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COMMON FATE AND SIMILARITY ATTRACTORS IN BARGAINING SETTINGS

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Common Fate and Similarity Attractors in Bargaining Settings

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Abstract

Sharing a common fate with some people but not others may affect how economic agents behave within firms and organizations. Recognizing that many bilateral transactions occur both within and between groups sharing some degree of common fate, we present an experimental test of the effect of common fate in bargaining settings. Virtually all subjects differentiating between insiders and outsiders discriminate against outsiders. Within-group cooperation was not increased, but between-group conflict was. We also test, and find support for, theories of similarity-based decision-making. We develop and use a generally applicable technique to understand framing effects, based on identifying similarity attractors.

JEL Classification Codes: C72, C78, C81, C91.
Keywords: bargaining, common fate, similarity, framing effects.

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"You Are Not in My Boat: Common Fate and Similarity Attractors in Bargaining Settings" by Daniel John Zizzo
NON-TECHNICAL SUMMARY

1. Introduction

Sharing a common fate with some people but not others may affect how economic agents behave within firms and organisations: they may behave differently when dealing with people they feel as their team-players or not. This paper presents an experiment that tests this intuition in relation to bilateral bargaining settings, and thereby aids our understanding of how and why this may happen. Does common fate matter? A large number of bilateral transactions occurs both within groups and between members of different groups sharing some degree of common fate. It appears relevant to get an understanding of the implications of this. Would a worker be more likely to do a favour if it were requested by a co-worker in the same team than by one belonging to a different team? Would fostering feelings of common fate within, say, the Northern Irish Catholic community lead to greater cooperation within the community, without affecting behavior towards the outgroup? These are important questions to ask, for issues such as team design within organisations and the role that perceptions of common fate may have within an economy and society at large.

The paper had two additional objectives: 1) to test the predictive power of similarity-based reasoning; 2) to show how one can use similarity evaluations made by the subjects to shed light on common fate and potentially other framing effects. When are two bargaining games similar and how does this affect choice? This is of interest if one assumes, as is plausible, that a) subjects do take their past experience into account when facing situations not identical to those faced in the past, and that b) this may be reflected both in the degree of expertise in facing the new bargaining game, and in framing effects or other apparent anomalies.

2. Experimental Design

Seventeen experimental sessions of eight subjects each were run in Oxford, for a total of 136 subjects. There were four experimental conditions: the common fate color-grouping condition (CF, 5 sessions), the minimal color-grouping condition (MC, 4 sessions), the no color-group condition (N, 5 sessions), the similarity-evaluations-only condition (SO, 3 sessions). The common fate condition had four stages. In *stage 0* subjects got grouped according to their preference of colours: the four subjects with the greatest preference for red (yellow) became part of the "Red" ("Yellow") group. Subjects were told that, in the payment stage, an experimenter would roll two dice: if a roll of 1 obtained on the Yellow (Red) die, all Yellow (Red) participants would earn a "lucky jackpot" of 36 pounds in place of any ordinary winnings (nine pounds above the maximum winnings subjects could otherwise earn from the experiment).

In *stage 1* they chose actions in twenty randomly ordered games. Subjects played twenty games ("decision tasks" in the instructions) in randomised order. They were randomly assigned either to the role of "first mover" (proposer) or to that of "second mover" (receiver) in asymmetric games, and were told that they would retain this role throughout the stage. Subjects did not know which player they were matched with, though they knew her color group. Subjects played each of five games twice with ingroup and twice with outgroup members:

(1) a coordination game where subjects earned what they claimed if the sum of their claims was exactly 100 experimental points;

(2) a Nash demand game where subjects earned what they claimed if the sum of their claims was no greater than 100 points;

(3) an ultimatum game where the proposer made an offer on how to split 100 points, and if the receiver rejected it neither got anything;

(4) a unilateral power game where the proposer made an offer on how to split 100 points, and if the receiver rejected it the proposer got 100 points;

(5) a dictator game where the proposer made a binding offer on how to split the 100 points (DG).

In *stage 2*, subjects evaluated how similar the scenario described on the top label of the computer display was to another, placed in the bottom label of the screen. The text for each scenario corresponded to that of one of the five games from Stage 1, with just an additional sentence specifying the coplayer's color group. So there were ten possible scenarios overall, and 90 possible permutations. Each permutation was shown once in random order. Subjects received no feedback on the outcome of their choices during the stage. Since all permutations were used, information was gathered not just on how game *x* was similar to *y*, but also on how game *y* was similar to game *x*.

If game X is more salient than Y, the similarity rating in the second case would be higher than in the first. Put it differently, similarity rating *outflows* ("how similar X is to Y") would be lower than similarity rating *inflows* ("how similar Y is to X"). The greater the inflows to relative to the outflows from game *X*, the more game X is a *similarity attractor*, i.e. it is considered salient in a given context.

There were three control conditions: one with no color-grouping, a second one where subjects were color-grouped but group assignment had no relevance for payments, and a third one where subjects only chose similarity evaluations.

3. Experimental Results and Policy Implications

Subjects did not choose similarity at random. Consistent with the idea that people reason by similarity, similarity evaluations can be used as predictors of behavior in games: amounts unclaimed in the various games are "closer" the more similar the games they are.

In the common fate condition only, subjects with all the bargaining power were significantly nastier towards outsiders: virtually all subjects who differentiated between insiders and outsiders discriminated against outsiders. More aggressive strong bargaining parties identified highly conflictual games as better similarity attractors than symmetric ones. This suggests that the existence of common fate made subjects perceive inter-group bargaining as highly conflictual, and behave accordingly with outsiders when there is no retaliation to fear. As a result, intra-group cooperation was not raised, but inter-group competitiveness was increased. “We are in the same boat” was less important than “you are in my boat”.

The methodological relevance of these findings is clear: similarity evaluations can be a useful tool to open the black box of behavioral anomalies and framing in bargaining settings and beyond. By getting a better understanding of common fate and other framing effects, managers and policy-makers may act on the frames used by agents as a policy tool. Framing and reframing may become a technological opportunity rather than a theoretical hindrance.

Equally important may be the practical and policy message of the paper, if further experimental work were to show its robustness. For example, in designing organizational units within a firm, a manager may need to take into account that, while smaller teams may be good in other respects, there may be more scope for inter-team conflict in bilateral settings where members of a team depend on the goodwill of members of the other team. Inducement of common fate at the company level (e.g. by the means of company-performance-related bonuses) may perhaps be a good thing in making employees more “aggressive” in between-companies dealings - but it may not be effective in raising within-firm cooperation in bilateral settings -. To end with an example from the political arena, raising feelings of group identity through common fate within the Protestant or Irish communities in North Ireland may not increase the likelihood of equitable or efficient bilateral transactions within those communities: rather, the impact may be one of increasing inter-community conflict.

"It would be difficult to describe the subtle brotherhood of men that was here established on the seas. No one said that it was so. No one mentioned it. But it dwelt in the boat, and each man felt it warm him. They were a captain, an oiler, a cook, and a correspondent, and they were friends, friends in a more curiously iron-bound degree than may be common. The hurt captain, lying against the water-jar in the bow, spoke always in a low voice and calmly, but he could never command a more ready and swiftly obedient crew than the motley three of the dingey. It was more than a mere recognition of what was best for the common safety. There was surely in it a quality that was personal and heartfelt."
From Stephen Crane, *The Open Boat: A Tale Intended To Be After the Fact. Being the Experience of Four Men Sunk from the Steamer Commodore*.

"There is a basic conflict of interest between the Palestinians and us: what is good for us is bad for them, and what is good for them is bad for us."
An Israeli citizen cited in *The Observer*, May 31, 1987.

This paper presents an experimental test of the effect that *common fate* framing has on bilateral bargaining settings; it also uses a new experimental technique to understand framing effects and to test similarity-based decision-making. When we say "we are all in the same boat" we mean that, in a particular situation, we share the same predicament: the shipwrecked characters of Crane's story believe that they shall all die together if their boat sinks or they can't find land in time; footballers, and their most enthusiastic supporters, share in the success and defeat of their team; teamworkers in a company may know that they will share in the success or failure of their team, with potential direct and indirect implications for each of them individually; to a lesser degree, workers in the same company might feel to share a common fate in the success of their company at the expenses of other companies; and strong national or religious identities (i.e., being a Palestinian or an Israeli, or being a Northern Ireland Catholic or Protestant) may also be associated with feelings of common fate.

In circumstances where common fate implies that by choosing a cooperative action agents can achieve a mutually superior outcome, it is no surprise that we should expect intra-group cooperation (e.g., Bornstein et al., 2002). More generally, the more the material payoffs among players are positively correlated, i.e. the more *harmonious* the game is, the more we may observe cooperation for purely strategic reasons (Zizzo, 2003b): it is in the interest of each of the characters in Stephen Crane's boat to row hard and to follow orders by the captain as the most competent seaman onboard.

What Crane's text appears to imply, however, is that his characters underwent "more than a recognition" that cooperation is required out of self-interest. They felt "a subtle brotherhood" which had "a quality that was personal and heartfelt".[1] Bornstein et al.'s (1997, 2002) experiments combine, without disentangling, both the strategic dimension and the purely framing dimension from inducing a common fate. Wit and Wilke (1992) found that a common fate manipulation increased cooperation in later game play of three social dilemma variations, based on the Prisoner's Dilemma, the Chicken, and the Stag-Hunt game. This was a pure framing effect, with no strategic explanation. But common fate, even in its pure framing dimension, may have a darker side. While there is cooperation towards ingroup members, there may be negative discrimination against outsiders: people who do not share the

[1] See Jacobson (1973) for a non-literary example, related to airplane skyjacking survivors.

common fate or, even worse, in relation to which fates are perceived as *negatively* correlated.[2] In one of the conditions of Rabbie and Horwitz (1969), subjects were arbitrarily divided in Greens and Blues; the experimenter announced that a radio would be given to each Green member or to each Blue member depending on the outcome of a roll of a die. This was sufficient to induce an ingroup bias as measured by some questionnaire ratings.

The experiment presented in this paper considers a set of bargaining settings in relation to which a common fate manipulation, induced in a way preventing strategic explanations, has not been studied. These games include a coordination game, a Nash demand game, an ultimatum game, a bargaining game with unilateral power by own part ("unilateral power game") and a dictator game. We are interested in finding out whether, due to what would be a pure framing effect, there is any discrimination favouring insiders relative to outsiders, and, if so, whether this discrimination is positive (insiders are treated better) and/or negative (outsiders are treated worse). As Cookson (2000) notes, economists are typically suspicious of framing effects. One reason for this suspicion is that they are often just a black box, a label for the unexplained. Against this pessimistic view, we claim that the black box can be opened and explanations may be provided. We try to do this in this paper in relation to common fate, by connecting the notion of common fate to that of game harmony (as in Zizzo, 2003b) and by asking subjects to evaluate the *similarity* between two bargaining settings.

