

How Salient is an Equal but Inefficient Outcome in a Coordination Situation? Some Experimental Evidence

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Abstract

We consider coordination situations with a conflict of interest, and experimentally vary the inefficiency of an equal earnings equilibrium, as well as the number of efficient and unequal earnings equilibria. We observe that equality, as long it is not extremely inefficient, remains very salient, and primarily because it offers players a way to avoid a coordination failure in selecting between the efficient unequal earnings equilibria, and less because subjects have a strong inherent preference for equality.

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1 Introduction

This paper considers simultaneous-move one-shot coordination situations with multiple equilibria and where there is a conflict of interest among players about which equilibrium to coordinate on. Well-known examples are the battle-of-the-sexes game, the chicken game, and the Nash demand game.

Experimental research on behavior in these and similar coordination situations has found that if the game has an equilibrium that gives players equal monetary earnings then this equilibrium is strongly focal. See for example Holm (2000), Mehta et al. (1992), Nydegger and Owen (1975), Roth and Malouf (1979), Roth and Murnighan (1982), Roth (1995), Schelling (1960), van Huyck et al. (1992), and van Huyck et al. (1995).

In these experimental coordination studies the equal earnings outcome was however also efficient (by this we mean that it was Pareto efficient, measured in monetary terms). This raises a simple question: Suppose the equal earnings equilibrium is *inefficient* – by how much does this reduce the salience of equality as a coordination device? Coordination situations where equality necessitates a loss in efficiency seem to occur quite frequently and are therefore relevant for experimental study.¹ We are only aware of two papers that consider the salience of inefficient equality in coordination games. They are described in Section 7.

In addition to measuring how the salience of an equal earnings equilibrium varies with its degree of inefficiency, we also sought to assess two general hypotheses for why equality is salient in coordination situations with a conflict of interest: The first is that people have an individual *preference* for equality, as modeled by theories of other regarding preferences (see for example Bolton and Ockenfels (2000), Charness and Rabin (2002), and Fehr and Schmidt (1999)). The second is that the players have no or little concern for equality per se, but see the unique equal earnings outcome as a *focal point* (Schelling (1960)) that can resolve the strategic uncertainty inherent in the situation, due to the multiplicity of equilibria, and hence help players to avoid a coordination failure (Crawford (1990)). Both hypotheses can, of course, have explanatory power. We seek to disentangle

¹Consider, for example, an organization or household where efficiency requires specialization but where there are constraints on the transfers that can be made, or incomplete contracts, or players may dislike large payoff inequality. Here equality may well imply inefficiency.

them by comparing data for coordination games that have the same equal earnings equilibrium but differ in whether or not players face a coordination problem in selecting among efficient and unequal earnings equilibria. If there is such a coordination problem (as in our ‘Three-Allocation Game’, described below), then both hypotheses predict that equality remains salient even when it is (not too) inefficient. But in the absence of such a coordination problem (as in our ‘Two-Allocation Game’), the preference for equality hypothesis predicts that equality remains as salient as in the game with a coordination problem, while the focal point hypothesis predicts that inefficient equality becomes much less salient.

We observe that when there is a coordination problem in selecting an efficient and unequal earnings equilibrium, then an equal and inefficient outcome remains strongly salient, as long it is not too inefficient. Moreover, its salience decreases only gradually as its inefficiency increases. However, when there is no such coordination problem (there is a single efficient unequal earnings equilibrium), the inefficient equal earnings equilibrium is much less salient. This indicates that in coordination situations with conflict over which efficient equilibrium to coordinate on an equal and not too inefficient earnings outcome is a strong focal point primarily because it offers players a way to avoid the strategic uncertainty due to the multiplicity of efficient equilibria, and hence risk of coordination failure (Crawford (1990), Janssen (2006), and Schelling (1960)), and less because players have an inherent strong preference for equality.

The rest of the paper is organized as follows. In Section 2 we describe the coordination games. Sections 3 and 4 describe the experimental logistics and treatments. The data are described in Section 5. Section 6 considers three explanations of the data, namely focal point based payoff dominance, inequality aversion, and a level-k model. In Section 7 we describe some other papers and relate our data to findings from dictator game experiments. Section 8 concludes. The Appendix contains the instructions.

