Strategic Use of a Cognitive Bias in Bargaining

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Abstract

The decoy effect describes how preferences shift when additional options are introduced, challenging the notion of rational choice. This cognitive bias can impact decisions in both individual and strategic contexts. In a bargaining setting, a decoy may help a party secure a better outcome. We explore whether stakeholders in two-person bargaining attempt to strategically exploit others' cognitive biases by incorporating a decoy in order to shift the bargaining outcome to their favorite original alternative. Our findings reveal that over one-third of participants opt to add a decoy, despite the small cost it incurs. We examine decoys that create attraction or compromise effects, and we vary the payoff levels of alternatives. Belief elicitation indicates that decoys creating a compromise effect are chosen with self-serving intentions to achieve more favorable outcomes, while decoys creating an attraction effect are also chosen because they are considered an acceptable agreement.

Keywords: Decoy Effect, Bargaining, Experiments
JEL Classification: C92, C72, D01.

1 Introduction

Cognitive biases affect people's thinking and beliefs, thereby altering their judgments and decisions, and often leading to predictable errors. Much research has focused on identifying these biases to better anticipate their effects and predict behavior. These findings are valuable in the context of individual decision-making, where they can be leveraged to induce specific behavioral outcomes.

Nudges, in particular, exploit cognitive biases by subtly altering the "choice architecture", that is, the decision-making environment, and have proven to be a useful and, arguably, not overly intrusive means of guiding people toward individually or socially more desirable outcomes (Thaler & Sunstein, 2008). While nudges are typically designed and implemented by experts who study human behavior and appropriate interventions, cognitive biases could also be fruitfully exploited in decentralized settings, provided that actors are able to modify the choice architecture. Our goal is to understand whether, and how, stakeholders in small strategic settings anticipate such effects and adjust the framing of decisions to shift outcomes in a desired direction.

The behavioral bias we consider is the decoy effect, which describes how introducing a third option can alter preferences between two original choices. It has been widely studied in individual choice contexts, offering valuable insights for both researchers and practitioners into the potential for guiding decisions toward more desirable outcomes. In strategic settings, little is known about how the decoy effect, as a cognitive bias, can be systematically used to influence outcomes.

Unlike individual choice settings, modifications to the choice architecture in strategic interactions may increase outcome uncertainty because agents' decisions are interdependent. In such contexts, introducing an additional option can generate new and potentially undesirable equilibria. As a result, exploiting cognitive biases in strategic environments is a more complex and less predictable endeavor than in individual choice settings.

Bargaining situations constitute a notable exception, as the presence of additional options does not increase the risk of reaching an undesirable agreement, provided that unanimity is required and any party can veto such an outcome. At worst, introducing a decoy may raise the likelihood of disagreement if it alters preferences in a way that impedes consensus. At best, the decoy increases the likelihood of a favorable outcome for one party by nudging the other toward a targeted choice, thereby creating an incentive for its strategic use. This paper seeks to advance understanding of the decoy effect as a behavioral bias by examining whether and how individuals strategically employ it in bargaining contexts to secure more favorable outcomes.

To investigate this, we conduct a series of controlled laboratory experiments where participants are paired and engage in interactive bargaining games. In each round, players negotiate over a set of either two or three alternatives, where the third option is a decoy that may shift preferences in favor of a particular outcome. While the predicted decoy effect was found in bargaining when the decoy is exogenously provided (Galeotti et al., 2022), our contribution shifts the focus on whether bargainers make strategic use of the decoy by including it in the set of bargaining alternatives, anticipating its effect.

Our experiment is structured in two phases. In the *Choice Phase*, players independently decide whether they prefer to bargain over a list containing only the two base alternatives or one that includes the decoy. In the *Bargaining Phase*, paired players negotiate over the alternatives of the selected list. Participants are not informed about the decoy effect; rather, they are presented with a menu of options and must determine whether or not to include the third alternative in the bargaining set. By observing these decisions, we examine the strategic use of a cognitive bias and the mechanisms through which the decoy effect influences decision-making in interactive settings. The experiment consists of 12 rounds, varying the characteristics of the decoy, as well as the properties of the alternatives – such as equality, efficiency, and symmetry – allowing for a comprehensive analysis of the decoy effect in bargaining dynamics.

Our findings show that over one-third of individuals choose to add a decoy despite the small cost it incurs. Eliciting participants' beliefs over how the decoy changes the likelihood of agreements on the base alternatives shows differences depending on the decoy type. In games where the decoy is an extreme option, making one of the base alternatives appear as a compromise, the decoy is added more frequently when it shifts the likelihood of agreement towards the preferred base alternative. In games where the decoy is dominated by one of the base alternatives, it is mainly added because the decoy alternative is considered an acceptable agreement, possibly because it implements the second-best choice for the player whom the decoy should serve. When one of the base alternatives offers equal payoffs, the decoy is added less frequently, suggesting that subjects recognize the power of equality as a focal point in negotiation.

The remainder of the paper is structured as follows. Section 2 defines the two types of decoy effects we are investigating. Section 3 offers a brief literature review of decoy effect findings. Section 4 describes our experimental design, and Section 5 describes the results we find, separated by the choice phase and the bargaining phase of our experiment. Section 6 concludes.

2 Definitions

The *attraction effect* (AE) and the *compromise effect* (CE) are two distinct decoy effects that both violate the *regularity* axiom in rational choice. This axiom states that the probability of choosing

any alternative from a set of options will not increase when the choice set is expanded (Luce, 1977).

The attraction effect, also known as the asymmetric dominance effect, was first identified by Huber et al. (1982) in individual choice contexts. It occurs when adding a dominated option (the decoy) increases the likelihood of selecting the dominating alternative. The *compromise effect* introduced by Simonson (1989) showed that adding an extreme alternative to a choice set increases the choice probability of one of the original options. The newly favored option becomes the intermediate – or "compromise" – choice. Thus, a suitable additional alternative may act as a decoy, inducing either an attraction effect or a compromise effect.

To illustrate how these concepts apply to strategic interaction, consider a two-player bargaining scenario in which players must agree on one of the available alternatives. Suppose the initial set includes two alternatives $\{A, B\}$, each defined by two attributes: Player 1's payoff and Player 2's payoff. Figure 1 provides an example with alternatives A and B. Assuming self-interested players, alternative B is more desirable for Player 1, as it yields a higher payoff for him, while alternative A is more favorable to Player 2. Introducing decoy D_{AE} makes B appear more attractive than A, since B dominates D_{AE}, whereas A does not. In this case, D_{AE} acts as a decoy that may induce an attraction effect. Alternatively, adding decoy D_{CE} – which offers the highest payoff for Player 1 and the lowest for Player 2 among all three alternatives – makes B appear as the intermediate option among $\{A, B, D_{CE}\}$. This may induce a compromise effect. In both cases, the decoys target alternative B, potentially increasing its likelihood of being chosen. Thus, B is referred to as the *target*, while A is the *competitor*.

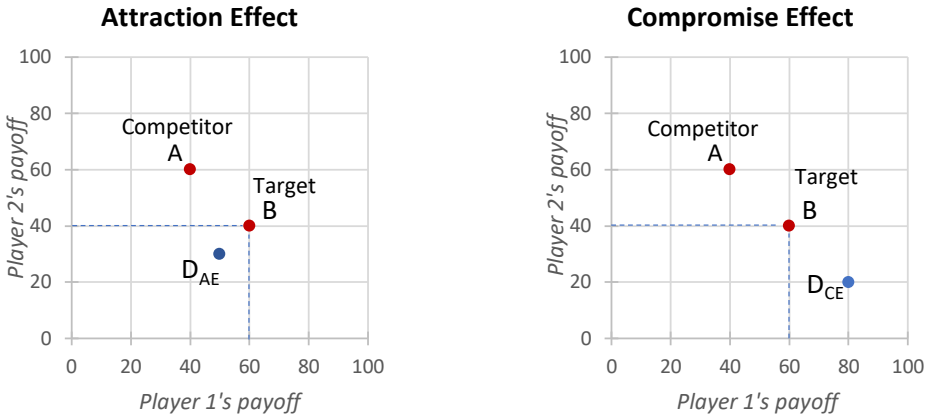

Figure 1: The Attraction Effect and the Compromise Effect in bargaining: With two initial alternatives A and B, alternative D_{AE} serves as a decoy targeting an attraction effect (it makes B seem more attractive, as D_{AE} is dominated by B but not by A); alternative D_{CE} serves a decoy targeting a compromise effect (it makes B seem a compromise among the three alternatives).

If players must reach an agreement via bargaining, Player 1 has an incentive to add a decoy such as D_{AE} or D_{CE} to the initial set $\{A, B\}$ if he believes that the presence of the decoy increases his chances to reach an agreement on the more favorable outcome B.

3 Literature Review

Following the pioneering work of Huber et al. (1982) and Simonson (1989) on the attraction and compromise effect in consumer choice, these effects have initially been studied in marketing and product choice, later extending across various contexts in individual choice settings, such as perceptual decision tasks (Trueblood et al., 2014), political decisions (Herne, 1997; Callander and Wilson, 2008), partner selection (Sedikides et al., 1999) or job candidate selection (Highhouse, 1996; Slaughter et al., 2011; Kuncel and Dahlke, 2020). For a comprehensive overview

of additional research on attraction and compromise effects, see Lichters and Sarstedt (2017). More recently, decoy effects for choices under risk have also been investigated (Sürücü et al., 2019; Castillo, 2020). Beyond attraction and compromise effects, other forms of decoy options can be designed to systematically violate the principles of regularity (and similarity): inferior, superior, symmetrically dominated and phantom decoys have been studied (for a review, see Farquhar and Pratkanis, 2017).

The literature on the decoy effect largely demonstrates its influence on decision-making, though its effectiveness varies by context. In particular, Frederick et al., 2014 show that the attraction effect is largely confined to highly stylized choice environments with purely numerical attribute representations, and that it weakens or disappears when consumers directly experience a product or evaluate perceptual attributes. Similarly, Crosetto and Gaudeul, 2023 find that allowing individuals to revise their choices leads to a fading of the attraction effect.

While the literature on the decoy effect in individual choice settings is extensive, research in interactive contexts remains limited. Using asymmetrically dominated strategies as decoys in interactive game settings, Colman et al. (2007) found that they increased the choice of strategies that dominated them, and the effect was also observed when the decoy strategy was visible but unavailable (phantom decoy). Similarly, Amaldoss et al. (2008) investigated asymmetric dominance in coordination games and found that it can facilitate coordination between players.

In a more recent study, Galeotti et al. (2022) examined the attraction effect (AE) and the compromise effect (CE) in a bargaining context, where paired players negotiated over outcomes yielding different monetary payoffs for each of them. The study investigated how the presence of a decoy option influenced agreement rates on a target option, either when the target dominated another option (AE) or when it represented the intermediate choice (CE). Comparing these agreement rates to those observed in a baseline bargaining scenario without a decoy, a decoy effect was found for a variety of payoff variations. However, the availability of equal-earnings outcomes strongly reduces the decoy effect.

In bilateral negotiations, a seemingly irrelevant alternative can thus have significant effects on outcomes. However, in order to gain advantage from this effect, bargainers must be able to anticipate it and bring the corresponding decoy to the table. Building on the results of Galeotti et al. (2022), our research explores whether individuals anticipate the potential advantage of using an appropriate decoy to shift the outcome to their favor. We provide the option to add a decoy as an additional bargaining alternative, and we elicit players' beliefs about the effect of the decoy. This approach provides new insights into the strategic use and anticipation of cognitive biases in interactive decision-making contexts.

