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**The Frames behind the Games: Player's Perceptions of Prisoners Dilemma, Chicken,  
Dictator, and Ultimatum Games**

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**Abstract**

The tension between cooperative and selfish impulses is a challenge for every society. But how is this problem perceived by individual participants in the context of a behavioral games experiment? We first assess individual differences in players' propensity to cooperate or defect in a series of experimental games. We then use open-ended interviews with a subset of those players to investigate the various concepts (or 'frames') they use when thinking about self-interested and cooperative actions. More generally, we hope to raise awareness of player's perceptions of experimental environments to inform both the design and interpretation of experiments and experimental data.

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## **Introduction:**

Cooperation is the foundation of human social life. Although progress toward an adequate understanding of cooperation has been made in recent years it remains insufficiently understood. Cooperative choices benefit the group, and are thus collectively rational, but sometimes those choices for an individual imply that the fundamental assumption of both economics and evolutionary biology - that of individual self-interest - has been violated. This tension between cooperative and competitive impulses is an ancient dilemma in all human societies, but how is this problem perceived by individuals?

For much of the twentieth century economics was concerned principally with the underlying mathematical structure of its models, not with social context or actual human psychology. This perspective was also adopted in game theory as it developed in the mid-twentieth century. Although many game theorists still view game theory as intended only to describe idealized players inhabiting abstract worlds rather than real players in human societies, this view is being increasingly challenged both in game theory and economics more generally (see Bruni and Sugden 2007). As Gold and Sugden comment in Bacharach (2006, p.xvi):

“Conventional game theory confuses the world as seen by the theorist with the world as seen by the decision-making agent. In constructing a stylized mathematical model of an interaction, the game theorist *imposes* a particular conceptual scheme on the world.”

We don't pursue this debate here, but simply note that it is to the behavioral approach to game theory that this paper seeks to make a contribution.

There is currently no one accepted 'best approach' to the study of cooperation. It remains a significant problem not only in the social sciences but also in economics and

evolutionary biology, where the concept carries considerable theoretical weight. Influential approaches from economics include, *inter alia*, Bolton and Ockenfels (2000), Sugden (1993, 2003), Dufwenberg and Kirchsteiger (2004), Burnham and Johnson (2005) and Bacharach (2006). Most of these and numerous other scholars have run experiments under the broad umbrella of ‘behavioral game theory’ in the rather artificial context of a laboratory (see Camerer 2003 for a review), but to what extent do the experimentalists’ assumptions about how players interpret their environment coincide with players’ actual perceptions?

We present an analysis of interviews with university students about the ways in which they played a set of one-shot Prisoners Dilemma and Chicken games, as well as one Dictator and one Ultimatum game. Games such as these are routinely used by economists to explore aspects of human cooperation and competition. In a larger study, of which these interviews are a part, we used this series of games to ask questions about the sources and circumstances of self-interested and cooperative human action. Secondly, we can identify possible connections between play across these games. Thirdly, we wanted to use established methodologies from anthropology in a novel application to economics. Finally, we hope to raise researchers’ awareness in the wider field of behavioural game theory of players’ perceptions such as those presented in the body of this paper. Such knowledge can inform both the future design of experiments and the understanding of experimental data.

## **1. Description of the Games**

### 1.a) Prisoner’s Dilemma

In a standard two-person “Prisoner’s Dilemma” (PD) game, each player chooses to cooperate or defect. There are four possible outcomes: both players co-operate, so each receives (**R**eward); both players defect, so each receives (**P**unishment) (R&P together constituting the ‘main diagonal’); one player cooperates, one defects; so the cooperator

receives (**Sucker**) and the defector receives (**Temptation**). The PD game's payoffs always satisfy:  $T > R > P > S$ .

The following diagram shows the first Prisoner's Dilemma game the students were asked to play. In our notation 'cooperate' is always choice 'A' and 'defect' is choice 'B'.

**Figure 1: The 2x2 PD Game**

		Player 2	
		<b>A</b>	<b>B</b>
Player 1	<b>A</b>	4,4	0,6
	<b>B</b>	6,0	2,2

The PD game has a dominant-strategy equilibrium for both players of [B, B]. However economists call this self-interested solution 'Pareto inferior' as each player views [B, B] as less preferred than [A, A]. The cooperative joint outcome [A, A] (also the payoff-dominant outcome; Harsanyi and Selten 1988) can only be achieved if each player is motivated by the 'best for both' aspect of an 'A' choice, and has sufficient trust that the other player will share that motivation. A willingness to bear risk, as well as a cooperative disposition, is then required before a player can justify choosing option 'A'. Both risk-aversion and selfishness can independently lead an individual to a 'B' choice (see Colman 1995). Social psychologists use the payoff difference [**T-R**] to measure the greed incentive, and [**P-S**] to measure the fear motive, and both are present in the PD (Simpson 2006).

To illustrate the importance of the differing implicit preconceptions even eminent scholars bring to the study of the one-shot PD, perhaps reflecting different assumptions about the purpose of economic models, consider the following statements. Anatol Rapoport (1989 p.203) comments:

“The different prescriptions of decisions based on individual and collective rationality in some conflict situations cast doubt on the very meaningfulness of the facile definition of ‘rationality’ as effective maximization of one’s own expected gains”

But in the same volume Aumann (1989 p.23), although not addressing Rapoport, stridently opposes any effort to justify a cooperative choice in the one-shot PD game:

“Worse than just nonsense, this is actually vicious, since it suggests that the prisoner’s dilemma does not represent a real social problem that must be dealt with”.

However, List (2006) presents evidence from a TV game show which finds a significant minority of participants choose cooperatively in a situation analogous to the PD, even when thousands of dollars are at stake, implying the social problem represented in the PD may be less widespread than Aumann fears. More recently, Bacharach’s (2006) theory has provided a broader framework which can encompass both perspectives. In particular the discussion contained in pp.169-175 presents a perspective that seems compatible with the body of evidence from social psychology (Colman *et al* 2008). Bacharach argues that the main diagonal of a symmetric PD game will for some people prompt a perceptual frame in which players’ perceived common interest leads them to identify as part of a dyad and the choice to be made as one for ‘us’ rather than for ‘me’.

Gold and Sugden note in Bacharach (2006) that Bacharach hoped<sup>1</sup> to build the agents’ frames- “the sets of descriptions that the players use to represent the problem to themselves” into the model of a game<sup>2</sup>. Frames are then the set of concepts used when one thinks about one’s situation in a games context. ‘We’-thinking is the frame players may bring to a decision that in certain circumstances can lead them to pursue joint-payoff maximization. (See also Tomasello et al. (2005) on the evolution and development of the uniquely human capacity for

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<sup>1</sup> Gold and Sugden brought Bacharach’s unfinished work to fruition following his untimely death in 2002.