2 The Coordination Games

2.1 Three-Allocation Games

In the Three-Allocation Game Player 1 and 2 separately, simultaneously, and without pre-play communication choose one of three feasible money

allocations (in British Pounds, £):

- £ X for Player 1 and £ X for Player 2
- £6 for Player 1 and £7 for Player 2
- £7 for Player 1 and £6 for Player 2.

We refer to these allocations as (X, X) , $(6,7)$, and $(7,6)$. If the players choose the same allocation, then the allocation is paid out. If the players choose different allocations, neither player receives any money.²

We assume throughout this section that players are self-interested. Assume also $0 < X < 7$. Any outcome where both players choose the same allocation is then a pure strategy Nash equilibrium, so the game has three such equilibria, (X,X) , $(6,7)$, and $(7,6)$. The $(6,7)$ and $(7,6)$ equilibria are always efficient. The equal earnings equilibrium is inefficient when $X \leq 6$. It follows that when $X \leq 6$ there are two efficient equilibria, $(6,7)$ and $(7,6)$, and players face a coordination problem in selecting among them.

There is also a mixed equilibrium where players randomize over $(6,7)$ and $(7,6)$. Here each player chooses his or her preferred allocation with probability $7/13 \approx 0.54$, and the expected payoff to each player in this equilibrium is $42/13 \approx 3.23$.³ It follows that when X exceeds 3.23, the equal earnings equilibrium Pareto dominates the mixed equilibrium.

²Similar games are studied in van Huyck et al. (1992) and van Huyck et al. (1995), but there the equal outcome is efficient. Our game can be interpreted as a 'mini Nash demand game' (Nash (1953)), where the equal outcome can be strictly Pareto-dominated by the efficient outcomes.

³There is another mixed equilibrium where players randomize over all three allocations; here each player chooses (X, X) with probability $42/(13X + 42)$ and the least preferred unequal allocation with probability $7X/(13X + 42)$. Each player's expected payoff in this equilibrium is strictly below the one in the equilibrium where players mix over $(6,7)$ and $(7,6)$. There are also mixed equilibria with randomization over the equal and one of the unequal outcomes. For example, if players mix over (X, X) and $(6,7)$, then Player 1 chooses the equal allocation with probability $6/(6 + X)$ and Player 2 chooses the equal allocation with probability $7/(7 + X)$. Note that all the mixed equilibria involving the equal allocation have the feature that the lower the earnings X in the equal outcome are, the *more* likely players are to choose the equal outcome. As will be clear, the data clearly refute this prediction.

2.2 Two-Allocation Games

The Two-Allocation Game is identical to the Three-Allocation Game, except that subjects choose between only two allocations:

- £ X for Player 1 and £ X for Player 2
- £6 for Player 1 and £7 for Player 2.

As before, when $X > 0$ both (X, X) and $(6, 7)$ are equilibria. If $X \leq 6$, only the $(6, 7)$ equilibrium is efficient. If $6 < X < 7$, both equilibria are efficient.

The Two-Allocation Game differs by design from the Three-Allocation Game in that there is no longer a coordination problem in selecting among efficient and unequal earnings equilibria. It follows that if for a given X behavior in the Three and Two Allocation Game is observed to differ significantly, the difference can be attributed to the absence or presence of such a coordination problem.

3 Experimental Logistics

The experiments were conducted during the period September 2012 – January 2013 at the Centre for Behavioural and Experimental Social Science, at University of East Anglia (Norwich, United Kingdom). In total 380 subjects took part, in 21 sessions. The average number of subjects per session was 18.

Subjects received a hardcopy of the instructions (see Appendix) which were read out by the experimenter. The instructions explained that each subject had been matched in a pair as either Player 1 or 2, that each subject had to choose an allocation individually, and that they would only earn money if they chose the same allocation.

Money allocations were always listed with the equal allocation at top (see Appendix). We ran additional experiments where the allocations appeared in a different order; see Section 4.3.2.

After the instructions had been read out, any questions were answered. Subjects then made their decisions, received their earnings from the game (including a £2 show up fee), and left the lab. Each subject encountered and made a decision in one game only. A typical session lasted 20 minutes.

4 Experimental Treatments

4.1 Three-Allocation Games

The parameter X (measured in British Pounds) was varied in a between-subjects design, and took the following values: 6.5, 6, 5, 4, and 3.⁴ 138 subjects took part in these treatments.