An agent reasons by similarity if, in facing a decision problem, (a) she assimilates it, under some dimension, to another she believes similar, and (b) she chooses her behavior accordingly. Reasoning by similarity is connected to case-based decision theory in individual choice (e.g., Gilboa and Schmeidler, 2001), analogy-based reasoning in cognitive science (e.g., Markman and Moreau, 2001) and decision-making by neural network agents (e.g., Zizzo and Sgroi, 2000). It has been suggested in bargaining settings by Gale et al. (1995) as an explanation for short-run anomalies in the play of ultimatum game, and, with specific connotations, by Jehiel (1999). We aim to test the predictive power of similarity-based decision-making in relation to bargaining settings.

While common fate and reasoning by similarity may appear disjoint ideas, they need not be so. Features of the decision problem may be more or less salient depending on the context, and this may affect similarity evaluations (e.g., Choi et al., 1997) and, thus,

[2] Perfectly negatively correlated in the second citation at the start of this paper.

similarity-based behavior. *Similarity attractors* are games that are more likely to have other games assimilated to them than they are to be assimilated themselves to other games. They correspond to the most salient games in any given context. We devise a novel technique (discussed in section 1.2) to enable us to determine what games operate as similarity attractors and how this relates to discrimination in the common fate condition. Common fate may operate by making subjects assimilate the decision problem to one that is more harmonious (cooperative) or disharmonious (conflictual), and this may affect how agents behave towards insiders or outsiders. We can learn about how common fate and other framing effects operate by gathering information on how agents perceive decision problems.

To summarize, the objectives of this paper are three-fold:

1. to test the effect of common fate framing on behavior in bilateral bargaining settings;
2. to test the predictive power of similarity-based reasoning;
3. to show how one can use similarity evaluations made by the subjects to shed light on common fate and potentially other framing effects.

Does common fate matter? A large number of bilateral transactions occurs both within groups and between members of different groups sharing some degree of common fate. It appears relevant to get an understanding of the implications of this. Would a worker be more likely to do a favour if it were requested by a co-worker in the same team than by one belonging to a different team? Would fostering feelings of common fate within, say, the Northern Irish Catholic community lead to greater cooperation within the community, without affecting behavior towards the outgroup? These are important questions to ask, for issues such as team design within organisations and the role that perceptions of common fate may have within an economy and society at large.

Objectives 2 and 3 appear more technical, but nevertheless they also are of more general relevance. Similarity-based reasoning can be used as a general conceptual framework for choice, as noted by Gilboa and Schmeidler (2001) in relation to case-based decision theory. Other anomalies and framing effects appear to matter in bargaining and other settings (see section 5), and our tools could be used more generally. Finally but perhaps most importantly, by getting a better understanding of common fate and other framing effects, we can ensure that managers and policy-makers may act on the frames used by agents as a policy tool. While changing social preferences is hard, inducing changes in the perception of the decision problem may be less hard (DesAutels, 1996), and may be used to induce socially desirable outcomes – if we think of framing and reframing as a technological opportunity rather than as a theoretical hindrance -.

Section 1 briefly reviews some experimental background. Sections 2, 3 and 4 contain the experimental design, hypotheses and results, respectively. Section 5 has a discussion, and section 6 concludes.

1. Experimental Background

1.1 Common Fate, Group Identity and Game Harmony

Group identity is a psychological mechanism by which subjects identify themselves with a group they feel they belong to (e.g., Dawes et al., 1988). If play in a public good contribution experiment is preceded by a comprehension task phrased in terms of benefits to the group (the "we" frame) rather than to the individual (the "I" frame), more cooperation follows (Cookson, 2000). Wording may also help in the context of an ultimatum game (Larrick and Blount, 1997). Similarly, if subjects first read some news briefs on cooperatives business strategies (emphasizing teamwork and group achievement) and have to answer a few questions on this topic, they contribute more in the follow-up play of a public good contribution game (Elliott et al., 1998). Just having a task of this kind is not always successful in raising cooperation (Solow and Kirkwood, 2002; Schram and Sonnemans, 1996); in Schram and Sonnemans' voting experiment, however, more voting *was* observed when a common fate manipulation is introduced. Experimental evidence on social dilemmas shows that the increase in cooperation can be ascribed to an increase in the value assigned to group welfare relative to individual welfare, rather than just an enhancement of trust in the cooperation of other group members (De Cremer and Van Vugt, 1999). Zizzo (2003b) hypothesizes that, to the extent that group identity elicitations are successful in increasing cooperation, they may do so by increasing perceived game harmony. Game harmony is a generic property describing how harmonious (non-conflictual) or disharmonious (conflictual) the interests of players are, as embodied in the payoffs.[3] Zizzo (2003b) notes how, while two successful examples of common fate manipulation (Rabbie and Horwitz, 1969; Wit and

[3] Pure coordination games are games of complete harmony, and constant-sum games are games of pure disharmony: the majority of games is somewhere in the middle. Zizzo (2003a, 2003b) and Zizzo and Tan (2002) discuss evidence on game harmony as a predictor of cooperation.

Wilke, 1992) may have operated by inducing a change in perceived harmony, a notable failure (Bouas and Komorita, 1996) can be shown not to have affected harmony at all.

The attention of the research on social dilemmas has mainly been on positive discrimination, but when more than one group is created this cannot be taken for granted. In Schram and Somnemans, there are two groups, and more voting may be explained by inter-group *competition* rather than intra-group cooperation, i.e. in terms of negative rather than positive discrimination.

Another qualification concerns the relationship between the common fate manipulation and “more minimal” group creation manipulations. Research on “minimal group” formation since Tajfel et al. (1971) has shown that the mere act of dividing people into groups according to some arbitrary criterion (say, their preference for Kandinsky relative to Klee paintings) is sufficient to induce discrimination: if asked to allocate money to an ingroup and to an outgroup member, agents will allocate more to the ingroup member than to the outgroup member (see Yamagishi et al., in press, and Brown, 2000, for reviews). In contrast to the common fate manipulation, this is associated only with a very small change in how outgroup members are rated relative to ingroup members, though. Discrimination may be driven purely by a belief in reciprocation by other ingroup members rather than by group identity considerations (Yamagishi et al., in press). It may just be a tie-breaking rule in a setting in which a self-interested rational agent would be indifferent among different choices: all that “minimal group” membership may produce is salience in the direction of favouring in-group members. Along these lines, in Hargreaves-Heap and Varoufakis’ (2002) experiment, color group assignment worked as a salience device to select which equilibrium to play in a Chicken game.

1.2 Similarity and Behavior

There is only a small experimental literature on the relationship between similarity evaluations and economic decision-making. Following Rubinstein’s (1988) theoretical work, Leland (1994), Buschena and Zilberman (1995, 1999) and Rubinstein (in press) used similarity-based reasoning to explain a host of anomalies in individual choice, including the Allax paradox, preference reversals and instances of framing effects. Zizzo and Tan (2002) and Zizzo (2003a) considered some indirect evidence in relation to 2×2 and 3×3 games.

Gregan-Paxton and Cote (2000) found evidence of analogical reasoning in the predictions made by experienced agents in an investment setting.

This literature failed to consider that similarity relations need not satisfy symmetry: e.g., Americans may think Taiwan more similar to China than China is to Taiwan (Tversky, 1977). Experimental research by Rosch and others (e.g., Rosch, 1973; Rosch and Mervis, 1975) showed that there are better (more familiar, salient) and worse (less familiar, salient) examples of members of a given category. This emerges from asking subjects to rate the typicality of various items in a category[4] and from measuring reaction times in classifying items presented to subjects; this research shows that, if X is more prototypical than Y, the similarity rating in the second case will be higher than in the first (e.g., Lakoff, 1987).

By asking subjects not only how similar a given bargaining setting X is to Y, but also how similar Y is to X, we may gather information on what games are more salient, or better *similarity attractors*, in a given context. We shall then be able to verify whether this changes according to the experimental condition, and whether, in the common fate manipulation, information on similarity attractors can be used as a predictor of discrimination.

2. Experimental Design

The experiment was run in seventeen sessions of eight subjects each in Oxford between October 2002 and February 2003, for a total of 136 subjects. Subjects were mostly, though not exclusively, graduate and undergraduate students. There were four experimental conditions: the common fate color-grouping condition (CF, 4 sessions), the minimal color-grouping condition (MC, 4 sessions), the no color-group condition (N, 5 sessions), the similarity-evaluations-only condition (SO, 3 sessions).

The CF condition will be described first, as the other conditions can be interpreted as controls relative to this one.

2.1 The Common Fate Condition

The experiment had four stages. In stage 0 subjects got grouped according to their preference of colors. In stage 1 they chose actions in games. In stage 2 they made similarity evaluations between games. Stage 3 was for payment.

[4] For example, in Malt and Smith (1984) ratings were on a 7-points scale, with 7 corresponding to the highest typicality. Robin and bluebird were given a "bird" typicality rating of 6.89 and 6.42 as birds, respectively, but chicken only 3.95, and penguins 2.65.

Stage 0. In stage 0, subjects were presented with a yellow rectangle and a red rectangle on the computer display and were asked to state on a scale between 0 and 9 what was their preference towards red, as a color, relative to yellow (higher numbers indicated a greater preference for red). The four subjects with the greatest preference for red (yellow) became part of the “Red” (“Yellow”) group (in case of borderline ties, color-group assignment was random). Subjects were told that, in the payment stage, an experimenter would roll two ordinary dice, a Yellow die and a Red die, into a glass cup. If a roll of 1 obtained on the Yellow (Red) die, all Yellow (Red) participants would earn a “lucky jackpot” of 36 pounds in place of any ordinary winnings (nine pounds above the maximum winnings subjects could otherwise earn from the experiment).

Stage 1. Subjects played twenty games (“decision tasks” in the instructions) in between-sessions randomised order. They were randomly assigned either to the role of “first mover” (proposer) or to that of “second mover” (receiver) in asymmetric games, and were told that they would retain this role throughout the stage. Subjects did not know which player they were matched with, though they knew her color group, and they knew that they would be matched an equal number of times with ingroup and outgroup members. They were also told that this was the only interactive stage of the experiment. Five games were used:

(1) a coordination game (CDG) where subjects earned what they claimed if the sum of their claims was exactly 100 experimental points;

(2) a Nash demand game where subjects earned what they claimed if the sum of their claims was no greater than 100 points (NDG);

(3) a standard ultimatum game where the proposer made an offer on how to split 100 points, and if the receiver rejected it neither got anything (UG);

(4) a unilateral power game where the proposer made an offer on how to split 100 points, and if the receiver rejected it the proposer got 100 points (UPG);

(5) a standard dictator game where the proposer made a binding offer on how to split the 100 points (DG).

Subjects played each game twice with ingroup members and twice with outgroup members. At the start of the stage they filled a short questionnaire with the only purpose of making sure they understood the instructions. Their answers were checked by experimenters, and, if any was incorrect or missing, the relevant points were explained individually.

If a receiver got to a round with an asymmetric game before the proposer for that round had made her choice, he had to wait until a choice had been made; he would then see the proposal and, in the UG and UPG, take his decision whether to accept or reject. With this exception, no feedback was provided on what other subjects had decided and on the outcome of each round.