If individuals understand that others are susceptible to cognitive biases, and anticipate that decoys have a predictable effect on preferences, then the decoy should consistently be used whenever it is available. However, in strategic settings where outcomes involve payoffs for multiple players, the influence of a decoy may conflict with other salient considerations, such as fairness, equity, or efficiency. In such contexts, the decoy effect may be weakened by players' sensitivity to these normative concerns. This is supported by the findings of Galeotti et al. (2022), which show that the decoy effect diminishes in the presence of equitable outcomes. As a result, predicting the strategic use of a decoy becomes more complex, since it is unclear which potential effects are considered by the player who makes the strategic decision to add the decoy.

Furthermore, Alempaki et al. (2022) show that individuals vary considerably in how they choose best responses based on expectations about others' behavior. This heterogeneity is further supported by D. Fehr and Huck (2016), who find that strategic responses to own beliefs are correlated with cognitive ability. As a result, we do not expect all decision makers to add a decoy. However, we do expect that the frequency of adding the decoy will exceed what would be expected from random error alone and will systematically depend on payoff variations.

4 Experimental Design

In our experiment, subjects play 12 bargaining games, in which they can earn money by pairwise bargaining over a set of alternatives that specify bundles of payoffs for the two players (*you* and *other*) in a pair. Each game consists of two stages: In the first stage (*Choice Phase*), each subject decides which list of alternatives they prefer to have available for bargaining. In the second stage (*Negotiation Phase*), subjects are paired up, and the list choice of one of the two subjects in each pair is randomly selected for actual bargaining. All this is common knowledge before the games start. Subjects are informed that their (anonymous) partner will change in each game.[1]

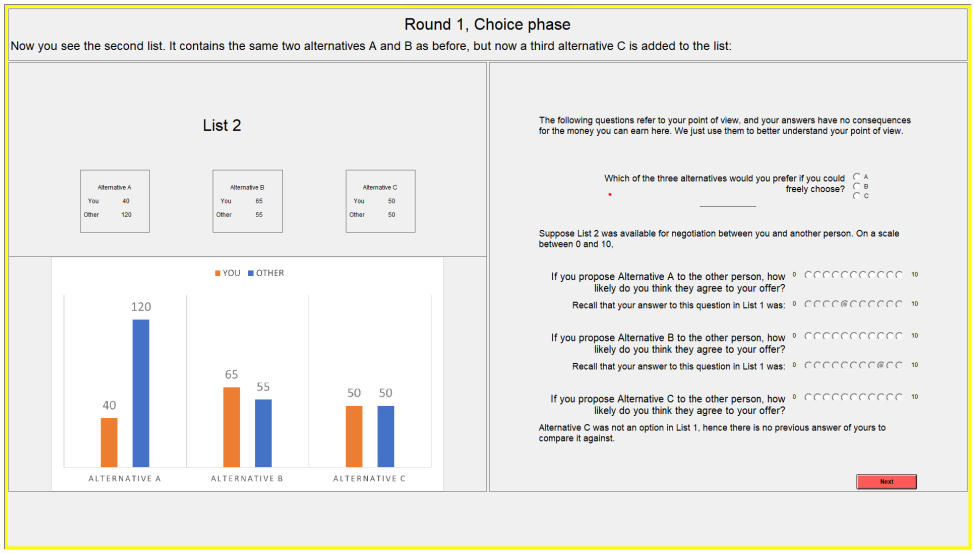

Figure 2: Screen of belief elicitation for the Extended List (List 2) in the Choice Phase. The left panel shows the available alternatives with graphical visualizations to facilitate comprehension, and the right panel reports the questions used to elicit subjects' beliefs.

4.1 Choice Phase

Our primary objective is to determine whether subjects perceive an advantage in adding a decoy to the set of available bargaining alternatives in order to secure a more favorable outcome. In each game, all subjects are in the same position throughout the Choice Phase and face an identical decision problem.

The Choice Phase proceeds in three steps. First, participants are presented with the *Base List*, which contains two alternatives, A and B. Participants are asked to report their preferred alternative if they could choose freely, as well as their beliefs about the likelihood that the other player would agree to each alternative if they propose it.[2] They can choose their answer on a radio scale from 0 to 10. Second, on a separate screen, participants are presented with the *Extended List*, which includes the same alternatives A and B as well as an additional alternative C that serves as a decoy. The decoy is designed to induce either an *attraction effect* (AE) or a *compromise effect* (CE), depending on the game, and it always targets the alternative that is more favorable to the choosing player ("you"). Participants again report their preferred alternative

[1] We made matching groups of 8 subjects and randomly paired subjects within this group, with the constraint that no players remains in the same matched pair in two consecutive periods, and that each player had to play all 12 games.

[2] Specifically, they are asked *"If you propose Alternative X to the other person, how likely do you think they agree to your offer?"* where X is replaced with each alternative in each of the two lists.

and their beliefs for each of the alternatives to be agreed upon by the other player if proposed. Figure 2 displays the screen used to elicit beliefs for the Extended List.

After preferences and beliefs have been elicited for both lists, participants are shown the Base List and the Extended List side by side on a single screen and asked to choose which list they would like to use. Choosing the Extended List entails a small cost of 1 point. This choice concludes the Choice Phase and occurs immediately before participants are paired for the Bargaining Phase (see Figure 3).

Importantly, up to this point all participants are in the same position: each selects their preferred list from the perspective of the player for whom the *target* alternative is favorable. The assignment of roles in the Bargaining Phase is random and is explained in the next section.

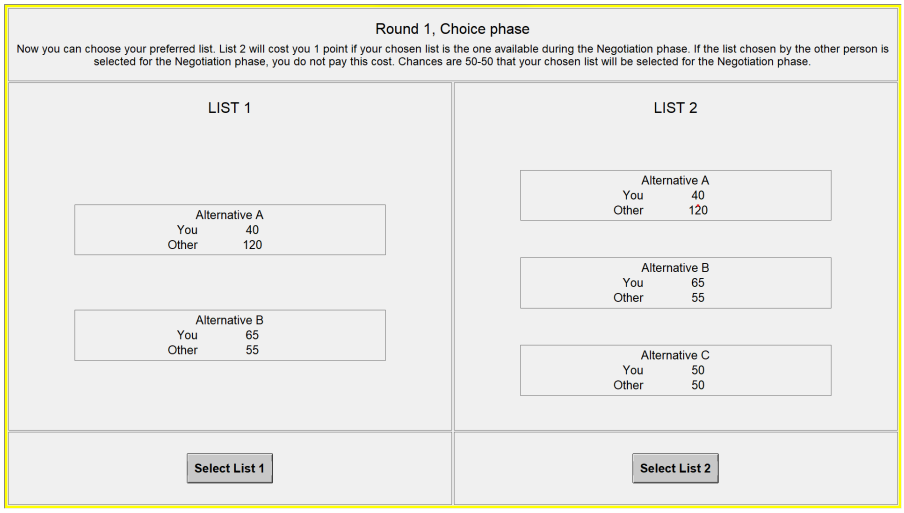

Figure 3: Example of a choice between Base List (List 1) and Extended List (List 2)

4.2 Bargaining Phase

After the Choice Phase, subjects are matched in pairs, and one of them in each pair is randomly selected as Player 1, taking the position labelled as "you" (i.e. the *chooser's* position) in the Choice Phase. This player's list choice is available for bargaining, while the other player now takes the role of Player 2, whose position was labelled as "other" during the Choice Phase.[3]

Bargaining consists of chatting via an on-screen chat box, with the available alternatives being displayed on the screen. Pairs have two minutes to reach an agreement on one of the alternatives. They can select an alternative anytime, and the selection is visible to the other player. The selection can be changed as long as no agreement is reached. If both players select the same alternative during the two minutes, an agreement is reached and the game ends. If bargaining time is exhausted and no agreement is reached, both players have zero earnings in this game. (see Figure 4)

4.3 Payoff Variations

Table 1 displays our 12 games with different payoffs. The alternatives are shown as bundles where the first element refers to Player 1's payoff and the second to Player 2's payoff. Recall that the Base List contains alternatives A and B, and the Extended List contains A, B, and a decoy C with expected effect as indicated in column "Decoy type". Note that the decoy always

[3]The cost for choosing the Extended List in the Choice Phase is borne only if the choosing player was selected to be Player 1 by the random draw in the Bargaining Phase. In this case, one point is deducted from the payoff earned by Player 1 in that round.

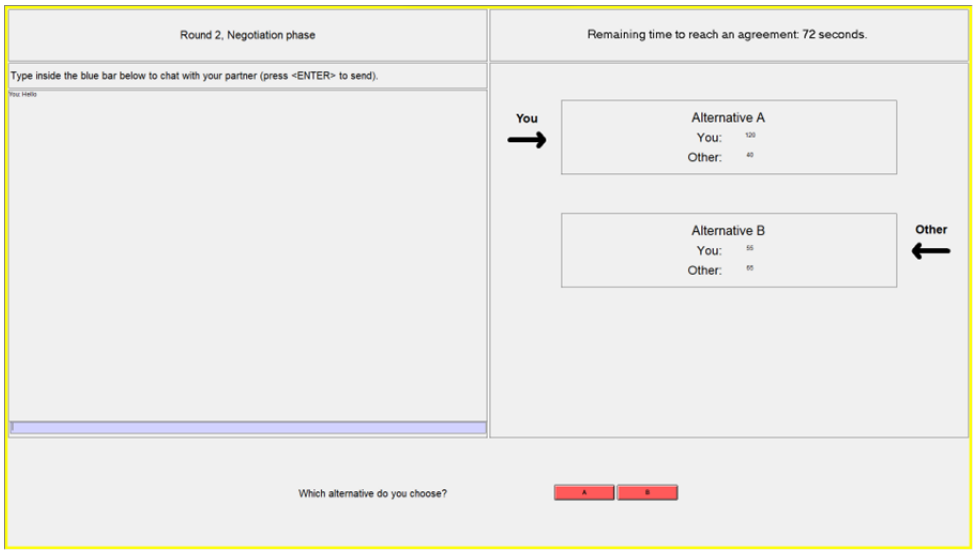

Figure 4: Screen of the Bargaining Phase. The left panel is the chat box where the pair can send and receive messages. The right panel shows the list of alternatives and preferred choices with an arrow. A timer on the top right counts down the remaining time.

targets the alternative that is more profitable for Player 1, who is the chooser of the available list.

The 12 games represent a subset of those studied in Galeotti et al., 2022 for reasons of replicability and comparability to their results regarding the decoy effect on the actual bargaining outcome. The selection of games was driven by our focus on characterizing the alternatives and decoys that players themselves consider useful for gaining influence over the outcome by strategically adding the decoy. Games 1 and 2 include the same initial alternatives with symmetrically unequal payoffs, $A = (40, 60)$ and $B = (60, 40)$, differing only in the type of decoy.

In Games 3 and 4, the target $A = (120, 40)$ is a highly unequal bundle, but one that maximizes total payoffs and is highly profitable for the chooser, competing with an equal bundle $B = (60, 60)$. Again, only the type of decoy varies between Games 3 and 4.

Games 5 and 9 contain the same unequal target $A = (120, 40)$ and same decoys as in Games 3 and 4, but the competitor $B = (55, 65)$ is slightly away from equality.

In Games 6, 7, 8, and 10, the total payoffs maximizing alternative $A = (40, 120)$ is the competitor, while the alternative $B = (65, 55)$ with almost equal payoffs is the target. Here the decoy varies between highly unequal, equal and nearly equal payoffs.