4.2 Two-Allocation Games

In the Two-Allocation Games X took the same values as in the Three-Allocation Game. We recruited 124 subjects for these treatments.

4.3 Additional Treatments

We ran some additional treatments, in order to assess the robustness of the results from the main treatments.

4.3.1 Increasing the Payoff Asymmetry

In order to assess the effects of a higher payoff inequality in the efficient equilibria we collected data for the Three-Allocation Game with $X=5$ and where the unequal outcomes offer £6 to one and £9 to the other player, as opposed to £6 and £7 used in the main treatment. We recruited 54 subjects for this game. We also collected data for the Two-Allocation Game, with allocations (5,5) and (6,9). 28 subjects took part in this treatment.

4.3.2 Measuring Order Effects

In the instructions the equal earnings allocation was always listed at the top (see Appendix). A potential concern is that this could have made the equal allocation more salient, compared to the case where this allocation appeared at, say, the bottom of the list. In order to measure any order effects we ran additional sessions, for $X=5$ Three-Allocation Games. In the '67-55-76' version the equal allocation was listed as the second alternative. In the '67-76-55' version, the equal allocation was located at the bottom. We recruited 16 subjects for the first of these games, and 20 for the second.

⁴At the time of the experiment, £1 equalled \$ 1.60 or €1.20.

	X=6.5	X=6	X=5	X=4	X=3
Allocation (X,X)	100%,100%	100%,100%	77.8%,77.8%	52.9%,47.1%	47.1%,29.4%
Allocation (6,7)	0%,0%	0%,0%	5.6%,22.2%	29.4%,35.3%	35.3%,29.4%
Allocation (7,6)	0%,0%	0%,0%	16.7%,0%	17.6%,17.6%	17.6%,41.2%
ECR	100%	100%	61.7%	38.4%	31.5%
(N,N)	8,8	9,9	18,18	17,17	17,17

Table 1: Data for Three-Allocation Games. Columns are treatments, and rows allocations. Each cell contains the percentages of Player 1 and 2 subjects choosing the allocation. ECR: Expected coordination rate; N: Number of subjects in the role of Player 1 and 2.

5 Data

5.1 Three-Allocation Games

Table 1 shows the data for Three-Allocation Games. For each treatment (columns), and each feasible allocation (rows) we report the percentages of Player 1 and Player 2 subjects who chose that allocation. The expected coordination rate (ECR) is the probability, given the observed behavior, that there is coordination on any of the three allocations.⁵

When the equal allocation is efficient ($X=6.5$), everyone coordinates on it, as has been observed in all the other experiments described in the Introduction. The same is true when equality is inefficient and weakly Pareto dominated ($X=6$). When $X=5$, the (5,5) equilibrium is strictly Pareto dominated by each of the two other outcomes, but is chosen by more than three quarters of Player 1 and 2 subjects. When equality is even less efficient ($X=4$), it remains the modal choice, and about half of Player 1 and 2s continue to choose it. Finally, when equality offers only three pounds ($X=3$), the equal allocation remains the modal choice for Player 1s, and almost a third of Player 2s choose it.

⁵For example, in the game $X = 4$, $ECR = 0.529 \times 0.471 + .294 \times .353 + .176 \times .176$.

	$X = 6.5$	$X=6$	$X=5$	$X=4$	$X=3$
Allocation (X,X)	86%,86%	40%,40%	31.6%,15.8%	0%,11.1%	14%,0%
Allocation (6,7)	14%,14%	60%,60%	68.4%,84.2%	100%,88.9%	86%,100%
ECR	77%	52%	62.6%	88.9%	86%
(N,N)	7,7	20,20	19,19	9,9	7,7

Table 2: Data for Two-Allocation Games. Each cell contains the percentages of Player 1 and 2 subjects choosing the allocation. ECR: Expected coordination rate; N: Number of subjects in the role of Player 1 and 2.

5.2 Two-Allocation Games

The data for Two-Allocation Games are shown in Table 2. When $X=6.5$, almost everyone chooses the equal allocation. When $X=6$, such that the equal outcome is weakly Pareto-dominated, a majority (60 %) of subjects now avoid the equal allocation and instead choose (6,7), whereas everyone chose the equal allocation in the Three-Allocation Game. When $X=5$ an even larger majority of subjects avoid the equal allocation, whereas the opposite was observed in the Three-Allocation Game. When $X=4$ only one subject chooses the equal allocation, while about half chose it in the Three-Allocation Game. Finally, when $X=3$, almost everyone chooses the unequal and efficient allocation.