Stage 2. Subjects were asked to evaluate how similar the scenario described on the top label of the computer display was to another, placed in the bottom label of the screen. The text for each scenario corresponded to that of one of the five games from Stage 1, with just an additional sentence specifying the coplayer's color group.[5] So there were ten possible scenario overall, and 10!/(10! – 8!) = 90 possible permutations. Each permutation was shown once in between-subjects randomised order. Subjects received no feedback on the outcome of their choices during the stage. Since all permutations were used, information was gathered not just on how game x was similar to y, but also on how game y was similar to game x. Again, there was a short understanding-checking understanding at the start of the stage.

Stage 3. Subjects had to wait until everyone had finished stage 2.[6] An experimenter would then roll a yellow die and a red die in trasparent plastic cups, and announce the outcome of the roll. If the yellow (red) die resulted in a 1, all yellow (red) subjects were paid 36 pounds. If not, they were paid a participation fee of 3 pounds, plus an "action payment" (based on stage 1) and a "similarity payment" (based on stage 2). The action payment was based on a between-sessions randomly chosen round; experimental points earned in that round were converted into pounds at the rate of 0.06 U.K. pounds per point (so the action payment was up to 6 pounds).

The similarity payment was based on a between-subjects randomly chosen round, and relied on a standard absolute difference payment system (Croson, 2000). If subjects got the similarity evaluation exactly right, they earned 18 pounds; for every point by which the guess was incorrect, the amount earned decreased by 7 pounds (if the evaluation was wrong by 3 points or more, the similarity payment was zero). Since no feedback was provided during the stage, the determination of the "correct" similarity answer was an issue that had to be

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[5] For asymmetric games, subjects who had been proposers (receivers) in stage 1 always viewed scenarios in the presentation for proposers (receivers) they had been acquainted with in stage 1.

[6] In the meanwhile, they filled a couple of questionnaires, collecting information on emotions felt and items related to a psychological individualism-collectivism scale. This data did not yield interesting results and is not discussed in this paper.

practically addressed to ensure financial motivation and determine payments, but not one with serious bearing on the experiment. Lack of feedback was required since any choice of "correct" similarity values was bound to be somewhat arbitrary, and a potential source of distortions in the experiment.[7]

2.2 The Control Conditions

MC Condition. The minimal color-grouping condition was identical to the CF condition in all but one key feature: color-grouping was *not* related to payments in stage 3. Thus, payments were always determined on the basis of the participation fee, the action payment and the similarity payment, and no common fate was induced.

N Condition. The no color-group condition did not have stage 0, and so subjects were not classified into groups. There was no mention of color groups on the computer display or the instructions throughout the experiment, including in the presentation of scenarios in stage 2. In a variant of this condition (*N1*, 3 sessions), this simply meant that each permutation was presented twice to the subjects; in another variant (*N2*, 2 sessions), "your coparticipant belongs to the red (yellow) group" was replaced in each scenario by a piece of irrelevant information, "it is an odd (even) day of the week".

SO Condition. This was a shorter experiment with only stage 2 and 3. Subjects did not choose actions in relation to games; they went straight to evaluating for 90 rounds how similar a game was to another. The scenarios were the same as those in the N1 condition, i.e. they coincided with the texts of each game and made no reference to color-groups (or to day of the week).

The experiment lasted up to about 1 hour and 45 minutes in the CF condition, between about 1 hour and 1 hour and a half in the MC condition, and between about 30 minutes and 1 hour in the SO condition. Mean experimental payments were 18.80, 10.64, 11.95 and 4.16 pounds in the CF, MC, N and SO condition, respectively.

3. Experimental Hypotheses

3.1 Similarity-Based Reasoning

[7] Games were placed on a line and assigned z values equal to 0, 2, 6, 9 and 9 for the CDG, NDG, UG, UPG and DG, respectively. The "correct" similarity value was then determined as $(9 - dz)$, where dz is the distance between the z values corresponding to the two games being compared. Whether game x was compared to y, or y compared to x, made no difference to the "correct" similarity value, nor did the coplayer's color group.

Similarity-based reasoning makes the prediction that, the more similar two games are perceived, the more likely it is that agents will behave in a similar way. For example, she may assimilate one game to the other, or may assimilate both games to the same salient bargaining situation they have in their mind because of past experience. For simplicity, we shall refer to amounts unclaimed as 'offers' in relation to all games, including the CDG and the NDG.

Hypothesis S1 (Similarity-Based Reasoning in Offers). The higher the similarity rating between the two games, the lower the absolute difference in mean offers between them.

Hypothesis S2 (Similarity-Based Reasoning by Receivers). The higher the similarity rating between the two games, the lower the absolute difference in mean acceptance rates between them.

One problem with interpreting a finding of correlation as a causal story from similarity to behavior is that, at least in principle, causality could work in the opposite direction: behavior (choice of amounts) could determine similarity values provided. The SO condition allows at least a partial verifiability of the claim. This reverse causation hypothesis implies that similarity judgements in stage 2 are affected by having chosen actions in stage 1. This by itself would not prove reverse causation: it would be natural to attribute them to the better understanding of the games that playing them actually implies, thus allowing better similarity judgements. However, if a higher negative correlation between similarity rating and absolute difference in mean offers (or mean acceptance rates) can be found for games where the distortions appear larger, this would be evidence for the reverse causation hypothesis.

Hypothesis S3 (Reverse Causation). Choosing actions in games changes mean similarity ratings. More specifically, the correlations defined in S1 and S2 should be higher for games where having had to choose actions appears to have made a greater difference on the distribution of mean similarity ratings.

3.2 Common Fate

If the common fate manipulation operates by raising perceived game harmony, this should raise offers for insiders relative to outsiders in the UDG and DG in the CF condition. No prediction of a positive relationship between offers and perceived game harmony is made in relation to the CDG (where game harmony is already perfect) and the NDG (where leaving unclaimed *less* to achieve a 50-50 split can be interpreted as cooperative). Receivers should be more likely to accept offers from insiders than from outsiders in the CF condition. In relation to proposers, the experiment by Ruffle (1998) showed how high offers in these games are driven by strategic concerns - the fear of being rejected by receivers - rather than by altruism. If this is so, the overall effect of higher perceived game harmony on offers is ambiguous: while higher altruism implies higher offers, the expectation of a lower likelihood of rejectal on the part of receivers may lead to lower offers.

Hypothesis F1 (Discrimination by Proposers). In the CF condition, proposers offer more, on average, towards insiders than towards ousiders in the UPG and DG.

Hypothesis F2 (Discrimination by Receivers). In the CF condition, receivers are more likely to accept the offers by insiders than those of outsiders in the UG and UPG.

Discrimination only says that insiders are treated better than outsiders. It does not say whether discrimination is positive or negative or both, i.e. whether common fate makes subjects kinder towards insiders ("we are in the same boat") or nastier towards outsiders ("you are not in my boat"), or both. We can determine this by comparing offers and acceptance rates to those in the other conditions.

Hypothesis F3 (Positive Discrimination by Proposers). In the UPG and DG, the mean offer by proposers to insiders is higher in the CF condition than in the other conditions.

Hypothesis F4 (Negative Discrimination by Proposers). In the UPG and DG, the mean offer by proposers to outsiders is lower in the CF condition than in the other conditions.

Hypothesis F5 (Positive Discrimination by Receivers). In the UG and UPG, the mean acceptance rate of offers by insiders should be higher in the CF condition than in the other conditions.

Hypothesis F6 (Negative Discrimination by Receivers). In the UG and UPG, the mean acceptance rate of offers by outsiders should be lower in the CF condition than in the other conditions.

If it is the inducement of common fate that is producing the increase in perceived game harmony, we would not expect any changes in behavior in the MC condition, where color groups are formed but without any "lucky jackpot" as a possible common fate.

Hypothesis F7. Mean offers in the MC condition do not differ according to the coplayer's color group, or from mean offers in the N condition.

Hypothesis F8. Mean acceptance rates in the MC condition do not differ according to the coplayer's color group, or from those in the N condition.

3.3 Similarity-Based Reasoning and Common Fate

As discussed in section 1.2, agents do not consider "how similar X is to Y" necessarily the same as "how similar X is to Y": namely, if X is more salient than Y, the similarity rating in the second case would be higher than in the first. Put it differently, similarity rating *outflows* ("how similar X is to Y") would be lower than similarity rating *inflows* ("how similar Y is to X"). The greater the inflows to relative to the outflows from game *X*, the more game X is a *similarity attractor*, i.e. it is considered salient in a given context. Let us define $dS(z)$ as the difference for game z between the mean similarity rating in relation to inflows and the mean similarity rating in relation to outflows. The higher $dS(z)$ is, the better z is as a similarity attractor.

Hypothesis SF0. Games have different degree of salience. Therefore, $dS(z)$ values systematically differ across games.

SF0 is a minimal hypothesis that implies that we can use data on $dS(z)$ values to gather information on what games are salient to subjects, either in general or under specific contexts. One way framing manipulations may operate in practice is by changing how salient certain more or less cooperative or conflictual settings are considered in a given context.

Hypothesis SF1 (Between-Conditions Positive Frame). If common fate inducement elicits a cooperative frame on average, and this operates through similarity-based reasoning, we would expect that highly harmonious games such as the CDG and NDG are *better* similarity attractors in the CF condition than in the MC and N conditions.

Hypothesis SF2 (Between-Conditions Negative Frame). If common fate inducement elicits an uncooperative frame on average, and this operates through similarity-based reasoning, we would expect that highly harmonious games such as the CDG and NDG are *worse* similarity attractors in the CF condition than in the MC and N conditions.

The next set of hypotheses tries to explain discrimination at the individual level with the degree of salience of harmonious and disharmonious games.

Hypothesis SF3 (Assimilation to Harmonious Attractor by Proposers). In the CF condition, if there is positive discrimination by proposers (i.e., F3 holds), the salience of the harmonious games is a predictor of such positive discrimination favouring insiders: *dS*(CDG) and/or *dS*(NDG) are positively correlated with differences in mean offers to insiders and outsiders in the UPG and DG.

Hypothesis SF4 (Assimilation to Disharmonious Attractor by Proposers). In the CF condition, if there is negative discrimination by proposers (i.e., F4 holds), the salience of the disharmonious games is a predictor of such negative discrimination against outsiders: *dS*(UPG) and/or *dS*(DG) are positively correlated with differences in mean offers to insiders and outsiders in the UPG and DG.

Hypothesis SF5 (Assimilation to Harmonious Attractor by Receivers). In the CF condition, if there is positive discrimination by receivers (i.e., F5 holds), the salience of the harmonious games is a predictor of such positive discrimination favouring insiders: *dS*(CDG) and/or *dS*(NDG) are positively correlated with differences in mean acceptance rates to insiders and outsiders in the UG and UPG.

Hypothesis SF6 (Assimilation to Disharmonious Attractor by Receivers). In the CF condition, if there is negative discrimination by receivers (i.e., F6 holds), the salience of the disharmonious games is a predictor of such negative discrimination against outsiders: *dS*(UPG) and/or *dS*(DG) are positively correlated with differences in mean acceptance rates to insiders and outsiders in the UG and UPG.

In Stage 2, in the CF condition, subjects were asked to compare scenarios that were identical in all but the color group of the coplayer. A first question was whether subjects took this into account more than they might in relation to any irrelevant piece of information (as in the N2 condition). If the answer is positive, we thought it possible that subjects who would most favour the ingroup relative to the outgroup would be subjects that would be most sensitive to the color group in evaluating similarity. Let us define *d*C in relation to game *x* as the difference between the mean similarity value when it is compared to a scenario with the same coplayer's color group and the mean similarity value when it is a compared to a scenario with a different coplayer's color group.