Games 11 and 12 have symmetrically unequal payoffs similar to Games 1 and 2, but the payoffs on the Base List are doubled.

4.4 Post Experimental Questions

Before the games started, subjects had to answer test questions to ensure everyone had understood the instructions correctly. Two of the 12 games were randomly selected to be paid out at the end of the experiment, with a conversion rate of 1 Euro for 15 points. After the main stages, a questionnaire was presented. As an indicator for *risk aversion*, a simple incentivized investment decision was used. Subjects had to decide how many points between 0 and 50 they would invest, given a 50% chance of making 2.5 times the amount invested and a 50% chance of losing all the points invested (see, e.g., Charness and Gneezy, 2010).

An incentivized cognitive reflection test (CRT) with three questions based on Frederick (2005) was used to elicit *cognitive skills* and the ability to reflect, thus possibly showing a correlation with the ability to anticipate the opponent's behavioral response in the presence of a

Table 1: Payoff Variations of the 12 Games

Game	Altern. A	Altern. B	Decoy C	Decoy type	Target
1	(40,60)	(60,40)	(80,20)	Compromise	B
2	(40,60)	(60,40)	(50,30)	Attraction	B
3	(120,40)	(60,60)	(130,30)	Compromise	A
4	(120,40)	(60,60)	(110,30)	Attraction	A
5	(120,40)	(55,65)	(130,30)	Compromise	A
6	(40,120)	(65,55)	(120,40)	Compromise	B
7	(40,120)	(65,55)	(50,50)	Attraction	B
8	(40,120)	(65,55)	(55,45)	Attraction	B
9	(120,40)	(55,65)	(110,30)	Attraction	A
10	(40,120)	(65,55)	(155,5)	Compromise	B
11	(80,120)	(120,80)	(160,40)	Compromise	B
12	(80,120)	(120,80)	(90,50)	Attraction	B

Notes: First element in parentheses is the payoff for Player 1 ("you"), and the second element is the payoff for Player 2 ("other"). The *target* is always the alternative more profitable for Player 1.

potential cognitive bias.

Finally, social preferences were elicited using a set of binary distributional choices commonly employed in the inequality-aversion literature (Blanco et al., 2011; E. Fehr & Schmidt, 1999). Subjects were presented with four incentivized choices, as displayed in Figure 5, intended to indicate other-regarding preferences. According to decisions in this task, we will categorize the players into *selfish dictator* and *spiteful*. A *selfish dictator* maximizes own payoffs irrespective of other's payoffs; choosing Option R in Decisions 2 and 4. A *spiteful* attitude would imply preferring options that worsen other's payoff when own payoff is not affected; choosing Option R in Decision 1, and Option L in Decision 3. This may help identify preferences for more equal payoffs over a selfish approach using decoys in the bargaining game.

The full set of instructions is provided in Appendix A.

		Option L		Option R
Decision 1	o	2 euro for you 2 euro for the other participant	o	2 euro for you 1 euro for the other participant
Decision 2	o	2 euro for you 2 euro for the other participant	o	3 euro for you 1 euro for the other participant
Decision 3	o	2 euro for you 2 euro for the other participant	o	2 euro for you 4 euro for the other participant
Decision 4	o	2 euro for you 2 euro for the other participant	o	3 euro for you 5 euro for the other participant

Figure 5: Binary Distributional Choices Measuring Social Preferences

4.5 Experimental Procedure

Two pilot sessions of the experiment were conducted at the Royal Holloway University of London which led to the current design of the experiment.[4] The experiment with the final design was conducted in 10 sessions at LabSi at the University of Siena. [5] We programmed the experiment using the software z-Tree (Fischbacher, 2007).

We conducted 9 lab sessions, some with 16 and some with 8 participants, with a total of 128 participants. One of the sessions was interrupted due to an earthquake and finished with 9 of

[4]Ethical approval obtained from Royal Holloway University

[5]This study is pre-registered on aspredicted.org with ID: 144311

the 12 games played, while in all other games subjects played all 12 games in random order. We have a total of 1487 observations over subjects and games.[6] Subjects earned on average 8.60 €plus a show-up fee of 4 €.

5 Hypotheses

Our main research question is whether subjects strategically use the decoy effect to gain an advantage in bargaining. In particular, we ask whether subjects perceive a decoy as a useful instrument for influencing bargaining outcomes and adjust their behavior accordingly.

Hypothesis 1 (Decoy inclusion):
A significant share of subjects bear a small cost to choose the Extended List, indicating that they perceive an advantage in adding a decoy to the original set of bargaining alternatives.

Hypothesis 2 (Belief channel):
The presence of a decoy increases subjects' beliefs about the likelihood of reaching agreement on the target alternative, relative to the Base List.

Hypothesis 3 (Context dependence):
The propensity to choose the Extended List varies across the 12 games. In particular, the presence of an equal-payoffs alternative in the Base List reduces the likelihood of choosing the Extended List, whereas no such reduction is expected when the Base List contains an alternative with almost-equal payoffs.

6 Results

We begin by examining behavior in the Choice Phase, where participants selected either the Base List or the Extended List of alternatives. Subjects' reported beliefs about their partners' willingness to agree to each alternative provide insight into the motivations underlying these choices. We then turn to the Bargaining Phase, where we assess whether the inclusion of a decoy ultimately translated into more favorable outcomes for the chooser.

6.1 Choice Phase

6.1.1 Observed Choices to Add the Decoy

The observed overall frequencies of choices of the Extended List are shown in Table 2, disaggregated by decoy type. n games designed to induce an attraction effect (AE), 39.5% of choices favor the Extended List, compared to 33.2% in games designed to induce a compromise effect (CE). Overall, across all games, subjects choose the Extended List in 36.3% of cases.

Table 2: Share of the choices of the Extended List by Decoy Type (Attraction vs. Compromise Effect)

Decoy Type	Choice of Extended List	# Obs.
AE games	292 (39.5%)	740
CE games	248 (33.2%)	747
Total	540 (36.3%)	1487

Despite being costly, the Extended List was selected in over one-third of all observations, suggesting that the additional alternative (the decoy) is either appealing as a possible outcome

[6] Besides the 3 missing games for 16 subjects in Session 1, one subject was disconnected during the last game in Session 10, and data could not be recovered. Thus of the total of $128 \cdot 12 = 1536$ observations for a symmetric data set we are missing $16 \cdot 3 + 1 = 49$ and remain with a total of 1487 observations.

or considered strategically useful. In games where the decoy targets an attraction effect (AE), the Extended List is chosen more often than in games where the decoy targets a compromise effect (CE). Using a Wilcoxon matched-pairs signed-rank test (referred to as SR2) over means of all games for each independent observation, this difference between AE and CE games is significant (SR2: $p < 0.01$).[7]

> **Result 1: Choice to add the decoy.** *(i) Over one-third of participants choose the costly Extended List which includes a decoy. (ii) This choice is more frequently observed when the decoy targets an attraction effect rather than a compromise effect.*

The less frequent selection of the Extended List in CE games is noteworthy. Given that the decoy in these games offers the highest payoff to the chooser, it makes it attractive as a potential agreement outcome. In contrast, the decoy in AE games is dominated and thus seems less attractive as a potential outcome. Including the decoy in AE games then seems to serve a purpose beyond merely aiming for agreement on it, possibly reflecting a strategic motive. Elicited beliefs from the Choice Phase are essential to obtain more insight into the chooser's underlying motives and the differing roles of the two decoy types.

6.1.2 Effect of Decoy on Beliefs

Before participants make their choice between Base List and Extended List, they are asked for their beliefs about the likelihood of the other player's agreement on each alternative, i.e. on the Base List for target and competitor, and on the Extended List for target, competitor, and decoy. We refer to these as *beliefs on target*, *beliefs on competitor*, and *beliefs on decoy*.[8]

Table 3: Changes in beliefs relative to the Base List, by decoy type.

	Δ Beliefs on Target			Δ Beliefs on Competitor			Beliefs on Decoy	
Decoy type	+	0	−	+	0	−	0	+
Attraction Effect	226 (30.54)	431 (58.24)	83 (11.22)	87 (11.76)	627 (84.73)	26 (3.51)	221 (29.86)	519 (70.14)
Compromise Effect	316 (42.30)	381 (51.00)	50 (6.69)	83 (11.11)	629 (84.20)	35 (4.69)	470 (62.92)	277 (37.08)
Total	542 (36.45)	812 (54.61)	133 (8.94)	170 (11.43)	1,256 (84.46)	61 (4.1)	691 (46.47)	796 (53.53)

Notes: The table reports distributions of subjects' beliefs by alternative and decoy type. The left block shows changes in beliefs about agreement on the *target* alternative when moving from the Base List to the Extended List; the middle block shows corresponding changes for the *competitor* alternative. Positive (+), zero (0), and negative (−) entries indicate increases, no change, or decreases in beliefs, respectively. The right block reports beliefs about the *decoy* itself, distinguishing between zero beliefs and any positive belief. Rows separate attraction-effect (AE) games, compromise-effect (CE) games, and the pooled sample. Percentages are reported in parentheses.

To assess how the introduction of a decoy affects beliefs, we compare each subject's reported beliefs under the Extended List to those reported under the Base List. We define the *change in*

[7] Since in our experiment a matching group consisted of 8 subjects who interacted anonymously at some point during the 12 games, this constitutes one independent observation. Means for non-parametric tests are therefore calculated over matching groups and over the 12 games, resulting in 16 independent observations for our primary variable, the choice of the Extended List.

[8] Beliefs capture the perceived likelihood that the other player would agree to a given alternative if it were proposed by the reporting player, regardless of whether the reporting subject would choose that alternative themselves. Beliefs are elicited on a 0–10 scale, where a value of 1 corresponds to a 10% likelihood. Reported beliefs across alternatives are not required to sum to one, as subjects may believe the other player would agree to more than one alternative.

beliefs as the difference between beliefs elicited for the Extended List and those elicited for the Base List. If choosers anticipate a decoy effect, the inclusion of a decoy should increase beliefs about reaching agreement on the *target* alternative, while no corresponding increase should occur for the *competitor* alternative. Table 3 summarizes the observed changes in beliefs on the target and the competitor, as well as reported beliefs on the decoy itself, separately for attraction-effect and compromise-effect games. Each block of the table is separately discussed below.[9]

Change in *beliefs on target*: Over all games, more than 36% of choosers' *beliefs on target* increase in the presence of a decoy, while only fewer than 9% believe that the decoy *decreases* the likelihood for the other player's agreement on the target. Figure 6 displays the distribution and size of the changes in individuals' *beliefs on target*. If these differences were just due to subjects' errors, we would expect them to be symmetrically distributed around zero. Instead, the median of the distribution of changes in *beliefs on target* is significantly different from zero (Wilcoxon signed rank test (SR1): $p < 0.01$), and a right-skewed distribution due to larger *beliefs on target* for the Extended List is observed, which is in line with the anticipation of the predicted decoy effect and its strategic use.

