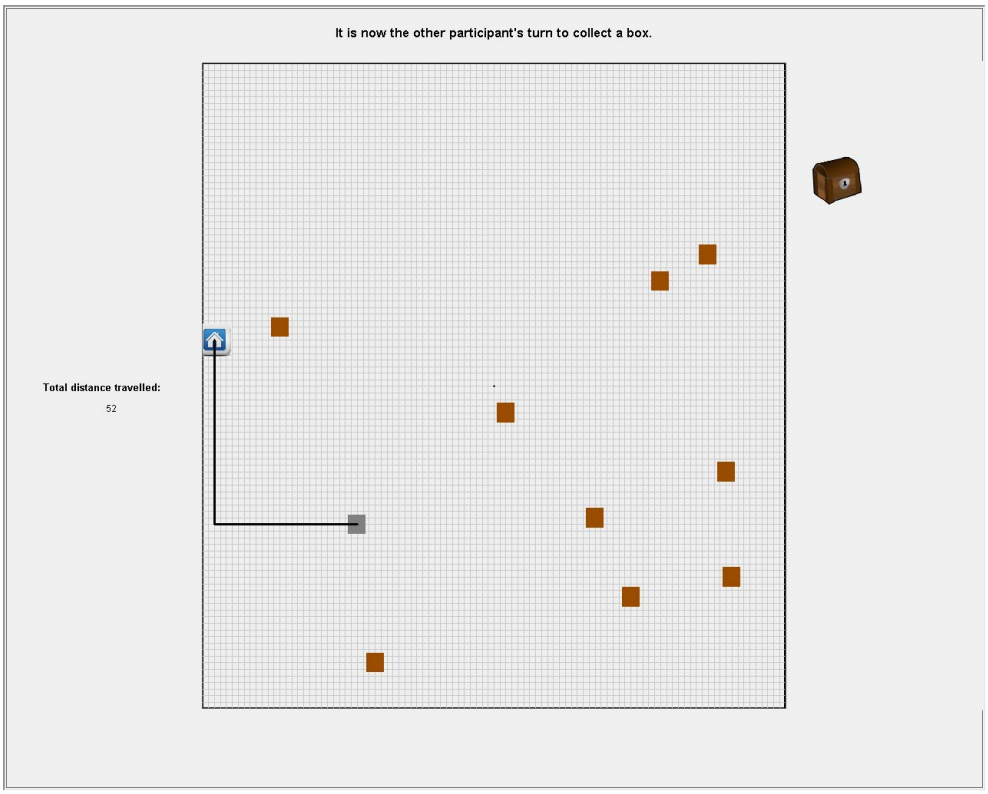
In Stage 1, you and the other participant with whom you are matched will collect ten (10) boxes. Each box either contains one disc, or is empty. Discs are worth various amounts of money. In Stage 2 of the scenario, you and the other participant will have the opportunity to agree on a division of the discs.

These boxes will be placed at 10 different points on a map. Each box is represented by a square. The locations of the 10 boxes will be different in each scenario. You and the participant with whom you are matched will start from a home location, which will be indicated by a picture of a house. The two of you will move around the map collecting the boxes, and then return to the home location. Here is an example of a typical map.



The two of you will take turns deciding which box to collect next. When it is your turn, you will see the message “It is now your turn” at the top of the screen. Click on a brown square to move and collect the box located there. Each collected box appears as a picture on the right side of the screen.

