ELSEVIER

Evolution and Human Behavior 31 (2010) 271 – 278

Evolution and Human Behavior

People recognise when they are really anonymous in an economic game

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Initial receipt 19 February 2009; final revision received 16 February 2010

Abstract

Mounting evidence that cues of being watched can enhance cooperative behaviour questions the existence of 'anonymous', one-shot, non-kin directed cooperation and the validity of using 'anonymous' economic games to empirically measure such behaviour in humans. Here we investigate how sensitive people are to such cuing effects. We test whether people playing an ultimatum game can use explicit information about experimental anonymity to override any effects of cuing in a public context, when faced with both simultaneously. The aims of our study were to investigate whether, (1) individuals respond to experimentally imposed anonymity within a public context and (2) the presence of known others affects cooperative behaviour over and above merely the presence of others. We find that *proposer* offers did not vary with changes in context (i.e., there was no "eyes effect") but did vary with the degree of actual anonymity and the specific presence of known others. Hence, we infer that people recognise when their decisions are anonymous or not and proposers respond to reputation concerns when they are not anonymous. *Responder* behaviour did not vary with changes in context, degree of actual anonymity or the specific presence of known others. Hence, responders do not respond to reputation concerns and use one uniform strategy, perhaps as long as the payoff structure remains constant. This latter finding may hint at selection in favour of strategies that uniformly ensure near-equal splits of resources in some environments, and thus manifest as strong fairness norms in a population.
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Keywords: Human cooperation; Altruism; Ultimatum game; Anonymous; Cues; Reputation

1. Introduction

Theoretical models and empirical work have demonstrated that cooperation can evolve and be sustained in a population if altruistic behaviour translates into reputation gains for the actor (e.g., Alexander, 1987; Milinski, Semmann, & Krambeck, 2002; Nowak & Sigmund, 1998; Panchanathan & Boyd, 2003; Wedekind & Braithwaite, 2002). However, humans appear to behave altruistically even when participating in one-shot economic experiments designed to guarantee their decisions complete anonymity (Fehr & Gächter, 2002; Henrich et al., 2001). Some researchers argue that such cooperation under one-shot anonymous conditions is an evolved behaviour and an evolutionary puzzle since the actor does not even stand to obtain reputation gains (Boyd et al., 2003; Fehr & Fischbacher, 2003; Gintis, 2000; Gintis et al., 2003). Others argue that it may be an artefact created by experimental conditions that people would not usually encounter in nature (Burnham & Johnson, 2005; Trivers, 2004). Varying the degree of anonymity does have some effect on cooperative behaviour as measured by economic games. People tend to make larger offers in economic games when other individuals can know their decisions, even if these others are only the experimenters (Andreoni & Petrie, 2004; Bohnet & Frey, 1999; Hoffman et al., 1994; Hoffman, McCabe, & Smith, 1996; Rege & Telle, 2004). This suggests that people recognise opportunities for reputation gain. However, in these and other studies we find that although increasing anonymity increases selfish behaviour, a considerable proportion of people do not adopt the selfish, income-maximising strategy, even under double-blind conditions where the experimenters cannot link decisions to specific individuals.

Decision-making processes purportedly use explicit, consciously cognised information as well as intuitive judgements elicited by cues. Haley and Fessler (2005) found that people making decisions on a computer screen displaying eyespots made higher transfers in a dictator game compared to a control group, despite no differences in actual

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doi:10.1016/j.evolhumbehav.2010.02.002

anonymity between the conditions. Similarly Bateson, Nettle, and Roberts (2006) found that pictures of eyes increased donations to an honesty box used to collect money for drinks in a university coffee room. Even when participants are explicitly made aware of the anonymous nature of their decisions, they may respond to environmental cues of being watched that prime them to behave otherwise. It has therefore been argued that part of the cooperative behaviour observed in anonymous economic games is perhaps cued tacitly despite the fact that individuals possess explicit knowledge about the conditions of the experiment (Bateson et al., 2006; Burnham & Hare, 2007; Haley & Fessler, 2005). This line of argument questions the validity of using 'anonymous' economic games to empirically measure 'anonymous', one-shot, non-kin directed cooperation in humans. We investigate how sensitive humans are to such cuing by studying the effects of 'real eyes', i.e., the presence of real people, on laboratory economic game behaviour, in order to contribute towards a resolution of these questions.