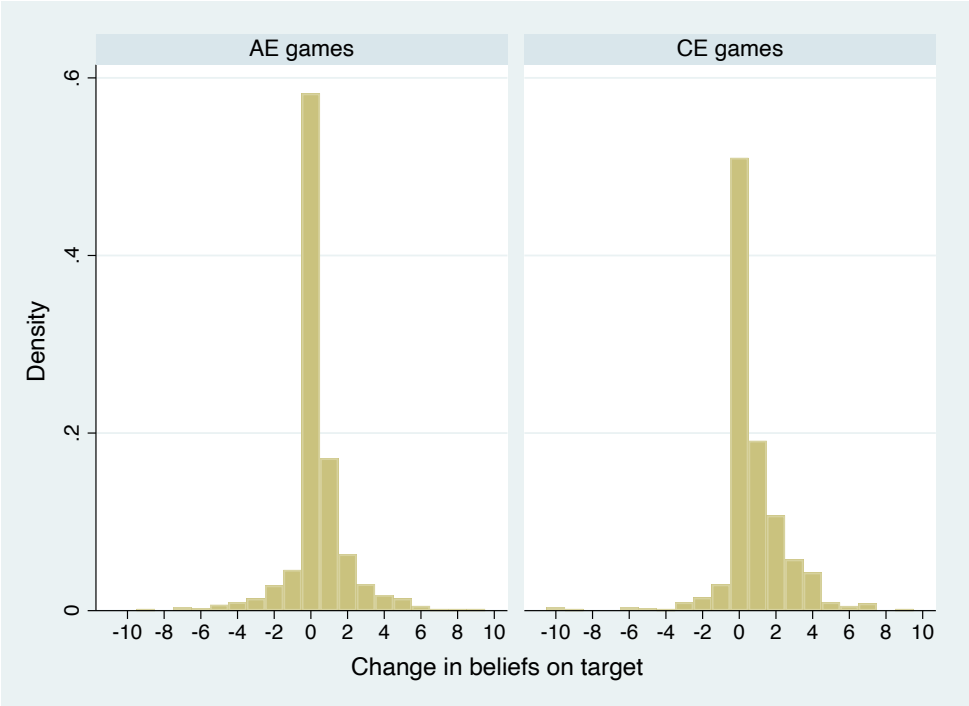

Figure 6: Effect of decoy on *beliefs on target*, by decoy type (AE vs CE games). The value for *Change in beliefs on target* represents the difference in belief about the likelihood that the other player agrees on the target when the decoy is introduced.

A comparison across decoy types shows that the decoy in CE games induces an increase in *beliefs on target* more frequently than in AE games (see Table 3: 42% vs. 30%; SR2: $p < 0.01$). Figure 7 allows for a better comparison of *beliefs on target* across AE and CE games. In the left graph, the distributions of *beliefs on target* for the Base List are displayed, showing no difference between AE and CE games. This is expected, given that by design the games in the Base List for both AE and CE are identical, and we have an equal number of AE and CE games (see Table 1). The right graph of Figure 7 shows that for the Extended List, *beliefs on target* in CE games stochastically dominate those in AE games. Thus, CE games not only exhibit a higher

[9]Table 3 disaggregated by the choice of Base/Extended Lists can be found in the Appendix, Table 11

frequency of positive changes in beliefs on target, but also systematically induce higher beliefs on target than AE games. The fact that the Extended List was found to be chosen more often in AE games suggests that choosing to add the decoy because it increases the chance of an agreement on the target is not the only motivation to choose the decoy in AE games.

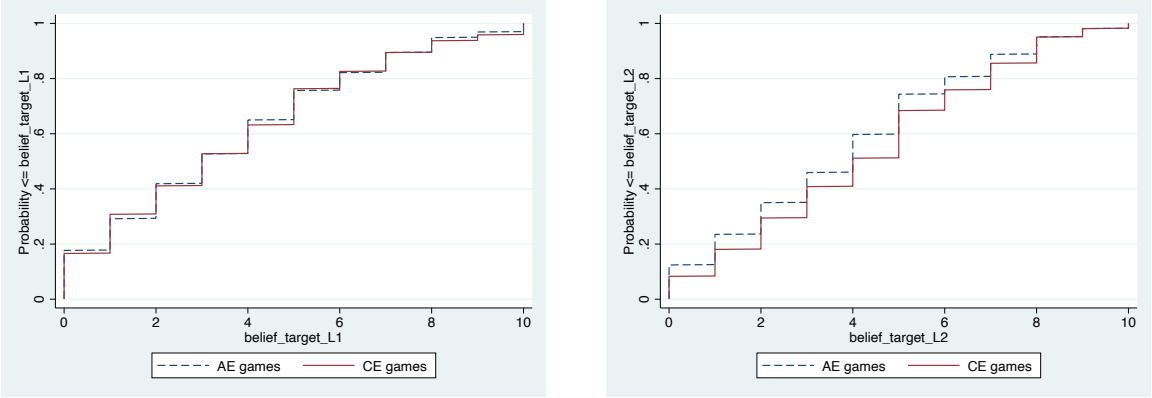

Figure 7: Distribution of *beliefs on target* in Base List (left) and Extended List (right)

Change in *beliefs on competitor*: Increases in *beliefs on competitor* are far less frequent than increases in *beliefs on target* (11.4% versus 36.4%), although increases still occur more often than decreases (see Table 3). For the vast majority of choosers, however, beliefs about agreement on the competitor remain unchanged when a decoy is introduced: in 85% of cases, *beliefs on competitor* are identical across the Base and Extended Lists. This pattern is consistent with the anticipated decoy effect, as the presence of a decoy need not alter expectations about agreement on the competitor alternative. Changes in *beliefs on competitor* are significantly less frequent than changes in *beliefs on target* (SR2: $p < 0.01$), both overall and by decoy type. Moreover, we find no significant difference between attraction-effect and compromise-effect games in their impact on beliefs about the competitor.

Beliefs on decoy: To understand the possible mechanisms behind the more frequent choice of the Extended List in AE games despite lower *beliefs on target*, we now consider *beliefs on decoy*. Recall that the decoy in both AE and CE games always offers the lowest payoff among all alternatives to Player 2 and is thus not expected to be an attractive option for this player. Figure 8 shows that AE and CE games differ considerably for *beliefs on decoy*. Over 60% of choosers in CE games believe there is no chance that the opponent would agree on the decoy, compared to only 30% in AE games (see also Table 3, right panel).[10]

Furthermore, the distribution shows that in CE games *beliefs on decoy* are more concentrated on lower values, i.e., choosers are less confident that the opponent will agree on the decoy. For AE games, on the one hand, the decoy payoffs are strictly dominated, so self-interested players would not be expected to agree on them. On the other hand, for the opponent, payoffs from decoys in AE games result in a smaller deterioration from the target compared to CE alternatives (see Table 1), making them potentially more acceptable. Additionally, the decoy payoffs in CE games are more unequal between the two players than any other payoffs across all games, making it a less likely agreement for inequity-averse or spiteful subjects.

We state our result regarding the effect on beliefs.

> **Result 2: Effect of decoy on beliefs.** *(i) Introducing a decoy induces asymmetric changes in beliefs on target and competitor, which are consistent with the expected direction of an anticipated decoy effect. (ii) The increase in beliefs on target is more frequent in CE*

[10] In Game 7, where the decoy offers equal payoffs to both players, 97% of subjects believe that the other player would agree to the decoy. Excluding Game 7, a substantial majority of subjects in the remaining attraction-effect games still assign a positive likelihood to agreement on the decoy, with 65% reporting strictly positive beliefs.

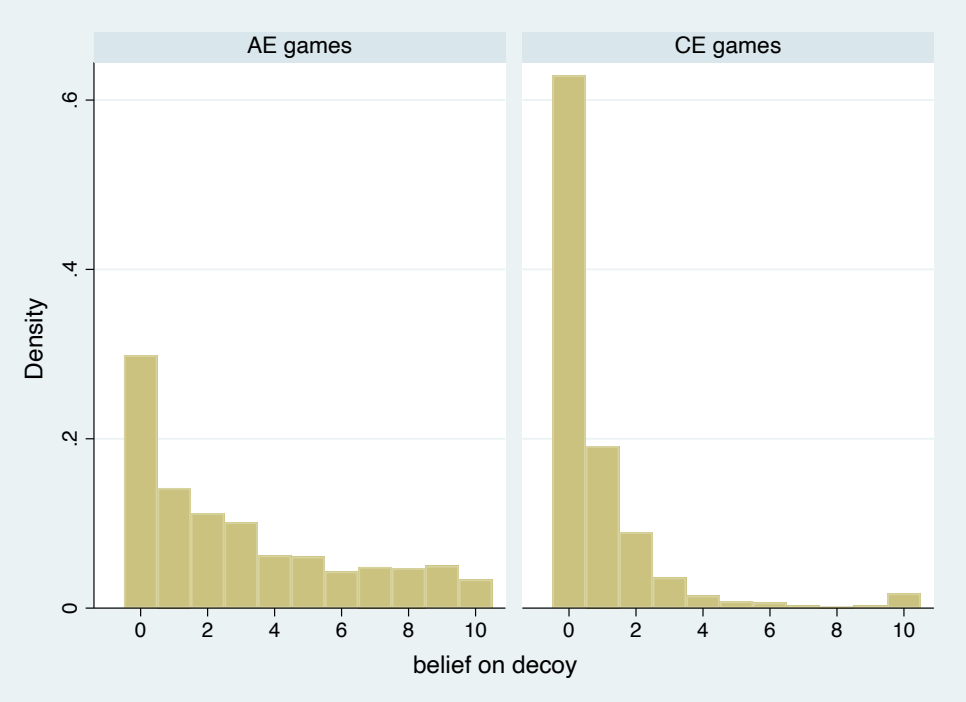

Figure 8: Distribution of beliefs about agreement on the decoy by decoy type (AE vs CE games). Belief values represent the expected likelihood that the other player would agree to the decoy if it were proposed.

games than AE games. (iii) A significant share of subjects have positive beliefs on decoy, and this is more frequently observed in AE games than in CE games.

6.1.3 Effect of Beliefs on Individual Behavior

To distinguish between a strategic use of the decoy to promote agreement on the target and alternative motives for selecting the Extended List, we link beliefs and choices at the individual level. Table 4 reports the frequency with which subjects choose the Extended List conditional on the sign of the change in their beliefs about agreement on the target. Across all games, subjects are more likely to select the Extended List when their beliefs about agreement on the target increase than when these beliefs remain unchanged or decrease. This pattern is particularly pronounced in CE games and drives the aggregate result.

At the same time, choosing the Extended List may also reflect expectations of reaching agreement on the decoy itself, rather than a strategic attempt to promote agreement on the target. Such a motive is especially plausible in CE games. In these games, the decoy offers a higher payoff to the chooser than the target alternative, making it an attractive potential agreement outcome in its own right. Consistent with this, stated preferences reveal a relatively high share of subjects who rank the decoy as their most preferred alternative in CE games.[11] This raises the possibility that subjects select the Extended List in order to increase the chance of agreement on the decoy, rather than to influence beliefs about the target.

Table 5 evaluates this mechanism by reporting the frequency of choosing the Extended List conditional on whether subjects assign a positive belief to agreement on the decoy. Overall,

[11] In the Base List, the target is the modal stated preference in all games, with its lowest support (73–76%) occurring in Games 3 and 4, where the competitor yields equal payoffs. In the Extended List, the target remains the most preferred alternative in AE games, exceeding 80% in all but Game 7, where the equal-payoff decoy attracts 19% of stated preferences and the target 78%. In CE games, by contrast, the decoy is consistently the most preferred alternative, with stated preference shares ranging from 62% to 75%.

