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Special Note

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Chapter 1: Introduction

Interactive decision making can be studied within the framework of game theory. However, standard game-theoretic reasoning fails to account for the occurrence of cooperation in a variety of games and situations. Team reasoning has recently been proposed as a solution to this problem, but to understand the importance of team reasoning as a theory it is first necessary to explain the limitations of traditional game theory.

Game theory was introduced by von Neumann and Morgenstern (1944). They outlined a mathematical theory which applies to social interactions involving two or more decision makers (or players), each with two or more ways of acting (strategies), such that the outcome of the interaction depends on the strategy choices of all the players. Game theory can represent social interactions when players have well-defined preferences among the possible outcomes of the game, so that numerical payoffs reflecting these preferences can be assigned to every player for each outcome. Each payoff represents a utility which a player receives in the corresponding outcome of the game. Utilities can be determined from preferences revealed by observable choices, and as such a wide range of social interactions can be said to fall within the scope of game theory.

In game-theoretic literature, games have been classified in a number of ways, one of the most basic distinctions being between cooperative and non-cooperative games. Nash (1951) introduced the distinction, defining cooperative games as those “based on an analysis of the interrelationships of the various coalitions which can be formed by the players of the game” and non-cooperative games as those in which “each participant acts independently, without collaboration or communication with any of the others” (p. 286). However, Harsanyi (1982) suggested that what is important is not whether collaboration or communication can occur but whether binding or enforceable agreements are possible, which enable effective coalitions to form. Thus Harsanyi offered a more precise definition, such that "cooperative games are defined as those permitting enforceable agreements while noncooperative games are defined as those not permitting them" (p. 211).

The primary objective of non-cooperative game theory is to determine what strategies rational players will choose in order to pursue their own interests optimally by maximising their expected utilities. A solution to a game is said to consist of a profile of strategies and the corresponding payoffs which result if every player acts rationally in this sense. The theory is thus normative, in that it prescribes how rational players ought to act in order to pursue their own interests optimally. It becomes more descriptive by including a hypothesis of weak rationality, in which people try to do the best for themselves in any given circumstance.

The leading solution for non-cooperative games is the Nash equilibrium. In any game, this equilibrium point is a profile of strategy choices, one for each of the n players, such that each player's strategy is a best reply to those of the other n - 1 players. A best reply is a strategy that maximises a player's payoff, given the strategies chosen by the other players. In other words, a Nash equilibrium is an outcome where no player could improve his payoff, given the strategies of the other players. As such, an equilibrium point is self-supporting in that no one player can benefit from deviating from it. In contrast to this, it follows that any non-equilibrium point is necessarily self-destabilising, such that at least one player has an incentive to deviate from it.

As an illustration, Figure 1.1 shows the payoff matrix for possibly the best known of all strategic games, the Prisoner's Dilemma game.

Figure 1.1: Payoff matrix for the Prisoner's Dilemma game

		Player 2 (Payoff in parenthesis)	
		C	*D*
Player 1	*C*	3 (3)	1 (4)
	D	4 (1)	2 (2)

Player 1 chooses between the rows labelled *C* (cooperate) and *D* (defect), Player 2 chooses between the columns labelled *C* and *D*, and the pair of numbers in each cell represents the payoffs to Player 1 and Player 2 respectively. The game-theoretic definition of cooperation is somewhat ambiguous; but it is generally assumed to be the decision which, if everyone adheres it, will result in everyone being better off than if they had all followed a different course of action. In a two-person game with a choice of two courses of action, the non-cooperative choice is generally referred to as defection. In some cases, such as the Prisoner's Dilemma game, this would give a player the possibility of receiving the highest personal payoff. A Prisoner's Dilemma game is defined by the rank and relative values of the payoffs, rather than their absolute values -- here the numbers 1, 2, 3 and 4 have been used for simplicity. The paradox of the Prisoner's Dilemma game is that individually, each player does better by choosing to defect; if Player 1 chooses to cooperate, then Player 2 will receive a payoff of 3 if he also cooperates, but 4 if he chooses to defect. Similarly, if Player 1 chooses to defect, Player 2 will score 1 if he chooses to cooperate, but 2 if he defects. By symmetry, Player 1 is also better off choosing to defect than to cooperate, irrespective of Player 2's choices. However, if both players choose to defect, both will be worse off than if they had both chosen to cooperate.

However, the only Nash equilibrium in the Prisoner's Dilemma game is the *DD* outcome in the bottom-right cell of the payoff matrix. If Player 1 chooses *D*, then Player 2's best reply will also be *D*, and if Player 2 chooses *D*, then Player 1's best reply will be *D*. In all of the other outcomes, at least one of the players has an incentive to deviate from their choice. If one player chooses to defect and the other has cooperated, the cooperating player would do better to defect, and score 2 rather than 1. If both players had cooperated, each could do better by deviating unilaterally to a *D* choice, thus scoring 4 instead of 3. It is only in the *DD* outcome that neither player has a motive to deviate unilaterally, and the players are making best replies to each other.

Nash gave formal proofs that every finite game (that is, every game with a finite number of players each with a finite number of strategies) has at least one equilibrium point, provided that mixed strategies are taken into account (Nash, 1950, 1951). A mixed strategy is a probability distribution over a player's set of strategies (which are called pure strategies when the distinction is being made). For example, if a player has two pure strategies, as in the Prisoner's Dilemma game, then one possible mixed strategy involves choosing randomly between them, with equal probabilities assigned to each, which could be implemented by tossing a coin. Harsanyi (1973) interpreted mixed strategies slightly differently, however, and showed that Player 1's mixed strategy can usually be interpreted as Player 2's uncertainty about which strategy Player 1 will choose, and vice versa.

Von Neumann and Morgenstern (1944), Luce and Raiffa (1957) and Bacharach (1987) have all supported the proposition that if a game has a uniquely rational solution, then it must also be an equilibrium point. This is dependent on the widely accepted game-theoretic assumptions of common knowledge and rationality of all the players.

The first of these assumes that the specifications of the game, including the players' payoff functions, and everything that can be deduced logically from this, are common knowledge in the game. The concept of common knowledge was introduced by Lewis (1969) and formalised by Aumann (1976). A proposition is common knowledge among a set of players if every player knows it to be true, knows that every other player knows it to be true, knows that every other player knows that every other player knows it to be true, and so on. Although this may appear beyond the cognitive capabilities of most human beings, it can be neatly illustrated as a form of knowledge that arises when something is publicly announced in a group.

The second of the assumptions, that of rationality, assumes that players are instrumentally rational utility-maximisers, who invariably choose strategies which maximise their own payoffs relative to the information available to them at the time of acting, and this is also common knowledge within the game, as are the players' payoff functions. This methodological individualism, where players are assumed to act as individual agents in order to maximise their own personal utility, has long been accepted as a cornerstone of game theory. For example, Jeffrey (1983) analysed the logic of decision making within a Bayesian framework in which agents deliberate about the consequences of their actions exclusively for themselves as individuals; Dawes (1988) discussed rational choice in terms of the best interests "*of the person making the decision*" (p. 8, italics in original); and Bell, Raiffa and Tversky (1988) outlined the basic normative generalisation of decision making "that posits utility maximisation behaviour on the parts of individual agents [such that] each agent seeks to maximise his own expected utility given some notional expectations of what others might do" (p. 14).

From the two assumptions of common knowledge and rationality, it follows that any conclusion which a player validly deduces about the game will also be deduced by the other player(s), and will be common knowledge within the game. This implication of the assumptions, described as "transparency of reason" by Bacharach (1987), imply that, if there are n players, and if it is uniquely rational for Player 1 to choose strategy S_1, Player 2 to choose strategy S_2, ..., and Player n to choose strategy S_n, then S_1, S_2, ..., S_n must be best replies to one another, because by the transparency of reason, each player will anticipate the others' strategies and, being a utility maximiser, will choose the best reply to them. Because S_1, S_2, ..., S_n are best replies to one another, they constitute an equilibrium point by definition.

The Nash equilibrium as a solution concept, however, presents serious problems. While a game's uniquely rational solution will necessarily be an equilibrium point, it does not follow that an equilibrium point will always be a rational solution. It is possible that a game with a unique equilibrium point has no uniquely rational solution.

Only if a game is known to have a uniquely rational solution do the common knowledge and rationality assumptions allow Player *i* to assume that the other *n* - 1 players will choose strategies which are components of that rational profile. In such circumstances, Player *i* knows that the others will choose their components of the profile because these are the strategies that uniquely maximise their utilities under the common knowledge and rationality assumptions. The argument presented above establishes that these strategies must be in Nash equilibrium, but this in itself is not sufficient reason for choosing them, as the common knowledge and rationality assumptions do not mandate selection of equilibrium strategies merely because they are equilibrium strategies. If the outcome is uniquely rational, then Player *i* knows that the others will play their parts in it, therefore because it is an equilibrium point then Player *i* can do no better than reply with the corresponding equilibrium strategy, this being the corresponding utility-maximising best reply. But in the absence of any reason to assume that the game has a uniquely rational solution, there is no reason for Player *i* to expect the *n* - 1 co-players to choose their components of the profile, even if the equilibrium profile is unique, and therefore Player *i*'s reason for choosing the equilibrium strategy collapses. In such circumstances, it follows that none of the players has any reason to choose the equilibrium strategy.

This conclusion applies also to games with multiple equilibria. The fact that a particular outcome is an equilibrium point is not, in itself, sufficient reason for a player to choose an equilibrium strategy. This point emerges strikingly in games with mixed-strategy equilibria which nullify any reason that a player might have for choosing an equilibrium strategy. Consider the game shown in Figure 1.2.

Figure 1.2: A game with mixed strategy equilibrium

		Player 2 (Payoff in parenthesis)	
		C	*D*
Player 1	*C*	3 (3)	4 (2)
	D	5 (1)	3(3)

This game has no pure strategy equilibrium, but it has a unique equilibrium point in mixed strategies. According to the game-theoretic solution, Player 1 randomises between strategies *C* and *D* with probabilities (⅔, ⅓), and Player 2 randomises between strategies *C* and *D* with probabilities (⅓, ⅔). If both players use these equilibrium strategies, then their expected payoffs are 3 ⅔ and 2 ⅓ respectively. But if Player 1 expects Player 2 to choose the prescribed equilibrium strategy, then this expectation provides Player 1 with no reason to choose the complementary equilibrium strategy, because any pure or mixed strategy yields an identical expected payoff of 3 ⅔ against Player 2's mixed strategy, and the same argument applies, with the necessary alterations, to Player 2. This illustrates that the fact that a particular outcome is an equilibrium point does not provide a player with sufficient reason to choose the corresponding equilibrium strategy. In this example, it actually provides a player who expects the co-player to select an equilibrium strategy with a reason for being indifferent between all available strategies, pure or mixed, thus nullifying any reason the player might have for choosing the equilibrium strategy.

Following this, it may appear that this equilibrium strategy is unstable, in that each player can deviate from it unilaterally without penalty, although neither player has any incentive not to choose the equilibrium strategy. However, Harsanyi (1973) argued that this instability is apparent rather than real, provided that an element of uncertainty is introduced into the modelling of the game.

According to this approach, a player may be assumed to have a small amount of uncertainty about the precise payoff of the co-player. Harsanyi showed that if games with solutions in mixed strategies are modelled by disturbed games with randomly fluctuating payoffs, deviating only very slightly from the original fixed payoffs, then the mixed-strategy equilibrium points disappear and are replaced by equilibrium points in pure strategies, and the fluctuations in the players' payoffs interact in such a way that the players choose them with the same probabilities as those prescribed for the original mixed strategies. In the game shown in Figure 1.2, for example, Player 1 receives a higher payoff from strategy *C* in ⅔ of disturbed games, and a higher payoff from strategy *D* in the remaining ⅓, while for Player 2 the proportions are ⅓ and ⅔ respectively. So, although the players make no attempt to randomise their pure strategies, they end up using them with the probabilities of the mixed-strategy solution prescribed by classical analysis.