5.3 Comparing Three and Two-Allocation Games

For each X we compare the proportions of subjects who choose the equal allocation in the Three and Two-Allocation Games. We find that the difference is strongly significant ($p < .0001$ for $X = 6, 5, 4$ and $p = .0395$ for $X = 3$, Fisher's Exact Test, two-sided). Since the only difference between the games is whether or not there is a coordination problem in selecting an efficient unequal earnings equilibrium, these findings support a hypothesis that subjects in the Three-Allocation Games seek to coordinate on an equal allocation primarily because they wish to avoid the risk of coordination failure in selecting an efficient equilibrium.

5.4 Effects of Higher Payoff Asymmetry

Consider now the game with allocations (5,5), (6,9), and (9,6) (Section 4.3.1). We observe that 19 (70 %) Player 1s choose allocation (5,5), 2 (7 %) choose allocation (6,9), and 6 (23%) choose allocation (9,6). For Player 2 the numbers are 19 (70 %), 1 (4 %), and 7 (26 %), respectively. The expected coordination rate is 56 %. The difference between the number of players choosing the equal outcome in each game is not statistically significantly different (Fisher's Exact Test, $p = .47$, two-sided).

For the Two-Allocation Game with allocations (5,5) and (6,9) we observe that 2 (14 %) of Player 1s choose allocation (5,5) and 12 (86 %) choose allocation (6,9). The Player 2 frequencies are the same. The expected coordination rate is 76%. More players thus choose the efficient outcome when payoff inequality is 6–9 than when it is 6–7. However, the difference between the number of players choosing the equal outcome in each game is not statistically significantly different (Fisher's Exact Test, $p = .53$, two-sided). These findings suggest that our findings are robust to increases in the payoff inequality in the efficient outcomes.

5.5 Order Effects

We next consider if there are order effects (Section 4.3.2). In the 67-55-76 version, 5 (62.5 %) Player 1s choose allocation (5,5), 3 (37.5 %) chose allocation (6,7), and none chose allocation (7,6). The corresponding Player 2 frequencies are 5 (62.5 %), 2 (25 %), and 1 (12.5 %). In the 67-76-55 version, 8 (80 %) Player 1s choose allocation (5,5), 1 (10 %) chose allocation (6,7), and 1 (10 %) choose allocation (7,6). The Player 2 frequencies are 9 (90 %), 1 (10 %), and 0 (0 %).

A majority of players thus chose the equal allocation regardless of the order. If we compare the total number of players choosing the equal allocation, we find that there are no statistically significant differences between the three choice distributions (a Fisher's Exact Test comparing the main data with the 67-55-76 data gives $p = 0.31$, two-sided, a comparison between the main data and the 67-76-55 data gives $p = .72$, and a comparison between 67-55-76 and 67-76-55 gives $p = 0.15$). Thus there is no evidence of an order effect.

6 Explanations

In this section we consider some explanations of the data.

6.1 Inefficient Equality is a Payoff-Dominant Focal Point

In the Three-Allocation Game with $X \leq 6$, (X, X) is an inefficient outcome. This property makes it unattractive per se. Nevertheless, (X, X) stands out because it is the *unique* equal outcome, and the players have no way of selecting $(6,7)$ or $(7,6)$ without a risk of coordination failure. Thus, if X is not too inefficient, both players can expect to earn more money if they choose X than if they try to coordinate on $(6,7)$ or $(7,6)$.