“shared” or “we” intentionality.) For other players no such frame is prompted and the problem is perceived as one for ‘me’. Bacharach (2006, p.170) likens this to the famous drawing which some perceive as a dark vase but others perceive as two opposing white faces.

Bacharach’s approach is not restricted to Prisoner’s Dilemma-type games, but explicitly applies more broadly to coordination games and other common interest games, including Chicken games, although it does not apply to constant sum games. As we share Bacharach’s approach we let our subjects interpret the games as they see fit, passing no judgment on the “rationality” of either their decisions or explanations.

1b) Chicken

There are important similarities and differences between PD and Chicken games. The Chicken Game takes a similar form to PD, except that the payoff rankings always satisfy:  $T > R > S > P$ ; the first such game our participants played is shown in Figure 2.

**Figure 2: The 2x2 Chicken Game**

		Player 2	
		<b>A</b>	<b>B</b>
Player 1	<b>A</b>	5,5	4,14
	<b>B</b>	14,4	2,2

In a Chicken game there is also a tension between cooperative and selfish impulses. But now mutual cautiousness leads to outcome [A, A] if both players avoid the lowest minimum. Option B is only selected by players who are willing to take on risk and also seek an advantage over the other. Referring back to the payoff differences introduced earlier, the Chicken game retains the greed incentive of [T-R] but the fear motive for defection is now

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<sup>2</sup> Bacharach’s ‘variable frame’ theory is described in more detail in Bacharach and Bernasconi (1997). This

negative, suggesting risk-aversion should promote cooperation. The Chicken game is less controversial than the PD at least because a cooperative choice can be rational whether a player sees the choice as for 'us' or as one for 'me'. It is the frequency of 'A'-choices rather than the existence of 'A'-choices that creates a puzzle for standard theory. Importantly, Thaler and Camerer (2003) argue Chicken is more suited to investigating cooperative versus competitive tensions than Dilemma games, because the 'fear' motive for defection is eliminated.

#### 1c) Ultimatum and Dictator Games

Ultimatum and Dictator Games, while quite different to PD and Chicken Games, are also well-known. In the Ultimatum Game a proposer offers a division of \$30 and a responder chooses whether to accept or decline. If he accepts, the division is as proposed; if he declines, each party gets zero. In the Ultimatum game economic theory suggests only a tiny offer will be made by a proposer which is also accepted by a responder. In contrast, numerous experiments have found a prevalence of substantial proposer offers. In our Dictator game a dictator also proposes a division of \$30, but this time the responder has no choice but to accept any proposal. Economic theory now predicts an offer of zero in the Dictator game, but as with the Ultimatum game, many experiments find positive offers from the proposer suggesting anomalous generosity.

#### 1d) The Frames

Partly with the hope of assisting economists' model development, we interviewed subjects to probe their conscious motives, rather as the labor and macroeconomic literature does when business leaders are interviewed to shed light on issues such as downward wage

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usage of 'frame' should not be confused with experimentalists' manipulation of descriptions to investigate



rigidity (e.g., Campbell and Kamlani 1997; Bewley 1998)<sup>3</sup>. Our interviews were designed to elicit material that would help us to identify and describe the frames used by the students to guide or rationalize their decisions to cooperate or defect in these games. Subjects' reflections can help us to better understand the perceptions that influence play in these kinds of laboratory environments. In particular, we sought to discover whether any of the following conceptualizations from the behavioral game theory literature finds support in players' reflections: self-interest, fairness, 'we'-thinking, inequality-aversion (Bolton and Ockenfels 2000) and guilt-aversion (Battigalli and Dufwenberg 2007). Or are there other models that better account for players' actions?

Another reason that we are interested in subjects' perceptions of their decisions to cooperate or defect is that we assume that frames necessarily intervene between any evolved psychobiological potentials to cooperate or compete and the player's experimental environment. Indeed we argue that frames are necessarily a part of, or reflect, any psychological mechanism whereby such dispositions *to* action *become* action. Bacharach (2006, chapter 3) makes a radical attempt to unify facets of economic and evolutionary theories of cooperation as both adaptive and rational using the concept of contingent 'we'-thinking. He also derives an evolutionary explanation for the origins of the potential for 'we'-thinking' frames based upon the evolutionary origins of group identification:

“Group identity implies affective attitudes which are behaviorally equivalent to altruism in Dilemmas, and it can explain what altruism cannot, notably human success in common-interest encounters” (p.111).

Although not referenced by Bacharach, we suggest one proximate mechanism for how 'we'-thinking is manifested in individual affective attitudes can be explained using Damasio's (1994) 'Somatic Marker Hypothesis'. This hypothesis holds that because nature

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'framing effects'.

‘built the apparatus of rationality [the cerebral cortex] not just on top of the apparatus of biological regulation [the limbic system], but also from it and with it’, our emotional responses “mark,” or represent, the body’s (soma’s) interests in decision making. In other words, when decisions involve cooperation, these affective markers are nature’s way of predisposing individuals to capture potential *future* rewards from *current* cooperation.

## 2. Methods

### 2a) The Experiment

We assessed individual differences in subjects’ propensity to cooperate experimentally, using a computerized series of: a) twenty one-shot PD games; b) twenty one-shot Chicken games; c) an Ultimatum game as the proposer; d) an Ultimatum game as the responder; e) a Dictator game, and finally f) one more PD game shown first with a male name [John] for the column player and then with a female name [Susan]. The games were run on a custom-designed series of web pages.

One hundred and three university student players from a variety of disciplines were recruited in groups of 6-10 to play the games in a computer lab. No subject participated in more than one session. Subjects sat in front of a computer on which the introductory web-page for the experiment was displayed. The administrator also projected the display onto a large white screen at the front of the lab, to assist in the explanation. The students were shown how to read the matrix displays (which also had a verbal explanation next to each matrix) and how to record their guesses of how others might choose in the same game. After completing some practice games and having an opportunity to ask questions, subjects were left to complete the series of games in their own time.

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<sup>3</sup> We thank Martin Dufwenberg for suggesting this connection.

For payment, an incentive-compatible design was used, and explained carefully during the introduction. We used a fictional currency, Ducats, with 1 Ducat = A\$2. Students were paired according to an ID number placed inside a sealed envelope beside each computer. The ID joining the pair was not revealed until the end of the experiment, so the identity of the other player could not be known until all decisions of both players had been completed. In other words, there were no opportunities for communication, feedback or learning, minimising any super-game effects.

When the players had been paired, one of the pair drew a ticket from a box containing a number from 1-45. This ticket selected the game to be played out. Both players' responses to this game were then retrieved and they were paid according to the choice combination that resulted. It was not possible to know which one of the games would be played out for money until all games had been played. So, while all decisions were incentivised *ex ante*, only one game was incentivized *ex post*, analogous to the 'random lottery incentive system' used for individual choice experiments. For evidence in support of this methodology, see Starmer and Sugden (1991).