Table 4: Choice of the Extended List Conditional on Changes in Beliefs on the Target

	ΔBeliefs on Target		
Choice of Extended List	**− / 0**	**+**	**All Beliefs**
AE games	197/514	95/226	292/740
	(0.38)	(0.42)	(0.39)
CE games	117/431	131/316	248/747
	(0.27)	(0.41)**	(0.33)
Total	314/945	226/542	540/1487
	(0.33)	(0.42)*	(0.36)

Notes: Cells report the number of Extended List choices over total observations conditional on changes in *beliefs on target*, with corresponding percentages in parentheses. Changes in *beliefs on target* are grouped into non-positive (−/0) and positive (+) changes. Rows separate AE games, CE games, and the pooled sample. Significance stars indicate differences across belief-change categories (between columns) based on Wilcoxon matched-pairs signed-rank tests. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

subjects with positive *belief on decoy* choose the Extended List substantially more often than those who assign zero probability to such agreement (43% versus 29%). Clearly, if the hopes of agreeing on the decoy were the main driver for choosing the Extended List, we would expect to see more such choices in CE games. However, in CE games, positive *belief on decoy* has little effect on list choice: the share of Extended List choices increases only modestly, from 31% to 36%, and the difference is not statistically significant. This makes the increase in *beliefs on target* the main obvious motivation for choosing the Extended List in CE games.[12] This supports the hypothesis of the decoy's strategic use in CE games.

In AE games, Table 5 shows that subjects with positive *beliefs on decoy* choose the Extended List almost twice as often as those who assign zero probability to such agreement (46% versus 24%, $p < 0.01$). This pattern points to a distinct motivation in AE games, particularly given that decoy in AE games is the second-best outcome for the chooser. Taken together, these findings suggest that expectations of agreement on the decoy itself are an important driver of decoy inclusion in AE games, whereas in CE games, the decision to add a decoy is better explained by strategic considerations related to belief shifts on the target alternative rather than by the decoy's direct appeal as a bargaining outcome.

Table 5: Choices of Extended List Conditional on Beliefs on the Decoy

	Beliefs on decoy		
Choice of Extended List	**0**	**+**	**All Beliefs**
AE games	52/221	240/519	292/740
	(0.24)	(0.46)***	(0.39)
CE games	148/470	100/227	248/747
	(0.31)	(0.36)	(0.33)
Total	200/691	340/796	540/1487
	(0.29)	(0.43)***	(0.36)

Notes: Cells report the number of Extended List choices over total observations conditional on *beliefs on decoy*, with corresponding percentages in parentheses. Rows separate AE games, CE games, and the pooled sample. Significance stars indicate differences between columns based on Wilcoxon matched-pairs signed-rank tests. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

[12] In Game 7 with an equal-payoffs decoy, over 97% of choosers have a positive *belief on decoy*. One half of these choosers then choose to include the decoy, the other half doesn't. Choosing the Base List here also means that the equal-payoffs decoy is not perceived as an attractive outcome *per se*.

Result 3: Effect of beliefs on behavior. *We observe two different motives for adding the decoy: (i) In CE games, the Extended List is chosen more often when individuals' beliefs about an agreement on target increase in the presence of the decoy, which supports the strategic use of the decoy effect. (ii) In AE games, individuals with positive beliefs on decoy are more likely to choose the Extended List, suggesting that the decoy itself is considered an acceptable outcome.*

Below, we will consider payoff variations in games to further understand the role of payoff (in)equality for outcomes.

6.1.4 Payoff variation

Besides the effects of choosers' beliefs, we also want to estimate how payoff variations in the 12 games explain the choice of the Extended List. Table 6 organizes the 12 games into structurally comparable pairs and evaluates how differences in payoffs translate into differences in list choice. The top panel separates games by decoy type, with six attraction-effect (AE) and six compromise-effect (CE) games. Within each decoy type, games are grouped into six comparison classes (c1-c6). Games sharing the same comparison code have identical Base Lists, meaning that the target and competitor payoffs are held fixed, and differ only in the payoff structure of the decoy. This pairing allows us to study how changes in decoy payoffs, holding the underlying bargaining alternatives constant, affect the propensity to include the decoy.

The final column of the top panel reports the relative frequency with which the Extended List is chosen in each game. These frequencies form the basis for the pairwise comparisons reported in the bottom panel. Each row in the bottom panel compares the choice frequency of the Extended List across two comparison classes, separately for AE and CE games. For instance, the comparison labeled c1 vs. c2 contrasts games that share the same Base List but differ in the payoff levels of the decoy, and reports the within-subject difference in Extended List choice frequencies along with the corresponding Wilcoxon matched-pairs test. Positive (negative) values indicate that the Extended List is chosen more (less) frequently in the first comparison class than in the second.

Taken together, the table provides a structured way to assess which payoff dimensions of the decoy matter for list choice, and whether these effects differ systematically between AE and CE environments. By exploiting within-pair variation, the analysis cleanly separates the influence of decoy payoffs from differences in the underlying bargaining problem.

With respect to reference pair ($c1$), where target and competitor offer equally unequal payoffs, we observe the following patterns regarding payoff variation. Pair ($c2$): Doubling the target's payoff increases the selection of the Extended List, but this effect is statistically significant only in AE games. Pair ($c3$): Equalizing the payoff of the competitor reduces the choice of the Extended List and it is significant in both type of games. Pair ($c4$): The negative effect of payoff equalization on the choice of the Extended List seems to require fully equal payoffs; when the competitor has almost equal payoffs, no such effect is observed. Pair ($c5$): When the target is only slightly unequal, adoption significantly increases in AE games with an equal-payoffs decoy. This is not observced in CE games, where the decoy is extremely unequal. Pair ($c6$): With identical alternatives on the Base List as in pair ($c5$), but a slighly unequal decoy in AE games, the adoption of the Extended List remain unaffected. For CE games, a decoy less extreme than in $c5$ does not significantly increase the adoption of the Extended List.

Finally, we also provide other pairwise comparisons that can be of interest. Pair ($c3$) vs ($c4$): here we compare the effect of having a competitor with slighty unequal payoffs (with disadvantage to the chooser) against a competitor with equal ones. We observe an increase in the adoption of the Extended List, but it is significant only in CE games. This suggests that choosers anticipate the strong focality of payoff equality. Pair ($c5$) vs ($c6$): this comparison highlights the effect of the size of inequality in the decoy. In AE games we do not observe any statistically

Table 6: Pairwise Ordering of Games and Tests of Main Payoff Variations

Decoy Type	Pair	Game	Target	Competitor	Decoy	Choice of Extended List (rel. freq.)
6*Attraction effect						
	c1	2	(60, 40)	(40, 60)	(50, 30)	0.359
	c2	12	(120, 80)	(80, 120)	(90, 50)	0.500
	c3	4	(120, 40)	(60, 60)	(110, 30)	0.225
	c4	9	(120, 40)	(55, 65)	(110, 30)	0.344
	c5	7	(65, 55)	(40, 120)	(50, 50)	0.508
	c6	8	(65, 55)	(40, 120)	(55, 45)	0.433
6*Compromise effect						
	c1	1	(60, 40)	(40, 60)	(80, 20)	0.371
	c2	11	(120, 80)	(80, 120)	(160, 40)	0.387
	c3	3	(120, 40)	(60, 60)	(130, 30)	0.202
	c4	5	(120, 40)	(55, 65)	(130, 30)	0.301
	c5	10	(65, 55)	(40, 120)	(155, 5)	0.281
	c6	6	(65, 55)	(40, 120)	(120, 40)	0.452

		Attraction effect		Compromise effect	
Comparison	N	Diff	p-value	Diff	p-value
c1 vs c2	16	-0.141**	0.0237	-0.016	0.8872
c1 vs c3	16	0.134**	0.0293	0.169***	0.0067
c1 vs c4	16	0.015	0.9707	0.070	0.2090
c1 vs c5	16	-0.149**	0.0146	0.090	0.1873
c1 vs c6	16	-0.074	0.3857	-0.081	0.2144
c3 vs c4	16	-0.119	0.1172	-0.099*	0.0566
c5 vs c6	16	0.075	0.2649	-0.171***	0.0067
c4 vs c6	16	-0.089	0.4026	-0.151*	0.0894

***, **, * indicates significant differences between columns at 1%, 5%, 10% (Wilcoxon matched-pairs signed-rank test).

significat difference when the decoy change from completely equal payoffs to slightly unequal ones. Instead, in CE games, a reduction in the extreme inequality of the decoy's payoff increases the adoption of the Extended List. Pair ($c4$) vs ($c6$): here we compare the adoption of decoy in games where target and competitor switch. When the decoy targets the less unequal option, the adoption of the Extended List increases; this is statistically significant only in the CE games.

Overall, the choice of the Extended List aligns closely with the patterns of decoy effects observed by Galeotti et al. (2022). Specifically, choosers are more likely to add the decoy under payoff conditions that correspond to those for which Galeotti et al. (2022) found stronger decoy effects, such as games 6, 7, 8, and 11 (see also Table 16 for this comparison). A major exception is game 12, for which we find a much higher rate of adopting the Extended List, but as will be shown in the next subsection, this is consistent with the anticipated bargaining agreement on the decoy, rather than an expected push for the target.

> **Result 4: Payoff Variation.** *The likelihood for choosing the Extended List in CE games increases when no equal-payoffs alternative is present, when the target is less unequal, and when the decoy payoffs are less extreme. In AE games, the decoy is more likely to be added when it has equal or almost equal payoffs and when the stakes are higher.*

6.2 Econometric model

To examine whether choices in the Extended List are influenced by participants' beliefs about the attractiveness of the target, competitor, and decoy options, we estimate a two-stage residual inclusion model (2SRI). This approach is appropriate when the endogenous regressors enter the structural equation non-linearly, as is the case in our logit second stage (Terza et al., 2008). The objective of the 2SRI procedure is to correct for potential endogeneity of the belief variables by including the residuals of the first-stage prediction in the second-stage structural equation.

First Stage: Belief Formation (Fractional Logit). In the first step, we model how subjects update their beliefs about the relative attractiveness of the three options for the opponent in each choice set. We estimate three different equations with the following dependent variables:

- Δp_{targ}: change in beliefs on target;
- Δp_{comp}: change in beliefs on competitor;
- p_{decoy}: beliefs on decoy.

These variables are normalized to lie in $[0, 1]$, and each equation is estimated using a fractional logit model (Papke & Wooldridge, 1996). The key explanatory variables estimating beliefs in the first stage are:

- *Compromise*: dummy variable taking 1 for CE games, 0 for AE games;
- Payoff-type dummies $c2 - c6$: identifying the payoff structure of each game (see Table 6);
- Interactions between payoff-type dummies and compromise,
- A set of control variables: *female*, *age*, *period*, and *cognitive* ability.[13]

This stage provides fitted values $\widehat{\Delta p_{targ}}$, $\widehat{\Delta p_{comp}}$, $\widehat{p_{decoy}}$, and, crucially, the corresponding first-stage residuals: res_x1, res_x2, res_x3. These residuals capture the component of belief formation that is correlated with unobservable variables and would otherwise bias the second stage.

[13] Proxy for cognitive ability is the number of correct answers (from 0 to 3) in the cognitive reflection test of the questionnaire, see Section "Experimental Design".

Second Stage: Choice in the Extended List (Logit with Residual Inclusion). In the second step, we estimate how beliefs affect the probability that a participant chooses from the Extended List, which is our dependent variable. The structural equation includes:

- Belief variables Δp_{targ}, Δp_{comp}, p_{decoy};
- The interactions between compromise and each of the belief variables;
- A set of control variables: *period*, *cognitive* ability, *selfish dictator* and *spiteful* attitude [14], *selfish bargaining*[15], and *risk* preferences;
- The interaction between compromise and each of the control variables;
- The three first-stage residuals (res_x1, res_x2, res_x3).