If players engage in such focal point based reasoning (see Schelling (1960), Crawford et al. (2008), and Isoni et al. (2013))⁶ we predict that they will choose (X, X) in the Three-Allocation Game when X is sufficiently large, and that no one will choose an inefficient (X, X) outcome in the Two-Allocation Game. More precisely, consider for the Three-Allocation Game the ‘reduced’ two-strategy game where each player either chooses the (X, X) equilibrium or mixes over the $(6,7)$ or $(7,6)$ outcomes. When X is sufficiently large ($X \geq 3.23$, cf. Section 2.1), (X, X) is the payoff dominant (Harsanyi and Selten (1988)) equilibrium of this game. The prediction for the Three-Allocation Game is therefore that the experimental subjects select the mixed equilibrium for $X \leq 3$ and choose (X, X) for $X \geq 4$. Of course, since subjects were not allowed to submit mixed strategies we cannot expect such a pattern. A weaker prediction is that the overall attraction of the equal earnings equilibrium should increase in X , and this is what the data show. When $X \leq 6$ subjects are predicted to never choose (X, X) in the Two-Allocation Game⁷. The data are qualitatively consistent with these predictions.

Taken as whole, the hypothesis that subjects’ observed coordination behavior is significantly influenced by whether or not they face a coordi-

⁶The argument is closely related to theories of team reasoning (see for example Bacharach (2006), Bardsley et al. (2010), Casajus (2000), Janssen (2001), Sugden (1993), and Sugden and Zamarron (2006)).

⁷When $6 < X < 7$ both equilibria are efficient. In this case the most salient equilibrium can be taken to be the one offering equal earnings. Thus the prediction is that all (no) subjects choose (X, X) for $X > 6$ ($X \leq 6$).

nation problem in selecting among efficient equilibria organises the qualitative features of the data.

6.2 Inequity Aversion

Other-regarding preferences, such as inequity aversion (see Bolton and Ockenfels (2000) and Fehr and Schmidt (1999)), are often invoked as explanations of observed behavior in coordination, bargaining, and division situations, such as the Ultimatum and Dictator Game (for surveys, see Cooper and Kagel (2009) and Fehr and Schmidt (2006)).

Suppose agents have inequity averse social preferences, as modeled in Fehr and Schmidt (1999). Player 1's utility from $(6,7)$ is $6 - \alpha$, the utility from $(7,6)$ is $7 - \beta$, and the utility from (X,X) is X , where, again following Fehr and Schmidt (1999) we assume $\alpha \geq \beta$ and $0 \leq \beta < 1$. Given these assumptions $(6,7)$ and $(7,6)$ are equilibria and both efficient; (X,X) is also an equilibrium, and efficient when $\alpha > 6 - X$, which may or may not hold. Note that when $X \leq 6$, (X,X) is never payoff-dominant; this would require $X > 7 - \beta$ which is ruled out by the assumption $\beta < 1$.

Suppose $X = 5$. If $\alpha < 1$, each player's ranking of the three allocations are the same as that of a self interested person, so assume therefore $\alpha > 1$. Then Player 1 ranks the three outcomes $(7,6) \succ (5,5) \succ (6,7)$, and Player 2 has the opposite ranking. The equal allocation is thus efficient, and there is in the Three-Allocation Game a coordination problem among not only two but three efficient equilibria. $(5,5)$ can now be salient because it is efficient (due to inequity aversion), and because its unique property of equality serves, as for the case of self interested preferences, as a focal device for avoiding coordination failure in selecting between $(6,7)$ and $(7,6)$. In the Two-Allocation Game there is, as before, a coordination problem among $(5,5)$ and $(6,7)$, but now both equilibria are efficient.

Suppose the salience of $(5,5)$ in the Three-Allocation Game is primarily due to inequity aversion. Then, as just described, it is primarily the efficiency of $(5,5)$ that generates salience. But inequity aversion increases the efficiency of $(5,5)$ as much in the Two as in the Three-Allocation Game, so we would expect the equal allocation to be equally salient in the Two and the Three-Allocation Game. The data show, however, that an inefficient and equal allocation is significantly more coordinated on in the Three than in the Two-Allocation Game.

Although the data suggest that other regarding preferences cannot explain the differential salience of equality in the Two and Three-Allocation Games, there may of course still be some other regarding concerns present among subjects in general. In the Two-Allocation Game, when $X = 6$ and $X = 5$, a significant proportion of players still choose the equal earnings equilibrium. An alternative explanation is that subjects are self interested but believe, incorrectly, that other subjects have other regarding concerns. Our experiment was not designed to distinguish between these possibilities.