Even with Harsanyi's (1973) model which incorporates randomly fluctuating payoffs, it remains the case that a strategy profile being an equilibrium point is insufficient reason to play one's component of it, and the common knowledge and rationality assumptions provide a player with no reason to expect the co-player(s) to choose equilibrium strategies merely because they are equilibrium strategies. However, if we could be sure that every game has a uniquely rational solution, then every game with a unique equilibrium point would automatically be solved. This follows from the fact that if a game has a uniquely rational solution, then it must be an equilibrium point; therefore, if the game has a unique equilibrium point and is also known to have a uniquely rational solution, then that equilibrium point must be the game's solution.

From this, the question arises as to whether we can be sure that there are games with uniquely rational solutions. This is often taken as a self-evident truth (e.g., Harsanyi, 1962, 1966; Harsanyi & Selten, 1988; Weirich, 1998), and more often appears to be assumed without being explicitly stated. In his earliest articles, Nash (1950, 1951), appears to have taken it to be self-evident, then in a later article he introduced it explicitly as the first of a set of seven axioms: “For each game ... there is a unique solution” (Nash, 1953, p. 136). However, this principle of rational determinacy is unproven and there are reasons for doubting it.

First, there are games without equilibrium points. If only pure strategies are taken into account, then many games are without an equilibrium point. Even if mixed strategies are considered, there are still infinite games without equilibrium points. The game in Figure 1.2 is a case in point. Nash’s (1950, 1951) existence proofs for equilibrium points require mixed strategies but only apply to finite games. If this restriction is relaxed, it is possible to find games without equilibrium points, even in mixed strategies. The first simple and unambiguous example of an infinite game with no equilibrium point was found by Sion and Wolfe (1957). Bearing in mind the fact that a uniquely rational solution must be an equilibrium point, these infinite games cannot have uniquely rational solutions.

Second, Cubitt and Sugden (1994, 1995) have examined the consistency of the common knowledge and rationality assumptions, together with the closely related assumption that players do not discount the possibility of any strategy being chosen by a co-player, provided it is rationally justified, and this set of assumptions admits the possibility of strategies that cannot be shown to be rationally justified nor unjustified.

Nash equilibrium’s status as a solution concept is further weakened by the fact that some equilibrium points require players to choose strategies which are manifestly irrational. This phenomenon was discovered by Selten (1965, 1975), who suggested the most widely accepted refinement of the equilibrium concept, namely the subgame-perfect equilibrium. A simple example of an imperfect equilibrium can be seen in Figure 1.3.

Figure 1.3: A game with an imperfect equilibrium

		Player 2 (Payoff in parenthesis)	
		C	***D***
Player 1	***C***	**2 (2)**	**0 (0)**
	D	**1 (3)**	**1 (3)**

Both *CC* and *DD* are equilibrium points, but *CC* is a subgame-perfect equilibrium and *DD* is an imperfect equilibrium which requires an irrational choice from one of the players. This can be illustrated with an extensive form of the game -- representing the game as a branching tree depicting the players' moves (Figure 1.4).

Figure 1.4: Extensive form of a game with an imperfect equilibrium.

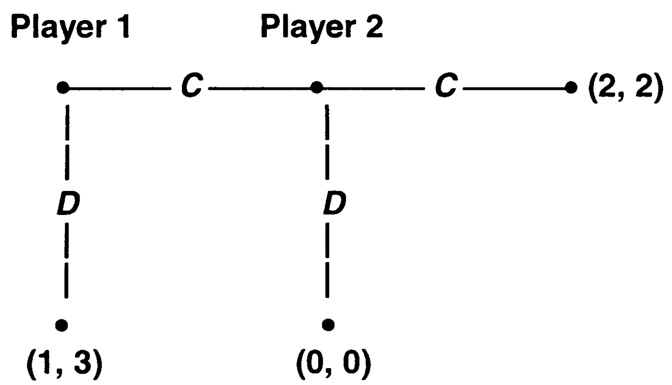


Figure 1.4 shows the players' moves, starting arbitrarily with Player 1's move at the left. It is clear from an examination of the game that *DD* is irrational, because at the second decision node it requires Player 2 to choose *D*, yielding 0 instead of 2. If this decision node could be reached by rational play (which of course it cannot), then a utility-maximising Player 2 would obviously choose *C*. Therefore, by backward induction, Player 1, who by transparency of reason can anticipate Player 2's reasoning, would choose *C*, so we can conclude that *CC* is the only sensible or subgame-perfect equilibrium point of the game.

In fact, it is clear in Figure 1.3 that *D* is a weakly dominated strategy for Player 2, in the sense that Player 2's *C* strategy yields at least as high a payoff as *D* for each of Player 1's strategies, and a higher payoff than *D* for one of Player 1's strategies (*C*). Were Player 1 to choose D, Player 2 would receive 3 points irrespective of whether he had chosen C or D. However, if Player 1 were to choose C, Player 2 would do better to choose C, and receive 2 points, than to choose D, and receive no points. In other words, a weakly dominated strategy is one which cannot do better than the alternative strategy in any of the possible outcomes, and in at least one possible outcome will yield a lower payoff than the alternative strategy. That is another reason why *DD* is an irrational outcome. It is assumed that no rational player will deliberately choose a weakly dominated strategy, and the fact that such a strategy can appear as a component of an equilibrium point further weakens the status of Nash equilibrium as a solution concept.

Selten (1975) introduced the concept of trembling hand equilibrium to eliminate the problem of imperfect equilibria. According to this approach, at every decision node in the extensive form of a game there is a small probability that the player's rationality will break down for some reason and the player will make a mistake, that is, an unintended move. The introduction of these small error probabilities produces what is termed a perturbed game. Whenever a player's hand trembles in this way, the resulting move is assumed to be determined by a random process, and every move that could be made at every decision node has some positive probability of being played. Assuming that players' trembling hands are common knowledge in the game, Selten proved that only subgame-perfect equilibria remain equilibria in the perturbed game. According to this refinement of the equilibrium concept, the standard game-theoretic assumption of rationality is reinterpreted as a limited incomplete rationality.

However, a further deficiency of Nash equilibrium as a solution concept, which is not entirely eliminated by subgame-perfect equilibria and other refinements, is the problem of multiple equilibria. Nash equilibrium provides convincing solutions for strictly competitive (finite, two-person, zero-sum) games because, in those games, if there are two or more equilibrium points, then they are equivalent and interchangeable. Two equilibrium points (s, t) and (s', t') are equivalent if both players receive the same payoff at each. Formally, if Π_1 is the payoff to Player 1 and Π_2 is the payoff to Player 2, then the two equilibrium points are equivalent if and only if $\Pi_1(s, t) = \Pi_1(s', t')$ and $\Pi_2(s, t) = \Pi_2(s', t')$. The two equilibrium points (s, t) and (s', t') are interchangeable if and only if (s, t') and (s', t) are also equilibrium points. If these conditions are satisfied, it makes no difference which equilibrium strategies the players choose, because their payoffs remain the same. An illustrative example is given in Figure 1.5, where choices are given arbitrary labels of X, Y and Z.

Figure 1.5: A finite, two person, zero-sum game with multiple Nash equilibria

		Player 2 (Payoff in parenthesis)		
		X	***Y***	***Z***
	X	**5 (-5)**	**3 (-3)**	**3 (-3)**
Player 1	***Y***	**6 (-6)**	**3 (-3)**	**3 (-3)**
	Z	**4 (-4)**	**1 (-1)**	**2 (-2)**

In the game shown in Figure 1.5, *XY*, *XZ*, *YY* and *YZ* are all Nash equilibria. For Player 1, both *X* and *Y* are best replies to Player 2's choices of *Y* and *Z*, and for Player 2, both *Y* and *Z* are best replies to Player 1's choices of *X* and *Y*. It does not matter whether Player 1 chooses *X* or *Y*, or whether Player 2 chooses *Y* or *Z*, because the payoffs are the same in all four possible outcomes.

Most non-strictly-competitive games have multiple equilibrium points which are non-equivalent and non-interchangeable. As a result, many games lack determinate solutions according to the Nash criterion. Such lack of determinacy is a major flaw of game theory. An example which has often been discussed in the literature is the Stag Hunt game, shown in Figure 1.6.

Figure 1.6: The Stag Hunt game

		Player 2 (Payoff in parenthesis)	
		C	***D***
Player 1	***C***	**4 (4)**	**1 (3)**
	D	**3 (1)**	**2 (2)**

This game was first discussed by Rousseau (1755), introduced into game-theoretic literature by Lewis (1969, p. 7), brought to prominence by Aumann (1987) and discussed by Harsanyi and Selten (1988, pp. 357-359). Both *CC* and *DD* are equilibrium points, and there is also a mixed strategy equilibrium, with each player assigning equal probability to *C* and *D*, yielding an expected payoff of 2 ½ to each player. Clearly both players prefer *CC* to *DD* and to the mixed strategy equilibrium, but there is no reason which is grounded in standard common knowledge and rationality assumptions for a player to choose *C* rather than *D*.

In an explicit attempt to provide a method for choosing between multiple equilibria, Harsanyi and Selten (1988) introduced as axioms two principles of equilibrium selection. The first is the payoff-dominance principle. If *e* and *f* are any two equilibrium points in a game, then *e* payoff-dominates (or Pareto-dominates) *f* if and only if it yields a greater payoff than *f* to every player. The payoff-dominance principle is the proposition that if one equilibrium point payoff-dominates all the others in the game, then players will choose the corresponding strategies. According to Harsanyi and Selten, payoff-dominance should be regarded as part of every player's "concept of rationality" and should be common knowledge among the players. In the Stag Hunt game, *CC* payoff-dominates *DD*, as both players receive a greater payoff, so the payoff-dominance principle requires both players to choose *C*.

Harsanyi and Selten's (1988) secondary criterion for choice among multiple equilibria is called the risk-dominance principle, and is used when subgame perfection and payoff dominance fail to present a single solution. If *e* and *f* are any two equilibrium points in a game, then *e* risk-dominates *f* if and only if the minimum possible payoff from an *e* choice is greater than the minimum possible payoff from an *f* choice. In the Stag Hunt game, *D* risk-dominates *C* because the minimum possible payoff is greater for a *D* choice than for a *C* choice, and in this sense *D* is a less risky choice. However, the payoff-dominance principle takes precedence in Harsanyi and Selten's theory, and allows a determinate solution, so risk dominance does not affect the players' choices in this case.

Payoff-dominance is a leading principle of equilibrium selection, and most game theorists accept its intuitive force (for example, Bacharach, 1993; Colman, 1997; Colman & Bacharach, 1997; Cooper, Dejong, Forsythe & Ross, 1990, 1992a, 1992b; Crawford & Haller, 1990; Farrell, 1987, 1988; Lewis, 1969; Sugden, 1995). However, despite the intuitive force of the argument, there is no rational justification for it. Consider the Hi-Lo Matching game, shown in Figure 1.7.

Figure 1.7: The Hi-Lo Matching game

		Player 2 (Payoff in parenthesis)	
		C	***D***
Player 1	***C***	**4 (4)**	**0 (0)**
	D	**0 (0)**	**2 (2)**

In this game, there are two pure-strategy equilibrium points at *CC* and *DD*, with *CC* payoff-dominating *DD*. It seems intuitively obvious that both players would choose *C*, although according to the standard common knowledge and rationality assumptions there is no rational justification for it. Player 1 will obviously choose *C* given reason to expect that Player 2 will also choose *C*, as this would yield a payoff of 4 rather than zero. However, in the absence of any grounds for believing that Player 2 will choose *C*, there is no reason for Player 1 to choose *C*, because if Player 2 were to choose *D* then Player 1 would do better to choose *D* and receive 2 rather than 0. Thus, whether or not Player 1 has a reason to choose *C* depends on whether there is any reason to suppose that Player 2 will choose *C*. However, Player 2 is in exactly the same position as Player 1, with no reason to choose *C* in the absence of any grounds for believing that the co-player, Player 1, will also choose *C*, and this argument spirals into an infinite regress from which neither player can derive any rational justification for choosing *C*. In short, a player would prefer *C* to *D* only if there were a reason to expect the co-player to choose *C*, but there is no such reason for this expectation, because the co-player is in exactly the same position.