Hypothesis SF7. CF condition color-grouping affects similarity evaluations more than MC condition color-grouping and N2 condition irrelevant information.

Hypothesis SF8. In the CF condition (only), there is a positive correlation between *dC* and discrimination against outsiders relative to insiders.

4. Experimental Results

4.1 Distributions of Choices

The histograms of amounts unclaimed in each game, pooled across conditions, are illustrated in Figure 2. For simplicity we shall refer to "amounts unclaimed" as "offers", even in relation to the CDG and NDG.

(*Insert Figure 2 about here*).

All differences among distributions are significant using Epps-Singleton nonparametric tests (at $P < 0.05$ or better). As Figure 1 makes clear, CDG and NDG play appears to differ from that of the UG, and that in these games from UPG and DG play. Subjects were sensitive to the game at hand, i.e. they did not play according to a uniform prior. About 90% of the subjects (0.897) chose 50 in the CDG, and slightly above 60% did so in the NDG (0.627). A fraction of subjects chose more than 50 in the NDG, a risk-averse choice. The modal and median offer was still 50 in the UG. In the UPG and DG the modal offer was zero, while median offers were 10 and 7.5, respectively.

The distribution of offers in the CDG and NDG was stable across conditions and, where applicable, coplayer's color group in Epps-Singleton tests. We now focus on the other three games. For the CF and MC conditions, we label s-offer (o-offer) as an offer when the coplayer belongs to the same (the other) color group.

(*Insert Figure 2 about here*).

Figure 2 of CF o-offers and N condition offers are significant for the UG ($\chi^2 = 49.236$, $P < 0.001$), the UPG ($\chi^2 = 10.669$, $P < 0.05$) and the DG ($\chi^2 = 15.101$, $P < 0.05$). The distribution of CF s-offers appears to differ from those in the N condition only for the UG ($\chi^2 = 12.181$, $P < 0.05$). Differences between the distributions of MC o-offers and N offers are significant for the UG ($\chi^2 = 54.088$, $P < 0.001$) and the DG ($\chi^2 = 16.150$, $P < 0.05$); the distribution of s-offers never differs from N offers.

The value of this section is purely as a description of the behavioral patterns in our experiment; the statistical analysis may be overstating the significance of statistical tests by treating repeated choices by each subject over the same task as independent (the next subsections will avoid doing so).

4.2 Similarity-Based Reasoning

Hypothesis S1. There is support for the hypothesis of similarity-based reasoning in offers. The overall Spearman correlation between mean similarity (classified by subject and game pair) and difference in offers was – 0.406 ($P < 0.001$), and is illustrated in Figure 3.

(*Insert Figure 3 about here*).

The correlation is variable but always significant across games (- 0.507, - 0.581 and - 0.236 for the CDG, NDG and UPG, respectively, $P < 0.001$; - 0.170, - 0.160 for the UG and DG, respectively, $P < 0.01$). It is also robust across conditions (- 0.433, - 0.376 and - 0.385 for the CF, MC and N condition, respectively). Higher similarity between games was associated with closer offers in the two.

Hypothesis S2. There is insufficient support for similarity-based reasoning in mean acceptance rates between the UG and UPG: while correctly signed, the Spearman ρ is insignificant (- 0.106, *n.s.*).

Hypothesis S3. We need to compare the SO condition with the N1 condition, as this had exactly the same set of scenarios in the similarity evaluations stage: the only difference between the two conditions is the absence of a game action stage in the former. Epps-Singleton tests show that there is a change in distribution in moving from the SO to the N1 condition. Table 1 compares game-by-game Epps-Singleton test χ^2 values with Spearman ρ values between mean similarity and difference in offers

(*Insert Table 1 about here*).

S3 would predict a negative relationship between the two series, but no obvious relationship emerges. By far the greatest distortion is for the UG, but there is no evidence of a particularly strong association between mean similarity ratings and differences in offers for this game: the Spearman ρ for the UG is only – 0.185, in line with the overall ρ of – 0.170 found across conditions. We can conclude that there is insufficient evidence for S3.

4.3 Common Fate

Table 2 contains the mean offers by game, condition and, where relevant, coplayer's group.

(*Insert Table 2 about here*).

There are no differences in means across conditions for the CDG, NDG and UG. A Mann-Whitney nonparametric test shows that, also in relation to the UPG and DG, there are no significant differences in comparing the MC means by subject to the N condition.

Hypothesis F1. A Wilcoxon nonparametric test can be used to compare how subjects behaved towards ingroup and outgroup members in the CF and MC condition. There is support for the prediction that in the CF condition we should expect ingroup bias, and so the s-offers mean should be greater than the o-offers mean: in both the UPG and the DG mean offers drop by about one third when an outsider is involved (from about 20-24 to about 13-15), a significant difference ($Z = 2.237$, $P < 0.05$ for the UPG; $Z = 2670$, $P < 0.01$ for the DG). A starker way of presenting this result is by noting that, of the 12 out of 20 subjects in the CF condition who in the UPG behaved differently on average with outsiders, eleven did so by discriminating against outsiders; still more starkly, each and every one of the 9 subjects who behaved differently with outsiders in the DG did so by discriminating against them. Thus, there is support for the discrimination hypothesis in offers.

Hypothesis F3. An inspection of Table 3, and Mann-Whitney tests, suggests that there is no support for the positive discrimination hypothesis that CF subjects behave more nicely towards ingroup members than they would if no common fate were induced, as in the N or the MC condition.

Hypothesis F6. Table 3 shows that mean o-offers by subject in the CF condition are very low, both in the UG and in the DG. A Mann-Whitney test shows somewhat inconclusive evidence for the prediction that mean CF o-offers are lower than those in the N condition ($Z = 1.169$, $P = 0.121$, for the UG; $Z = 1.527$, $P < 0.1$, for the DG). A more appropriate comparison for the effect of common fate inducement is that between the MC and CF, as it is the comparison that isolates such effect in the purest form. Mean o-offers almost halved in moving from the MC to the CF condition in the UG and DG (from about 25-26 to about 13-15), a statistically significant difference (in a Mann-Whitney test, $Z = 1.701$, $P < 0.05$ for the UPG and $Z = 1.692$, $P < 0.05$ for the DG). We conclude that there is evidence for the negative discrimination hypothesis in offers.

Hypotheses F2, *F4*, *F5*. Table 3 displays mean acceptance rates.

(*Insert Table 3 about here*).

The acceptance rate was 0.866 in the UG, but only 0.656 in the UPG, a significant difference (Wilcoxon $Z = 5.775$, $P < 0.001$). As for F2, in the UPG (only), receivers were more likely to accept offers by insiders than outsiders (Wilcoxon $Z = 1.387$, $P < 0.1$). As for proposers, the UPG discrimination appears more against outsiders than in favor of insiders. There is no difference between how insiders are treated in the CF and MC condition, against F4, while the evidence in relation to outsiders is in the right direction, if ambiguous: the difference between CF and MC condition is marginally insignificant (Mann-Whitney $Z = 1.204$, $P = 0.114$). One problem with the interpretation of the findings is that, as we know that proposers made lower offers to outsider receivers, the latter may have been more prone to reject offers by proposers simply of their lower value.

Hypotheses F7, F8. Tables 2 and 3 make clear that color-grouping by itself makes no difference for either proposers or receivers. The most likely candidate for significance is the

DG increase in mean offers from 18-19 in the N condition to about 29 with insiders in the MC condition, suggesting some positive discrimination, but the hypothesis is still rejected (Mann-Whitney $Z = 1.137$, $P = 0.128$). Overall, the supportive evidence appears insufficient for F7, and inexistent for F8. Behavioral differences in the CF condition appear driven by common fate inducement, rather than by the simple act of color-grouping.

4.4 Similarity-Based Reasoning and Common Fate

Hypotheses SF0. Figure 4 plots $dS(z)$ values by game and condition.

(*Insert Figure 4 about here*).

A nonparametric Friedman test for related samples is significant (CF: χ^2 (4) = 10.463, $P < 0.05$; MC: χ^2 (4) = 38.525, $P < 0.001$; N: χ^2 (4) = 38.525, $P < 0.001$). There is support for SF0.

Hypotheses SF1, *SF2*. Figure 4 shows a more complex picture than either SF1 or SF2 would predict. A nonparametric Kruskal-Wallis test shows that all differences across conditions are significant (dS(CDG): χ^2 (3) = 8.272, $P < 0.05$; dS(NDG): χ^2 (3) = 22.151, $P < 0.001$; dS(UG): χ^2 (3) = 6.391, $P < 0.1$; dS(UPG): χ^2 (3) = 7.702, $P < 0.06$; dS(DG): χ^2 (3) = 6.249, $P < 0.1$). Two-tailed Wilcoxon tests indicate that the DG and UG are similarity attractors in the MC condition (dS(DG) and dS(CDG) are both significantly greater than 0, with $Z = 3.991$ and $Z = 4.345$ respectively, $P < 0.001$), but only the DG is in the CF and N conditions (CF: $Z = 2.031$, $P < 0.05$; N: $Z = 2.556$, $P < 0.05$). There is no evidence, however, that either is significantly greater than the other in the CF condition in Mann-Wilcoxon tests, or in the CF condition relative to the N and MC conditions. Two interesting clues are provided by the evolution of mean dS(NDG) and dS(UG) across conditions. Mean dS(NDG) is insignificantly different from mean dS(DG) in the N condition (two-tailed Wilcoxon $Z = 1.109$, *n.s.*), whereas it is significantly lower than in the CF condition ($Z = 2.081$, $P < 0.05$). Conversely, mean dS(UG) is significantly lower than dS(CDG) in the N condition ($Z = 1.712$, $P < 0.1$), whereas it is virtually identical in the CF condition ($Z = 0.140$, *n.s.*).

Overall, the indications are that, if anything, negative similarity attractors (among which we may include the UG) are *relatively* more important than positive similarity attractors in the CF condition than in the other conditions, as for SF3. Nevertheless, the aggregate patterns are clearly inconclusive, and it is important to look at between-subject variations.

Hypotheses SF3, *SF5*, *SF6*. Table 4 displays Spearman correlations between *dS*(z) values by subject and differences in acceptance rates between insiders and outsiders.

(*Insert Table 4 about here*).

As there is no support for positive discrimination on the part of proposers or receivers (i.e., for F3 and F5), no prediction is made of a correlation between discrimination and the degree of salience of the harmonious games, CDG and NDG, as measured by *dS*(CDG) and *dS*(NDG). No correlation is indeed found in Table 4.

Only equivocal support was found for negative discrimination on the part of receivers (i.e., for F6), and that only in relation to the UPG. The picture from Table 4 is also equivocal, even though there is a significant negative correlation between *dS*(DG) and differences in acceptance rates between insiders and outsiders in the UG ($\rho = - 0.407$, $P < 0.1$, two-tailed). This appears driven by a strong increase in mean acceptance rate with outsiders ($\rho = 0.477$, $P < 0.05$, two-tailed; the corresponding correlation with insiders is insignificant). An interpretation of this finding may be that acceptance may come from a recognition of lack of bargaining power, that would follow from an assimilation of the UG to the DG. This would be in line with similarity-based reasoning.