The second stage is also estimated using a logit model. The inclusion of the first-stage residuals implements the 2SRI correction: if any of the residuals enter significantly, the associated belief variable is endogenous and the correction is necessary.

Overall, this procedure allows us to isolate the causal effect of belief updating on choices of the Extended List while accounting for potential endogeneity arising from unobserved characteristics that jointly influence beliefs and choices.

Results Table 7 reports the marginal effects from the second-stage fractional logit model, estimated both on the pooled sample and separately for AE and CE games. The coefficients estimated in the first and second stages are reported in Appendix A. Several patterns emerge:

First, belief updating strongly predicts whether subjects choose the Extended List. In the pooled regression, increasing the perceived probability that the target is chosen (Δp_{targ}) has a large and significant positive marginal effect (1.50, $p < 0.01$). The effect is present in both AE and CE games, though it is substantially stronger in CE games (1.71 vs. 0.95).

Beliefs about the decoy option also have an important effect. The marginal effect of p_{decoy} is positive and significant in the pooled estimation (0.23, $p < 0.01$) and in AE games (0.31, $p < 0.01$), but it becomes smaller and statistically insignificant in CE games. This supports our finding that beliefs about the decoy's attractiveness are more closely related to the decision to use the Extended List in AE environments than in CE environments (see Table 5).

While the pooled estimation yields a weakly positive marginal effect for beliefs about the competitor (1.15, $p < 0.10$), this result does not carry over to the marginal effects from the separate regressions, and the coefficients are not statistically significant in either the pooled or disaggregated estimations (see Tables 13 and 15).

Regarding the control variables, the game period has a small negative marginal effect in the pooled regression, indicating a decline in the use of the Extended List over time. Separate regression results show that this is mainly driven by AE games. This could be explained by subjects learning not to aim at the dominated decoy in AE games, while the anticipated decoy effect in CE games does not vanish over time.[16]

None of the individual preference or cognitive ability measures show direct significant effects on choices, with the exception of a positive and significant effect of *selfish bargaining* (measuring preferences over the bargaining alternatives) in CE games. This is consistent with the interpretation that the decoy effect was anticipated and used strategically to increase the likelihood of securing a more favorable outcome by subjects who prefer the largest possible payoffs for themselves here. By contrast, selfish preferences over bargaining outcomes have no effect

[14] Binary variables derived from questionnaire task eliciting social preferences. See section "Experimental Design".

[15] Binary variable taking value 1 if stated preference in hypothetical free choice among bargaining alternatives in a given game is maximizing the own payoff in both lists.

[16] The fact that we do not find a systematic impact of experience on list choices in both game types supports the impression that our symmetric design – asking both players for their list choice – did not have any systematic effects on behavior. We discuss this further in the section on bargaining outcomes.

Table 7: Two-stage Residual Inclusion Regression; Marginal Effects on Choices (Pooled, AE, CE).

	Pooled	**AE Games**	**CE Games**
compromise	0.012	–	–
	(0.038)		
Δp_{targ}	1.495***	0.946**	1.705***
	(0.402)	(0.473)	(0.363)
Δp_{comp}	1.149*	1.268	1.274
	(0.693)	(0.901)	(0.830)
p_{decoy}	0.233***	0.313***	0.161
	(0.060)	(0.088)	(0.131)
period	-0.010**	-0.017**	0.000
	(0.005)	(0.008)	(0.006)
cognitive	-0.002	-0.014	0.007
	(0.022)	(0.022)	(0.023)
selfish dict	0.017	0.020	0.013
	(0.068)	(0.070)	(0.072)
risk	0.002	-0.000	0.004
	(0.008)	(0.010)	(0.008)
spiteful	0.024	-0.003	0.050
	(0.054)	(0.061)	(0.064)
selfish barg	0.014	-0.052	0.080*
	(0.038)	(0.046)	(0.043)
*res_x*1	-0.949***	-0.521	-1.032***
	(0.360)	(0.350)	(0.332)
*res_x*2	-0.798	-1.122	-0.715
	(0.707)	(0.974)	(0.814)
*res_x*3	-0.083***	-0.052	-0.120***
	(0.022)	(0.033)	(0.033)

Pooled: $N = 1320$; AE/CE: $N = 660$.
Standard errors clustered on matching groups.
***, **, * indicate significance at 1%, 5%, 10%.

in AE games, which is consistent with the motive of adding the decoy as a potential agreement option, settling for the second-best alternative for choosers.

There are important indirect effects on the list choice through beliefs, which can be seen in Table 12 (pooled) and Table 14 (separate for AE and CE games): the payoff structure has an important effect on the *belief on decoy*, which is then mainly relevant for AE games where p_{decoy} is significant (see Table 15). Higher cognitive ability is correlated with a smaller *belief on decoy* in both AE and CE games and with an increase in the *belief on target* in CE games. In other words, the strategic anticipation of the decoy that we see in CE games is correlated with a higher level of cognitive reflection. Female subjects are more likely to have positive *beliefs on decoy* mainly in AE games.

Finally, the coefficients on the first-stage residuals provide evidence on the endogeneity of the belief variables. In the pooled regression, the residual res_x1, associated with Δp_{targ}, is large, negative, and highly significant, which supports the use of the 2SRI correction. The residual res_x3 associated with *belief on decoy* is also consistently negative and significant in the pooled and CE estimations. These findings suggest that unobserved factors jointly influence beliefs about the target and decoy, as well as the decision to choose from the Extended List, potentially biasing single-equation models that do not account for endogeneity.

Overall, the results indicate that belief formation plays a central role in driving the decision to expand the choice set, with stronger and more precisely estimated effects in CE games. The significance of the residual terms further validates the two-stage residual-inclusion approach.

6.3 Bargaining Phase: Aggregate Observations

While our focus is on the question whether individuals make strategic use of the decoy, the actual bargaining outcomes can reveal to what extent choosers' decisions were successful. Table 8 provides a summary of actual outcomes from the Bargaining Phase. The Extended List was available in 38% of all pairs. In less than 5% (34 of 743 pairs) of all encounters, bargaining resulted in disagreement.

Table 8: Distribution of Bargaining Outcomes

	AE games		CE games		All games		Total
List / Agreement	Base	Extended	Base	Extended	Base	Extended	
on Target	96	72	112	73	208	145	353
	(45.07)	(45.86)	(44.98)*	(58.87)	(45.02)	(51.60)	(47.51)
on Competitor	108	51	127	36	235	87	322
	(50.70)***	(32.48)	(51.00)**	(29.03)	(50.87)***	(30.91)	(43.34)
on Decoy	0	27	0	7	0	34	34
	(0.0)	(17.20)	(0)	(5.65)	(0.00)	(12.10)	(4.58)
None	9	7	10	8	19	15	34
	(4.23)	(4.46)	(4.02)	(6.45)	(4.11)	(5.34)	(4.58)
Total	213	157	249	124	462	281	743
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

Notes: Relative frequencies in parenthesis; ***, **, * indicates significant difference between Base List and Extended List at 1%, 5%, 10% (Wilcoxon matched-pairs signed-rank test).

The inclusion of the decoy has a significant impact on bargaining outcomes. Across all games, the choice of the Extended List resulted in a substantially lower number of agreements on the competitor (31% vs. 51% on Base List; SR2: $p < 0.01$). This pattern holds for both CE games ($p < 0.01$) and AE games ($p < 0.05$). Thus, the decoy had a large impact on helping the chooser to improve over the worst possible outcome of an agreement on the competitor.

However, the predicted decoy effect, which involves a shift of agreements from the competitor to the target, is observed only in CE games. Here, agreements on the target increased from 45% on the Base List to 59% when the Extended List was available (SR2: $p < 0.1$). In AE games, no such shift is observed, and 17% of agreements occur on the decoy itself. Agreements on the decoy are more frequent in AE games than in CE games (17% vs 5.6%. SR2: $p < 0.1$, t-test: $p < 0.05$).[17]

The effect of the decoy on bargaining outcomes is fully consistent with elicited beliefs (see Table 3). In CE games, the decision to include the decoy is driven by positive beliefs about the target option, which aligns with the observed increase in agreements on the target when the Extended List is chosen. In contrast, in AE games, it is positive beliefs about the decoy (and not the target) that drive the inclusion of the decoy, corresponding to a higher frequency of agreements on the decoy itself. These patterns confirm that the strategic motives for adding the decoy differ between CE and AE games: while choosers in CE games use the decoy to make the target more appealing, those in AE games seem to perceive the decoy as a fallback strategy.

Comparing our bargaining outcomes with the ones in Galeotti et al. (2022) shows some divergence in some of the games (see Table 16). In contrast to their study, our focus is on strategic decision-making rather than the bargaining process itself. The preceding choice between Base List and Extended List induces subjects to consider the potential influence of the third (decoy)

[17] Game 7 featuring an equal-payoffs decoy contributes significantly to the size of this effect, with 16 of the 27 agreements on the decoy in AE games occurring in this game. However, without Game 7, still 9% of agreements in AE games are on the decoy, nearly double the rate observed in CE games. Table 16 in the Appendix provides more information about agreements for each game separately.

alternative and may change their subsequent bargaining behavior. However, we believe that it is a realistic component of bargaining behavior, as parties themselves may decide whether to bring other alternatives to the table.

In this respect, a note about the possible effect of our design on observed behavior is in order. Since all participants first make a list choice as choosers, one may argue that this could reduce the non-choosers' susceptibility to the decoy effect when, in the bargaining phase, the partner's list choice is implemented, and it may affect bargaining behavior.

We do not believe that this is what we observe for the following reasons: First, not necessarily both subjects in a pair anticipate the predicted decoy effect. This is evident from the fact that a relevant share of participants do not display increasing *beliefs on target*, and from subjects' willingness, particularly in AE games, to agree on the decoy itself. Second, if awareness of the decoy effect did influence bargaining behavior, perhaps by provoking spiteful reactions or resistance to being nudged toward the target, then we would expect a decline in the use of the Extended List over time, as it would become ineffective. Yet this is not what we find. As shown in Table 7, which includes a control for *period*, experience has no significant effect on list choice in CE games. In AE games, by contrast, the choice of the Extended List decreases with experience. But recall that agreements mainly shifted towards the decoy here, but being a dominated alternative, this possibly loses its appeal as a possible agreement over time.

Furthermore, games were presented in a scrambled order, and the list choice alternated between Player 1 and Player 2, meaning that even subjects who chose the decoy in one game may have experienced a game without the decoy. Additionally, disagreement rates are similar in bargaining on the Base List and the Extended List, and the effect of experience is small and significant only in AE games, not in CE games. Overall, experience does not have a systematic effect across the different games, suggesting that our design does not significantly distort behavior.

> **Result 5: Bargaining Outcomes.** *Adding the decoy is successful in that fewer agreements are reached on the competitor in all bargaining games. More agreements were reached on the target, but this is significant only in CE games. In AE games, we observe around 17% of agreements on the decoy. Bargaining Outcomes are consistent with choosers' beliefs.*

7 Conclusion

Our experimental findings reveal that in a two-person bargaining setting, participants in the role of the chooser – who decides whether to add a decoy to the list of available alternatives for bargaining – use decoys selectively, depending on the type of decoy. Their behavior suggests strategic consideration of their beliefs about the opponent's behavior.

We observe that decoys creating an attraction effect, i.e. dominated options that make the chooser's target appear more attractive, are added more frequently when the chooser assigns a positive probability to the decoy being accepted as the final agreement. That is, the decoy is used not only to shift preferences toward the target, but also when it is considered a potentially viable outcome itself.