The argument that rational players would choose *C* because it yields 4 or zero, and *D* only yields 2 or zero, does not hold, because it rests on an irrational and unsupported belief about which strategy the co-player will choose. To be more precise, it assumes that the co-player is not more than twice as likely to choose *D* than to choose *C*, in which case *D* would yield a higher expected payoff. But game-theoretic reasoning does not allow for players to assign arbitrary probabilities to co-players' strategies, as such assumptions can lead to contradictions. For example, if it were valid to assume that Player 2 is equally likely to choose *C* or *D*, then Player 1's payoff would be maximised by choosing *C*. But if this inference were rational, it would be common knowledge within the game, and would cause a rational Player 2 to choose *C* with certainty, thus contradicting the original assumption.

Standard game theory identifies *CC* and *DD* as equilibrium points but from then on it provides players with no further help in choosing between the *C* and *D* strategies. Harsanyi and Selten's (1988) payoff-dominance principle clearly instructs both players to choose *C*, but it does not explain why.

Furthermore, there are limits, or bounds, to peoples' rationality. In all bar the simplest games, players cannot reasonably be expected to observe the set of payoffs and, given common rationality and knowledge of selfish and individualistic behaviour, decide which is the best choice for them to make in the light of what the other player(s) will do. Indeed, given that this is so, the whole rationality assumption breaks down -- players know that they themselves may not be making their decisions rationally, and that other players may not be, and that other players may know that they may not be rational and so on. There is evidence that in all bar the simplest situations, the bounded rationality of players causes them to use a variety of decision-making heuristics which deviate from prescriptive rationality (Kahneman & Tversky, 1984; Tversky & Kahneman, 1981).

One proposed alternative to conventional rationality, as outlined by decision theory, is that of Stackleberg reasoning (Colman & Bacharach, 1997; Colman & Stirk, 1998). Using this model, conventional problems which arise from multiple Nash equilibria can be overcome. Essentially, a Stackleberg reasoner would look at every strategy he himself could choose, and consider the best reply which the co-player could make to each of these strategies. The Stackleberg reasoner then considers which of these best reply strategies would result in the best payoff for himself, and chooses accordingly. Colman and Bacharach proved that Stackleberg reasoning leads to selection of the payoff-dominant equilibrium whenever it exists.

However, a more compelling explanation for payoff dominance is team reasoning. This was suggested informally by Gilbert (1987, 1994), developed into a theory by Sugden (1993), formalised by Bacharach (1999) and discussed in more depth by Sugden (2000) and Gilbert (2001). Sugden (1993) described team reasoning as "a theory in which individuals can act cooperatively, following rules which it would be in everyone's interests for everyone to follow" (p. 89). Gilbert (1994) described essentially the same phenomenon when she wrote that "one acts from *groupish* motives when one acts so as to promote what one perceives as 'our' goals, needs, and so on" (p. 621, italics in original), and Bacharach (1999) characterised a team reasoner as someone who "chooses the act (if this is unique) which is her *component* in the *profile* which is best for the objective of some group" (p. 132, italics in original).

In essence, team reasoning players maximise their collective or joint utility, relative to the information available to them at the time of acting, rather than their own individual payoffs as in standard game theory. A team reasoning player first identifies the profile of strategy choices which would maximise the collective payoff, and then, if that profile is unique, plays the individual strategy which forms a component of that profile, provided the individual has confidence that the co-players are also team reasoning. This abandons the methodological individualism which underlies standard decision theory, and the idea that decision makers may sometimes deviate from acting selfishly (by maximising collective rather than individual payoffs) and individualistically (by acting in conjunction with other players, rather than as individual agents) is a radical departure from conventional game theory. But there are everyday circumstances in which it seems intuitively plausible, such as when members of sports teams, small businesses, families, or tribal clans appear to be motivated by the interests of the group rather than by individual interests.

Non-selfish behaviour is apparent in everyday life. Giving blood, for example, involves a temporary loss of well-being, and a small sacrifice of time, yet many people still engage in the activity. Giving blood contributes to a project which benefits a number of people, but the likelihood that the contributor will benefit from the service is slim, and giving will only increase the likelihood by a negligible amount. Of course, many seemingly selfless acts could be defined as selfish, or seeking to promote one's own self-interest, by using the explanation of seeking social rewards, such as praise (or similarly avoiding social censure), or seeking self-rewards, such as increase in self-esteem, or similarly avoiding feelings of guilt (Batson, 1994). Selfish motives behind selfless acts have been suggested as the desire for a "warm glow" (Andreoni, 1990), decreasing personal negative emotions brought about by empathy (Cialdini, Schaller, Houlihan, Arps, Fultz & Beaman,1987), seeking an increase in social prestige (Olson, 1965), and/or the avoidance of scorn (Becker, 1974). These explanations can be used to support an argument that there must always be a selfish motive behind selfless behaviour, otherwise the act would not be performed. However, if voluntary behaviour is always assumed to be selfish by definition, then this definition of selfishness is either circular, or else the assumption is incorrect because examples of non-selfish behaviour are easy to find in everyday life.

While the example of blood donating is not necessarily an example of selfish behaviour, it is clearly individualistic in that the blood donor was acting as an individual, pursuing their own desires. However, in some interactive decisions the reasoning employed by decision makers may not be individualistic. Consider the following hypothetical example: (a) *A development corporation is considering putting in a planning application to build a number of executive homes on some green belt land near my house;* (b) *We, the people who live in the area, want to stop the development;* (c) *The corporation will only reconsider if every household in the area indicates that they are not happy with the proposal;* (d) *Therefore, I should write to the corporation expressing my opposition to the plan.* Here the decision maker in question is considering what we, the group, want, and is looking at what part he personally should play in order for the aim of the group to be achieved. The aim of the group is outlined, along with the role of the individual in achieving that aim, but there is no need for any reference to an individual's personal goals, and Gilbert (1989, 1994) provided compelling arguments to show that this reasoning is inherently non-individualistic and does not hide any presupposed individualistic premise. From a general premise of the form *We desire X*, whatever *X* might be, plus specific premises about the appropriate means to achieve *X*, "a conclusion about what an individual should do can follow directly, without the interposition of any assumptions about what that individual wants or seeks. Indeed, no single individual's aims need be referred to" (Gilbert, 1989, p. 708). Team-reasoning decision makers do not focus on their own goals, whether they are selfish or altruistic or a combination of the two, but on their roles in achieving a group goal.

Furthermore, what "we desire or prefer" is not merely what "I desire or prefer, and you desire or prefer, and they desire or prefer". Sugden (2000) illustrates this with an example of his family preferring "walks of six miles or so to ones which are much shorter or longer" and elaborates that his "ideal walk would be somewhat longer than six miles, along rougher and less well marked paths than we prefer as a family" (p. 175). Thus it is possible for every member of a group to hold different personal preferences of courses of action, yet also for that group to have a coherent and meaningful collective preference which differs from each group member's personal preference.

The literature based around social value orientations has long acknowledged that people do not always interact in accordance with rational self-interest, and are sometimes motivated to maximise joint or collective gain (e.g. Griesinger & Livingston, 1973; Kelley & Stahelski, 1970; McClintock & Liebrand, 1988). Van Lange's (1999) integrative model of social value orientation incorporates this approach, together with a motivation to maximise equality of payoffs, into a transformational analysis of payoffs. Here it is assumed that a player's individual utility may be illustrated as a function of their own payoff, the other player's payoff and the difference between those two payoffs. However, this transformational approach relies implicitly on the methodological individualism of conventional decision theory. Decision makers are assumed to incorporate the joint or collective utilities into their individual utility functions and then engage in individualistic reasoning by maximising the transformed utilities individually, rather than engaging in team reasoning as defined above.

Team reasoning cannot, in fact, be illustrated coherently within the framework of the transformational approach. In particular, van Lange's (1999) integrative theory includes a model of prosocial value orientation which may appear superficially to resemble team reasoning, and may therefore be expected to predict coordination in the Hi-Lo Matching game. However, it does not provide a solution to the game, nor to the payoff-dominance quandary. According to the transformational model, in the two-person case, cooperation is defined as a motivation to maximise the outcome transformation function OT = W_1(own payoff) + W_2(co-player's payoff). Individual payoffs are replaced by OT values, and each player proceeds with individualistic reasoning using the transformed payoffs. This approach results in cooperation in the Prisoner's Dilemma game, but it does not solve the payoff dominance problem. A transformation of the Hi-Lo Matching game using the model is given in Figure 1.8.

Figure 1.8: An outcome transformation of the Hi-Lo Matching game, using van Lange's (1999) prosocial value orientation of cooperation, in which each player's individual payoff is the sum of the payoff to both the players in the original game illustrated in Figure 1.7.

		Player 2 (Payoff in parenthesis)	
		C	***D***
Player 1	***C***	**8 (8)**	**0 (0)**
	D	**0 (0)**	**4 (4)**

It is clear that the transformed Hi-Lo Matching game is simply another Hi-Lo Matching game, with doubled payoffs, in which there is still no rational reason for choosing *C*. No difference is made to the strategic structure, and no player, using the individualistic reasoning of traditional decision theory, has any reason to choose *C*. The transformational approach still relies on individualistic reasoning; decision makers operate as single-person agents, which rely on knowledge of other players' preferences in order to determine the best way to maximise utility.

In van Lange's (1999) integrative model, all social value orientations are modelled as linear transformations of the variables W_1, W_2 and W_3. The variable W_3 is described simply as "equality in outcomes" and is not formally defined. However, it is clear from his examples that $W_3 = -|W_1 - W_2|$ (the negative value of the absolute difference between the players' payoffs).

It can be shown that no linear transformation of these variables captures the essential quality of team reasoning. Firstly, because $W_3 = -|W_1 - W_2|$, any linear transformation of these three variables can be expressed as $aW_1 + bW_2$, where a and b are suitably chosen weights. For example, cooperation plus egalitarianism is defined by van Lange (1999) as the motivation to maximise OT = $W_1 + W_2 + W_3$, and this is equivalent to maximising $2W_2$ if $W_1 \geq W_2$ or $2W_1$ if $W_1 \leq W_2$.

No linear payoff transformation $aW_1 + bW_2$ can yield a payoff structure in which a player who reasons individualistically within the constraints of van Lange's (1999) integrative model can ever have a reason to choose C in the Hi-Lo Matching game, shown in Figure 1.7 or Figure 1.8. In this game, $W_1 = W_2$, hence maximising $aW_1 + bW_2$ amounts to maximising W_1 for any values of a and b, and this is simply individualistic payoff maximisation, which as has been shown leaves neither player with any reason for choosing C. More generally, no linear transformation of W_1, W_2 and W_3, with the conventional maximisation assumption, can capture the essence of team reasoning.

Social identity theory (Tajfel, 1970, 1978, 1979, 1981; Tajfel & Turner, 1986; Turner, 1985) also bears a superficial resemblance to team reasoning. The main thrust of social identity theory is that arbitrary group membership is enough to produce discrimination between members of the ingroup (those in the same group as the self) and the outgroup (those not in the ingroup) such that an individual will seek to promote the ingroup.

Team reasoning is likely to the linked to group identity in some way, in that it may be brought about by an increased level of group identity, or group identity may just make it more likely that people would team reason. It is possible that similar factors encourage both group identity and team reasoning, and as group identity is often described by the bias shown to in-group members, the two could be hard to untangle empirically. However, conceptually they are different, and it must be considered that group identity would not necessarily lead to team reasoning, and team reasoning may occur with a very low level of group identity.