Each player thus met their 'pair' when the incentivised game was retrieved and played, and so they witnessed the combination of their payoff and the other party's payoff, although payments were collected subsequently from staff. All this was explained carefully prior to any choices being made. For the great majority of players their pair was not well-known to them. In a few cases they were known to each other but those players did not discover this until after all choices had been made.

We designed our experiment with only a modest degree of social distance between players because a greater social distance would not be conducive to the purpose our study. Evidence shows that use of a double-blind design for example, can fail to trigger human social cues sufficiently to engage our latent social tendencies (for evidence see Hoffman,

McCabe and Smith 1996, or Eckel and Grossman 1998). Such designs also are susceptible to player's suspicions regarding the existence of the unseen other player. If players suspect they are really paired with a confederate such as a computer program, the brain's reward circuitry from mutual cooperation fails to activate and choice behavior approaches that of *Homo Economicus* (Rilling *et al*, 2002). The difficulty then is a lack of parallelism between the experimental context and the real life social phenomena that motivated the research in the first place. Interestingly, even the less extreme anonymity we used was disturbing to some of our players; (see sub-section 3f). Masclet *et al* (2003) also provide evidence that decreasing anonymity raises cooperation in social dilemmas.

The games were assigned different payoff values to reflect a wide range of incentives to co-operate or defect, while maintaining the requisite rank-orders of the payoffs. Of course, defection is always dominant under the 'me'-frame in PD games, but we hypothesized that for those using the 'we'-frame the actual crystallization of cooperative choices would be sensitive to the trade-offs inherent in the payoff values.

## 2b) The Interviews

A male and a female graduate student in anthropology conducted tape-recorded, open-ended interviews with 30 people, the first 15 men and 15 women from our main sample to volunteer for this part of the research. Volunteers received a fee of \$20 for the interview. Prior to the conversation, the interviewer was provided with a printout summarizing the play of the interviewee in the games session. Interviewers began showing interviewees a diagram of the first game (a prisoners' dilemma) they had played and asking why they had made the choice they did and what they were thinking of when they made this choice. Interviewees were also reminded of their estimate of the other player's choice and asked what they were thinking about the other player when they were deciding which choice to make.

These initial questions were followed by seven more regarding the games the students had played. Finally, students were asked several questions to associate these games to experiences of daily life, people, relationships and cultural products such as movies and songs. Participants were also asked a series of questions about their feelings in the game they eventually played for real money, how they felt about playing and talking about the games and why they agreed to be interviewed. (Interview questions are listed in Appendix 1). Consonant with anthropological methods, the interviewers were instructed to encourage as open-ended, subject-directed conversation as possible. The verbatim interview transcripts displayed a close adherence to this stricture.

2c) The Participants:

All participants (n = 103) were undergraduate students at the University of Western Australia (although some were mature age). Demographic characteristics of the full sample, which also shows that the students who participated in the interviews (n = 30) were not different to the rest (n = 73), (except for fewer females among the volunteer interviewees, as we aimed to interview equal numbers of men and women) are available on request from the authors. Summary game play of those subjects interviewed and not interviewed, and then of men and women separately, is shown in Table 1.

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Insert Table 1 about here.  
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2d) The Analysis:

In-depth, qualitative analysis of the thirty interviews is a necessarily intensive and time-consuming activity. The technique discussed in Section 3, inspired largely by Quinn (1997, 2005), requires repeated readings of the verbatim interview transcripts. Thirty interviews are sufficiently representative of the full sample and provide enough text for

analysis, without incurring burdensome transcription and other time costs. Our decision in this regard is consistent with current practice in anthropology for qualitative analysis.

As a first step in the analysis one of us conducted a debriefing with each of the two interviewers, asking them for overall impressions of the content and the general tone of the interviews they had conducted. Several themes, metaphors and patterns were found to be important. We discuss these in detail in Section 3.

### **3. Interpretations of the Interviews**

#### **3a) Key Experimental Results**

The interviews are interpreted to provide an overall picture of the ways in which players describe their play. To provide context, Table 2 summarizes the pattern of play for each of the interviewees and assigns each a participant number. We then use this number to let the reader tie each of the more significant quotations back to the summary of their play.

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Insert Table 2 about here.  
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While the current paper does not seek to explain or model the data from the full sample of one hundred and three players, it is instructive to describe some of the main aggregate findings which will assist interpretation of subjects' comments. Overall, proposer offers in the ultimatum game averaged \$13.75, or 45.8% of the 'pie'. For the dictator game the figure was \$10.13, or 33.8% of the 'pie'. The mean minimum average offer (MAO) a respondent would accept in the ultimatum game was \$11.86. By gender the only significant difference was for the dictator game: males offered \$11.06 and females \$9.66, suggesting males are slightly more generous in this domain. These figures are in line with, or slightly higher than, the bulk of previous studies summarised in Camerer (2003, chapter 2).

For the 20 chicken games the mean percent cooperative choices across all games was 68%: 64.1% for males and 70.7% for females, suggesting females are slightly less greedy in this context. The lowest mean percent cooperation in any chicken game was 15%, and the highest was 89%. For the 20 prisoner's dilemma games, the overall mean cooperation percent across all games was 25.4%: 20.6% for males but 28.0% for females, reinforcing the previous observation. The lowest mean percent cooperation in any PD game was 7% and the highest was 55%. These results are broadly consistent with Niederle and Vesterlund's (2007) work which found women have a lesser preference for competitive behaviour than men.

There were a small number of significant correlations in play across games. One unsurprising link is that the less one offers as a proposer in the ultimatum game, the less one offers as a dictator. Another link is that the less one offers as a proposer or as a dictator, the less one cooperates in chicken games. As defection in chicken games reflects greed rather than fear, this connection also makes intuitive sense. It may be that such players are also less risk-averse, because a low offer in the ultimatum game and defecting in the chicken game are both relatively risky strategies. In general, a relatively risk-averse pattern of behaviour across domains would also include a high frequency of defection in PD's.

There is some evidence from social psychology (summarised in Van Vugt and Van Lang, 2006) that measures of social value orientation find some 60% of people are disposed to maximise mutual gains (*pro-socials*), some 30% seek to maximise individual gain (*individualists*) and 10% to maximise relative gains (*competitive types*), however the latter two categories can't be separated by play in our games. Experimental economics has also found evidence for similar types; see in particular Kurzban and Houser, 2005. If we take these proportions as a broad generalisation for our subject pool, then count the total number of cooperative choices in the PD and Chicken games, we find the least cooperative 42 of 103 subjects chose 'A' 17 or fewer times out of a possible 40. Of these 42, 14 are in our pool of

interviewees and we have identified them in Table 2 with the Subject subscript “*su*” for ‘selfish, uncooperative’. An alternative measure of selfishness is giving in the Dictator game, which we call ‘selfish-dictator’ or “*sd*”. In our subject pool, 36 of 103 subjects offered strictly less than \$10 to the other player, and of these 11 are in our pool of interviewees. Interestingly, and consistent with Bacharach’s assumption that ‘we’-thinking doesn’t extend to constant-sum games, only 4 of these 11 players are also selfish using the ‘uncooperative’ definition.