Hypothesis SF4. In section 4.3 we found evidence for negative discrimination by proposers (i.e., for F4). Can the salience of the disharmonious games be used as a predictor for such discrimination? Table 4 shows that the answer is positive. There is CF condition evidence for greater discrimination against DG receivers if the UPG is a better similarity attractor; this is also true in the MC condition. In the CF condition, there was greater discrimination against UPG receivers the more the subjects treated the DG as salient; the pattern does not exist, or is reverted, in the MC condition.

We conclude that common fate induced subjects to discriminate against outsiders, and they did so the more they treated the DG (in relation to UPG offers) and the UPG (in relation to DG offers) as salient. Perceiving games as having high disharmony of interests with outsiders led subjects to exploit them when they could. Interestingly, there is evidence that in the CF (and not the MC) condition this was also true with mean UG offers: discrimination was greater the more salient the UPG was.[8]

[8] Another significant correlation we did not make *a priori* predictions on is the negative one between *dS*(UG) and discrimination in mean UG offers.

Hypothesis SF7. Mean similarity is 4.688 (4.751) if the scenarios present the same (a different) coplayer's color group in the CF condition: the difference is negligible and in the wrong direction. Mean similarity is 4.351 (4.286) if the scenarios present the same (a different) coplayer's color group in the MC condition, a comparable difference of about 0.06-0.07. Both differences are, if anything, lower than those in the N2 condition: mean similarity if the day of the week is even or odd in both scenarios is 3.945, against 4.343 if the piece of irrelevant information is different between the scenarios. We conclude that there is no support for SF7.

Hypothesis SF8. In considering the CF condition dataset, *dC* does not appear to be a predictor of mean offers by subject in the UG, UPG and DG, or mean acceptance rates by subject in the UG and UPG, either in relation to insiders or in relation to outsiders. We also tried to correlate *dC* directly with the difference in mean offers (between insiders and outsiders) in the UG, UPG and DG, and in acceptance rates in the UG and UPG; the Spearman ρ values that are closest to being significant are those between *dC* and difference in mean offers in the UPG (0.287, $P = 0.110$) and DG (0.249, $P = 0.145$). Overall, there is insufficient support for SF8.

5. Discussion

Bargaining settings play an important role in markets, firms and organisations. They may be more or less symmetric, and present more or less scope for cooperation or conflict. Some of the bargaining occurs, more or less implicitly or explicitly, within teams economic agents share, at least partially, a common fate with; other occurs with people outside one's own group or team. Dissatisfied with the possibility of just finding a framing effect and leaving it unexplained, we tried to open the black box of what common fate entails for discrimination against outsiders relative to insiders. We did so by employing a new technique based on similarity evaluations and their potential asymmetry. The technique may be more generally applicable, for example in the study of other anomalies in bargaining and related settings, such as the role of deservingness and entitlements (e.g., Hoffman and Spitzer, 1985), that of need (Schotter et al., 1996), that of poor outside options that should not matter strategically (Jehiel, 1999), or behavior in tournament games (Carter and McAloon, 1996).

We considered five games: a coordination game, a Nash demand game, an ultimatum game, a "unilateral power" game, and a dictator game. We found no evidence that people are kinder to others in the same group under common-fate framing relative to the baseline treatments. In other words, there was no evidence for positive discrimination. However, if proposers (the strong bargaining party) have all the bargaining power, they are significantly nastier towards outsiders; when this is so, there is also some evidence of negative discrimination by receivers (the weak bargaining party), perhaps as the result of the negative discrimination by proposers. Negative discrimination is the outcome of common fate inducement, not just having classified subjects into groups; it means that "we are in the same boat" counts less than "you are *not* in my boat".

Except where negative discrimination was at work, offers in the ultimatum game, unilateral power game and dictator games clearly tended to differ from the rational self-interested predictions of zero or minimal offers. In congruence with the similarity-based reasoning framework, agents were more likely to choose similar claims for themselves the more they considered two games as similar. This correlation can be explained in various ways. It could be that choices of claims cause similarity ratings - but we brought evidence suggesting that this is unlikely -, or it could be that similarity ratings cause choices – as similarity-based reasoning stories would have -. A third possibility is that both ratings and choices are correlated with a third variable. A rational agent who does not believe in similarity-based reasoning as a normative guide for behavior may behave very differently in a coordination game and in a dictator game, and at the same time consider the two games as very dissimilar; he may also behave in the same way in the unilateral power game and the dictator game, and, quite independently, treat the two games as very similar.[9] Yet, if this were the whole story, it still would not explain the patterns we observed in relation to the asymmetry in similarity judgements.

We used a novel technique to identify which games work as *similarity attractors*: similarity attractors are games that are more likely to have other games assimilated to them than they are to be assimilated themselves to other games. They correspond to the most salient games in any given context. In our experiment we found that similarity attractors exist and the

[9] Gilboa and Schmeidler (2001) argue that rational agents *should* be using case-based decision reasoning, i.e. that case-based decision reasoning has normative value. If we were to agree with this position, the objection would obviously fail.

degree to which they operate varies across conditions. In playing the ultimatum game, receivers for whom the dictator game was a better similarity attractor were more likely to just accept what was offered to them, also by outsiders. Proposers for whom highly disharmonious (conflictual) games (such as the dictator game and the unilateral power game) were better similarity attractors engaged in more negative discrimination.

This suggests that those subjects who perceive inter-group bargaining as highly disharmonious behave more competitively with outsiders when they can afford to do so. While cooperation within the group is not increased, conflict between groups is.

This paper shows how one can use similarity evaluations as a tool to open the black box of framing effects. Equally important may be its practical and policy message, if further experimental work were to show its robustness.[10] For example, in designing organizational units within a firm, a manager may need to take into account that, while smaller teams may be good in other respects, there may be more scope for inter-team conflict in bilateral settings where members of a team depend on the goodwill of members of the other team. Inducement of common fate at the company level (e.g. by the means of company-performance-related bonuses) may perhaps be a good thing in making employees more “aggressive” in between-companies dealings - but it may not be effective in raising within-firm cooperation in bilateral settings -. To end with an example from the political arena, raising feelings of group identity through common fate within the Protestant or Irish communities in North Ireland may not increase the likelihood of equitable or efficient bilateral transactions within those communities: rather, the impact may be one of increasing inter-community conflict.

6. Conclusions

This paper had three objectives: (1) to test the effect of common fate framing on behavior in bilateral bargaining settings; (2) to test the predictive power of similarity-based reasoning; (3) to show how one can use two-sided similarity evaluations, not just in terms of “how similar is *X* to *Y*” but also in terms of “how similar is *Y* to *X*”, to shed light on common fate and potential other framing effects.

In relation to (1), we found that common fate caused negative discrimination by parties with all bargaining power, i.e. in the unilateral power game and the dictator game.

[10] This is an important qualification given the novelty of the study.

Discrimination was against outsiders relative to insiders for 92% of the subjects who differentiated between insiders and outsiders in the ultimatum power game, and 100% of those who did so in the dictator game. Discrimination was not produced by favouring insiders, but, rather, by being more competitive towards outsiders: “you are not in my boat” mattered more than “we are in the same boat”. This result is in contrast with that found in the “minimal group” paradigm of social psychologists, which suggests, if anything, ingroup favouritism (Yamagishi, in press). The contradiction is not as large as it seems since, as discussed in section 1.1, common fate is not properly elicited in this literature, and factors other than common fate are likely to be at work; in addition, there is typically no benefit or cost for the subjects from engaging in discrimination, and so replication with a better incentive structure would be required to verify whether these findings are genuine. In contrast, in our experiment, discrimination has a direct impact on one’s own earnings.

In relation to (2), we found support for similarity-based reasoning: mean amounts unclaimed were closer the more similar two games were judged. In relation to (3), we found that common fate made the degree to which highly disharmonious (conflictual) games acted as similarity attractors matter for discrimination in behavior. The existence of common fate made those subjects who perceived inter-group bargaining as highly disharmonious behave “aggressively” with outsiders. As a result, intra-group cooperation was not raised, but inter-group competitiveness was increased.

Our results are of general interest because of the potentially far-reaching nature of similarity-based reasoning and because of the pervasive nature of common fate, and differences in perceived common fate, in bargaining and other bilateral transactions within and between organizations; but, also, because by developing tools to open the black box of framing effects, we can better hope not only to understand their implications but also to use them for policy purposes.

Appendix. Experimental Instructions

Condition CF

Instructions for the Preliminary Task

You are about to participate in an experiment on decision-making. The experiment starts with a preliminary task, and continues with three stages; the last stage is for payment. There are eight participants in each session.

There are two labels on the computer display. They correspond to different colours, Yellow and Red. *You need to decide on a scale between 0 and 9 what is your preference towards Red relative to Yellow*: the higher the number of your choice, the greater your preference for Red relative to Yellow. So, for example, put 9 in case of absolute preference for Red relative to Yellow, 0 in case of absolute preference for Yellow relative to Red. More in general, a high number corresponds to a preference for Red, and a low number to a preference for Yellow. There is no "correct" answer.

To choose a number, please click the white cell using the mouse and then write the number in it. A message window will then appear asking you to confirm your choice. To do so, click OK on the window and then click the Confirm button. If you want to cancel your choice, click OK on the window and then click the Cancel button; you can reset the content of the white cell by double-clicking on it.

Everyone has to make his or her choice before you are allowed to move on to Stage 1. Many thanks for your participation to the experiment, and good luck!

Please raise your hand if you have any questions.

Stage 1 Instructions

Assignment of colour group and implications for final winnings

The computers have now collected all the color preference values by you and the other seven participants.

The four participants with the greatest preference for Yellow are now Yellow participants. The four participants with the greatest preference for Red are now Red participants. Your computer screen tells you whether you belong to the Yellow group or to the Red group. You belong to the same colour group throughout the experiment.

In the payment stage, an experimenter will roll two ordinary six-faced dice, a Yellow die and a Red die, into a glass cup. If a roll of 1 obtains on the Yellow die, all Yellow participants will earn a "lucky jackpot". If a roll of 1 obtains on the Red die, all Red participants will earn a "lucky jackpot".

If you are a Yellow participant, your earnings, like those of your Yellow coparticipants, will be affected by the roll of the Yellow die only, *not* by the roll of the Red die. All the Yellow participants share the same outcome of either winning or not winning the lucky jackpot.

If you are a Red participant, your earnings, like those of your Red coparticipants, will be affected by the roll of the Red die only, *not* by the roll of the Yellow die. All the Red participants share the same outcome of either winning or not winning the lucky jackpot.

The lucky jackpot is of **36 pounds**, and is won in place of any ordinary winnings you may earn during Stage 1 and 2 or as participation fee. The jackpot is nine pounds above the maximum winnings you can otherwise earn in the experiment.

If you do not win the lucky jackpot, your winnings will be equal to your earnings from Stage 1 and 2, plus 3 pounds as participation fee.

The experimenter will declare the outcomes of the dice rolls verbally. You will be given the chance to check the dice outcomes yourself, if so you wish and one participant at a time, while leaving the room.