Furthermore, suggested reasons for discrimination which occurs with group identity, and occurrence of behaviour which seeks to further the ingroup's cause, are mostly based around self-esteem. An individual will use group membership to support self-esteem (Cialdini & Richardson, 1980) and the more positively the group is perceived, the better the individual's self esteem. Thus, under the assumptions of social identity theory, an individual acting to promote the group can be interpreted as essentially individualistic behaviour, thus encountering the same problems related to decision theory as outlined above.

If the methodological individualism of conventional decision theory is relaxed, and players are assumed to be motivated not necessarily by their own individual payoffs -- whether or not incorporating those of their co-players -- but by the joint or collective payoff of the group of players, then the outcome of *CC* in the Hi-Lo Matching game would follow immediately. Under the assumptions of team reasoning, players would view the game as shown in Figure 1.9.

Figure 1.9: The Hi-Lo Matching game of Figure 1.7, as viewed by a team-reasoning player

Choices		Team payoff
Self	Other	
C	C	8
C	D	0
D	C	0
D	D	4

Here, the objective function is the team payoff (the joint or collective payoff), and it is assumed that each player is motivated to maximise its value. Team-reasoning players do not merely consider the joint or collective payoff in a particular outcome as their individual payoffs, as is the case in van Lange's (1999) model. Instead, each team-reasoning player views the joint or collective payoff as that of the dyad or group and, given the common knowledge assumption, all players see themselves as members of the team and each assumes that the co-player(s) view the situation in the same way. Bacharach (1999) developed a stochastic model of team reasoning, in which the common knowledge assumption that the players are team reasoners can be weakened, where each player assigns a subjective probability to the event of the other players team reasoning. However, this is a surplus complication to the case that team reasoning can explain coordination in the Hi-Lo Matching game. In brief, if the individualistic assumption of traditional decision theory is relaxed, and instead it is assumed that each player is motivated by the collective payoff, and this is common knowledge within the game, then the *CC* solution naturally follows.

Brase (2001) discussed the functionality of behaviour that is in the interests of group members. He suggested that naturally occurring groups, or coalitions, tend to be formed on the basis of common interests or features, and as such behaviour which benefits the group members can be seen as sensible. The cohesiveness of groups vary considerably, and Brase suggested that this was at least partially due to the extent to which members share common objectives and act as a cooperative unit in order to promote those objectives. In this, he seems to touch on the idea of team reasoning, and then goes on to discuss how people make assumptions about group membership. His discussion appears at first to be linked to social identity theory, but the focus is not on the inherent individualism which seems to be behind the social identity literature.

To date, there is no published empirical evidence bearing directly on the existence of team reasoning. However, literature on behavioural decision making belies the assumption that humans have consistent individualistic rationality, and framing effects are a pertinent example of this. Framing effects can be defined as the way in which an individual interprets a situation or event, partly due to the presentation of the situation, and partly due to the internal norms and characteristics of that person (Tversky & Kahneman, 1981). As such, the interpretive frame of a problem can affect strategies which people use (Bacharach, 1994; Ormerod, Manktelow , Robson & Steward, 1986) and decisions people make (for example, Eiser & Bhavnani, 1974; Levin & Gaeth, 1988; Manktelow & Over, 1991; Tversky & Kahneman, 1988), even though the structure of the problem remains unchanged. This has potential implications for the study of team reasoning, in that selection of such a decision strategy may be subject to framing effects. Brayer (1964) and Colman (1982) found that players acted more in accordance with conventional game-theoretic predictions when games were presented in abstract, matrix format than when games were presented in a lifelike frame. Colman (1995) suggested that this might have been due to an excess of irrelevant information clouding the essential structure of the problems. However, everyday strategic interactions are rarely conducted in isolation, so could also be subject to such effects, although how similar such interactions are to games presented in lifelike frames is unclear. Nonetheless, games presented in lifelike frames hold more resemblance to everyday interactions than do abstract matrices, and as such provide a more realistic starting point from which to start studying team reasoning.

Two preliminary studies were carried out (see Appendix 1) which attempted to distinguish between standard individualistic reasoning, social identity, and team reasoning, using decision making in a one-shot Prisoner's Dilemma game. The experiments were flawed to a large extent, although they served as a useful highlight for some problems which might be encountered while studying team reasoning. Team reasoning would predict cooperation in the Prisoner's Dilemma game, but it does not follow that cooperation is necessarily due to team reasoning. As such, it was decided that two-person games were an unsuitable method to start studying team reasoning, and a less ambiguous tool would need to be used. However, qualitative responses provided insight into motivations behind choices, so asking participants to explain their answers was thought to be a useful tool to incorporate into further studies. Furthermore, the lack of previous empirical research into team reasoning suggests a more basic starting point.

The first experimental chapter will consider people's perceptions of a variety of different outcomes in a number of situations. The second experimental chapter will consider participants' outcome preferences in the same hypothetical situations used in Chapter 1. The third experimental chapter will move on to consider a link between preferences for maximum joint outcomes and a desire for equal outcomes. The fourth experimental chapter will look at the effect of a number of factors on preferences for maximum joint payoffs. The final experimental chapter will use the findings of the fourth experimental chapter to look at framing effects on cooperation in a number of two-person games.

Chapter 2

Introduction

Framing effects can be defined as the psychological effects of the way people interpret situations and events -- partly due to the presentation of the situation and partly determined by the habits, norms and characteristics of the person involved (Tversky & Kahneman, 1981). Smith and Levin (1996) showed how framing biases affect individuals with relatively low levels of need for cognition more than those with high need for cognition, where need for cognition is how much an individual tends to think about and analyse concepts and problems. This difference is assumed to be due to individuals with high need for cognition considering the actual structure of the problem, rather than the context, so the context has relatively less bearing on their decisions. Smith and Levin found that those individuals with low need for cognition were clearly affected by manipulation of frames whereas those with a high need for cognition were not, so in a sense the individual's characteristics could be seen as the first "screen" to determine how strong framing effects from the presentation of the situation will be.

Framing effects as yet are relatively under-researched. There is some literature on the Wason selection task, showing that presenting the problem in a lifelike "social contract" format as opposed to the identical problem as an abstract task improves performance (e.g. Fiedler & Hertel, 1994; Griggs, 1983; Pollard, 1981), and that the social dynamics of a presentation scenario affects performance (Manktelow & Over, 1991). Similarly, a small amount of research adopts an "abstract versus lifelike" perspective in the Prisoner's Dilemma literature. Colman (1979), and Furnham and Quilley (1989) compared choices on abstract Prisoner's Dilemma game matrices to decisions on lifelike vignettes. Both studies found that the lifelike frame yielded more competitive responses. However, both studies used a vignette with a financial, rather than social, basis to it. Eiser and Bhavnani (1974) found that participants altered their decision behaviour in a Prisoner's Dilemma game according to whether they were told that they were taking part in a simulation of economic bargaining, social interactions or international negotiations, or not told anything at all, with the "economic bargaining" condition leading to most competitive responses, followed by the subjects being told nothing, followed by the "international negotiations" condition, with the "social interactions" condition yielding the most cooperative responses. Bearing this in mind, it would seem likely that the type of lifelike story (e.g., with a financial or social basis) would have an effect on the level of cooperation. However, to date little has been done to investigate this.

Framing effects are potentially relevant to many different aspects of social interaction, probably, in part at least, because of the absence of hard and fast rules regarding what is "right" and what is "wrong". It is not unusual for different contexts to elicit different types of responses to essentially similar situations, as mentioned above. Concepts such as fairness and selfishness are likely to be salient to some extent in the decision-making process in many types of social interaction, so interpretations of these types of concepts are themselves likely to be subject to framing effects.

This study aims to look at framing effects on key aspects of decision making in social situations. Ten hypothetical situations were used, each designed to encourage one of five different types of behaviour: altruistic (maximising the other's payoff, irrespective of own payoff); competitive (maximising the difference between own payoff and the other's payoff, regardless of absolute levels of payoffs); equality-seeking (minimising the difference between own payoff and the other's payoff, regardless of absolute levels of payoffs); individualism (maximising own payoff, irrespective of the other's payoff); and team reasoning (maximising overall combined level of payoffs, regardless of individual levels of payoff).

A mutually exclusive set of outcomes was devised for each scenario. Each outcome pertained to one of the five motivations, with one and only one outcome to match that motivation. The following five questions regarding the outcomes were presented after each vignette.

"Which of these options would be the most equal?"

"Which of these options would be the fairest?"

"Which of these options would be most selfish?"

"Which of these options would be most unfair?"

"Which of these options would lead to the best total overall outcome?"

These questions aimed to include factors which people might consider when making decisions in social interactions, as they concern both absolute and relative payoffs. Some are more subjective and context-dependant than others. "Equal" is likely to be the least subjective of the five terms, as it has an obvious and unambiguous definition, which none of the others has. It is possible that a particular outcome could be seen as equal even if it was not, in a case such that the situations of the individuals involved in the interaction were not equal to start with and the outcome placed the individuals on a more equal footing. However, because "equal" is a fairly objective term, it is unlikely that people will look to the frame to define "equal".

The question regarding the "best total overall outcome" is designed to elicit the maximum joint payoff response. If people do recognise that there is an option of adding payoffs together and not necessarily looking at separate and individual payoffs, then participants should respond to this question with the maximum joint payoff response. The other questions, however, are more subjective. "Fair", "unfair" and "selfish" are likely to be context-dependent ideas, therefore by definition subject to framing effects. Also they are subject to different interpretations by different people, which would in turn increase their vulnerability to framing effects. Following these observations, the hypotheses are as follows.

Hypothesis 1: The most frequent response to the question "Which of these options would be the most equal?" will be the equality-seeking option in all vignettes.

Hypothesis 2: The most frequent response to the question "Which of these options would lead to the best total overall outcome?" will be the maximum joint payoff option in all vignettes

Hypothesis 3: There will be framing effects across vignettes in the most frequent responses given to the questions "Which of these options would be the fairest?", "Which of these options would be most selfish?", and "Which of these options would be most unfair?".

Method

Participants

Fifty-five undergraduate psychology students at the University of Leicester, 7 male and 48 female, with ages ranging from 18 to 38 years (M = 19.96, SD = 2.88) were recruited as participants for the experiment, which was presented to them as a study of decision making. The study was piloted on three undergraduate students, aged 20-23 years.

Materials

Data were collected through a 10-part questionnaire, comprising two vignettes representing each of five different types of decision scenarios differing in terms of the social value orientation, the order of the vignettes being varied quasi-randomly across questionnaires. Each vignette described a scenario designed to engage one of the major social value orientations in the models of McClintock (1972) and van Lange (1999). Thus each of the following social value orientations was represented by two vignettes that were expected, on common-sense grounds, to elicit it: *individualism* (maximizing own payoff, expected in situations in which, for practical or conventional reasons, one's individual payoffs and those of the co-player could not or would not be redistributed or shared); *altruism* (maximizing other's payoff, expected in situations in which one has a close relationship with a co-player whose need is greater than one's own); *competitiveness* (maximizing own minus other's payoff, expected in situations such as recreational games or business interactions in which cultural norms prescribe or encourage competitiveness); and *equality-seeking* (minimizing the difference between own and other's payoff, expected in situations in which moral or ethical considerations of fairness prescribe or encourage equal payoffs to both players). In addition, two vignettes were designed to elicit *team reasoning* (maximising joint payoff, expected in situations in which payoffs go into a common pool and the players benefit jointly from the cooperative outcome), which falls outside the scope of existing theories of social value orientation.

The following is one of the two equality-seeking vignettes used in the experiment:

> You and a friend have helped a mutual acquaintance collect and chop firewood for the winter. You have both worked hard for a couple of days. He pays you each a certain amount of money. Here is a list of the possible options:

This was followed by five response alternatives defined by pairs of payoffs labelled "you are paid (friend is paid)". In this vignette, the five response alternatives were: £50 (£50), £50 (£70), £25 (£80), £70 (£40), and £50 (£10). The first of these options uniquely maximises equality of payoffs (equality seeking); the second, joint payoff (and therefore represents team reasoning); the third, other's payoff (altruism); the fourth, individual payoff (individualism); and the fifth, own minus other's payoff (competitiveness). Respondents were requested to indicate which outcome they thought was the fairest, which was the most selfish, which was the most unfair, which would lead to the best total overall outcome and which was the most equal.