On average the ‘selfish, uncooperative’ type offered an average of \$8.83 in the Dictator game, compared with \$11.02 for the cooperative types, a difference marginally insignificant at the 10% level. Similarly, ‘selfish, dictator’ types cooperated an average of 17.1 times out of 40 in the PD and Chicken games, compared with 19.5 for the altruistic types, a difference marginally significant at the 10% level. These results are consistent with Bacharach’s framework which distinguishes altruism in the context of constant-sum games from choices in games with a degree of common interest; only defection in Chicken games seems related to Dictator giving.

### 3b) Frames

Although we anticipated players would make reference to concepts such as selfishness and fairness, the anthropological method we employ seeks only to guide players to reflect upon our questions, while avoiding ‘leading’ participants by making explicit reference to specific concepts. Several concepts and issues were nonetheless raised explicitly by participants in a number of the interviews, which we reflect in the sub-headings below. We discuss these alongside relevant quotes from the transcripts. While some of these concepts offer support to standard economic theory, many appear at odds with it and instead support alternative models. Also noteworthy are some interesting subtleties in players’



perceptions of these concepts compared with the assumptions commonly made in behavioral game theory research. We shall see examples of these also. Other comments, such as on the efficacy of using financial incentives and direct evidence that players' make mistakes also arise, but less frequently.

### 3c) Selfishness

Not surprisingly, the interviews provided plenty of evidence that many players embrace self-interest as the motive for their decisions, even if they know others will lose out. We can see this in the words of one female:

I: What did you imagine about the other player?

S<sub>2</sub>: Selfish like me, trying to optimize his incentives and all that. I will assume that he will also choose B throughout, if he has caught the whole of the game.

I: What would you think of him if he just chose A?

S: At the beginning of the [series of] games, probably that he doesn't know. At the end... I would probably think that he was very stupid.

I: So if they are still going for A by the end of the [experiment]...

S: He cannot survive in this world, if he's going to continue choosing A.

Or this man, who offered his respondent \$0 in the Dictator Game:

S<sub>14</sub>: I wanted to offer them nothing, basically, because it maximizes what I get. I wanted to keep \$30 dollars myself.

One female interviewee gave the following reflections on her play:

S<sub>24</sub>: Yeah, I can be pretty competitive, and if I can do something to outdo the next person to get me in front then I'll do it.

I: Do you think if you had known which person you were playing against that this would have affected your choice?

S: Yes, because when I met the girl I was playing against for the last game, she seemed really polite, she let me pick the number out and she was quite shy and that. Just my perception was that she was 'A'...and that would have made me play B for all the extra money anyway.

Clearly, these participants conveyed no hint of we-thinking, guilt-aversion, or other social preferences. The following woman acknowledged one of her decisions was selfish, but seems uncomfortable about it, and gave a careful explanation to justify her motivation when she decided to keep \$30 and give the respondent \$0 in the Dictator Game:

S<sub>18</sub>: I guess for me, my thinking changed in that I thought... to be selfish to a stranger, where their life still continues on going as it was going before.... being unselfish to a stranger really had no effect on their life except in that one instance, that one moment, and even then, they might not notice it or it might not even trigger a reaction, they just carry on [with] their life as it was; but to be unselfish to someone I know, it does affect where they are going because I am a part of their life as opposed to a part of a stranger's life.

But not all players accept that self-interest either did or should guide their choices in these games, as we see in the next sub-section.

### 3d) The Fairness Affect

Because we asked the students how they felt about the game they eventually played for money it is not a surprise to find emotion words in their answers. Psycho-cultural frames would necessarily intervene between any evolved psychobiological potentials to cooperate or

compete and actual behavior, and are a necessary part of, or reflection of, individual experience in early risk and uncertainty via the attachment process (Bretherton and Munholland 2008). But following Wierzbicka (1999; see also Reddy 1997, 2001) we assume that what humans as a species share are feelings. In contrast emotions are more complex, subjective, culturally influenced experiences of feeling states; they are the emergent products of those feelings manifested in players' perceptual frames.

The interviewers asked many of the student players not only how they felt about the choices in the game played out, but also how they would have felt if it had acted differently, and if, say, instead of coming out even, they had won more or less than the other person. Players associate good feelings with receiving an equal amount or winning more than one's pair. Bad feelings are associated with winning less than one's pair, but also for some players with winning more. Both men and women said they expected to feel bad if they were to win at the other player's expense. An example for one woman follows:

S<sub>16</sub>: [If I got more than the other player] I might have felt bad. . . 'Oh now she thinks I'm really selfish because I took the higher number'.

I: What would you find hard about [taking more]?

S: Thinking that the other person is not happy with it or thinking that the other person is disappointed in me or... 'Selfish' comes to mind, that I am taking more than I should or not caring enough about what the other person wants or needs.

This woman's reflections are clearly consistent with the concept of guilt-aversion (Battigalli and Dufwenberg 2007). However guilt-aversion can only promote cooperation in games where defection has a greed motive; if there is only a fear motive at play, guilt-aversion would not raise cooperation. Indeed, one might say that guilt aversion is fear of

being greedy! This suggests that chicken games provide a better test for the guilt-aversion hypothesis than prisoner's dilemma games.

The introduction of these hypothetical situations into the interview was initiated by the interviewers, spontaneously and independently, by asking the student how they would feel in the event that they won more than the other player. Out of the twelve interviewees asked this question, the replies of eleven included an expression of feeling bad. While offering clearest support to guilt-aversion as a motive, this finding is not necessarily inconsistent with either inequality-aversion or 'we- thinking'.

One man gave the following thoughtful explanation for equality when his proposer chose to keep \$15 and offer him \$15 in the first Ultimatum Game:

S<sub>23</sub>: I mean there is no point in being selfish. The way I see it is that if you have \$30, give \$15 and keep \$15 – it makes sense to do it that way.

I: How do you respond when you meet people who don't share that attitude [of equality]?

S: I just feel a bit sad because... either they haven't been taught, or they are simply ignorant so they become selfish, and, well, I guess there is not much I can do about it except show them by what I do, because I think my actions do speak louder than my words, so I want to really show them what it means to share equally, rather than just try to talk you out of it, which doesn't help much, so I want to prove it to you by doing it.

The following man interpreted standard instructions for the Dictator game as 'you were *meant* to split [the \$30]' which might come as a surprise to some experimentalists:

S<sub>25</sub>: It was the fairest way to go. It was not like I didn't like the other person, or if I didn't, I didn't know it... and I was asked to split it and you were meant to split it –

and you know, that suggests that you aren't meant to keep it for yourself – then split it half and half... if you don't know why you're splitting it then that would be the fairest way to go.