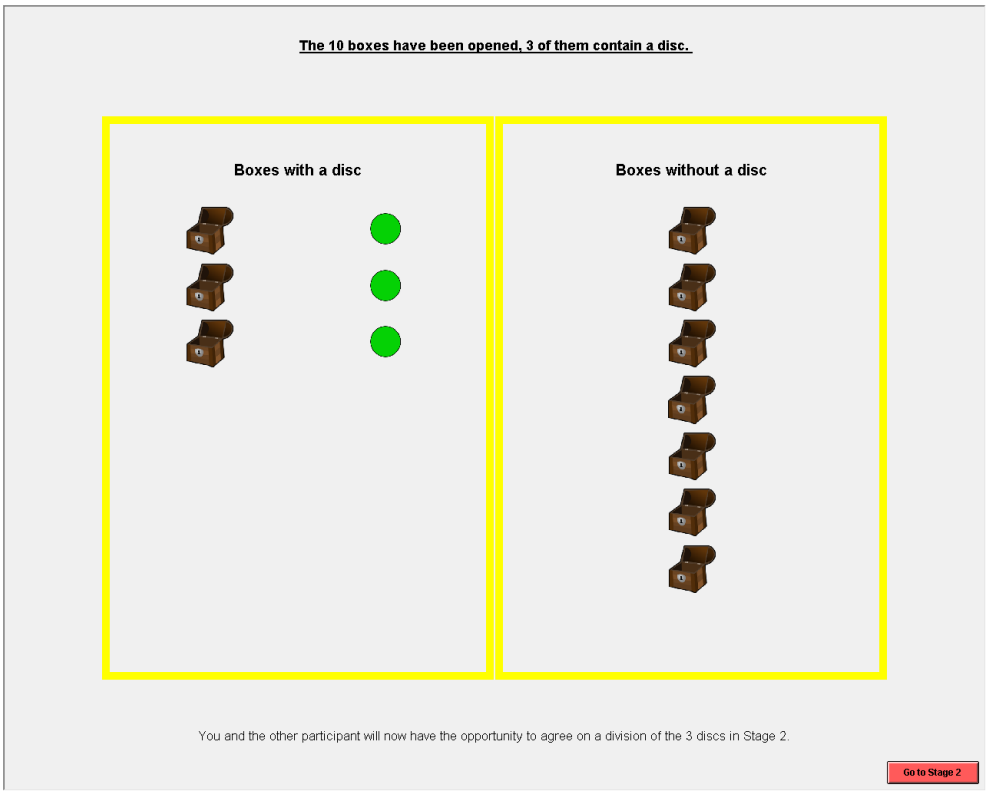
After you click to collect a box, it will be the other participant's turn. Your screen will display the message "It is now the other participant's turn to collect a box," as shown in this screen:



As the two of you move around the map collecting boxes, the computer will draw the path the two of you take. The locations of boxes which have already been collected will be shown as grey squares; the locations of boxes which still have to be collected will be shown as brown squares. As there are 10 boxes to be collected, you and the other participant will each collect 5 boxes.

At the left of the map, the computer will report the total distance travelled by the two of you. After Stage 2 of the scenario, you will see a ranking listing the total distance the two of you travelled, and the distances travelled by other participants in the session. The route with the shortest distance will receive the top rank. You may be able to improve your ranking by thinking ahead. The route with the shortest total distance is not necessarily the one which always moves to the next closest box. Instead, it may sometimes be useful to collect a more distant box first to set up shorter moves later on.

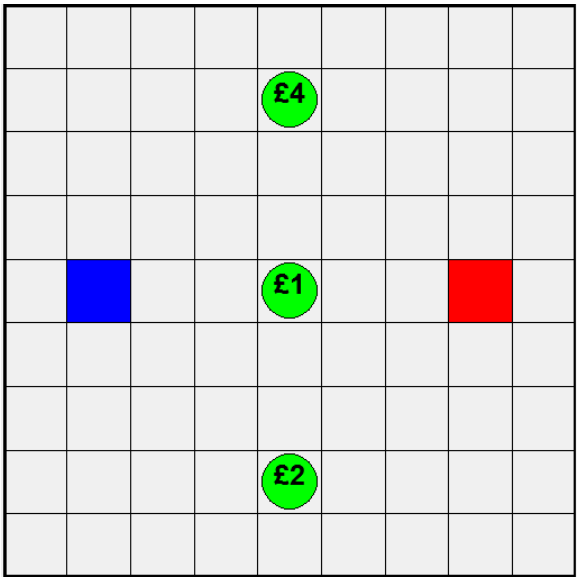
After the two of you have collected all 10 boxes, the boxes will be opened. Some boxes will be empty, and some will contain a disc.



In this example, 3 of the 10 boxes contained a disc, and 7 of the 10 boxes were empty. In Stage 2, you and the other participant will learn how much each disc is worth, and will have the opportunity to agree on a division of the discs.

Stage 2

In Stage 2, each scenario is represented by a picture like this on your screen.



We will call this picture a **table**. The discs which the two of you collected together in Stage 1 of the scenario will be laid out on it. Each disc is labelled with its corresponding monetary value. In this example, the 3 discs collected in Stage 1 are worth £4, £1, and £2, respectively.

You and the other participant will be either Red or Blue. The role of Red or Blue will be randomly decided by the computer. Each of you has a **base**, represented by a red square for the Red participant and a blue square for the Blue participant. You will see "YOU" on your base. Your base will keep the same colour and the same position on the table in all the scenarios you will encounter.

The basic rules

You and the other participant have the opportunity to agree on a division of the discs.

Each of you separately record which discs you propose to take. We will say that you are **claiming** those discs. You can claim as many (or as few) discs as you want. These claims determine whether there is an agreement or not.

There is an agreement if you have not claimed any of the discs that the other participant claimed, that is, if you and the other participant claimed different discs. In this case, you get all the discs that are yours according to the agreement. You then earn the total value of these discs.