The other equality-seeking vignette described "you and your brother" being left different amounts of money in a family friend's will. One of the individualistic vignettes described a scenario in which "you and your next-door neighbour" win different amounts of money in a prize draw; the other described "you and a classmate" completing an on-line test for potential employers and each obtaining a different score. One of the altruistic vignettes described "your best friend's flat" being burgled and then both of you winning different amounts of money in a game of bingo; the other described "your sister" being given six months left to live and both of you then winning different amounts of money in a lottery. One of the competitive vignettes described "you and another person" setting up hot dog stands and attracting different numbers of customers; the other described "you and a drinking acquaintance" playing pool and winning different numbers of games. Team reasoning was represented by two vignettes: the first described "you and another group member" being involved in a campaign against a test site for genetically engineered (GM) crops and collecting different numbers of names for a petition; the other described "you and a friend" raising different amounts of money through sponsored head shaves for new computers in your school. In the first of these two vignettes, the people involved would benefit from an outcome with a lot of names on the petition, by there being less likelihood of the test site in their area going ahead. In the second, both would benefit from an outcome in which a large amount of money was raised, by increased access to computers in their school. For the complete questionnaire, see Appendix 4.

Procedure

Participants were presented with a booklet containing the 10 vignettes, arranged in a different quasi-random order in each questionnaire, each vignette being followed by a set of five response categories representing outcomes with different pairs of payoffs for the respondent and the other person in the vignette. Instructions were given to the participants to indicate which outcome each participant felt was the fairest, which was the most selfish, which was the most unfair, which would lead to the best total overall outcome and which was the most equal. In each case, the five response alternatives uniquely reflected individualism, altruism, competitiveness, equality seeking, and team reasoning. The questionnaire took about 15 minutes to complete.

Results

Each vignette was followed by five different questions, each with five possible answers. Answers to each question were analysed separately.

Hypothesis 1: The most frequent answer to the question "Which of these options would be the most equal?" will be the equality-seeking option (E) in all vignettes.

Results of the tests are given in Table 2.1. A chi-square goodness-of-fit test was performed for responses to this question in each vignette, on frequencies across the five response categories.

Table 2.1: Frequencies across response categories of answers to the question "Which of these options would be the most equal?" in each vignette (A = Altruistic, C = Competitive, E = Equality-seeking, I = Individualistic, J = Maximum joint payoff)

	Frequency of response (N=55)					$\chi^2$of E versus not E	*p* value
Choice	A	C	E	I	J		
Expected freq.	11	11	11	11	11		
Vignette:							
GM (T)	-	-	54	-	1	210.11	$p < .001$
Head shave (T)	-	-	55	-	-	220.00	$p < .001$
Burgled (A)	1	-	48	-	6	155.57	$p < .001$
Lottery (A)	2	-	52	-	1	191.02	$p < .001$
Will (E)	-	1	54	-	-	210.11	$p < .001$
Firewood (E)	-	-	55	-	-	220.00	$p < .001$
Computer (I)	-	-	54	-	1	210.11	$p < .001$
Prize draw (I)	-	-	55	-	-	220.00	$p < .001$
Pool game (C)	-	-	55	-	-	220.00	$p < .001$
Hotdog (C)	-	-	55	-	-	220.00	$p < .001$

This hypothesis was supported. In all vignettes, the frequency of equality-seeking responses to the question "Which of these options would be the most equal?" was significantly higher than frequencies of other responses.

Hypothesis 2: The most frequent answer to the question "Which of these options would lead to the best total overall outcome?" will be the maximum joint payoff (J) option in all vignettes.

Results of the tests are given in Table 2.2. A chi-square goodness-of-fit test was performed for responses to this question in each vignette, on frequencies across the five response categories.

Table 2.2: Frequencies across response categories of answers to the question "Which of these options would lead to the best total overall outcome?" in each vignette (A = Altruistic, C = Competitive, E = Equality-seeking, I = Individualistic, J = Maximum joint payoff)

	Frequency of choice (N=55)					χ^2 of J Versus not J	*p* value
Choice	A	C	E	I	J		
Expected freq.	11	11	11	11	11		
Vignette:							
GM (T)	-	-	4	3	48	155.57	$p < .001$
Headshave (T)	1	-	5	1	48	155.57	$p < .001$
Burgled (A)	22	-	6	-	27	29.09	$p < .001$
Lottery (A)	5	-	15	1	34	60.11	$p < .001$
Will (E)	-	-	25	1	29	36.82	$p < .001$
Firewood (E)	-	-	30	3	22	13.75	$p < .001$
Computer (I)	2	-	24	7	22	13.75	$p < .001$
Prize draw (I)	-	-	17	7	31	45.45	$p < .001$
Pool game (C)	-	3	25	8	19	7.27	$p < .01$
Hotdog (C)	1	1	16	8	29	36.82	$p < .001$

This hypothesis was partially supported. Although there was a significantly above-chance level frequency of the maximum joint payoff response to this question in all vignettes, it was not the most frequent answer in the Firewood, Computer and Pool game vignettes. In these three cases the equality-seeking (E) response was the most frequent, with the maximum joint payoff response being the next most frequent.

Hypothesis 3: There will be framing effects across vignettes in the most frequent responses given to the questions "Which of these options would be the fairest?", "Which of these options would be most selfish?", and "Which of these options would be most unfair?".

Response frequencies to the above three questions are summarised in Tables 2.3, 2.4 and 2.5. Chi-squared tests of independence were used in the analysis, comparing frequencies of each commonly given response and other types of response across vignettes. Thus, responses to the question "Which of these options would be the fairest?" were analysed as altruistic responses versus other responses across vignettes, equality-seeking responses versus other responses across vignettes, and maximum joint payoff responses versus other responses across vignettes. Responses to each of the questions "Which of these options would be most selfish?" and "Which of these options would be most unfair?" were analysed as altruistic responses versus other responses across vignettes, competitive responses versus other responses across vignettes, and individualistic responses versus other responses across vignettes.

Table 2.3: Frequencies across response categories of answers to the question "Which of these options would be the fairest?" (A = Altruistic, C = Competitive, E = Equality-seeking, I = Individualistic, J = Maximum joint payoff)

	Frequency of choice (N=55)				
Choice	A	C	E	I	J
Expected freq.	3.2	0.0	48.2	0.5	3.1
Vignette:					
GM (T)	-	-	51	-	4
Head shave (T)	-	-	53	-	2
Burgled (A)	19	-	19	-	17
Lottery (A)	12	-	36	-	7
Will (E)	1	-	54	-	-
Firewood (E)	-	-	55	-	-
Computer (I)	-	-	52	2	1
Prize draw (I)	-	-	55	-	-
Pool game (C)	-	-	52	3	-
Hotdog (C)	-	-	55	-	-

Comparisons across vignettes of different answers to the question "Which of these options would be the fairest?" are given below:

For A (altruistic) choices versus other choices, a chi-squared test of independence gave $\chi^2(9) = 133.92$, $p < .001$, with the adjusted residual (two-tailed) showing that there were significantly higher than expected frequencies in the Burgled and Lottery vignettes.

For E (equality-seeking) choices versus other choices, a chi-squared test of independence gave χ^2 (9) = 207.01, $p < .001$, with the adjusted residual (two-tailed) showing that there were significantly higher than expected frequencies in the Head shave, Will, Firewood, Prize draw and Hotdog vignettes, and lower than expected frequencies in the Burgled and Lottery vignettes.

For J (Maximum joint payoff) choices versus other choices, a chi-squared test of independence gave χ^2 (9) = 89.87, $p < .001$, with the adjusted residual (two-tailed) showing that there were significantly higher than expected frequencies in the Burgled and Lottery vignettes.

Table 2.4: Frequencies across response categories of answers to the question "Which of these options would be most selfish?" (A = Altruistic, C = Competitive, E = Equality-seeking, I = Individualistic, J = Maximum joint payoff)

	Frequency of choice (N=55)				
Choice	A	C	E	I	J
Expected freq.	13.2	22.9	0.0	18.8	0.1
Vignette:					
GM (T)	23	20	-	12	-
Head shave (T)	15	26	-	13	1
Burgled (A)	7	32	-	16	-
Lottery (A)	4	32	-	19	-
Will (E)	14	26	-	15	-
Firewood (E)	16	18	-	21	-
Computer (I)	10	22	-	23	-
Prize draw (I)	15	20	-	20	-
Pool game (C)	15	25	-	15	-
Hotdog (C)	13	8	-	34	-

Comparisons across vignettes of answers to the question "Which of these options would be the most selfish" are given below:

For A (altruistic) choices versus other choices, a chi-squared test of independence gave χ^2 (9) = 24.68 , $p < .005$, with the adjusted residual (two-tailed) showing that there was a significantly higher than expected frequency in the GM vignette, and significantly lower than expected frequencies in the Burgled and Lottery vignettes.

For C (competitive) choices versus other choices, a chi-squared test of independence gave χ^2 (9) = 33.89 , $p < .001$, with the adjusted residual (two-tailed) showing that there were significantly higher than expected frequencies in the Burgled and Lottery vignettes and a significantly lower than expected frequency in the Hotdog vignette.

For I (individualistic) choices versus other choices, a chi-squared test of independence gave χ^2 (9) = 30.03 , $p < .001$, with the adjusted residual (two-tailed) showing that there was a significantly higher than expected frequency in the Hotdog vignette and a significantly lower than expected frequency in the GM vignette.

Table 2.5: Frequencies across response categories of answers to the question "Which of these options would be most unfair?" (A = Altruistic, C = Competitive, E = Equality-seeking, I = Individualistic, J = Maximum joint payoff)

	Frequency of choice (N=55)				
Choice	A	C	E	I	J
Expected freq.	39.5	12.0	0.1	3.0	0.4
Vignette:					
GM (T)	43	9	-	-	3
Head shave (T)	44	9	-	1	1
Burgled (A)	20	32	-	3	-
Lottery (A)	20	26	-	9	-
Will (E)	44	9	-	2	-
Firewood (E)	45	9	-	1	-
Computer (I)	45	10	-	-	-
Prize draw (I)	46	7	1	1	-
Pool game (C)	50	3	-	2	-
Hotdog (C)	38	6	-	11	-

Comparisons across vignettes of answers to the question "Which of these options would be the most unfair" are given below:

For A (altruistic) choices versus other choices, a chi-squared test of independence gave χ^2(9) = 92.39 , $p < .001$, with the adjusted residual (two-tailed) showing that there were significantly higher than expected frequencies in the Prize draw and Pool game vignettes and significantly lower than expected frequencies in the Burgled and Lottery vignettes.

For C (competitive) choices versus other choices, a chi-squared test of independence gave $\chi^2(9) = 82.93$, $p < .001$, with the adjusted residual (two-tailed) showing that there were significantly higher than expected frequencies in the Burgled and Lottery vignettes and significantly lower than expected frequencies in the Pool game and Hotdog vignettes.

For I (individualistic) choices versus other choices, a chi-squared test of independence gave $\chi^2(9) = 46.54$, $p < .001$, with the adjusted residual (two-tailed) showing that there were significantly higher than expected frequencies in the Lottery and Hotdog vignettes.

Without framing, if the problems were presented purely abstractly, there would be no reason to expect any differences, as the problems would be effectively the same. However, framing effects were shown in answers to all these three questions, in that response distributions varied across vignettes, thus the third hypothesis was supported.

Discussion

From the results it is clear to see that there is support for the first hypothesis, in that the response to the question "Which of these options would be the most equal?" was predominantly the equality-seeking option in all vignettes. This is an unsurprising finding -- "equal" is a fairly objective term and as such the "most equal" option is generally likely to be seen as the option with the least difference between the two individual outcomes.