The next male player justified his willingness to share by reference to the money being unearned by him:

I: Would you have considered offering \$5?

S<sub>26</sub>: To the other person? No!

I: Why?

S: Because in this sort of situation... it's not as if I have done all the hard work and they have done nothing and they deserve less than me.

I: So what if it was actually your money and you had earned it or whatever?

S: If I had earned it working and the other person hadn't as much, I would have taken a higher share, if I felt I had done more. By the same token, if I felt they had done more, I would have been more than happy to accept the fact that they should get more profit from it.

His comments may go some way to explaining why it is that individuals who are generous to the point of equality in the context of a Dictator game exhibit proportionally much less generosity in society at large when it comes to donating a substantial fraction of their salary to charity. We return to this point in sub-section 3f). The extant literature on the existence of a 'house money' effect is mixed. While Thaler and Johnson (1990) first raised this possibility, Clark (2002) found little support for it. Our experiment made no attempt to test for this effect, we simply note some of our participants made unprompted reflections which appear to be consistent with it.

Twenty-five of the thirty interviewees ended up winning equal sums of money either because they and their pair both chose 'A'; both chose 'B'; or evenly split the money in the Ultimatum or Dictator Games. There was a suggestion of gender difference, at least in the way players' talked about this experience. Seventeen of these twenty five participants who won equal sums described the game in 'we'-terms. A second kind of answer, however, one we might label competitive, characterized three of these twenty five replies, all those of men. An example follows:

S<sub>14</sub>: We both chose B. She wasn't supposed to choose that one. I would have liked more [money].

Another gave an answer that was a blend of the two:

S<sub>21</sub>: We both got 'A' . . . I am kind of glad that we did get the same thing because you would have felt really, really guilty . . . you would remember it, maybe not for the whole year, but maybe for a week or so afterwards . . . you left [the other player] with not much and you got all this money.

Four of the thirty interviewees 'won' the 'real money' game, two men and two women. Both of the women focused on their pleasure in winning, for example:

S<sub>24</sub>: I got \$38 and she got \$18 because I played B and she played A . . . I was happy that I won. And then I heard how much she was getting, I went 'Sorry', but I was really happy that I had beaten her, basically. And I think I was the highest out of that [session], so 'Yeah, I won!'

In contrast both male winners expressed concern for the other player they had disadvantaged. One said he offered to split his win of \$20 with the woman he played against who had won only \$8. She refused his offer. The other male winner comments:

S<sub>28</sub>: I played against a girl. I got 11 [Ducats, or \$22] and she got nothing. I felt quite bad. It was as if I had taken something from her and left her with nothing. But, it was her particular choice. She chose wrong and I chose right.

The only interviewee out of the thirty to 'lose' the game played out received only \$8 compared to the other player's \$28. Her emotion was negative:

S<sub>6</sub>: Yeah, I was a bit annoyed because the choice that she chose, I didn't think she would choose. Like my whole plan... which was a lot of the A's... she actually didn't go that way, she went a different way. So I thought, 'Yeah, the whole thing must be wrong'.

### 3e) 'We'-thinking

While our students were not part of any well-defined team, they did share some common experiences, such as all being UWA students participating in the same experiment to see if they could win money from Professors. Our design's use of intermediate social distance, by allowing players to see the community of other volunteers, and our use of symmetric payoffs in PD and Chicken games, is also likely to have enhanced the possibility of group identification and so 'we-thinking'. One kind of answer which we interpret as statements of team-identification was found in the texts of both men and women. Here are some examples:

S: I think we both picked 'A' and it came out as 10 [Ducats] each. I was glad I went with A. I was relieved that the other person went with A as well. I thought, 'Hey, maybe they thought like I did'.

Or this woman:

S<sub>6</sub>: I guess I was imagining someone identical to me, and I was just thinking about them as, basically what I choose would be what they would choose. I didn't really think that it could be someone who is just jumping out and wanting to get like all the big money and taking big risks, because that obviously didn't come into any of my choices. So basically it was someone with the same ideas as me.

Or in the words of another woman:

S<sub>12</sub>: When I was doing it I was thinking that if I was going to do this then why wouldn't they do the same thing, basically.

One male interviewee implicitly identifies the difference between a PD and a zero-sum game for a 'we'-thinker:

S<sub>1</sub>: I was thinking about Monopoly... but I don't really think there is any connection because I play Monopoly a lot different, I don't share at all in Monopoly. You go all out to try and kill the other person, pretty much. Whereas, in this game, I am likely to sympathize with the other person a lot more, basically because you don't lose in a game. You can only win and I think, 'hey, why don't we win together?'

This participant also appears to share the view that because players can't lose any of their own money, there is no opportunity cost to playing fair. We will see more evidence of this perspective in sub-section 3h).



### 3f) Anonymity

Over half of the interviewees raised a series of points that revolve around the issues of playing with an unknown person or a computer instead of a known person or a friend. The remarks from eighteen of the thirty interviewees made the point that their play would have been different if they had known the person they were playing.

S<sub>25</sub>: I ended up playing my friend . . . Well, we didn't actually know until it was the end of the game, so you can't really collaborate.

For some of the players, 'knowing' someone might only take a few minutes.

S: I think some of the decisions might have been different if you had five minutes to sort of get to know the person you were playing against. I am sure that would have affected... some of my responses.

Or this man:

S<sub>11</sub>: I wish I could have had a better idea of who I was playing against because I think if I had been able to know who it was or talk to them before hand, not about the game, but just to talk to them to get an idea of who they were.

So 'knowing' someone may only take a brief meeting, supporting evidence in Dawes (1991), on the rapid acquisition of group identity. Bacharach [2006, chapter 2] also needs this assumption for his theory to have explanatory power. Five of the participants mentioned that they looked around the room trying to learn something about the other players. Four men mentioned that they would have chosen to cooperate had they known the other player; for example:

S: Obviously it would always be best if the two players playing off each other knew who they were and knew what they were thinking. And also it would be great if you could discuss it with them before each game and work out . . . which [choice-pair] was the most money and split it.

The woman who said even five minutes with the other player would make a difference also said that if she had met the other player and ‘didn’t like them, then I would have gone for the higher [B] option.’ This hints at a need for ‘assurance’ regarding the other’s choice, itself an important issue in this literature. While Sugden (2003) sees assurance as necessary before acting on we-thinking, Bacharach’s (2006, p.168) theory of circumspect team-thinking does not.

Knowing the other player’s identity often seemed to represent information that could have been used by our players, had our experiment permitted it. We explained earlier why our experiment avoided artificially asocial conditions; but the degree of anonymity we used still caused our players some consternation. Seven of the fifteen men and three of the fifteen women volunteered that information about the other player would have informed their play or that their play was difficult because they lacked this information. In the texts of nine men and six women, discussions of the known person/stranger contrast were associated with sharing. One interviewee provided the following account in her interview:

S<sub>3</sub>: If someone ended up really worse, say someone got \$2 and someone got \$20, often they ended up just splitting it when they went up to the offices [to get their payout on the ‘game played for real’].