Our aims are to investigate whether, (1) individuals respond to anonymity within a public context and (2) the presence of known others affects cooperative behaviour over and above merely the presence of others.

1.1. Null Hypotheses

H_{01}. The presence of any people in a public setting (implicit cue) has no effect on cooperative behaviour if the explicit information provided about experimental conditions ensures an individual's decisions anonymity.

H_{02}. The presence of known people in a public setting (implicit cue) has no effect on cooperative behaviour if the explicit information provided about experimental conditions ensures an individual's decisions anonymity.

We used the ultimatum game (UG) played with the minimum acceptable offer method as our behavioural measure. This is a two-player game where one of a pair of individuals, the "proposer", must divide a sum of money (S) between himself and an unknown "responder". At the same time the second individual, the responder, independently indicates the minimum offer that he is willing to accept (y). If the responder's minimum acceptable offer (y) is either less than or equal to the proposer's offer (x), then the responder earns x, and the proposer earns S-x. If $y>x$ then neither player earns anything. We chose the ultimatum game as our behavioural measure for two reasons: (1) This game has been widely used as a measure of one-shot, anonymous, non-kin directed cooperation (e.g., Henrich et al., 2001), and neither proposers nor responders always adopt the selfish income-maximising strategy; we wanted to test whether cued reputation considerations explain any part of this behaviour. (2) Proposer behaviour in the UG is predicted to be a best response to responder behaviour (e.g., Bolton & Ockenfels, 2000; Fehr & Schmidt, 1999) and the game as a whole is taken to capture extant cooperative or fairness norms. However, to our knowledge there has been no work testing the sensitivity of responder behaviour to the effects of varying anonymity (except Bolton & Zwick, 1995) or cuing, or whether proposer behaviour mirrors any such effects.

The ultimatum game was played under three conditions as described below.

Anonymous UG in *Anonymous* context (Condition *AA; Completely Anonymous*): A double-blind anonymous ultimatum game was played such that no one, including the experimenters, could link a decision to a participant. Participants were made explicitly aware of this set-up prior to making their decisions. All participants made their decisions in complete privacy, in the absence of any other individual.

Anonymous UG in *Public* context (Condition *AP; Anonymous in Public*): A double-blind anonymous ultimatum game was played such that no one, including the experimenters, could link a decision to a participant. Participants were made explicitly aware of this set-up prior to making their decisions. All participants were seated in the same room and made their decisions independently, but in the presence and full view of all other participants.

Public UG in *Public* context (Condition *PP; Completely Public*): An ultimatum game was played such that all decisions were made public knowledge once all participants had made their decisions, so that decisions could be linked to specific individuals. Participants were made explicitly aware of this set-up prior to making their decisions. All participants were seated in the same room and made their decisions independently, but in the presence and full view of all other participants.

Note that the real degree of anonymity (explicit information) was the same for the *completely anonymous* (AA) and *anonymous in public* (AP) conditions, but the context (implicit cue) differed and was anonymous for AA and public for AP. Conversely, the public context (implicit cue) was the same for the AP and *completely public* (PP) conditions, but the real degree of anonymity (explicit information) differed between the two. In conditions AP and PP, data were collected on the number of individuals known to the participant in that session.

1.2. Predictions

H_{01}. All possible experimental outcomes are mutually exclusive. H_{01} cannot be rejected if either of the following outcomes is obtained:

(i) There is no difference in behaviour between the three conditions, indicating that people use a single strategy independent of context and degree of anonymity, perhaps as long as the payoff structure of the game remains the same.
(ii) Behaviour varies only with a change in information about real anonymity between the AP and PP

conditions, indicating that implicit cuing from the public context has no effect on game behaviour if explicit information ensures anonymity in the game.

H_{01} will be rejected if either of the following outcomes is obtained:

(i) Behaviour varies only with a change in context between the AA and AP conditions, indicating that implicit cuing from the public context completely overrides explicit information ensuring anonymity in the game.
(ii) Behaviour varies with both, a change in context between the AA and AP conditions, and a change in anonymity between the AP and PP conditions, indicating that both implicit cuing from the public context and explicit information about anonymity influence game behaviour.

Note that if behaviour varies between either, the AA and AP conditions, or between the AP and PP conditions, then we should expect a difference in the same direction between the AA and PP conditions.