The second hypothesis was only partly supported. The frequency of maximum joint payoff responses to the question "Which of these options would lead to the best total overall outcome?" was significantly above chance level in all vignettes, however, in some cases it was not the most frequent response. In most of the vignettes the distribution of answers was not exclusively skewed towards the team-reasoning response; there were many equality-seeking responses, and in the Firewood (E), Computer (I) and Pool game (C) vignettes the equality-seeking choice was the most frequent response. In the Computer and Pool game frames the type of payoff is such that it cannot be pooled and redistributed -- in these cases scores are on a test or a series of games -- so people are unlikely to think in terms of summing payoffs. The phrasing of the question was designed to give participants room for their own interpretation of the best overall outcome, and while it was expected that most people would choose the maximum joint payoff the question was gave room for personal interpretations, unlike the question "Which of these options would be the most equal?". Nonetheless, the frequencies of the team-reasoning response in these frames were still significantly above chance level. It is possible that participants who chose the maximum joint payoff option could have been comparing the equality-seeking option with the maximum joint payoff option and thinking in terms of Pareto optimisation -- in the maximum joint payoff option the payoff to self is the same as in the equality-seeking option, so the decision maker would not be losing out, and the payoff to other increases from what it was in the equality-seeking option, so overall a better outcome would be reached. However, for those motivated solely or mostly by equality, absolute levels of payoff would be less important than similarities of payoffs. Van Lange (1999) outlined how preferences for outcomes are a function of both equality in payoffs and absolute levels of own and other's payoffs, which could explain the distribution of answers to this question.

In the Burgled vignette responses to the question "Which of these options would lead to the best total overall outcome?" were fairly frequently the altruistic choice. As the fictional other is at a disadvantage, having had his/her possessions stolen, it is not entirely surprising that several participants decided that the altruistic option -- giving the other a very good payoff -- was the best option. However, the sum total of the altruistic option is still less than the sum total of the maximum joint payoff option. Those participants choosing the altruistic option would be forgoing payoffs which could be better for one or both people in the scenario, just by redistribution of resources. There are various possible reasons for this. It could be that the participants do not think in terms of pooling individual benefits and redistributing them. When asked what the best total overall outcome would be, it appears that many people only think in terms of direct benefits to individuals in many cases. Obviously in the team-reasoning frames, this is less likely to be the case because the aim of the situation is get the maximum overall benefit; the people involved in the situation would not be keeping any of "their part" of the payoffs for themselves. However, in cases where there is no prerequisite that the payoffs are pooled, it is unlikely that it would occur to everyone that they may be better off pooling and redistributing the payoffs.

Pooling and redistributing may be a more attractive option when the participant benefits from it personally. When looking at the set of outcomes, for the fictional other to do as well in the team-reasoning outcome as in the altruistic outcome, the participant would have to relinquish some of their own outcome. However, if the payoffs from the team-reasoning option were to be pooled, and then redistributed equally, the participant would actually be given some extra on top of his original share. The psychological impact of giving away some of one's winnings is obviously likely to be different from being given some more winnings, irrespective of the final outcome. However, there have been no consistent findings from work on social dilemmas, regarding levels of cooperation in resource dilemmas (where people cooperate by exercising restraint in consumption of a resource) compared to public goods dilemmas (where people cooperate by providing some of their own provisions to provide a public good). McDaniel and Sistrunk (1991) found more cooperation in a public good dilemma (giving away provisions) than in a resource dilemma (consuming resources), but Brewer and Kramer (1986) found the reverse effect, Komorita and Carnevale (1992) found effects in both directions in a number of experiments, and Fleishman (1988) found no framing effects of this type, which suggests no consistent preference to either help the public good by giving from one's own funds or by exercising restraint in taking from a communal resource.

It is also possible that participants would interpret the question so that the answer they chose was the final outcome, with no possibility of redistributing. In this case they would not consider pooling the payoffs in the team-reasoning outcome to give a disadvantaged other in the altruistic vignettes a better individual payoff than in the altruistic option, or pooling and redistributing the payoffs in the team-reasoning outcome equally to give a better payoff for each individual than the equality-seeking option.

Aside from the two vignettes where the payoffs cannot be meaningfully distributed, the other vignette in which the frequency of equality-seeking responses exceeded the frequency of maximum joint payoff responses was the Firewood vignette, an equality-seeking vignette. Here the people in the vignette are, in effect, being paid for their work -- it is not just an abstract amount of money that they are receiving. This may account for a lot of people seeing the equality-seeking option as the "best overall outcome", the pay representing the amount of work carried out. If the pay was unequal, as it would be in the team-reasoning option, it may be perceived as unsatisfactory and unfair -- as the work done was equal.

The third hypothesis was supported, although to different degrees in the different questions. Responses to the question "Which of these options would be the fairest" differed significantly across vignettes, with the most notable differences being in the altruistic vignettes. In these vignettes, equality-seeking responses were much less frequent than expected, given the frequency of equality-seeking responses in other vignettes, and altruistic and team-reasoning responses were more frequent than expected, given the frequencies of these responses in other vignettes. Eek, Biel and Garling (2001) outlined how the concept of fairness does not necessarily equate with equality, although this is only really evident in the altruistic vignettes. In these vignettes, the other person involved has suffered some kind of misfortune. In both the vignettes the payoffs are money, the level of which would be determined by chance (bingo, or the lottery) and as such is not representative of input. Thus it is more likely that, in the absence of any other deciding factors, participants may take the other's circumstances into account when deciding which outcome is the fairest. In the team-reasoning outcome, the participant would do no worse than in the equality outcome, and the other person would do slightly better, which might be perceived as fair because of their prior misfortune. In the altruistic outcome, the difference between the two payoffs is even greater, but again, depending on how much relevance the participant places upon the prior circumstances of the two people, the difference may be perceived as fair.

Answers to the question, "Which of these options would be most selfish?", showed some framing effects. The altruistic vignettes varied from the other vignettes in that frequencies of the competitive response were much higher and frequencies of the altruistic response were much lower than in other vignettes. Bearing in mind responses to the question regarding fairness, it seems apparent that the situation of the other person is being taken into account, so to sacrifice the other person's payoff in favour of increasing the difference between your own and the other person's payoff (at no particular gain to yourself) is likely to be seen as selfish, on your own part. Likewise, the other person taking a larger share of the outcome at the expense of one's own payoff is less likely to be seen as selfish when taking their circumstances into account, especially considering that the outcome is not the direct result of any shared input.

In the GM vignette (one designed to elicit team reasoning), altruistic responses were more frequent than in other vignettes, and individualistic responses were less frequent than in other vignettes. The chief aim in this vignette is to collect as many signatures as possible on a petition, with the payoffs being the number of names that each person collects. When the payoff structure was arranged, it was assumed that, as the general goal is to achieve as many signatures as possible, each individual's goal would be the same -- thus an individualistic response would be the option in which the respondent himself collects the most names, and an altruistic response one where the other person collects the most names. However, as well as the perspective that it would be selfish to collect more names, it could be that some participants considered the amount of work which had gone into collecting the names -- thus it would be selfish to collect few names yourself and let the other person collect several names, because it implies that you have been letting them do all the work. Similarly, frequencies of the individualistic answer were significantly lower than in other vignettes; it may be that fewer people saw this as selfish because they would be doing a large proportion of the work.

In the Hotdog vignette, which was designed to elicit competitive motivations, competitive responses were perceived as selfish less frequently than in the other vignettes, and individualistic responses were perceived as selfish more frequently than in other vignettes. This is surprising, in that a competitive response yields a very small payoff to the other person, and a moderate payoff to the respondent, whereas the individualistic response yields a better payoff to the other person than in the competitive response and a very good payoff to the respondent. Furthermore, the difference between the two payoffs in the competitive response is larger than the difference between the two payoffs in the individualistic option. In the Hotdog vignette payoffs were measured in number of customers served, whereas most of the other vignettes had money or points as payoffs. It is possible that the nature of the Hotdog vignette (a business scenario, designed to elicit a competitive orientation) may have combined with the nature of the payoffs (number of customers served) to alter perceptions of what is perceived as selfish. In the competitive outcome, the other person attracts very few customers, and it may be that this was considered to be due to poor business practice on his or her part. In such a case, attracting more customers than the other person may not be perceived as selfish simply because it is an indication of a superior business. However, when both hotdog stalls are attracting at least certain level of customers, it may be inferred that both are successful businesses and differences between the two stalls may be attributable to reasons other than the quality of the business. In this case, it may be that more people perceived the individualistic outcome as more selfish than either the competitive outcome or the altruistic outcome, because low levels of customers in the latter two indicated poor business practice by one of the parties, who were then judged to be undeserving of more custom.

The ambiguity of the question could account for some of the variation in responses; it is not clear to which character in the vignettes the word "selfish" is meant to apply. However, a large proportion of the responses were the competitive and the individualistic options, which implies that people were considering the term selfish to apply to themselves, rather than the other person, although this is not a conclusive measure in the team-reasoning vignettes, as discussed above.

The responses to the question "Which of these options would be most unfair?" were subject to framing effects. In the altruisic vignettes, frequencies of competitive responses were significantly higher than in other vignettes, and frequencies of altruistic responses were significantly lower than in other vignettes. It is likely that this is for similar reasons as the responses in these vignettes to the question "Which of these options would be the fairest?". Given the other person's circumstances, fewer people would be likely to consider the altruistic option unfair, and to aim for a large difference between one's own payoff and the other person's payoff, at the expense of the other person, would be likely to be perceived as unfair. Similarly, the individualistic response in the Burgled vignette was perceived as unfair significantly more frequently than in other vignettes, which could be for the same reasons as the competitive responses, although not to the same extent.

In both the vignettes designed to elicit competitive motivations, the competitive response was significantly less frequent than in other vignettes, in one of the vignettes (Pool game) the altruistic response was significantly more frequent than in other vignettes and in the other vignette (Hotdog), the individualistic response was significantly more frequent than in other vignettes. Low frequencies of the competitive response could be due to competitive behaviour being seen as acceptable in the scenarios outlined in the vignettes, although this does not explain the higher than expected frequency of individualistic responses in the Hotdog vignette. The difference between outcomes, irrespective of direction, is largest in the altruistic responses, which could account for the generally high levels of this response in answer to the question, although it is impossible to determine from these results whether the fact that the difference is in favour of the other person, rather than in favour of the participant, would affect this decision. However, bearing in mind that in most vignettes (with the exception of the altruistic vignettes), responses to the question "Which of these options would be the fairest?" were generally equality-seeking responses, it is not surprising that the majority of responses to the question "Which of these options would be the most unfair?" were the most unequal option.

Unfortunately, there is no room for subjects to indicate why they answered each question in a particular way. It was felt this would make the questionnaire too time-consuming and tedious for the subjects -- with 50 very similar questions to answer, writing a reason for the answer after each one would be likely to lessen the quality of the responses. Thus it is not possible to draw conclusions about why the patterns in responses were present.

Overall, responses to the questions in the altruistic vignettes showed consistent differences from responses to questions in the other vignettes. In all the other vignettes, there is nothing to indicate that participants do not start on an equal footing, and it is likely that it is this factor which leads to the difference in distributions of responses. In a sense, the parameters of the problem in the altruistic frames have changed, with the explicit statement that the other person has recently suffered a misfortune, which leads to some doubt regarding whether these are true framing effects. However, other differences were present in responses to the different questions, which indicates that concepts of unfairness, selfishness, and the best overall outcome vary depending upon the situation.

Chapter 3

Introduction

The study outlined in Chapter 2 found that people's perception of what constitutes the best total overall outcome is subject to framing effects. The maximum joint outcome was always chosen significantly more frequently than chance level, but it was not the most popular choice in all of the hypothetical scenarios which were presented to participants. The current study will attempt to expand on this finding, by using the same scenarios and asking participants which of the five outcomes they prefer, and why.