But if **any** disc has been claimed by both you and the other participant, there is no agreement. In this case, you get no discs and so earn nothing from the scenario.

You can claim a disc by clicking on it with your mouse. If you do this, a coloured line connecting the disc to your base will appear on the table. If you have claimed a disc but change your mind and decide you no longer want to claim it, you simply click on it again. The coloured line connecting it to your base then disappears.

In each scenario, you can claim as many discs as you like. You should remember that the other participant will be claiming discs too.

You will not know which discs the other participant has claimed.

When you are happy with the claims you have made in a scenario, you go on to the next scenario by pressing the CONFIRM button.

Your earnings

When you have finished all 12 scenarios, you will be told which of them was selected to determine your earnings. The earnings of you and the participant matched with you in that scenario are determined by the decisions you have made in Stage 2. The Table in that scenario in Stage 2 will appear on your screen again, and this time you will see both the claims you made and the claims made by the other participant. You will not be able to change your claims at this stage.

How much you earn depends on these claims. Remember the rules that determine your earnings:

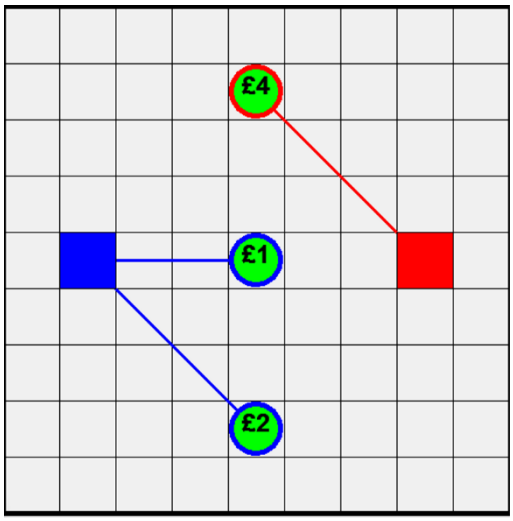
- There is an agreement if you have not claimed any of the discs that the other participant claimed, that is, you and the other participant claimed different discs. In this case, you get all the discs that are yours according to the agreement. You then earn the total value of these discs.

- But if any disc has been claimed by both you and the other participant, there is no agreement. In this case, you get no discs and so earn nothing from the scenario.

We will now show some examples of how these rules work.

Example 1

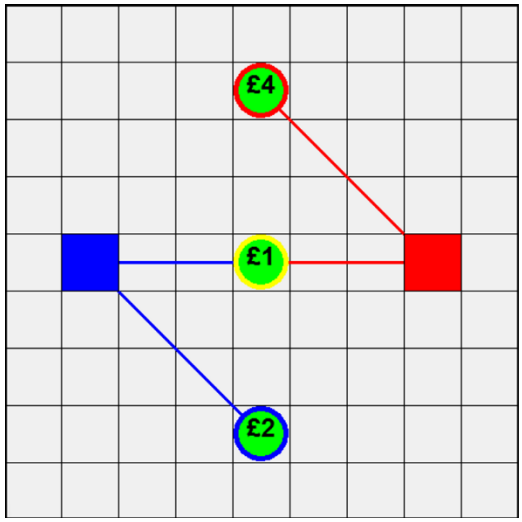
Suppose the Table in the selected Scenario is the one displayed on the screen, and that the Red participant's and the Blue participant's claims are as shown.



In this case, no disc has been claimed by both Red and Blue, and so there is an agreement. According to this agreement, Blue gets the £4 disc, and Red gets the £2 disc and the £1 disc. So Blue earns £4 and Red earns £3 from the Scenario.

Example 2

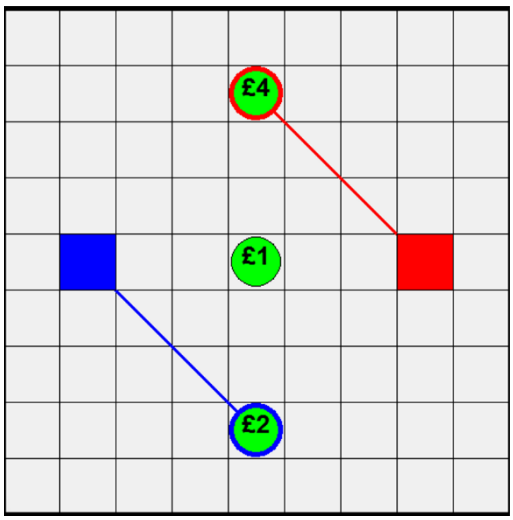
Suppose instead the claims are as now shown. The £1 disc, which is outlined in yellow on the screen, has been claimed by both Red and Blue.