H_{02}. H_{02} will be rejected if the number of individuals known to a participant in the AP condition correlates with offers/minimum acceptable offers, indicating that specifically the presence of known others influences game behaviour even when explicit information ensures anonymity in the game.

2. Methods

University College London (UCL) students (n=156) were recruited through advertisements posted around the campus as well as by email. We further advertised amongst students from the same second year undergraduate Biology class so that each experimental session would contain some individuals belonging to the same class who knew each other and others who did not know anyone. Mean age of participants was 22.4±4.9 years, and 41% of participants were male.

The pie size (S) for all games was £10 with offers and responses restricted to units of £1. All participants received a £3 show-up fee. Each participant played the game once and in only one condition. Participants in all three conditions filled in a game response sheet on which they made their game decisions, answered two questions testing whether they had correctly understood the game rules, and recorded their sex, age, and whether they had any previous knowledge of or experience with economic games. Participants in the AP and PP conditions filled in an additional acquaintance sheet. On this sheet, they recorded the number of individuals present in the room (including the two experimenters) that fell into the following categories, in roughly descending order of familiarity: (1) People they knew by name and interacted with often. (2) People they knew by name and interacted with sometimes. (3) People they knew by name but very rarely interacted with. (4) People they knew by face but very rarely interacted with. (5) People they had never seen before. For each participant, the first four categories were summed to obtain the total number of individuals known to the participant in the session. Note that participants always received the acquaintance sheet after making their game decisions.

In all three conditions, participants were provided explicit instructions about the set-up and degree of anonymity of their decisions prior to making their game decisions. Nine out of a total 156 participants failed to answer both test questions correctly and were excluded from the analyses. Nonparametric statistics and general linear models (GLM) were used to analyse the data using SPSS version 16.0.2. Bootstrap confidence intervals were generated in the statistical package R 2.8.1 (http://www.r-project.org/).

Each condition had two phases; the decision-making phase and post-decision-making phase. Conditions AP and PP had the same experimental set-up during the decision-making phase, and conditions AA and AP had the same set-up during the post-decision-making phase.

2.1. Experimental set-up in decision-making phase

In the AA condition, four participants were invited at a time to sessions at the Anthropology Department at UCL with arrival times staggered at ten-minute intervals to prevent contact between them. Each person was immediately escorted upon arrival to one of four experiment rooms. In the experiment room, the participant was presented with a box containing several identical brown envelopes, each enclosing a proposer, responder, or blank sheet. The participant selected one of these envelopes. If an envelope containing a blank sheet was selected, the participant picked another envelope until one with a non-blank sheet was chosen. This reduced the likelihood that the last participant to select an envelope in a session knew that s/he was the last to do so. The procedure ensured that the experimenters could not know whether a participant was a proposer or responder. The participant was left alone to fill in the game sheet so that no one, not even the experimenter, was present in the room. Participants did not know how many other individuals were in their session. They also did not meet at any point during or after the session, and were explicitly informed about this in the instructions they received.

In the AP and PP conditions, participants were seated in a large lecture theatre at least two seats apart in each direction from any other individual in the room. Half the participants of a session received proposer sheets and the other half received responder sheets at random, from a pre-arranged bundle of alternating proposer and responder game sheets with an identical first page of instructions. All game decisions were made in the presence and full view of others but remained private knowledge at this stage in both

conditions. Conditions AP and PP differed only once all participants had made their game decisions.

2.2. Experimental set-up in post-decision-making phase

In the AA and AP conditions, a double-blind procedure was implemented to ensure that even the experimenter could not link decisions to specific individuals. Upon making their game decisions, participants entered a private room (condition AA) or private booth at the front of the lecture theatre (condition AP) respectively, one at a time. Here each person selected one of several pairs of numbered envelopes. Both envelopes had the same number on them and one was sealed while the other was open. This privately chosen number was an individual's only identification. Participants deposited their sheets in the unsealed envelope into one of two appropriate boxes labelled either proposer or responder. They retained the sealed envelope (containing the acquaintance sheet in condition AP) and took it back to their rooms (condition AA) or seats (condition AP). Once everyone had deposited their game sheets, the experimenters entered the private room (condition AA) or booth (condition AP), randomly paired proposers with responders and created payment envelopes, labelled with the appropriate identification numbers and containing the appropriate amounts of money, according to the outcome of each paired interaction. In the meantime participants in condition AP filled in their acquaintance sheets. Once the payment envelopes had been created, a third previously uninvolved person collected the payment envelopes and took them to the department exit (condition AA) or outside the lecture theatre (condition AP). Participants then departed one at a time, handed in their second envelopes (containing the acquaintance sheet in condition AP) to this person and collected their matching payment envelopes in exchange. This process ensured every individual's decisions complete anonymity from anyone, including the experimenters, since:

1. Participants did not put their names on their response sheets and were only identifiable by the number on their envelopes, which they had selected in a private room (condition AA) or booth (condition AP) and which no one else had access to.
2. The experimenters created the payment envelopes according to identification numbers inside a private room (condition AA) or booth (condition AP), and a third individual who had not been party to these proceedings handed them out to participants one at a time. Hence neither the experimenters nor any other participant could know how much money any participant received.

In the PP condition, upon making their decisions, participants deposited their game sheets into one of two appropriate boxes labelled either proposer or responder at the front of the lecture theatre and then collected the acquaintance sheet from one of the experimenters. The experimenters randomly paired proposers and responders and recorded the outcome of each game while participants filled in their acquaintance sheets. The name of each participant was announced along with their indicated offer or minimum acceptable offer, to everyone assembled in the room. Finally, the acquaintance sheets were collected and payments were made.

Note that if an odd number of individuals were present in any session of the three conditions, one individual was paired randomly with someone from a previous session in order to determine the outcome of the interaction and the payoff to that individual. This does not confound our analyses, which are conducted on the offers and minimum acceptable offers of individuals, not their payoffs.

3. Results

The AA condition was run over 17 sessions, AP condition was run over three sessions (mean number of participants per session±S.D.=15.67±4.93), and PP condition was run over four sessions (mean number of participants per session±S.D.=13.25±2.87). The number of participants did not vary significantly between sessions for either the AP (chi-squared test: χ^2=3.11, *df*=2, *p*=.212) or PP (chi-squared test: χ^2=1.87, *df*=3, *p*=.600) conditions.

3.1. Proposers

3.1.1. Offers do not differ between the AA and AP conditions, but do differ between the AP and PP conditions

The modal offer for all three conditions is £5 (Fig. 1A). Individuals make offers as low as £1 in the AA condition [mean=4.57, 95% BCa confidence interval=(3.96, 4.86), *n*=28], never make offers greater than £5 and less than £3 in the AP condition [mean=4.52, 95% BCa confidence interval=(4.17, 4.69), *n*=23], and make offers of up to £7 in the PP condition [mean=4.96, 95% BCa confidence interval=(4.52, 5.26), *n*=27].

Offer distributions across the three conditions are significantly different at the 0.01 level (Kruskal-Wallis test: χ^2=5.42, *df*=2, Monte Carlo simulated *p*=.065; Fig. 1A). Offers do not differ significantly between the AA and AP conditions (Mann–Whitney *U*=267, *n*=51, Monte Carlo simulated *p*=.234). Offers are significantly lower in the AP than in the PP condition (Mann–Whitney *U*=208, *n*=50, Monte Carlo simulated *p*=.019).

Offers are lower in the AA than in the PP condition, but not significantly so (Mann–Whitney *U*=317, *n*=55, Monte Carlo simulated one-tailed *p*=.119). However, once individuals with prior experience of the games are excluded from the analyses, this difference becomes significant (Mann–Whitney *U*=225, *n*=49, Monte Carlo simulated one-tailed *p*=.042). The exclusion of experienced individuals does not change the other results (Kruskal-Wallis test: χ^2=7.06, *df*=2, Monte Carlo simulated *p*=.027; AA vs. AP: Mann–Whitney