As established in Chapter 1, team reasoning cannot be coherently formulated within the conceptual framework of social value orientations. However, distinguishing empirically between a preference for the best joint outcome attributed to individualistic reasoning, and a preference for the best joint outcome attributed to team reasoning, is no easy task. In the current study, emphasis will be placed upon the reasons which participants give for their preferences. A qualitative slant to participants' responses will enable some conclusions to be drawn about why certain outcome preferences exist, and enable any anomalies not covered by the outcome structures to be observed.

The current study will use the same ten hypothetical scenarios as in Chapter 2, each designed to encourage one of five different types of motivation -- altruistic (maximising the other's payoff, irrespective of own payoff), competitive (maximising own payoff minus other's payoff, regardless of absolute levels of payoffs), equality seeking (minimising the difference between own payoff and the other's payoff, regardless of absolute levels of payoffs), individualism (maximising own payoff, irrespective of the other's payoff) and team reasoning (maximising overall combined payoffs, regardless of individual levels of payoff). Each vignette will be followed by five different outcomes, each of which uniquely and exclusively fulfils one of the above motivations. Participants will be asked which outcome they prefer, and to give a reason for their preference.

The hypotheses were that preferences for outcomes would be significantly biased towards the motivations which the vignettes were designed to elicit, and in the vignettes designed to elicit team reasoning motivations, reasons given for preferences for the maximum joint outcome would reflect team reasoning.

Method

Participants

Fifty undergraduate and postgraduate psychology students at the University of Leicester, 7 male and 43 female, with ages ranging from 19 to 42 years ($M = 22.96$, $SD = 5.35$) were recruited as participants for the experiment, which was presented to them as a study of decision making.

Materials

Data were collected through a 10-part questionnaire, comprising two vignettes representing each of five different types of decision scenarios differing in terms of social value orientation, as described in Chapter 2. The order of the vignettes was varied quasi-randomly across questionnaires, and the same set of vignettes was used as in Chapter 2, with the same sets of different possible outcomes. Each vignette described a scenario designed to engage one of the major social value orientations in the models of McClintock (1972) and van Lange (1999). Thus, each of the following social value orientations was represented by two vignettes that were expected, on common-sense grounds, to elicit it: *individualism* (maximising own payoff, expected in situations in which, for practical or conventional reasons, one's individual payoffs and those of the co-player could not or would not be redistributed or shared);

altruism (maximising other's payoff, expected in situations in which one has a close relationship with a co-player whose need is greater than one's own); *competitiveness* (maximising own minus other's payoff, expected in situations such as recreational games or business interactions in which cultural norms prescribe or encourage competitiveness); and *equality-seeking* (minimising the difference between own and other's payoff, expected in situations in which moral or ethical considerations of fairness prescribe or encourage equal payoffs to both players). In addition, two vignettes were designed to elicit *team reasoning* (maximising joint payoff, expected in situations in which payoffs go into a common pool and the players benefit jointly from the cooperative outcome), which falls outside the scope of existing theories of social value orientation.

The following is one of the two individualistic vignettes used in the experiment:

> You and a classmate have completed an on-line test for potential employers to assess your computing abilities, the results of which could be a useful addition to your CV. Scores for the test are out of 100. Which of the following would you prefer?

This was followed by five response alternatives defined by pairs of payoffs labelled "you score (classmate scores)". In this vignette, the five response alternatives were 65 points (95 points), 80 points (50 points), 65 points (10 points), 30 points (100 points), and 65 points (60 points). The first of these options uniquely maximises joint payoff (and therefore represents team reasoning); the second, individual payoff (individualism); the third, own minus other's payoff (competitiveness); the fourth, other's payoff (altruism); and the fifth, equality of payoffs (equality seeking). Participants were requested to indicate which outcome they preferred and to give a brief reason for their preference.

The other individualistic vignette described a scenario in which "you and your next-door neighbour" win different amounts of money in a prize draw. One of the equality-seeking vignettes described "you and your brother" being left different amounts of money in a family friend's will; the other described "you and a friend" chopping some wood for a mutual acquaintance and each being paid a certain amount of money. One of the altruistic vignettes described "your best friend's flat" being burgled and then both of you winning different amounts of money in a game of bingo; the other described "your sister" being given six months left to live and both of you then winning different amounts of money in a lottery. One of the competitive vignettes described "you and another person" setting up hot dog stands and attracting different numbers of customers; the other described "you and a drinking acquaintance" playing pool and winning different numbers of games. Team reasoning was represented by two vignettes: the first described "you and another group member" being involved in a campaign against a test site for genetically engineered (GM) crops and collecting different numbers of names for a petition; the other described "you and a friend" raising different amounts of money through sponsored head shaves for new computers in your school. For the complete questionnaire, see Appendix 5.

Design

The experiment was a within-participants design.

Procedure

Participants were presented with a booklet containing the 10 vignettes, arranged in a different quasi-random order in each questionnaire. Each vignette was followed by a set of five response categories representing outcomes with different payoffs for the respondent and the other person in the vignette. Instructions were given to the participants to indicate which outcome they preferred in each vignette, and to give a brief reason for their preference. In each case, the five response alternatives uniquely reflected individualism, equality-seeking, altruism, competitiveness and team reasoning. The questionnaire took about 15 minutes to complete.

Results

For each vignette, responses were scored according to the number of choices corresponding to each alternative. Chi-square analyses were then performed to determine whether the observed distributions differed significantly from chance. For each of the two individualistic vignettes, the relative frequencies of individualistic versus non-individualistic (altruistic, competitive, equality-seeking, or team reasoning) outcome preferences were tested against the chance distribution of 20 per cent versus 80 per cent, and the corresponding test was performed for each of the other vignettes.

The frequencies of individualistic, altruistic, competitive, equality-seeking and team reasoning outcome preferences are shown in Table 3.1. In most of the vignettes, outcome preferences were significantly biased in the direction of the response alternative which the vignette was designed to elicit, which serves as a useful manipulation check. The only exceptions were one of the altruistic vignettes and both of the competitive vignettes.

Table 3.1: Frequencies of altruistic (A), competitive (C), equality-seeking (E), individualistic (I), and maximum joint payoff (J) outcome preferences in the 10 experimental vignettes (*N* = 50)

Vignette	Outcome preference frequencies					χ^2	*p* value, two-tailed
	A	C	E	I	J		
Bingo (A)	40	-	2	-	8	112.50	$p < .001$
Lottery (A)	15	2	14	2	17	3.13	$p > .05$
Hot-dog (C)	1	5	12	30	2	3.13	$p > .05$
Pool game (C)	-	7	15	28	-	1.13	$p > .05$
Firewood (E)	-	-	40	4	6	112.50	$p < .001$
Will (E)	-	-	47	1	2	171.13	$p < .001$
Computer test (I)	-	-	8	42	-	128.00	$p < .001$
Prize draw (I)	1	1	9	37	2	91.12	$p < .001$
GM site (T)	1	-	7	-	42	128.00	$p < .001$
Headshave (T)	1	-	8	11	30	50.00	$p < .001$

Reasons given by participants for preferences for the maximum joint payoff were found by two raters to fall naturally and usually unambiguously into four categories: Team reasoning; Altruistic reasoning; Best for both reasoning; and Pacifying the other party. In the examples of reasons given below, A denotes a vignette designed to elicit altruistic motivations; C, a vignette designed to elicit competitive motivations; E, a vignette designed to elicit egalitarian motivations; I, a vignette designed to elicit individualistic motivations; and T, a vignette designed to elicit team reasoning motivations.

- Team reasoning: indicating a preference for the highest joint or collective payoff for the pair. For example:

"As collectively we'd have the most names" (Participant 38, GM (T) vignette)

and

"This adds up to the most amount of money, which is beneficial to our goal" (Participant 21, Headshave (T) vignette).

- Altruistic reasoning: indicating a preference for the highest total payoff in order for the other party to receive the benefits, for example:

"This gives the highest total, and by putting the money together, she would be able to do more of the things she wants" (Participant 8, Lottery (A) vignette).

This type of reasoning illustrated a departure from the way in which preferences were expected to influence motivation. Usually, a participant with an altruistic motivation would be expected to prefer the altruistic outcome. In some cases, however, participants preferred the greatest joint payoff as a way to fulfil altruistic motivations.

- "Best for both" reasoning: indicating a preference for the highest total payoff in order to obtain a high individual payoff for each party, for example:

"The most I can get here is £80 but if I get £80 she only gets £45. I might feel sorry in some way to have won so much more than her. The next highest amount that I can get is £65. So if I have a maximum of £65 and I can choose what she gets here, I might as well maximise it. She has had bad luck after all. £65 is good winnings for me, and I would be happy for her to win £85 in this scenario" (Participant 29, Bingo (A) vignette).

- Pacifying the other party, for example:

"It might stop them moaning" (Participant 1, Bingo (A) vignette).

Table 3.2 shows the frequencies with which each of the four reasons illustrated above were given for maximum joint payoff preferences in the 10 vignettes. In both vignettes designed to elicit team-reasoning motivations, namely the GM and Headshave vignettes, team-reasoning explanations were invariably given for maximum joint payoff preferences. The only two vignettes in which non-team-reasoning reasons were given for maximum joint payoff preferences were the two vignettes designed to engage altruistic motivations.

Table 3.2: Frequencies of different types of reason given for maximum joint payoff preferences in the 10 experimental vignettes: Team reasoning (T), altruistic (Alt), best for both (B), pacifying the other party (P), and no reason given (0).

Vignette	Frequency of maximum joint payoff preferences	Frequencies of reasons given for maximum joint payoff preferences				
		T	Alt	B	P	0
Bingo (A)	9	1	1	5	1	1
Lottery (A)	17	4	5	7	1	-
Hot-dog (C)	2	2	-	-	-	-
Pool game (C)	0	-	-	-	-	-
Firewood (E)	6	6	-	-	-	-
Will (E)	2	2	-	-	-	-
Computer test (I)	0	-	-	-	-	-
Prize draw (I)	2	2	-	-	-	-
GM site (T)	42	42	-	-	-	-
Headshave (T)	30	30	-	-	-	-

Co-occurrences of different classes of preferences were assessed by correlating the frequencies with which each participant indicated a preference for each different type of outcome. Table 3.3 shows Pearson's *r* coefficients for the correlations. There was a significant positive correlation between frequencies of preferences for maximum joint payoffs and most equal payoffs, and significant negative correlations between frequencies of preferences for most equal payoffs and individualistic outcomes, most equal payoffs and competitive outcomes, and altruistic outcomes and maximum joint payoffs.

Table 3.3: Pearson's *r* coefficients for the frequencies with which participants prefer the five different types of outcome: Altruistic (A), competitive (C), equality-seeking (E), individualistic (I) and maximum joint payoff (J) (*N* = 50)

Outcome type	A	C	E	I
J	-.36 *	.01	.45 **	.10
I	-.04	-.09	-.67 ***	---
E	-.16	-.29 *	---	---
C	.01	---	---	---

*** *p* < .05, ** *p* < .01, *** *p* < .001 (two tailed)**

A variety of reasons were given by participants for other preferences, and the types of reasons given for particular preferences differed across vignettes.

There were several different reasons given for preferences for equal payoffs.

- In the vignettes designed to encourage equality-seeking motivations, the reasons given frequently mentioned the fairness of equal payoffs, for example:

  "I'd want us to be left the same as it wouldn't be fair for one of us to get more" (Participant 2, Will (E) vignette)

  and

  "If we have both done the same amount of work it is only fair that we get paid the same" (Participant 19, Firewood (E) vignette).

  Those participants who referred to what was deserved in that situation, or what the outcome should be, were also included in this category, for example:

"It seems like we'd both deserve the same" (Participant 2, Firewood (E) vignette)

and

"If we had both done the same work we should get paid the same" (Participant 33, Firewood (E) vignette).

Fairness of payoffs was the most popular category for reasons given by those who preferred equal payoffs in the Firewood vignette, which was designed to encourage egalitarian motivations. It featured prominently in the Will vignette, which was also designed to encourage egalitarian motivations, although it was not the most frequently cited reason for preference of equal payoffs. In other vignettes, where equal payoffs were preferred, it was occasionally cited as a reason for the preference.