Decoys creating a compromise effect, which position an original target option as the middle or moderate option, are chosen more frequently when the chooser expects an increased likelihood that the target will be agreed upon. The strategic use of the decoy in this case is in line with the anticipation of the bargaining partner's cognitive bias, increasing the acceptability of the target triggered by the compromise effect.

This pattern of behavior suggests that participants are not merely relying on non-strategic cognitive biases such as the attraction or compromise effect, but instead use boundedly strategic reasoning about their opponents' likely responses. In particular, these findings are consistent with level-k models of behavior, in which players form beliefs about their opponents'

reasoning level and best respond accordingly (Costa-Gomes & Crawford, 2006). For example, a level-1 chooser may believe that his bargaining partner is level-0, making decisions based on salient features, fairness, or other heuristics. Adding a decoy that changes the frame of the choice set is then a strategic move, intended to influence the bargaining partner's decision, conditional on beliefs about how they process the available options.

This interpretation stands in contrast to a purely bias-based model, which would predict that decoys exert "mechanical" effects on preferences regardless of context or beliefs. Under such a model, the chooser should consistently use attraction or compromise decoys whenever they exist. Our findings that participants' motives to select decoys differ depending on the type of decoy support the conclusion that they exploit cognitive biases conditionally in strategic settings, i.e., in the way they align with their strategic interests.

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A Appendix

A.1 Tables

Table 9: Frequencies of List Choices by Game

Game	Effect	Base List (%)	Extended List (%)	Total
1	CE	78 (62.90)	46 (37.10)	124
2	AE	82 (64.06)	46 (35.94)	128
3	CE	99 (79.84)	25 (20.16)	124
4	AE	93 (77.50)	27 (22.50)	120
5	CE	86 (69.92)	37 (30.08)	123
6	CE	68 (54.84)	56 (45.16)	124
7	AE	59 (49.17)	61 (50.83)	120
8	AE	68 (56.67)	52 (43.33)	120
9	AE	84 (65.63)	44 (34.38)	128
10	CE	92 (71.88)	36 (28.13)	128
11	CE	76 (61.29)	48 (38.71)	124
12	AE	62 (50.00)	62 (50.00)	124
all CE games		499 (66.80)	248 (33.20)	747
all AE games		448 (60.54)	292 (39.46)	740
Total		947 (63.69)	540 (36.31)	1,487

Table 11 displays the distribution of beliefs by AE and CE games, given subjects' list choice. For example, of all subjects who chose the Extended List in AE games, 82% had positive beliefs on decoy, compared to 62% among those who decided not to choose the Extended List.

Table 10: Observed Choices of Extended List and Changes in Beliefs on Target and Competitor by Game (percentage in second row for each game)

Game	Choice of Extended List	*ΔBeliefs on Target* -	0	+	*ΔBeliefs on Competitor* -	0	+
1	46	7	60	57	6	103	15
	37.1	5.65	48.39	45.97	4.84	83.06	12.1
2	46	13	73	42	4	105	19
	35.94	10.16	57.03	32.81	3.13	82.03	14.84
3	25	5	77	42	5	105	14
	20.16	4.03	62.1	33.87	4.03	84.68	11.29
4	27	8	66	46	5	102	13
	22.5	6.67	55	38.33	4.17	85	10.83
5	37	10	67	46	9	90	24
	30.08	8.13	54.47	37.4	7.32	73.17	19.51
6	56	10	66	48	3	113	8
	45.16	8.06	53.23	38.71	2.42	91.13	6.45
7	61	32	63	25	1	112	7
	50.83	26.67	52.5	20.83	0.83	93.33	5.83
8	52	5	75	40	5	106	9
	43.33	4.17	62.5	33.33	4.17	88.33	7.5
9	44	11	87	30	7	96	25
	34.38	8.59	67.97	23.44	5.47	75	19.53
10	36	9	59	60	5	114	9
	28.13	7.03	46.09	46.88	3.91	89.06	7.03
11	48	9	52	63	7	104	13
	38.71	7.26	41.94	50.81	5.65	83.87	10.48
12	62	14	67	43	4	106	14
	50	11.29	54.03	34.68	3.23	85.48	11.29
Total	540	133	812	542	61	1,256	170
	36.31	8.94	54.61	36.45	4.1	84	11.43

Table 11: Distribution of Beliefs by Decoy Type and List Choice Condition

max width=

		ΔBeliefs on target			**ΔBeliefs on competitor**			**Beliefs on decoy**	
		−	0	+	−	0	+	0	+
Base List	AE	41	276	131	12	384	52	169	279
		(9.15%)	(61.61%)	(29.24%)	(2.68%)	(85.71%)	(11.61%)	(37.72%)	(62.28%)
	CE	29	285	185	22	425	52	322	177
		(5.81%)	(57.11%)	(37.07%)	(4.41%)	(85.17%)	(10.42%)	(64.53%)	(35.47%)
	Total	70	561	316	34	809	104	491	456
		(7.39%)	(59.24%)	(33.37%)	(3.59%)	(85.43%)	(10.98%)	(51.85%)	(48.15%)
Extended List	AE	42	155	95	14	243	35	52	240
		(14.38%)	(53.08%)	(32.53%)	(4.79%)	(83.22%)	(11.99%)	(17.81%)	(82.19%)
	CE	21	96	131	13	204	31	148	100
		(8.47%)	(38.71%)	(52.82%)	(5.24%)	(82.26%)	(12.50%)	(59.68%)	(40.32%)
	Total	63	251	226	27	447	66	200	340
		(11.67%)	(46.48%)	(41.85%)	(5.00%)	(82.78%)	(12.22%)	(37.04%)	(62.96%)

Changes in *belief on target* (left block), changes in *belief on competitor* (middle block), and *belief on decoy* (right block), disaggregated by decoy type in rows (Attraction Effect/ Compromise Effect). The top panel is conditional on the choice of Base List, and the bottom panel is conditional on the choice of Extended List.

Table 12: Two-stage Residual Inclusion Regression; First Stage: Fractional Logit Regression Results for Beliefs

	Δp_target	**Δp_competitor**	**p_decoy**
compromise	0.089**	-0.034	-1.123***
	(0.040)	(0.042)	(0.159)
pyf type			
c2	-0.000	-0.009	0.189**
	(0.034)	(0.040)	(0.090)
c3	0.017	-0.045	-0.932***
	(0.031)	(0.039)	(0.186)
c4	-0.032	-0.049*	-1.019***
	(0.039)	(0.028)	(0.169)
c5	-0.157***	-0.021	1.902***
	(0.050)	(0.026)	(0.134)
c6	0.023	-0.036	0.556***
	(0.035)	(0.044)	(0.109)
pyf type#compromise			
c2	0.023	0.014	-0.288*
	(0.064)	(0.053)	(0.165)
c3	-0.121*	0.031	0.695**
	(0.064)	(0.054)	(0.298)
c4	-0.043	0.071	0.720***
	(0.044)	(0.050)	(0.144)
c5	0.158***	0.024	-2.988***
	(0.061)	(0.048)	(0.391)
c6	-0.045	0.054	-0.252
	(0.055)	(0.081)	(0.163)
cognitive	0.015	-0.001	-0.146**
	(0.010)	(0.007)	(0.065)
female	-0.052**	0.027*	0.406*
	(0.025)	(0.014)	(0.208)
age	-0.000	-0.002*	0.002
	(0.002)	(0.001)	(0.008)
period	0.005	0.002	-0.050***
	(0.005)	(0.003)	(0.017)
const	0.068**	0.044	-0.840***
	(0.034)	(0.029)	(0.258)

$N = 1320$, standard errors clustered on matching groups. ***, **, * indicates significant coefficients at 1%, 5%, 10%.

Table 13: Two-stage Residual Inclusion Regression; Second Stage: Logit Regression Results for Choices

Dep. Variable:	**Extended List**
compromise	-3.133**
	(1.521)
Δp_target	6.095***
	(2.092)
compromise#p_target	1.422
	(1.236)
$\Delta p\_competitor$	4.171
	(2.773)
compromise#$\Delta p\_competitor$	2.138
	(1.915)
p_decoy	1.450***
	(0.432)
compromise#p_decoy	-0.796
	(0.799)
compromise#Period	
0	-0.084**
	(0.029)
1	-0.003
	(0.026)
compromise#cognitive	
0	-0.079
	(0.112)
1	0.066
	(0.110)
compromise#selfish dict	
0	0.089
	(0.309)
1	0.063
	(0.335)
compromise#risk	
0	-0.001
	(0.043)
1	0.020
	(0.035)
compromise#spiteful	
0	-0.001
	(0.268)
1	0.223
	(0.278)
compromise#selfish barg	
0	-0.245
	(0.204)
1	0.391*
	(0.203)
*res_x*1	-4.311**
	(1.631)
*res_x*2	-3.624
	(3.220)
*res_x*3	-0.378***
	(0.103)
conts	-1.127
	(1.425)

$N = 1320$, standard errors clustered on matching groups.
***, **, * indicates significant coefficients at 1%, 5%, 10%

Table 14: Two-Stage Residual Inclusion Regression; Separate Estimations by Decoy Type; First Stage: Fractional Logit Regression Results for Beliefs

Dep. Variable:	**Δp_target**	**Δp_competitor**	**p_decoy**
AE games			
c2	-.005	-0.005	0.217**
	(0.035)	(0.043)	(0.089)
c3	0.009	-0.039	-0.898***
	(0.030)	(0.026)	(0.195)
c4	-0.025	-0.054**	-1.051***
	(0.054)	(0.026)	(0.171)
c5	-0.192***	-0.018	1.960***
	(0.053)	(0.028)	(0.148)
c6	0.018	-0.032	0.584***
	(0.035)	(0.047)	(0.117)
cognitive	0.002	0.004	-0.153***
	(0.011)	(0.006)	(0.053)
female	-0.044*	0.009*	0.463**
	(0.026)	(0.024)	(0.187)
age	0.005**	-0.002*	0.001
	(0.002)	(0.002)	(0.012)
period	0.008	0.000	-0.065***
	(0.005)	(0.005)	(0.023)
const	0.068**	0.058	-0.791***
	(0.032)	(0.036)	(0.259)
CE games			
c2	0.037	0.003	0.161
	(0.052)	(0.034)	(0.132)
c3	-0.092*	-0.015	-0.280
	(0.048)	(0.034)	(0.287)
c4	-0.067	0.024	-0.270*
	(0.048)	(0.030)	(0.152)
c5	0.002	0.003	1.092***
	(0.002)	(0.036)	(0.389)
c6	-0.022	0.018	0.303**
	(0.033)	(0.047)	(0.151)
cognitive	0.029**	0.007	-0.140***
	(0.015)	(0.013)	(0.115)
female	-0.064	0.045***	0.286
	(0.039)	(0.013)	(0.320)
age	0.001	-0.002*	-0.001
	(0.002)	(0.001)	(0.010)
period	0.002	0.004	-0.015
	(0.005)	(0.003)	(0.024)
const	0.163**	-0.005	-2.084***
	(0.063)	(0.050)	(0.305)

$N = 1320$, standard errors clustered on matching groups.
***, **, * indicates significant coefficients at 1%, 5%, 10%

Table 15: Two-stage Residual Inclusion Regression; Separate Estimations by Decoy Type; Second Stage: Logit Regression for Choices