In this case, because the £1 disc has been claimed by both Red and Blue, there is no agreement. So neither participant gets any discs, and so they both earn nothing from the Scenario.

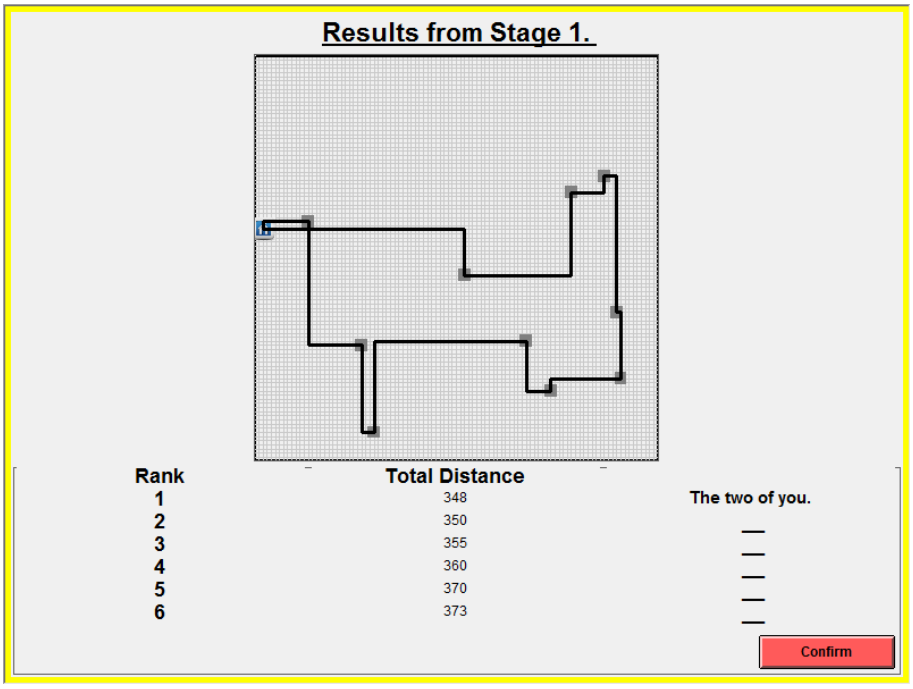
Example 3

Suppose instead the claims are as now shown. Here, no one has claimed the £1 disc.

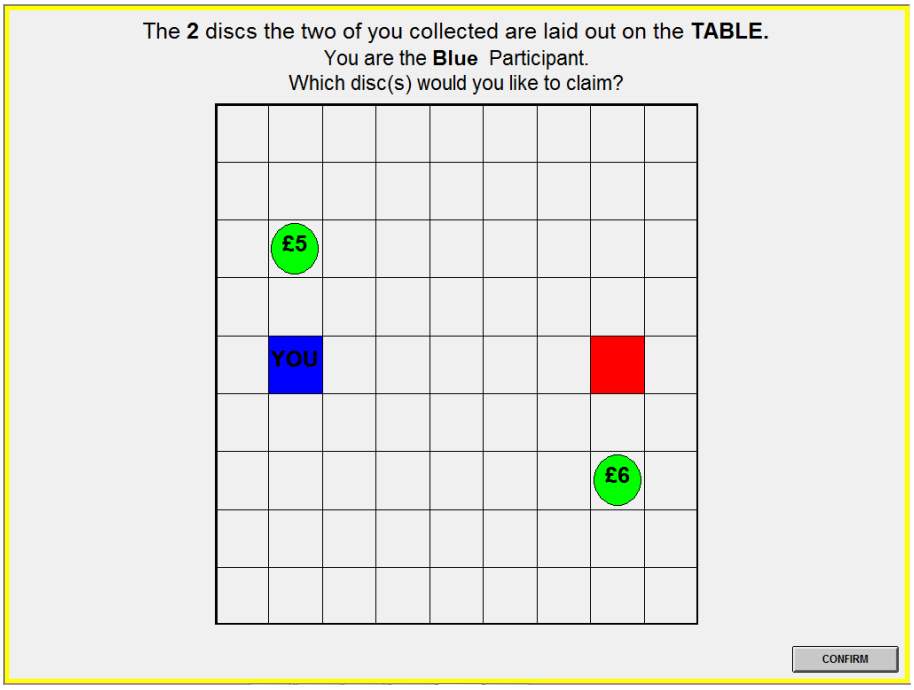


In this case, no disc has been claimed by both Red and Blue, and so there is an agreement. According to this agreement, Blue gets the £4 disc and Red gets the £2 disc. No one gets the £1 disc. So Blue earns £4 and Red earns £2 from the Scenario.

Appendix C. Screenshots of participant interface



Ranking table after Stage 1



Participant Blue in the bargaining table