Your choices

There are twenty rounds in Stage 1. You face a Decision Task in each round, and the instructions will be provided on the screen for each of them as you go along.

For example, right now you can see the instructions for the Decision Task of round 1 on the computer display. All Decision Tasks involve two participants, you and a coparticipant. You do not always face the same Decision Task, so in each round please make sure that you read carefully the Decision Task description that you see on the screen.

The coparticipant you face in any given round may or may not belong to your same colour group. You know what the colour group of the coparticipant is each round, and, similarly, the coparticipant knows what your colour group is. You will face coparticipants from your colour group and coparticipants from the other colour group an equal number of times. The coparticipants from your colour group are two out of three in your colour group. The coparticipants from the other colour group are two out of three in the other colour group. Overall, there are four different coparticipants you are matched with at different points of this stage.

This is the only interactive stage of the experiment: this means that you will not make decisions that affect other people's winnings, and vice versa, afterwards.

In some (symmetric) Decision Tasks, you and your coparticipant face the same kind of choices. In other (asymmetric) Decision Tasks, you are either a first mover or a second mover. If you are a first mover, you are a first mover in all asymmetric Decision Tasks that you will be facing. If you are a second mover, you are a second mover in all asymmetric Decision Tasks that you will be facing.

Decision Tasks will be described on the computer display as you move through the stage.

Your winnings

The computer will randomly choose a payment round to determine the *action payment*. This payment round will be the same for you and your coparticipant.

The action payment depends on the point numbers, always between 0 and 100, you earn in this round. Unless you happen to win the lucky jackpot together with the other members of your colour group, *each point earned in this round is worth 0.06 pounds in the Payment Stage* (so, for example, 100 points are worth 6 pounds). Since there is only one chance out of six to win the lucky jackpot, it is in your best interest to make your Decision Tasks choices with care, as they are very likely to affect final earnings. Care in making choices is also very important for the scientific value of the experiment.

Before starting taking decisions, we ask you to answer a brief questionnaire, with the only purpose of checking whether you have understood the instructions. Raise your hand when you have completed the questionnaire.

Please raise your hand if you have any questions.

Stage 2 Instructions

In Stage 2 you are asked to ***evaluate how similar the Decision Task on the top label of the computer display is to another, placed in the bottom label of the screen***. The Decision Tasks are those you are already familiar with from Stage 1, but now you are not asked to make decisions. Rather, you are asked to compare the Decision Task on the top label of the computer display with the Decision Task on the bottom label of the computer display, and to express a judgement on how similar the first is to the second.

Stage 2 has 90 rounds. Each round you should assess similarity on a scale between 0 (very different) to 9 (very similar). The similarity payment, discussed below, will depend on how accurate your similarity evaluation is, and can be up to 18 pounds.

Once you decide your similarity evaluation, please click the white cell using the mouse and then write the number in it. A message window will then appear asking you to confirm your choice. To do so, click OK on the window and then click the Confirm button. If you want to cancel your choice, click OK on the window and then click the Cancel button; you can reset the content of the white cell by double-clicking on it. If you make some mistake and want to reset the white cell, just double click on it with the mouse. Any choice you make will not be communicated to the other participants, and similarly you will not learn anything about their choices.

The Similarity Payment

The computer will randomly choose a payment round to determine the *similarity payment*. Unless you happen to win the lucky jackpot together with the other members of your colour group, you will be paid the similarity payment in the payment stage. Since there is only one chance out of six to win the lucky jackpot, it is in your best interest to make your choices with care, as they are very likely to affect final earnings. Care in making choices is also very important for the scientific value of the experiment.

How is the similarity payment determined? If you get the similarity evaluation exactly right, you earn **18 pounds**. The more incorrect is your evaluation, the less you gain: in particular, for every point by which your guess is incorrect, you lose 7 pounds. If your evaluation is wrong by 3 points or more, your similarity payment is zero. The following table tells you what your similarity payment is for various levels of error.

Similarity Payment Table

Error ***(=gap between your valuation and correct answer)***	***Similarity Payment (in pounds)***
0	**18**
1	**11**
2	**4**
3 or more	**0**

Example: assume that your similarity evaluation is 8 but the correct answer is 7. Then the error (i.e., the gap between your similarity evaluation and the correct answer) is 1, and your similarity payment is equal to 11 pounds.

Before starting making decisions, we ask you to answer another brief questionnaire, with the only purpose of checking whether you have understood the instructions. Raise your hand when you have completed the questionnaire.

Please raise your hand if you have any questions.

<u>Text of Games Appearing on Computer Display in Stage 1 and 2</u>

(*Coordination Game*):
You and your coparticipant are to make a claim of up to 100 points. If the sum of the two claims is equal to 100, you get the amount you claimed, and your coparticipant gets the amount he or she claimed. If the sum of the two claims is different from 100, neither you nor your coparticipant gets anything.

(*Nash Demand Game*):

You and your coparticipant are to make a claim of up to 100 points. If the sum of the two claims is equal to or below 100, you get the amount you claimed, and your coparticipant gets the amount he or she claimed. If the sum of the two claims is above 100, neither you nor your coparticipant gets anything.

(*Ultimatum Game, proposers*):
You are to split up 100 points. You have to make a proposal to your coparticipant on how to divide these 100 points. If your coparticipant accepts this proposal, he or she gets what you offered him or her, while you get the remainder. If your coparticipant rejects the proposal, an agreement is not reached and neither you nor your coparticipant gets anything.

(*Ultimatum Game, receivers*):
Your coparticipant is to split up 100 points. He or she has to make a proposal to you on how to divide these 100 points. If you accept this proposal, you get what your coparticipant offered you, while he or she gets the remainder. If you reject the proposal, an agreement is not reached and neither you nor your coparticipant gets anything.

(*Unilateral Power Game, proposers*):
You are to split up 100 points. You have to make a proposal to your coparticipant on how to divide these 100 points. If your coparticipant accepts this proposal, he or she gets what you offered him or her, while you get the remainder. If your coparticipant rejects the proposal, an agreement is not reached: in this case, you get the 100 points, while your coparticipant gets nothing.

(*Unilateral Power Game, receivers*):
Your coparticipant is to split up 100 points. He or she has to make a proposal to you on how to divide these 100 points. If you accept this proposal, you get what your coparticipant offered you, while he or she gets the remainder. If you reject the proposal, an agreement is not reached: in this case, your coparticipant gets the 100 points, while you get nothing.

(*Dictator Game, proposers*):
You are to split up 100 points. You decide how to divide these 100 points. Your coparticipant gets what you offered him or her, while you get the remainder.

(*Dictator Game, receivers*):
Your coparticipant is to split up 100 points. You wait for his or her decision. You get what your coparticipant offers you, while he or she gets the remainder.

Condition MC

The instructions are identical to those of the CF condition, with the following changes:

1. STAGE 1. The first section is titled “Assignment of colour groups and final winnings”; it contains only the first two paragraph of the CF condition section on “Assignment of colour group and implications for final winnings”, plus the line:
“Your winnings will be equal to your earnings from Stage 1 and 2, plus 3 pounds as participation fee.”

2. STAGE 1. The second paragraph under “Your winnings” is replaced by the following:
“The action payment depends on the point numbers, between 0 and 100, you earn in this round. *Each point earned in this round is worth 0.06 pounds in the Payment Stage* (so, for example, 100 points are worth 6 pounds). It is in your best interest to make your Decision Tasks choices with care, as they will affect final earnings. Care in making choices is also very important for the scientific value of the experiment.”

3. STAGE 2. The first paragraph under “The Similarity Payment” is replaced by the following:
“The computer will randomly choose a payment round to determine the *similarity payment*. You will be paid the similarity payment in the payment stage. It is in your best interest to

make your Decision Tasks choices with care, as they will affect final earnings. Care in making choices is also very important for the scientific value of the experiment."

Condition N

The instructions are identical to those of the CF condition, with the following changes:
1. There is not a Stage 0, so there are no corresponding instructions.

2. STAGE 1. The section on "Assignment of colour group and implications for final winnings" is replaced by the following introductory paragraph:
"You are about to participate in an experiment on decision-making. The experiment is in three stages; the last stage is for payment. There are eight participants in each session. Your winnings will be equal to your earnings from Stage 1 and 2, plus 3 pounds as participation fee."

3. STAGE 1. The second paragraph under "Your choices" is replaced by the following:
"For example, right now you can see the instructions for the Decision Task of round 1 on the computer display. All Decision Tasks involve two participants, you and a coparticipant. Overall, there are four different coparticipants you are matched with at different points of this stage. You do not always face the same Decision Task, so in each round please make sure that you read carefully the Decision Task description that you see on the screen."

4. STAGE 1. Same change as in point 2 under Condition MC.

5. STAGE 2. Same change as in point 3 under Condition MC.

Condition SO

The instructions are identical to those of the CF condition, with the following changes:

1. There are only instructions for Stage 2, under the label "Experimental Instructions".

2. STAGE 2. Introduce the following initial paragraph:
"You are about to participate in an experiment on decision-making. There are eight participants in each session. Your winnings will be equal to your earnings from the experiment, plus 3 pounds as participation fee."

3. STAGE 2. Replace first paragraph of CF condition with:
"In the experiment you are asked to ***evaluate how similar the Decision Task on the top label of the computer display is to another, placed in the bottom label of the screen***. You are asked to compare the Decision Task on the top label of the computer display with the Decision Task on the bottom label of the computer display, and to express a judgement on how similar the first is to the second."