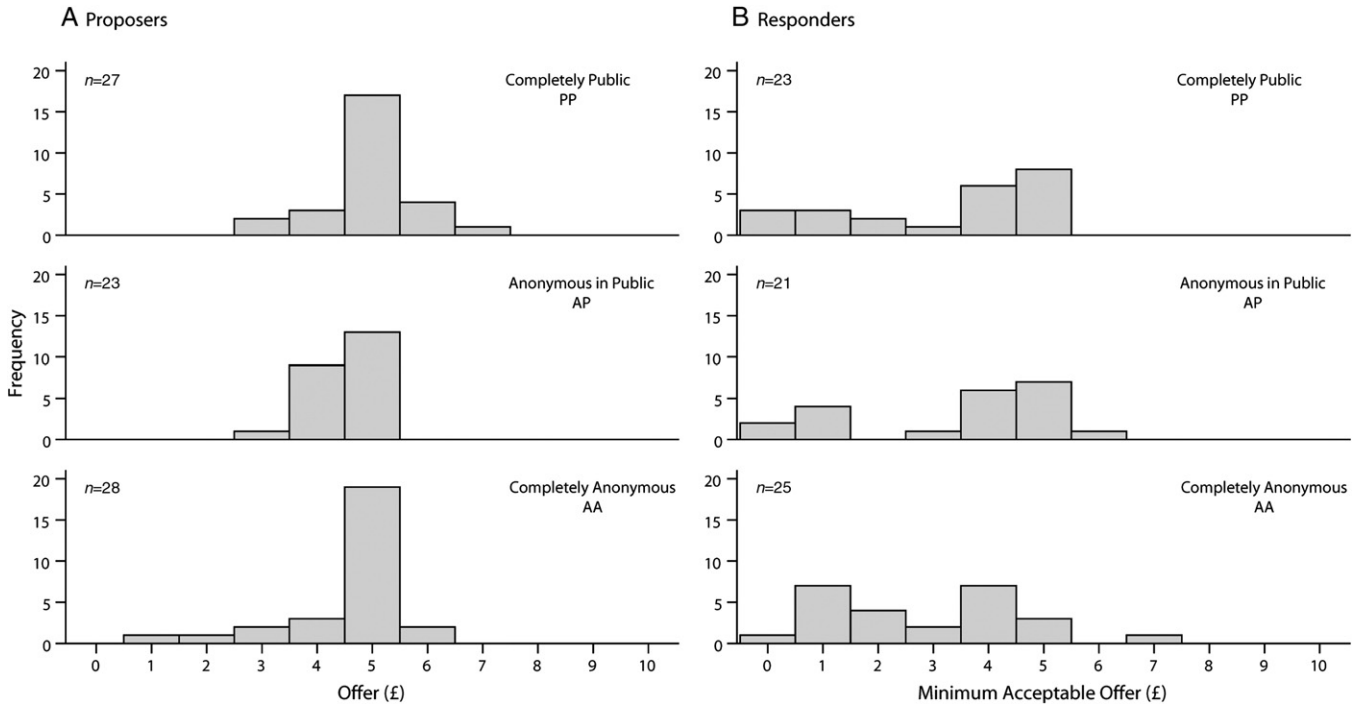

Fig. 1. Frequency distributions of (A) proposer offers and (B) responder minimum acceptable offers for the three conditions: AA, AP and PP. Proposer offers do not differ between the AA and AP conditions (Mann–Whitney U=267, n=51, Monte Carlo simulated p=.234) and are significantly lower in the AP than in the PP condition (Mann–Whitney U=208, n=50, Monte Carlo simulated p=.019). Responder minimum acceptable offers do not differ between the AA and AP conditions (Mann–Whitney U=206.50, n=46, Monte Carlo simulated p=.206) or between the AP and PP conditions (Mann–Whitney U=225.50, n=44, Monte Carlo simulated p=.700).

U=201.50, n=45, Monte Carlo simulated p=.266; AP vs. PP: Mann–Whitney U=114.50, n=40, Monte Carlo simulated p=.009).

3.1.2. The presence of known others does affect offers

The mean number of people known to participants was 1.39±3.11 individuals in the AP condition and 0.32±0.59 individuals in the PP condition. In both conditions taken together, 60% of people knew no one, and 95% knew two or less people. Table 1 (Model 1) reports results from a GLM with offer as the dependant variable, condition as an explanatory variable and a binary variable coding for whether a participant knew at least one other person in the session or not as the second explanatory variable. Condition has a significant main effect with lower offers being made in the AP condition (β=−1.04, n=50, p=.004). The number of people known does not have a significant main effect but it has a significant interaction effect with condition (condition AP ∗ none known: β=0.94, n=50, p=.037). While participants in the PP condition make higher offers when they know at least one person in the room (marginal mean±S.E.=5.43±0.274) as opposed to when they do not (marginal mean±S.E.=4.80±0.162), those in the AP condition make lower offers when they know someone in the room (marginal mean±S.E.=4.39±0.201) as opposed to when they do not (marginal mean±S.E.=4.70±0.229). These analyses were run controlling for age, sex and experience and this did not change the main results.