I: Did they?

S: Yeah, because they felt so bad that they had done so much better than the other person... Well because at first you think, ‘This is great’, but when it actually comes

down to it... you don't actually want to be getting more than everybody else when everybody else has done the same as you. It just seems fair that everyone gets around about the same.

Three points regarding this observation should be made. First, while initially the choice was made in a PD game, a subsequent decision to share occurs instead in a Dictator situation. This is because the strategic element of the initial decision is over, and the winning player now faces a choice over whether to share a fixed sum with the other person. Clearly, defecting in the context of a PD does not indicate that a player would give the other person zero in a Dictator game. Indeed, the correlation between the number of cooperative choices in the series of PD's and the level of giving in the Dictator game was not statistically significant in this study (Brosig, 2002, p.285, found a similar result).

Second, as the 'winner' may now view herself as having earned her reward, her generosity may be lessened compared with the usual Dictator Game scenario (see also subsection 3h). Third, the anonymous conditions under which the initial decision in the PD was made are removed when a game is selected to be played out, replacing the unknown other player with an identifiable person. This can be expected to increase generosity by the 'winner', hence the occasional belated offer to share. Consistent with this interpretation, nine participants associated the known person/stranger contrast with future consequences, demonstrating a concern for their reputation. For example, referring back to her reasons for splitting the \$30 as she did, one woman draws an analogy to her sister:

S<sub>7</sub>: She ... would be one that is most likely to battle me to the death, until it is like evenly split. She wouldn't give in, because she knows...that there will be another fight a week, a month, down the track.

The previous two quotes appear to be consistent with the ‘inequality-aversion’ concept. Taking a different tack, one man focused on the anonymity of the games in contrast with real life:

S<sub>28</sub>: I think that is probably a big thing, the fact that you have anonymity there. That people won’t know who it is that’s choosing the bigger numbers or going for this, therefore it can't reflect back upon yourself and people’s opinion of you. So, self image perhaps, self-presentation.

Or another man:

S<sub>4</sub>: And it is kind of difficult because you were under controlled situations where you are asked not to know who the other person is, or not to talk with them or anything like that, and it made it difficult because it takes away something that you rely on as a person. Like learning how to write and then you lose your hands. You’ve lost something that you rely on to communicate with.

All of these quotes are consistent with extant evidence that the ‘social distance’ created by the experimental conditions can affect play (Hoffman, McCabe and Smith 1996). When playing out a game for money, players did briefly meet; for some this was a moment of discomfort:

S<sub>21</sub>: The guy who [I talk about earlier] chose B. . .He got \$32. . . [the other player got nothing] . . . I think amongst us, because none of us actually knew the person who got nothing, it was like ‘Wow, good on you, you got this money’. . .You know I think we could all see . . . he was feeling guilty that he had left [the other player] with nothing, we could all see quite easily how he would feel guilty about it . . .We kind of stood around waiting to see how he was going to react to getting the money before saying,

‘Congratulations’, while he was feeling really guilty, it’s like you were trying to congratulate him for getting the most instead of saying, ‘Oh, you left this girl with nothing’.

### 3g) Safety

One notable pattern was the oft-repeated description of one’s own choice, whether of A or of B, as taking the safe option. Because the B option is usually referred to as the strategy of defection, we found some players’ self-description of their B choice as safe rather than selfish pointing to fear rather than greed as the motive. Out of the 30 interviews, 11 participants used the words ‘safe’ or ‘safety’ as one influence on their own choices in the games. For example, ‘Most of what I chose was the safe option...so there wasn’t a lot of risk’, said one female player. Three of these eleven players were describing the A option with these words, seven, however, were describing their choice of the ‘selfish’ B option, and one player was describing her choice of first A and then B in different games. (Recall that those players using the word safety to mean avoiding the choice with the lowest outcome will choose B in a PD game but A in a Chicken game.)

While 11 interviewees used the words “safe” or “safety” to describe their play, a total of 16 interviewees, 9 women and 7 men, used these words at some point in the interviews; for example, to describe how they viewed others’ play. In the vast majority of statements it was apparent that safe was being contrasted to the word ‘risk’. In both the men’s and women’s interviews, but especially in women’s<sup>4</sup>, harm minimization seems a fair way of interpreting what is being said when players talk about ‘playing it safe’. For example, one woman said: “we never picked the option where we could get zero... we just played it safe because it

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<sup>4</sup> Eckel and Grossman (2002) survey and build upon evidence that shows women tend to greater risk-aversion than men, albeit with substantial heterogeneity within both genders.

would be kind of crappy to come out of it with nothing'. Another woman said, 'B would be the safe option because you would definitely get some money'. A third said, 'I would have chosen ones where you would at least get something, that's better than risking it all for a big number and getting zero...it is always better to get something than nothing'.

It thus seems a legitimate interpretive move to return to the interview texts to see how many others described their play in terms of harm minimization, though they did not actually use the words safe or safety. This increased the number of interviewees whose choices appear to be influenced by self-protective concerns to 20, that is, two-thirds of the 30 interviewees were explicitly motivated, at least in part, by a fear of receiving the lowest outcome. For example, one man explained, 'If I selected A and they selected B I would have nothing, so in selecting B I still would have got something regardless.' Five other students used the words safe or safety at some point in the interview to describe others play or in generalizations from the game to life. Taken together, these reflections provide support for the game-theoretic concept of choosing so as to maximize the minimum outcome through a fear of being exploited.

The possible relevance of this observation is suggested by one female player generalizing from her game play to her life experiences and expectations:

S<sub>2</sub>: In Singapore, it's like a dog-eat-dog world out there. If you don't make it, that's it. The government is not going to give you welfare programs; they are not going to give you funds or whatever. They just remind you to save early and then spend later, that sort of thing. . . It's much slower in Perth. People don't compete as much. In Singapore it is very bad. You start from when you are very young. You have to have the top grades to make it to the best school. If you don't make it to the best school, you make sure you excel.

Returning to the safe/risk contrasts and their associations, three of the men made reference to the other player being unknown. For example one man, commenting on the games generally, said:

S<sub>11</sub>: I definitely didn't like that I didn't know the person. . .I was actually thinking about that quite a bit as I was playing. . .it was like. . .what is this person really going to do? I figured it was better to play it safe than to try to go for it all and trust the other person to do the same.

Another male player imagined relationships in his associations to the risk/safe contrast. He made the following comment about his decision in the Dictator Game: 'In choosing \$15 you are taking the safer way, or the more likeable' He then went on to generalize to life experience saying:

S<sub>28</sub>: I think that friendship and relationship between others is very important to everybody. . . And they like to keep that, they wouldn't want to hurt people or, get people on the bad side of them . . . So I think that people prefer to play it safe . . . They don't want to get on the wrong side of the mob.