4. STAGE 2. Replace "Stage 2" with "The experiment" at the start of the following paragraph.

5. STAGE 2. Same change as in point 3 under Condition MC.

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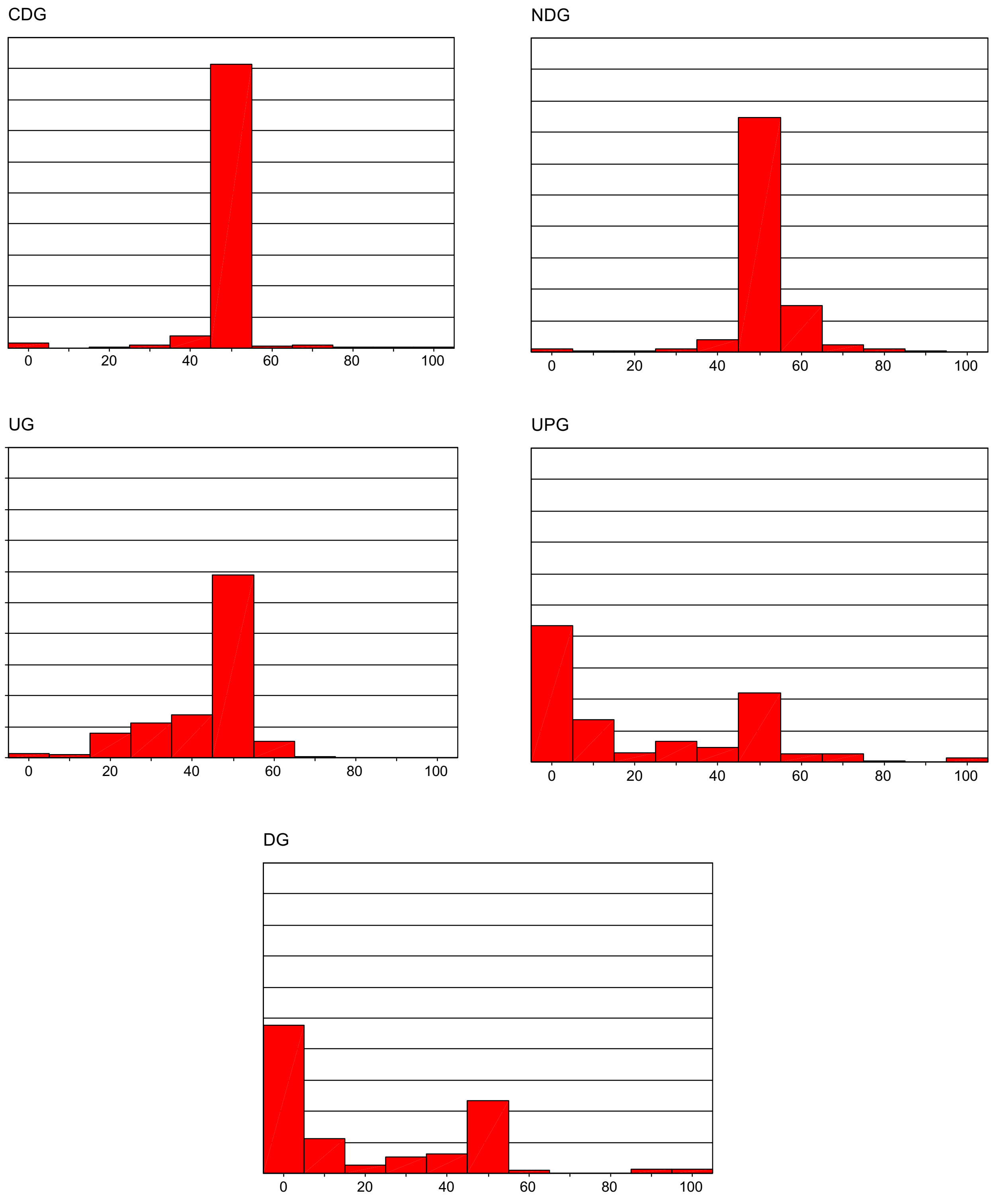
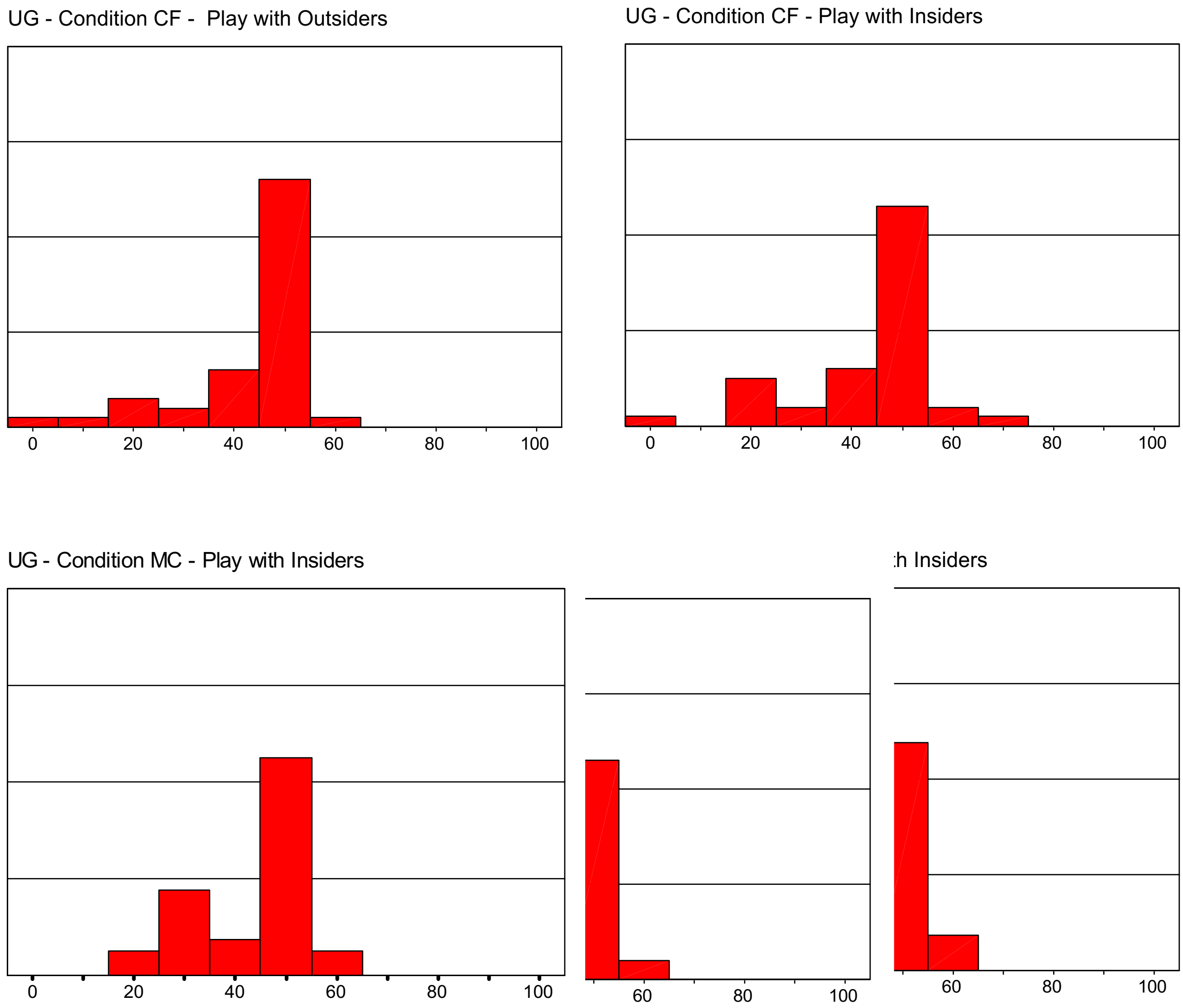
FIGURE 1. HISTOGRAM OF MEAN OFFERS (AMOUNTS UNCLAIMED) BY GAME.

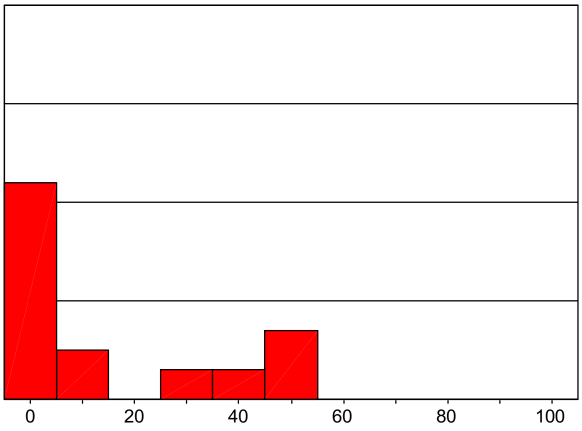


CDG: Coordination Game. NDG: Nash Demand Game. UG: Ultimatum Game. UPG: Unilateral Power Game. DG: Dictator Game.

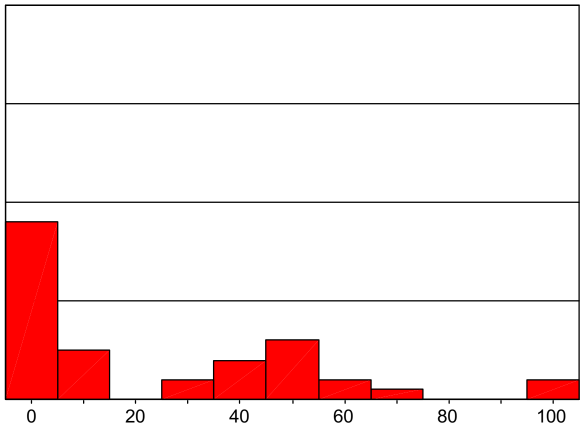
FIGURE 2. HISTOGRAMS OF MEAN OFFERS (AMOUNTS UNCLAIMED) BY GAME, CONDITION AND COPLAYER TYPE.



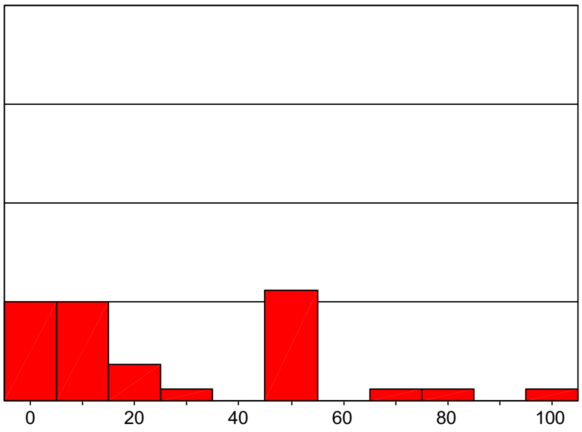
UPG - Condition CF - Play with Outsiders



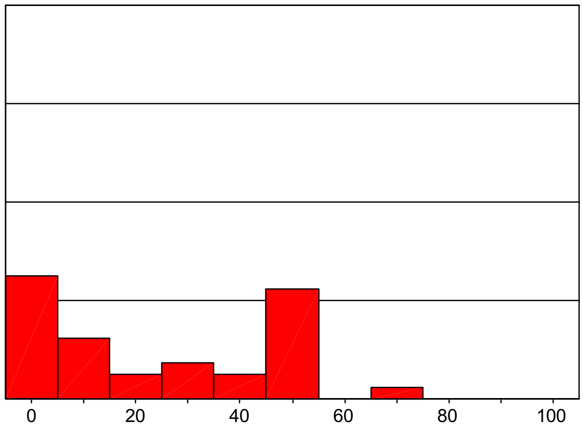
UPG - Condition CF - Play with Insiders



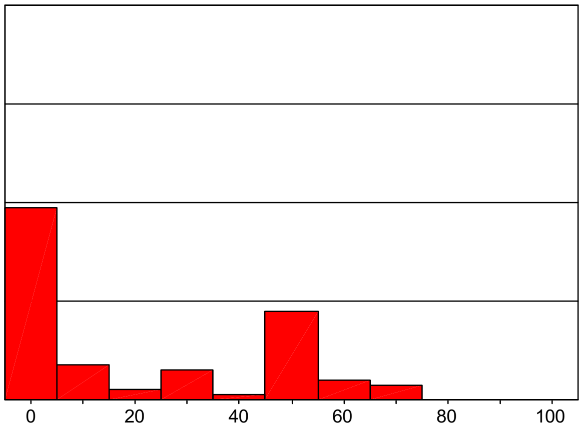
UPG - Condition MC - Play with Outsiders