Considerations based on procedural fairness could lead players to be more occupied with equality in the Two-Allocation than in the Three-Allocation Game, since the latter game, due to its symmetry, can be perceived as being more procedurally fair (the players have the same opportunity to get their preferred efficient outcome in the Three-Allocation Game, while in the Two-Allocation Game only Player 2 has such an opportunity); see also Bolton et al. (2005) and Bolton and Ockenfels (2006). Note, however, that such procedural concerns should only reinforce outcome-based fairness in making (X, X) salient in the Two-Allocation Game. Thus our results can be viewed as being robust to the presence of any such procedural concerns.

6.3 Level-k Modelling

In this section we consider if a level-k model (see e.g. Crawford et al. (2013), Crawford et al. (2008), Nagel (1995), and Stahl and Wilson (1995)) can explain our findings from Three-Allocation Games.

Let $X \leq 6$. Suppose first, as assumed in Stahl and Wilson (1995) and Camerer et al. (2004), that the Level Zero (L0) player randomizes uniformly over the three allocations, (X, X) , $(6, 7)$, and $(7, 6)$. This specification cannot replicate the data. For Player 1 L1 would then choose $(7, 6)$ and Player 2 L1 would choose $(6, 7)$. Player 1 L2 players then choose $(6, 7)$ and Player 2 L2s choose $(7, 6)$. Thus only L0s choose $(5, 5)$, and since this proportion is assumed constant, this specification cannot explain why fewer people choose (X, X) when X decreases. It is also clear that an assumption that L0 chooses its preferred outcome, $(7, 6)$ when Player 1 and $(6, 7)$ when Player 2, does not organize the data for the Three Allocation Game, since L1s and L2s would then never choose outcome (X, X) .

Consider instead the following specification of the Level Zero (L0) type: With probability p , L0 chooses the preferred outcome ((7,6) when Player 1 and (6,7) when Player 2), and with probability $1 - p$, L0 chooses (X, X) . One interpretation is that L0 is influenced either by a desire to get the highest payoff, or notices that there is an outcome with an appealing property of payoff equality. Given this L0 specification, Player 1 L1 (P1 L1) chooses (6,7) when $6p > X(1 - p)$, or equivalently $X < (6p)/(1 - p) \equiv X^*(p)$, and otherwise chooses (X, X) . Similarly, P2 L1 chooses (7,6) when $X < X^*(p)$ and otherwise (X, X) . P1 L2 chooses (7,6) when $X < X^*(p)$ and otherwise (X, X) ; finally, P2 L2 chooses (6,7) when the same condition holds, and otherwise (X, X) .

The model thus predicts for the Three-Allocation Game that all L1s and L2s switch to (X, X) at the same time, when X crosses the threshold X^* ; for this to be compatible with the values of X used in the experiment we need $3 \leq X^*(p) \leq 5$, that is, $0.3333 \leq p \leq 0.4545$. Note also that it is necessary that there is a positive proportion of L0s in the population; otherwise play changes discontinuously from everyone playing (6,7) or (7,6) to everyone playing (X, X) as X reaches the critical value, $X^*(p)$. While this simple model cannot reproduce the observed gradual increase in play of the equal allocation as X increases in Three-Allocation Games, it can qualitatively replicate the observed data.

7 Related Literature

7.1 Other Studies of Inefficient Equality in Coordination Games

We are only aware of two other contributions that study coordination situations with inefficient equal earnings equilibria. Crawford et al. (2008) (CGR) collect data for ‘Pie’ games where an equal earnings allocation is weakly (but not strictly) Pareto dominated.⁸ CGR observe that most subjects choose the equal allocation. In their design the equal allocation was, however, also salient by virtue of being visually distinct from the other

⁸In one of their games the money allocations are (\$5,\$5), (\$5,\$6), and (\$6,\$5); another game offers (\$5,\$5), (\$5,\$10), and (\$10,\$5).

allocations⁹, so it is not entirely clear to what extent the observed behavior is driven by the salience of equality or by the visual appearance of the game. Our finding, that weakly dominated equality is as salient as efficient equality in a more neutral frame, thus complements and strengthens their results. Also, we extend the investigation to the case where the equal earnings outcome is strictly dominated by other outcomes.

Bett (2013) collects data from battle of the sexes type games where in some games players can coordinate on an equal but inefficient outcome. Her focus is on the salience of gender and of commonly known gender information on behavior in such an environment (see also Holm (2000)).