His last comment also suggests another, darker, concept of risk, this time leading to cooperation rather than defection. It ties in with an alternative explanation for the existence of 'we-thinking' frames; the concept of 'Machiavellian Intelligence' has been shown to be an important factor in the evolution of the human brain and its capacity for predicting the intentions and responses of others (e.g., Dunbar 1993).

### 3h) The 'Experimenter's Money' Fallacy

One female commented as follows:

S<sub>15</sub>: Well in respect to the money... it just doesn't seem right to me that I should get more than the other person when I have done nothing to earn the money. It's not mine anyway; it's just being shared or divided between us. If it's going to be divided between us then 'fair', to me, is that each person gets treated equally without preference.

A male player made a similar comment, having chosen to give the other player \$15 in the Ultimatum Game:

S<sub>30</sub>: Well if someone is giving me \$30 free and there's two people then I would give it out evenly, because it is not my money to start with and I am just getting it free, so it is a bonus anyway.

For them, as for a number of other interviewees, two things seem to be going on. One is the distinction between earned and unearned money, in which generosity with the latter feels much more natural than with the former (see Guala and Mittone (2010), on the impact of such social norms). The importance of this distinction has probably been under-emphasized in the existing experimental literature on cooperation and generosity in laboratory experiments, which for the most part use 'unearned' money. Cherry *et al* (2002) is a notable exception; they found that if the proposer has to earn the money before dividing it, the proportion of proposers in Dictator Games offering zero rose from 19% when unearned to 79% when earned.

Importantly, Ruffle (1998) found that when the *recipient* successfully wins a test of skill with other recipients, thereby increasing the sum for their dictator to divide, the average dictator offer rises to nearly half of the 'pie'. In fact 21% of dictators offered *more* than half of their money to the recipient, an allocation almost never observed in typical dictator games.



The closest analogy to Ruffle's result is probably the 'trust' game in which a trusting player 1 creates a surplus for a player 2 who is free to decide how much of it to return to player 1. See Camerer (2003, pp.59-68) for a summary of additional studies which vary methodological and demographic variables in Ultimatum and Dictator Games.

Second, the concept of opportunity cost does not seem to be readily understood. Players' do not appear to view their participation in the experiment as earning them this money. Just because the money wasn't theirs before the experiment does not imply it is not theirs now, so cooperative and altruistic actions still have an opportunity cost in dollars foregone.

Finally, experimental economists may benefit from a look at the diverse ways our seemingly straightforward instructions and features of the experiment can be (mis)interpreted by players.

### 3i) Perceptions of the Presentation of the Experiment

Perhaps naively, our recruiting literature made reference to 'an experiment involving games'. This female was not impressed:

S<sub>18</sub>: I didn't expect this, the whole experiment was about games – I was expecting physical games – so when I came in I was quite put off by that.

Another woman was more positive:

S<sub>6</sub>: I found it interesting ... thinking up these imaginary people in our heads and just deciding on what... they would be thinking.

A third female thought the backgrounds of the players would affect their ease of comprehension of the experiment:

S<sub>17</sub>: It is quite alien to me to think in ‘squares’ and to make choices based on [how things are] positioned [relative to each other]. It took me a while to get into, ... I think someone like an engineer would have an advantage in understanding that set up because that is the way they often work, with models that capture a lot with a little...

Supporting the current practice in experimental economics, the importance of financial incentives was noted by several subjects, for example this woman:

S<sub>20</sub>: The games were fun, they were well organized... it was good that there was a money incentive to do it properly. I thought that was a good idea. I have done so many psychology experiments where there was no payment and people weren’t doing it properly.

Ethical issues were also touched upon by a couple of players. One man reflected on his previous experimental experiences:

S<sub>27</sub>: I have been very suspicious of the psych department ever since they tricked us, in one of the labs they gave us all a sheet of paper that we all assumed was the same, talking about a diagnosis of mental illness. And we watched a video and were asked to like diagnose this person’s thing. And then we all found out that the little introductory thing was all different and that sneaky psych department tricked us into doing a primary experiment rather than doing an exercise on mental illness.

His observation raises the difficult issue of contamination of the subject pool at a university. The many methodological differences between experiments in psychology and in economics are discussed at length in Hertwig and Ortmann (2001). But it is not always easy

to avoid causing distress to subjects. To our surprise, one woman found playing our games to be a slightly frightening experience, particularly the anonymity involved:

S<sub>16</sub>: While [I was] sitting at the computer going through [the] instructions etc it all seemed so anonymous and so ... although we had been told that we could walk away from it at any time - have you seen the movie “The Game”? He [Michael Douglas] plays a game that he doesn’t realize is a game and all these things happen to him, he nearly gets killed... and I just kept thinking back to that and I was thinking... it was kind of scary how anonymous it was...’

Fortunately she went on to say:

‘I am really glad I did it. It was weird, it was strange to me, I have never done anything like it before, so I am really pleased I did it’

Nevertheless her experience, which was only uncovered because we took the unusual step of interviewing our participants, should alert experimentalists to taking care that all subjects are comfortable with their participation. Perhaps one reason for the pervasive dislike of anonymity by our participants in these games (which to experimentalists is standard practice) is because players feel they can spot a co-operator or a defector in real life, which would influence their decisions, and we deny them that opportunity (see sub-section 3f). This would be an illustration of the ‘Greenbeard’ effect (Dawkins, 1976) that has also been noted in the social psychology literature (e.g., Yamagishi et al, 2003) in which co-operators think they can spot and reward others who share their cooperative traits. Nor is this confidence necessarily misplaced: Frank *et al* (1993) found that co-operators in PD games who had a brief meeting with the other player were able to predict with more than double chance

accuracy whether that other player would co-operate or defect, and Fetchenhauer *et al* (2010) report a related finding for giving in a Dictator game.

## **5. Conclusion.**

Application of an anthropological interview method to a behavioral games experiment has offered us new insight into players' perceptions of these important games. We have seen that our players are heterogeneous regarding the belief systems they bring into the economists' experimental environment, so that traditional game theory can describe play accurately only for some. The behavioral approach to game theory then needs a richer framework in which the diverse motives our players display can find expression. Bacharach's dual-levels of agency approach is one possibility, as are other models such as guilt-aversion which can find expression only within the broader theoretical structure of 'Psychological Game Theory' (Battigalli and Dufwenberg, 2009).

Our interviews provide evidence for selfish motives, but also for the presence of emotions that dispose us to frame the choice as one for a dyad or to weigh the interests of others against our own. Extant theories such as we-thinking, inequality-aversion and guilt-aversion may all explain part of the puzzle of human sociality, but not for all people or in all contexts. The interviews also point to a concern for 'safety' and the significance of whether a player conceives of their money from the experiment as being earned or unearned, as well as to a pervasive dislike of the common practice of anonymity in such experiments. Other details of the experimental instructions and context also took on relevance in unanticipated ways in the eyes of some players, which may prove to be of interest to experimentalists.