3.2. Responders

3.2.1. Minimum acceptable offers do not differ between the three conditions

The bi-modal distribution of minimum acceptable offers in the AA condition [mean=2.84, 95% BCa confidence interval=(2.16, 3.48), n=25] has modes at £1 & £4, while the modal minimum acceptable offer for both the AP [mean=3.43, 95% BCa confidence interval=(2.52, 4.10), n=21] and PP [mean=3.22, 95% BCa confidence interval=(2.35, 3.87), n=23] conditions is £5 (Fig. 1B).

Minimum acceptable offer distributions are not significantly different across the three conditions (Kruskal-Wallis test: χ^2=1.82, df=2, Monte Carlo simulated p=.411; Fig. 1B). Pair-wise comparisons confirm the absence of a difference between the three conditions (AA vs. AP: Mann–Whitney U=206.50, n=46, Monte Carlo simulated p=.206; AP vs. PP: Mann–Whitney U=225.50, n=44, Monte Carlo simulated p=.700; AA vs. PP: Mann–Whitney U=242, n=48, Monte Carlo simulated p=.346). Excluding individuals with prior experience of the games does not change these results (Kruskal-Wallis test: χ^2=1.95, df=2, Monte Carlo simulated p=.387; AA vs. AP: Mann–Whitney U=144.50, n=39, Monte Carlo simulated p=.189; AP vs. PP: Mann–Whitney U=136.50, n=37, Monte Carlo simulated p=.291; AA vs. PP: Mann–Whitney U=178.50, n=38, Monte Carlo simulated p=.972).

Table 1
GLM results with proposer offer (Model 1) and responder minimum acceptable offer (Model 2) as the dependent variables respectively

Model	R^2	Explanatory variable	Marginal mean±S.E. (£)	F	β±S.E.	p
1	0.173	Condition		6.757		.013
		AP	4.542±0.152		**-1.044±0.339***	.004
		PP†	5.114±0.159			
		People known		0.506		.480
		None	4.750±0.140		-0.629±0.318	.054
		At least one†	4.907±0.170			
		Condition * People known		4.601		.037
		*AP * None*	4.700±0.229		**0.944±0.440***	.037
		*AP * At least one*†	4.385±0.201			
		*PP * None*†	4.800±0.162			
		*PP * At least one*†	5.429±0.274			
2	0.036	Condition		0.120		.731
		AP	3.361±0.421		0.833±0.956	.388
		PP†	3.147±0.454			
		People known		0.276		.602
		None	3.092±0.394		0.294±0.907	.748
		At least one†	3.417±0.478			
		Condition * People known		1.000		.323
		*AP * None*	2.889±0.637		-1.239±1.238	.323
		*AP * At least one*†	3.833±0.552			
		*PP * None*†	3.294±0.463			
		*PP * At least one*†	3.000±0.780			

NOTE. AP and PP indicate the *anonymous in public* and *completely public* conditions respectively.
Model 1: $df_{factors}$=3, df_{error}=46; Model 2: $df_{factors}$=3, df_{error}=40.
Parameter estimates (β coefficient) indicate the difference between a variable level and its reference category (†).
* Values in bold are statistically significant at p<.05.

3.2.2. The presence of known others does not affect minimum acceptable offers

A GLM with minimum acceptable offer as the dependent variable, condition as an explanatory variable and a binary variable coding for whether a participant knew at least one other person in the session or not as the second explanatory variable shows no effect of either condition or knowing people in the session (Table 1; Model 2). These analyses were run controlling for age, sex and experience and this did not change the main results.

4. Discussion

We find that proposer offers do not differ between the AA and AP conditions but differ significantly between the AP and PP conditions (Fig. 1A). Hence, since game behaviour does not vary with context (between the AA and AP conditions) but only varies with explicit information about anonymity (between the AP and PP conditions), we cannot reject the null hypothesis H_{01} for proposers. We infer that in our experiments, any cues of being watched derived from just the presence of other people, had no effect on proposers' cooperative behaviour if explicit information about experimental conditions ensured their decisions anonymity.