We should also mention the experiment by Isoni et al. (2013) who study bargaining games where surplus divisions that equate earnings can be inefficient. In their set-up equality is however only weakly, never strictly, Pareto-dominated. They observe that very few subjects coordinate on such a division. It is however not straightforward to directly compare their and our findings, since strategy sets, payoffs, and frame differ.¹⁰

7.2 Inefficient Equality Versus Efficient Inequality – Evidence from Dictator Game Studies

Our finding from Two-Allocation Games, that subjects in interactive situations coordinate on an efficient and unequal earnings equilibrium, can be related to data from non-strategic settings, where individuals divide money between themselves and others. Several studies find that most subjects, when deciding on money allocations in a dictator game, prefer an efficient unequal allocation to an inefficient equal allocation. See Balafoutas et al. (2012), Charness and Grosskopf (2001), Charness and Rabin (2002), Engelmann and Strobel (2004), Engelmann and Strobel (2006), and Kritikos and Bolle (2001) - but see also Bolton and Ockenfels (2006) and Fehr et al. (2006).

⁹In CGR's representation, players coordinated by choosing the same 'slice' from a 'pie', and the equal allocation slice had a different color than the other slices.

¹⁰In Isoni et al's set-up there are several surplus divisions that equate earnings, so players not only face a coordination problem regarding the selection of unequal and efficient allocations, but also with respect to equal and inefficient divisions. This means it is not straightforward to interpret why subjects avoid equal and inefficient divisions. In our coordination frame, there is a unique equal allocation, so there is only a coordination problem regarding which efficient and unequal earnings equilibrium to coordinate on.

The data from these dictator game studies are consistent with our findings, in the sense that if a subject as dictator prefers to sacrifice equality for the sake of Pareto improvements (say choose allocation (6,7) over (5,5), as Player 1 or 2), then it seems natural to expect that two subjects in a coordination game like our Two-Allocation Game will coordinate on an efficient and unequal equilibrium (given the individual preferences, the equilibrium where both choose (6,7) Pareto-dominates (5,5)), and this is what we observe. When there is a coordination problem among efficient equilibria (three allocations, (6,7), (5,5), (7,6)), however, most subjects choose (5,5).

8 Conclusion

Our experiment investigates how salient an equal and inefficient earnings outcome is in a coordination situation. We observe that equality is highly salient also when it is (not extremely) inefficient, but much less so when there is no coordination problem in selecting an efficient unequal earnings allocation. This indicates that the salience of equality in coordination situations is mainly due to the fact that its uniqueness and conspicuousness (Schelling (1960)) offers players a way to escape the strategic uncertainty and inherent coordination problem that clearly is an integral feature of these situations (see Crawford (1990)), rather than reflecting an inherent preference for equality.

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Appendix: Instructions

This Appendix shows the instructions used for the Three-Allocation Game with $X=5$. The instructions for the corresponding Two-Allocation Game were identical, except that there were only two allocations (i.e., the line describing allocation (7,6) had been removed).

Your ID number: _____

Thank you for taking part in this experiment. Please do not communicate with any other participant. You will be matched with one of the other participants. The two of you will play anonymously. That is, no one will learn who they are matched with.

One of you will be Player 1, and the other will be Player 2. If your ID number is odd (1,3,5 etc), you are Player 1. If it is even (2,4,6 etc), you are Player 2. In your case:

Your ID is an _____ number, so you are Player _____, and the participant you are matched with is Player _____.

Your earnings will be paid to you in cash at the end of the experiment. In addition, you receive £2 for taking part in the experiment.

What must Player 1 and 2 do?

Each person chooses one of the following three allocations of money between Player 1 and 2:

- £5 for Player 1 and £5 for Player 2
- £6 for Player 1 and £7 for Player 2
- £7 for Player 1 and £6 for Player 2

How to earn money:

If both persons choose the *same* allocation, then each person gets the money that the chosen allocation says he or she should get. But if they choose *different* allocations, each person gets no money (= £0). It is therefore in the interest of both persons to choose the same allocation.

Are there any questions?

Your decision:

Please now think carefully about this, and then make your decision by circling or underlining the allocation you choose.

When you are done, please turn this sheet face down and wait for one of the experimenters to come and collect it.

We then calculate your money earnings, and you will receive them shortly afterwards. Thank you for participating in this experiment.