	AE Games	**CE Games**
Δp_target	4.171**	7.992***
	(2.116)	(1.778)
$\Delta p\_competitor$	5.591	5.972
	(4.002)	(3.894)
p_decoy	1.381***	0.754
	(0.416)	(0.613)
$period$	-0.073**	0.002
	(0.035)	(0.028)
$cognitive$	-0.063	0.035
	(0.095)	(0.108)
$selfish\ dict$	0.090	0.063
	(0.308)	(0.339)
$risk$	-0.000	0.029
	(0.042)	(0.036)
$spiteful$	-0.011	0.229
	(0.271)	(0.286)
$selfish\ barg$	-0.226	0.379*
	(0.204)	(0.207)
res_x1	-2.299***	-4.838***
	(1.538)	1.548
res_x2	-4.945	-3.351
	(4.334)	(3.823)
res_x3	-0.227	-0.564***
	(0.146)	(0.150)
$const$	-1.432	-3.785***
	(1.443)	(1.172)

$N = 660$, standard errors clustered on matching groups.
***, **, * indicates significant coefficients at 1%, 5%, 10%

Table 16: Observed Bargaining Outcomes for all Games (percentages by list); Comparison to Outcomes in Galeotti et al. (2022) in row "GMP"

	Agree Target		**Agree Compet**		**Agree Decoy**	**Disagree**	
	Base L	**Extended L**	**Base L**	**Extended L**		**Base L**	**Extended L**
1	44.74	37.50	47.37	37.50	8.33	7.89	16.67
GMP	45.96	55.15	45.96	35.29	2.94	8.08	6.62
2	46.34	60.87	48.78	17.39	4.35	4.88	17.39
GMP	45.96	52.21	45.95	38.23	2.21	8.08	7.35
3	10.00	8.33	88.00	91.67	0.00	2.00	0.00
GMP	7.35	11.03	91.91	87.50	0.00	0.74	1.47
4	17.39	7.14	76.09	92.86	0.00	6.52	0.00
GMP	7.35	9.56	91.91	86.76	0.00	0.74	3.68
5	11.36	35.29	81.82	52.94	0.00	6.82	11.76
GMP	17.65	17.65	75.00	75.99	0.73	7.35	6.62
6	87.50	83.33	12.50	3.33	10.00	0.00	3.33
GMP	75.00	87.50	17.65	5.15	1.47	7.35	5.88
7	96.00	48.57	4.00	0.00	45.71	0.00	5.71
GMP	75.00	72.80	17.65	8.82	13.97	7.35	4.41
8	81.82	85.19	15.15	7.41	7.41	0.03	0.00
GMP	75.00	88.23	17.65	11.03	0.00	7.35	0.74
9	18.42	15.38	76.32	76.92	7.69	5.26	0.00
GMP	17.56	17.65	75.00	79.41	0.73	7.35	2.21
10	86.36	90.00	13.64	0.00	10.00	0.00	0.00
GMP	91.91	91.17	7.35	7.35	0.00	0.74	0.74
11	46.34	66.67	46.34	28.57	0.00	7.32	4.76
GMP	45.70	57.81	45.70	29.69	0.00	8.60	12.50
12	36.67	30.62	60.00	37.50	18.75	3.33	3.12
GMP	45.70	46.88	45.70	43.75	4.68	8.60	4.69

A.2 Experiment Instructions

Below are the in-lab instructions exactly as printed on paper and distributed among the subjects.

Instructions

General information

Thank you for participating in our experiment. Please read these instructions carefully. If you have any questions, please raise your hand, and an experimenter will come to answer your questions.

At this point, you have already earned £4 for showing up on time to the experiment. How much money you will earn in total will depend on your own decision and the decisions made by other participants in this experiment and on random factors.

Your earnings will be paid out to you in private, so nobody will know how much you have earned in the experiment.

If you haven't done so already, please turn off your mobile phones and put them away. Please also put away anything that could distract you from the study, e.g. book, notes, or other devices.

The Experiment

Rounds

The experiment consists of 12 rounds. In each round, you will be paired with another person in this room. The computer will decide randomly who you will be paired with. You will not learn the identity of whom you are paired with in any round; pairs are changing from round to round.

In each round, you and the person you are paired with (called "other" in the experiment) have to decide whether you agree on one alternative from a list of alternatives. An **alternative** describes how many points you and the other person will receive. For example, an alternative could be:

You:	40
Other:	50

This alternative specifies that you receive 40 points and the other person receives 50 points. The numbers chosen here are only for illustration.

A **list of alternatives** contains two or more such alternatives. For example, a list of two alternatives could be:

Alternative A:

You:	40
Other:	40

Alternative B:

You:	50
Other:	30

Again, the specific numbers here are only for illustration. In each round, the alternatives available will change.

Each round consists of two phases: A **"Choice Phase"** and a **"Negotiation Phase"**. In the **"Choice Phase",** a list of alternatives is selected and in the **"Negotiation Phase"** you and the other person decide on whether you can agree on one of the alternatives from the selected list. We will explain the details on the following pages.

Choice Phase

In the Choice Phase, it will be determined which list of alternatives will be available during the Negotiation Phase of the current round.

- First, you will see a list of alternatives. You will be asked which alternative you would prefer if you could freely choose, and how likely it is in your view that the other person will agree on each of the listed alternatives. The answers to these questions have no consequence for the amount of money you will earn. They just allow us to better understand your choices, and we ask you to answer them honestly.
- Next, you will see a second list of alternatives. You will be asked similar questions as before for this list. Again, your answers to these questions have no consequence for the amount of money you will earn.
- Then you will see the two lists of alternatives on your screen, and you will be asked to choose one of them for the negotiation phase. Some lists of alternatives may cost 1 point. You will be informed which lists are costly.
- The other person will also have a choice between the same two lists with the same cost.
- Finally, the computer will randomly decide whether it is your chosen list or the list of the other person which will be available for finding an agreement during the Negotiation Phase that will follow immediately. The computer is equally likely to choose your list or the list of the other person.
- If you chose a costly list of alternatives in a given round, then the cost of 1 point will be subtracted from your earnings in that round if your list is selected for the Negotiation phase. If the chosen list of the other person is selected for the Negotiation Phase, you do not pay this cost.

Negotiation Phase

During the Negotiation Phase, you and the other person can propose alternatives from the list that was selected as described in the Choice Phase.

If both of you propose the same alternative during the Negotiation Phase, then you have reached an **agreement** on that alternative. Your current round **earnings** and those of the other person will be the amount of points specified in the alternative you agreed on. These points will be converted into pounds at the end of the experiment (conversion rate see below).

If you do not reach an agreement, your earnings and those of the other person are zero.

Negotiation time: You have 2 minutes (120 seconds) to reach an agreement in each round.

Messages: You can exchange messages with the other person on the screen during the negotiation. How to do this will be explained below.

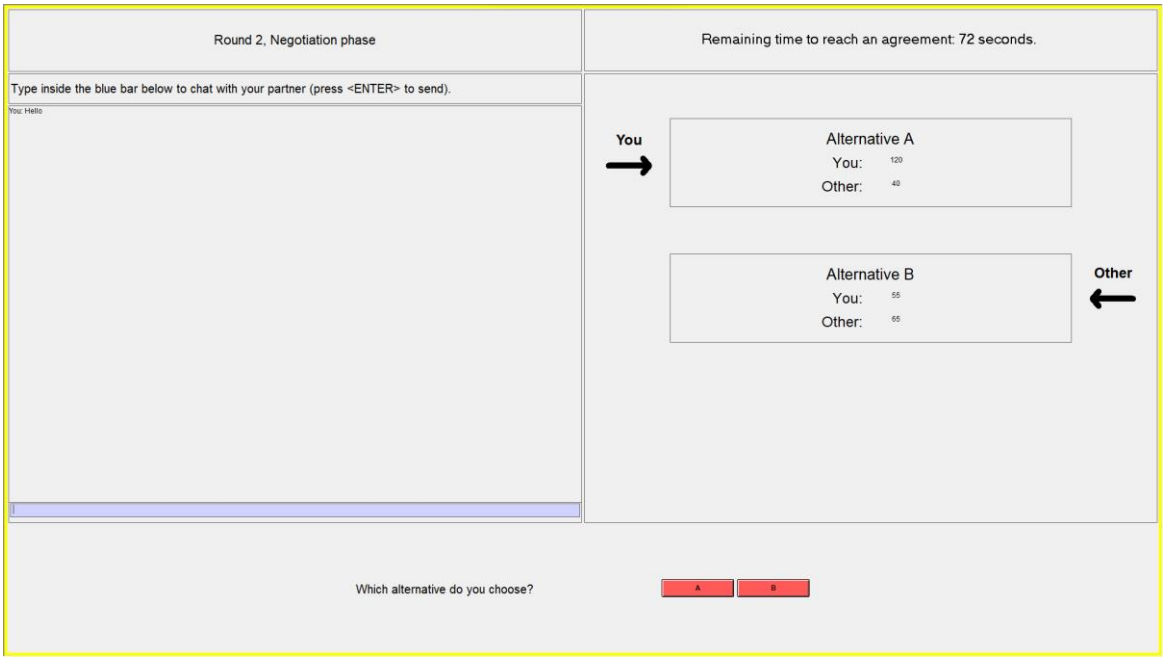
Paying out your earnings

When all decisions for the 12 rounds are completed, we will **randomly select two rounds.** You will be informed which rounds were selected. We will then convert the total of points you earned in these two selected rounds into pounds, using this exchange rate: **15 points = £1**. Note that you will not know which rounds are selected for payment at the time when you make your decisions. All rounds are equally likely to be selected for payment.

You will receive information about your total earnings at the end of the experiment on your screen.

At the end of the experiment, you will see some questions about you and your background, for which you are asked to give an answer. Again, all collected data is treated anonymously.

What a negotiation looks like on the computer:



- The computer screen shows you the remaining time (out of 120 seconds) for negotiation in the upper right corner.
- If you click on one of the red buttons indicating an alternative, this is your current proposal for an agreement. An arrow will appear on your screen and the other person's screen, pointing to your proposed alternative.
- If a person has not made a proposal, then there is no arrow for that person.
- If you and the other person have **clicked on the same alternative** at any point during the 120 seconds, an **agreement** is reached **immediately**, and neither of you can change your proposal anymore.
- As long as you and the other person click on two different alternatives, no agreement has been reached. In this case, you may change your proposal by clicking on another alternative, and the person you are paired with may also change their proposal.
- If you and the other person have **not agreed on an alternative** (by both clicking on the same alternative) after 120 seconds, the round has ended in **disagreement**, and neither of you gets any points.
- The sample screen above shows the situation in which you have proposed alternative A, which would assign 120 points to you and 40 points to the other person. The other person has proposed alternative B, which assigns 55 points to you and 65 points to the other person. Therefore, no agreement has been achieved so far, but there are still 72 seconds left.
- Be aware that the payoffs for "You" and "Other" are not always listed in the same order in the box describing an alternative. Sometimes "You" is listed first, sometimes "Other" is listed first. For example the alternative on your screen may look like this:

-

Other: 40 You: 120

How to write messages: You may write any messages in the message box. Messages are entered by first clicking in the light blue text field, and they are sent by hitting the "enter" key. All messages are shown on your screen as well as the other person's screen. Once an agreement has been reached or the round has ended, messages cannot be exchanged anymore.

IMPORTANT: You are not allowed to write anything in the chat that would reveal your identity to the other person. This includes, but is not limited to, your name, appearance, or seat number. You are also not allowed to request information about the other's identity. You are also not allowed to make threats or make agreements concerning what happens after the lab study ends.

If you and the other person reach an agreement *before* the 120 seconds have passed, you are both asked to wait until the 120 seconds have passed. You then move on to the next round. We ask you to remain silent while you wait.

The experiment will soon start with some test questions on the screen to make sure everyone understood the instructions.