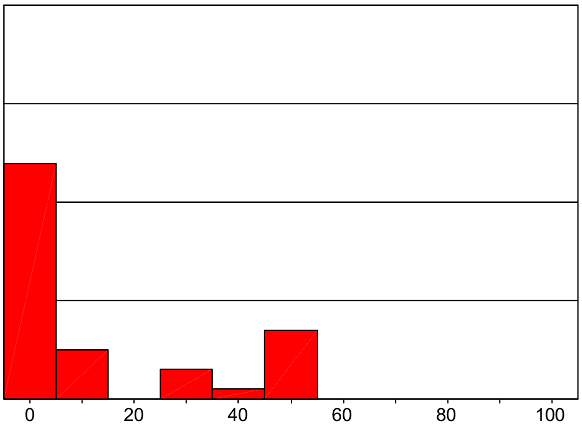
UPG - Condition MC - Play with Insiders



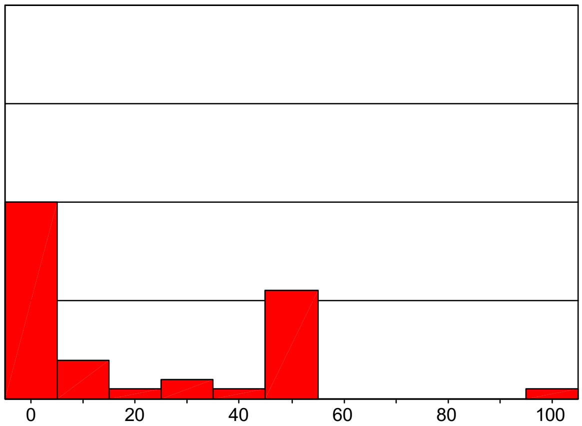
UPG - Condition N



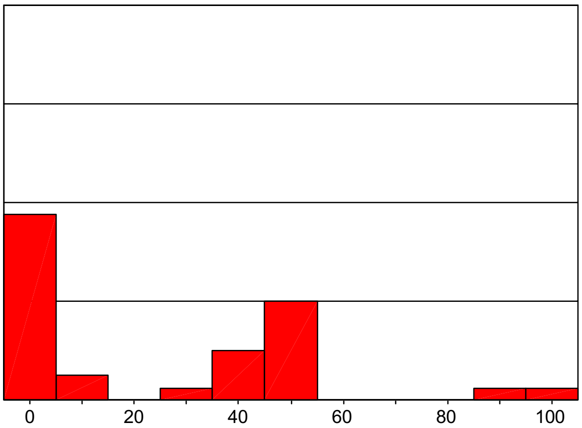
DG - Condition CF - Play with Outsiders



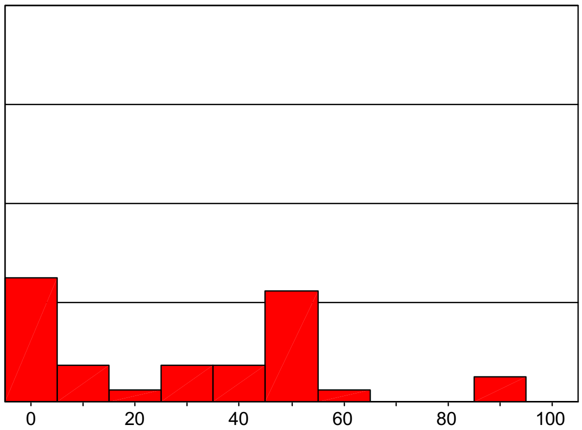
DG - Condition CF - Play with Insiders



DG - Condition MC - Play with Outsiders



DG - Condition MC - Play with Insiders



DG - Condition N

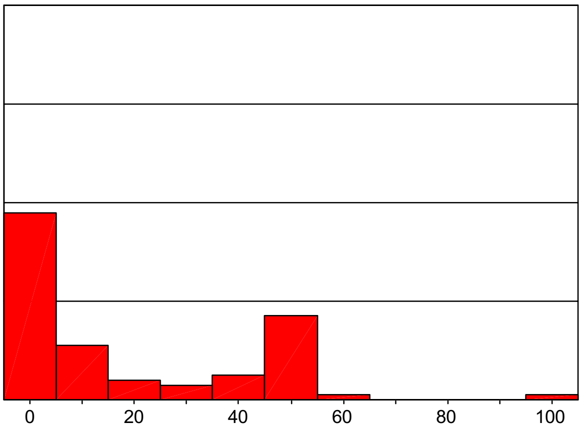
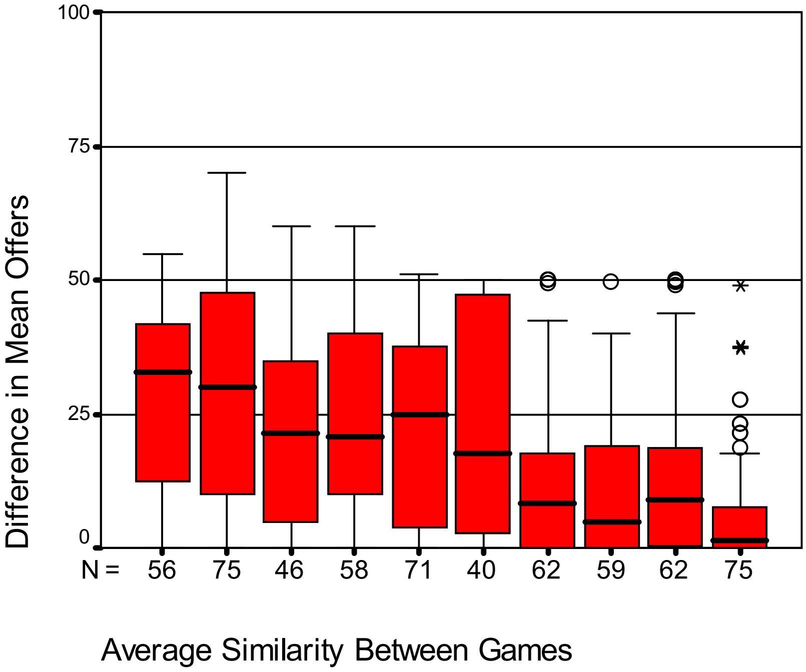
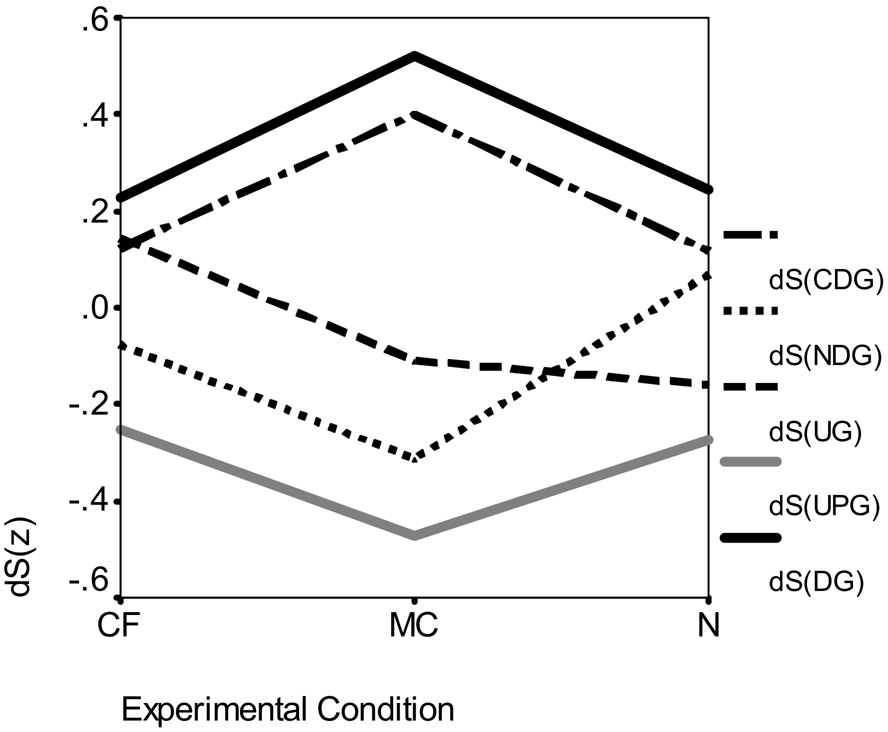


FIGURE 3. BOXPLOT OF SIMILARITY AND DIFFERENCES IN MEAN OFFERS BETWEEN GAME.



The box represents the interquartile range which contains half of values (the line across is the median). The whiskers extend from the box to the highest/lowest values, excluding outliers.

FIGURE 4. SIMILARITY ATTRACTORS BY EXPERIMENTAL CONDITION.



dS(*z*) is the difference *between* the mean similarity evaluation of the other games to game *z* *and* the mean similarity evaluation of game *z* to the other games.

TABLE 1.
PRIOR CHOICE OF ACTION AND SIMILARITY-ACTION CORRELATION.

Game	χ^2	**ρ**
CDG	84.97	-0.488
NDG	42.001	-0.511
UG	125.738	-0.185
UPG	67.113	-0.155
DG	37.367	-0.173

r (χ^2, **ρ**) = 0.191, *n.s.*
ρ (χ^2, **ρ**) = -0.100, *n.s.*

χ^2 is the test statistic for the Epps-Singleton test comparing the mean distribution of offers in the SO condition with that in the N1 condition. **ρ** is the Spearman correlation between difference in mean offers and similarity between two games. CDG: Coordination Game. NDG: Nash Demand Game. UG: Ultimatum Game. UPG: Unilateral Power Game. DG: Dictator Game.

TABLE 2.
MEAN OFFERS (AMOUNTS UNCLAIMED).

Condition	Coplayer's group	CDG	NDG	UG	UPG	DG
CF	Outsider	50.6	50.85	43.125	14.7	12.675
	Insider	48.6	51.288	43.25	23.725	19.975
MC	Outsider	49.688	50.766	42.969	26.063	24.656
	Insider	48.297	50.75	43.594	23.844	29.156
N	No grouping	48.513	50.469	42.638	20.788	18.575

TABLE 3.
MEAN ACCEPTANCE RATES.

Condition	Coplayer's group	UG	UPG
CF	Outsider	0.85	0.55
	Insider	0.9	0.675
MC	Outsider	0.875	0.719
	Insider	0.875	0.719
N	No grouping	0.85	0.65

TABLE 4.
SALIENCE OF GAMES AND INGROUP-OUTGROUP DISCRIMINATION.

CF	*dS* (CDG)	*dS* (NDG)	*dS* (UG)	*dS* (UPG)	*dS* (DG)
dA (UG)	-0.05	-0.086	0.187	0.148	-0.407*
dA (UPG)	0.002	0.2	0.262	-0.234	0.098
dO (UG)	0.037	0.022	-0.608***	0.516**	-0.316
dO (UPG)	-0.085	0.19	-0.029	0.03	0.535***
dO (DG)	0.11	-0.165	-0.278	0.339*	-0.118

MC	*dS* (CDG)	*dS* (NDG)	*dS* (UG)	*dS* (UPG)	*dS* (DG)
dA (UG)	-0.18	-0.273	0.001	0.075	0.018
dA (UPG)	-0.014	0.001	-0.098	-0.032	0.267
dO (UG)	-0.274	0.062	0.22	0.129	-0.229
dO (UPG)	-0.118	-0.223	-0.162	0.318	-0.439**
dO (DG)	0.056	-0.096	-0.016	0.47**	-0.424*

* $P < 0.1$, ** $P < 0.05$, *** $P < 0.01$.