These prisms through which our players interpreted the games they played are also important because they help us understand the frames that influence decision-making in games exposing the tension between the interests of the 'self' and the 'other'. Identification

of the frames behind these games is then a critical step in understanding and validating how each of us balances these motives.

## Appendix 1

Generally, interviews were conducted according to the protocol presented below. As the interviewers were instructed to follow student leads as much as possible, the order and number of specific questions asked varied, for example, an interviewee might answer Question 2 spontaneously when answering Question 1. In such a case the interviewer would not ask Question 2. One interviewer routinely began interviews with the last question listed here; the other used the order listed.

### Sample Interview Protocol

1. Interviewer presents interviewee with a diagram of the first game [prisoners' dilemma see diagram 1]. Here is the first game that you played and you chose [student's choice]. Could you tell me why you made this choice? What were you thinking of when you made this choice?

2. In this first game, your estimate of the other player's choice was [give number] indicating that you thought they would be more likely to choose [A or B]. What were you thinking about the other player when you thought about what they would do?

3. Here is a summary of a sample of your choices [read ratio of A and B]. Could you tell me why in [first ratio] % of the games you chose A? Could you tell me why in [second ratio] % of the games you chose B? What were you thinking about when you made your choices?

4. Here is a summary of a sample of your estimates of the other players' choices [read mean of expectation]. Thinking of all the games, could you tell me why you thought that the other player would choose A? Thinking of all the games you played could you tell me why you thought the other player would choose B? What were you thinking about when you made your estimates about the other player?

5. In one game you were asked to propose an amount of \$30 to keep in a division of the money with another player. You chose to keep \$\_\_\_\_. Why did you choose this amount? What were you thinking about when you made this choice?

6. You were next asked to propose an amount of the \$30 that you would accept from the other player. You chose to accept \$\_\_\_\_. Why did you choose this amount? What were you thinking about when you made this choice?

7. In the next game you were asked how much of \$30 you would keep for yourself if the other player had to accept your choice. You chose to keep \$\_\_\_\_. Why did you choose this amount? What were you thinking about when you made this choice?

8. When you played a game with 'John' you chose [student's choice]. Could you tell me why you made this choice? What were you thinking of when you made this choice? What did you imagine about the other player?

9. When you played a game with 'Sue' you chose [student's choice]. Could you tell me why you made this choice? What were you thinking of when you made this choice? What did you imagine about the other player?

10. Overall did playing the games remind you of any experience in your daily life, or in your past?

11. Overall did playing the games remind you of particular people or particular relationships?

12. Overall did playing the games remind you of a particular story, poem, song or movie?

13. In the game you played for real with another player, how did you feel about the choice you made? How did you feel about the other player's choice?

14. Overall what do you think/feel about the games and talking about playing them?

15. Why did you choose to be interviewed about the games?

**Table 1: Summary Data**

Full sample (n = 103)*		Interviewed (n = 30)*	Not interviewed (n = 73)*	<i>P</i> <
<i>Variable</i>	<i>N</i>	<i>N</i>	<i>N</i>	
	102	30	72	
Chicken A	68.00	63.00	70.00	.11
Chicken P	63.89	64.26	63.74	.84
Prisoner A	25.40	26.50	24.93	.77
Prisoner P	39.86	45.63	37.49	.08
Ultimatum Keep	16.29	16.27	16.30	.95
Ultimatum Accept	11.89	11.77	11.95	.86
Dictator Keep	19.88	19.67	19.96	.85
		Male (n = 34)*	Female (n = 68)*	
Chicken A		64.12	70.10	.11
Chicken P		61.87	64.76	.24
Prisoner A		20.59	28.01	.14
Prisoner P		33.36	42.66	.04
Ultimatum Keep		16.12	16.32	.69
Ultimatum Accept		11.41	12.09	.48
Dictator Keep		18.94	20.34	.34



**Table 2: Interviewee's Choices in the Games**

Subject	% Cooperation in PD Games	% Cooperation in Chicken Games	\$ Offer in Ultimatum Game	\$ Offer in Dictator Game	% Expectation of Cooperation in PD Games	% Expectation of Cooperation in Chicken Games
S <sub>1</sub> ♂	60	70	10	15	65.8	71.0
S <sub>2</sub> ♀, <i>su, sd</i>	5	25	15	0	97.5	77.4
S <sub>3</sub> ♀, <i>su, sd</i>	5	75	10	5	34.2	70.8
S <sub>4</sub> ♂, <i>su</i>	10	65	15	15	8.7	90.0
S <sub>5</sub> ♀	40	75	15	15	37.2	48.2
S <sub>6</sub> ♀, <i>sd</i>	65	90	15	5	63.5	65.0
S <sub>7</sub> ♀	45	55	10	10	57.8	76.5
S <sub>8</sub> ♂, <i>sd</i>	25	70	15	0	55.2	60.4
S <sub>9</sub> ♂, <i>su</i>	10	70	15	15	19.2	59.1
S <sub>10</sub> ♂, <i>sd</i>	20	70	10	5	44.3	67.9
S <sub>11</sub> ♂, <i>su</i>	10	60	15	10	21.7	45.7
S <sub>12</sub> ♀, <i>sd</i>	20	75	12	5	35.1	63.7
S <sub>13</sub> ♀	30	70	15	15	54.2	69.2
S <sub>14</sub> ♂, <i>su, sd</i>	5	50	15	0	32.6	46.5
S <sub>15</sub> ♀	30	65	15	15	47.8	56.4
S <sub>16</sub> ♀	45	85	15	15	54.7	62.4
S <sub>17</sub> ♀, <i>su</i>	10	15	10	10	70.5	73.5
S <sub>18</sub> ♀, <i>sd</i>	75	55	15	0	90.0	73.9
S <sub>19</sub> ♀	45	55	15	10	59.0	54.2
S <sub>20</sub> ♀, <i>su</i>	15	65	15	15	54.8	69.4

$S_{21} \text{ ♂, } sd$	40	80	15	5	45.6	66.9
$S_{22} \text{ ♀, } sd$	15	75	15	5	25.2	64.8
$S_{23} \text{ ♂}$	75	75	15	30	43.2	53.2
$S_{24} \text{ ♀}$	30	65	10	15	50.2	60.2
$S_{25} \text{ ♂, } su$	5	60	15	15	30.3	71.0
$S_{26} \text{ ♂, } su$	15	65	15	15	19.2	61.2
$S_{27} \text{ ♂, } su, sd$	10	35	15	0	50.6	56.8
$S_{28} \text{ ♂, } su$	5	50	10	15	19.4	57.7
$S_{29} \text{ ♂, } su$	20	55	15	15	43.5	72.8
$S_{30} \text{ ♂, } su$	10	70	15	15	36.9	60.9

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