People make higher offers when they know others in the PP condition and make lower offers when they know others in the AP condition (Table 1; Model 1). We therefore reject the null hypothesis H_{02} for UG proposers and infer that the presence of known people has an effect on cooperative behaviour even if the explicit information provided about experimental conditions ensures individuals' decisions anonymity. The finding that people make higher offers in the PP condition when they know other people in the room may be interpreted as a strategic response to an opportunity to build a reputation for generosity. The result that they make lower offers when they know other people in the room in the AP condition creates more of a puzzle. That participants in the AP condition respond at all to the presence of known others may be interpreted as a response to implicit cuing since experimental conditions ensure individuals' decisions complete anonymity. However, the direction of this response (a decrease in offers) suggests that the effect of cuing itself may be context dependent, providing a strategic benefit. People may experience greater competition with their peers, or expect that peers will accept low offers, and may hence use experimental anonymity to maximise payoffs while protecting their reputations; these hypotheses need to be tested. People may also respond differently to cuing in larger or smaller groups, depending on whether perceived anonymity increases or decreases. Our experiments should be replicated to examine whether their results are valid across groups of different sizes.

Responder minimum acceptable offers do not differ between the three conditions (Fig. 1B). Hence, the null hypothesis H_{01} is not rejected for responders. Moreover, the number of known others has no effect on responder

behaviour (Table 1; Model 2), and hence, H_{02} is not rejected for responders. These results suggest that responders did not respond to reputation considerations and used a single strategy independent of context, perhaps so long as the payoff structure remained the same; this corroborates Bolton and Zwick's (1995) finding that responder behaviour is not significantly affected by the degree of experimenter-subject anonymity. Our results contribute to a growing body of evidence (e.g. Oosterbeek, Sloof, & van de Kuilen, 2004) suggesting that responders in some societies care considerably about relative payoffs. This may hint at selection in favour of strategies that uniformly ensure near-equal splits of resources for second-movers in a bargaining situation. Such strategies may be beneficial in stochastically more stable environments, where consideration of relative payoffs may be more important for long-term fitness than maximising absolute payoffs in the short-term. Fairness norms could thus be inequity-averse behavioural strategies that become frequent due to their adaptive advantage to individuals in certain environments.

In summary, the "eyes effect" worked neither on proposers nor on responders in so much as both did not respond to any cuing effects from just the presence of other people. Hence, while cuing may work under certain conditions (e.g., Bateson et al., 2006), explicit information can override it, and some economic games may be reliable experimental measures of anonymous, one-shot, non-kin directed cooperation. A study on the effects of anonymity on church offerings (Soetevent, 2005) found that people made smaller contributions when collections were made in closed bags as opposed to open baskets, despite the fact that all collections were made in a public context. In our study, UG proposers demonstrated reputation considerations when their decisions were made public knowledge while responders did not. These results contradict the predictions of models that suggest that proposer behaviour should be a best response to responder behaviour in the ultimatum game (e.g. Bolton & Ockenfels, 2000; Fehr & Schmidt, 1999). Our findings pose an interesting question as to whether proposer and responder strategies are influenced by different considerations and selection pressures; this conjecture is also supported by a meta-analysis of 75 ultimatum game studies (Oosterbeek et al., 2004) which has shown that proposer and responder behaviour do not always co-vary in the same way.

Some economic games appear to be more susceptible to cuing effects than others. Charness and Gneezy (2008) found that the revelation of player family names had an effect on dictator game transfers but not on ultimatum game offers. Indeed there is accumulating evidence that the dictator game is a volatile measure of behaviour (Bardsley, 2008). The public goods game is more stable with respect to experimenter-subject effects (Laury, Walker, & Williams, 1995) and social interaction (Gächter & Fehr, 1999). The one-shot, anonymous ultimatum game may be a robust measure of behaviour, perhaps because it elicits greater concern with relative payoffs between members of an interacting dyad. Researchers using experimental games to measure behaviour should choose their tools carefully, and take account of cuing effects in their study designs.

Acknowledgments

We thank Katherine Balolia and members of the UCL Human Evolutionary Ecology Group for assistance with running the experiments, the UCL Graduate School and The Cogito Foundation for financial support.

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