- Peace-seeking reasons were often given for preferences for equal payoffs in the Will vignette. This category included wanting to avoid arguments or bad feeling arising from unequal payoffs, for example:

"This would cause less argument" (Participant 11, Will (E) vignette)

and

"Then, neither would feel jealous or guilty" (Participant 30, Prize draw (I) vignette).

This was the most frequently given reason for preferring equal payoffs in the Will vignette (which was designed to encourage egalitarian motivations), and was occasionally cited as a reason in other vignettes. This type of reason was sometimes given in conjunction with reference to fairness of outcome.

- A simple statement of a desire for equal payoffs was sometimes given as a reason for preferring equal payoffs, for example:

"I would want us to win the same amount so we could both do all the things we want to do" (Participant 34, Lottery (A) vignette)

and

"Simply because I would want it shared equally" (Participant 16, Will (E) vignette).

While there was never a large proportion of people giving this reason for their preference, it featured as a reason for a preference for equal payoffs in every vignette.

- Occasionally the reason given by participants who preferred the equality-seeking outcome showed that they were concerned with both people in the scenario putting equal effort into the task, for example:

"As I said before I'm not that fussed about the winning thing but this outcome means we both put roughly the same amount of work in which would satisfy me" (Participant 11, Headshave (T) vignette).

This reason was only given in those vignettes where the payoffs could be affected by the level of input of the people involved, namely the Hotdog vignette, where the payoffs were the number of customers served at a stall; the Pool game vignette, where the payoffs were the number of pool games won over a month; the Firewood vignette, where the payoffs were the amount paid for chopping firewood; the Headshave vignette, where the payoffs were the amount of sponsorship money raised; and the GM site vignette, where the payoffs were the number of names collected on a petition.

- In the Pool game vignette, which was designed to encourage competitive motivations, some participants' reasons for preferring the most equal payoffs were because it would indicate close competition, and as such improve the games, for example:

"This implies that we are more equally matched in our pool playing abilities; which would make the games better" (Participant 8, Pool game (C) vignette).

This reason was only given in the Pool game vignette.

- Restrained competition was occasionally given as a reason for preferences for equal payoffs, in the Computer test and Headshave vignettes, for example:

"I'd like my friend and I to be quite similar but with me having the slight 'edge' over him / her. I always like to be just that bit better than my friends; so long as the gap isn't too big, I don't feel too clever or boastful" (Participant 42, Computer test (I) vignette).

- Of those participants who preferred the individualistic outcome, most gave an individualistic reason for their preference, for example:

"Because that's the maximum amount I can win" (Participant 6, Prize draw (I) vignette)

and

"I would want as many customers as possible" (Participant 33, Hotdog (C) vignette).

- Sometimes this reason was given in conjunction with wanting the other person to receive a reasonable payoff as well, for example:

"I would win a substantial amount and so would my neighbour. £70 was the highest I could achieve; £40 for my neighbour is still quite high" (Participant 5, Prizedraw (I) vignette),

although concern for the other person's payoff alone was never given as a reason for a preference for the individualistic outcome.

- Another reason commonly given for a preference for the individualistic outcome, particularly in the vignettes designed to elicit competitive motivations, was competition, for example:

"It's a competition; I want to win!" (Participant 32, Pool game (C) vignette)

and

"Once again, I suppose I am a bit competitive, so I'd like to get more custom than my rival" (Participant 21, Hotdog (C) vignette).

- A competitive reason was also frequently mentioned alongside an individualistic reason, for example:

"Again this is my highest individual score and it proves that I make the best hotdogs" (Participant 1, Hotdog (C) vignette).

- Restrained competition was also mentioned occasionally as a reason for preferences for individualistic outcomes in the Pool game vignette, for example:

"I win, which is good, but it is reasonably equal, so the games would be more 'fun'" (Participant 29, Pool game (C) vignette).

- Most of the reasons given for preferring the altruistic outcome were altruistic, for example:

"I would prefer her to have the money so she could do everything she wanted" (Participant 18, Lottery (A) vignette)

and

"That's the most my friend could win & considering the bad luck they'd had they'd deserve something" (Participant 6, Bingo (A) vignette).

- The few exceptions to this were one case where the participant also mentioned the favourable own payoff in the Bingo (A) vignette:

"She needs the money more than me, and £35 is better than nothing!" (Participant 26, Bingo (A) vignette);

One case of individualistic reasoning in the Lottery (A) vignette:

"Hopefully she would leave me the rest when she dies!" (Participant 10, Lottery (A) vignette);

One case where the participant appeared to miscalculate the sum of the payoffs in the GM test vignette:

"The collective no. of signatures is higher than the other combinations" (Participant 4, GM test (T) vignette);

One context dependent reason in the Headshave (T) vignette; and one case where no reason was given in the Hotdog (C) vignette.

- The competitive outcome was rarely preferred to the other outcomes. However, the most frequent reason given for preferring the competitive outcome was a competitive reason, for example:

"I make much more profit this way than the other stall" (Participant 35, Hotdog (C) vignette).

- A few individualistic reasons were given for a preference for competitive outcomes, for example:

"I would want as many customers as possible" (Participant 33, Hotdog (C) vignette)

- And sometimes participants' reasons included both competitive and individualistic motivations, for example:

"By selling more than the other person increases your chances of staying in business and making a profit" (Participant 17, Hotdog (C) vignette).

- In the Lottery (A) vignette, two participants gave altruistic reasons for preferring the competitive outcome, for example:

> "If she wins the £10,000, this would help her live a more normal lifestyle than if she won £90,000, and she would still be able to do lots of things she never got the chance to do" (Participant 31, Lottery (A) vignette).

Discussion

The results given in Table 3.1 partially support the first hypothesis, that preferences for outcomes would be significantly biased towards the motivations which the vignettes were designed to elicit. In seven of the ten vignettes, preferences for outcomes were significantly biased towards the motivations which the vignettes were designed to elicit. However, in both the vignettes designed to elicit competitive motivations, and one of the vignettes designed to elicit altruistic motivations, preferences for outcomes were not biased in the expected direction. The second hypothesis, that in the vignettes designed to elicit team-reasoning motivations, reasons given for preferences for the maximum joint payoff would reflect team reasoning, was corroborated with no exceptions, as shown in Table 3.2. Taken together, these results support the idea that there is a preference for a team-reasoning orientation in human decision making in certain contexts.

It is worth noting that in most types of vignette, response frequencies remain similar across both vignettes, as shown in Table 3.1. However, this is not the case with the vignettes designed to elicit altruistic motivations. Both of these vignettes involve money, but the Bingo vignette deals with tens of pounds, and the Lottery vignette deals with tens of thousands of pounds. In the Lottery vignette, there were many more preferences for the equality-seeking option and the maximum joint payoff, than in the Bingo vignette. In the Bingo vignette, most participants preferred the altruistic outcome. It is possible that the magnitude of the outcomes affected participants' preferences in one of two ways. Firstly, it is possibly easier to "be generous" and want the other person to benefit, even at the expense of one's own payoff, when all that will be lost is a matter of tens of pounds. When one would be losing out on tens of thousands of pounds, it is easy to see that some people would find it harder to give up that amount of money in order to benefit the other person, whatever their circumstances. Secondly, if the other person is already benefiting from tens of thousands of pounds anyway, a few extra tens of thousands would not much of an impact, comparatively speaking. However, if the other person only has a few tens of pounds, another few tens of pounds would make a lot of difference. In a sense, this is similar to the law of diminishing marginal utility, in that as more units of any product (in this case, money) are received, less utility is derived from each subsequent unit. Put simply, if someone has no money, ten pounds would make a lot of difference. However, if someone had one million pounds, an extra ten pounds would be neither here nor there. In all likelihood, the person with one million pounds would probably derive less utility from one thousand pounds than the person with no money would derive from ten pounds. Of course, participants could apply this law of diminishing marginal utility to themselves, in order to justify giving the other person more money, but they could also apply it to the other person in order to justify why they themselves should not be receiving the lowest payoff.

The qualitative results suggest that, in the vignettes designed to elicit competitive motivations, many participants who preferred the individualistic outcomes were motivated by competitiveness. While the difference between the two individual payoffs was not so great as in the competitive outcome, it was still a noticeable difference. Furthermore, the payoff to self was larger in the individualistic outcome than in the competitive outcome, so this outcome had a double benefit of receiving a large individual payoff which was also substantially greater than the other person's payoff. This highlights a limitation of this type of payoff-structure in determining people's motivations for preferences, and outlines the importance of the qualitative response.

For those participants preferring equal payoffs, considerations of fairness often appeared to be important, particularly in vignettes designed to elicit egalitarian motivations. As shown in Chapter 2, the concept of fairness is somewhat context-dependent, and the qualitative results from the current chapter suggest that the role of fairness in determining preferences is also context-dependent. Avoiding bad feeling or arguments was another popular reason for preferences for equal payoffs. It is possible that such bad feeling could arise out of perceptions of unfairness, although from the current data this cannot be inferred. This is also the case for those participants who commented on equal payoffs indicating equality of effort put into the task, again such motivations may be linked to concepts of what is fair, but it is not possible to deduce this within the limits of the data.

Correlations between frequencies of preferences for the different types of response from each participant indicated that frequency of preferences for maximum joint payoffs correlated positively with frequency of preferences for equality-seeking outcomes, and negatively with frequency of preferences for altruistic outcomes. Frequency of preferences for equality-seeking outcomes correlated negatively with frequency of preferences for individualistic outcomes and competitive outcomes.

Significant negative correlations between frequencies of preferences for equality-seeking outcomes and both individualistic and competitive outcomes, indicates that those participants who prefer equal payoffs tend not to prefer doing well individually, or doing better than the other person.

The positive correlation between frequency of preferences for maximum joint payoffs and frequency of preferences for equality-seeking outcomes indicate that people who prefer maximum joint payoffs over other types of outcome in some situations tend to prefer equality-seeking outcomes over other types of outcome in other situations. This indicates a link between preferences for maximum joint payoffs and equality-seeking outcomes, both of which involve consideration of all the payoffs, in one way or another. Reasons which participants gave for preferences for maximum joint payoffs indicate an orientation towards collective goals, as suggested by Gilbert (1994, 2001) and Sugden (1993, 2000), which cannot be understood within the framework of van Lange's (1999) integrated model of Social Value Orientation. It may be that people who prefer team reasoning outcomes in certain situations, tend to prefer equality-seeking outcomes in other types of situations, and there is no attempt to achieve both maximisation of joint payoff and equal individual payoffs in any one outcome. However, in all the outcome sets used in the questionnaire, the maximum joint payoff was the outcome with the second most equal payoffs. This was necessary to uphold the structure of the outcome sets. Although the reasons which participants gave for their choices gave no indication that the maximum joint payoff was most preferred because it was both the maximum joint payoff, and consisted of fairly equal payoffs, this possibility must be considered. It may be the case that joint payoff and equality of payoffs are both important factors in determining some people's preferences, and the situation determines whether a higher joint payoff with slightly unequal payoffs is preferred over a slightly lower joint payoff with more equal payoffs, or vice versa. It is possible that participants put only their primary reason for preferring a particular outcome, so a preference for the maximum joint payoff may in fact be an illustration of van Lange's (1999) model, with levels of both individuals' payoffs and equality of payoffs being of importance in determining preferences.

The significant negative correlation between frequencies of preferences for the maximum joint payoff and preferences for the altruistic outcome demonstrates that preferences for the maximum joint payoff, or team-reasoning outcome, are not likely to be motivated through altruism. The correlation further suggests that equality of payoffs may be important to those who preferred the maximum joint payoff, because in every outcome set, the altruistic outcome is the most unequal outcome.

The next chapter will aim to address this matter, by looking at the importance of equality of payoffs to those participants who prefer a team reasoning outcome in certain vignettes and give a team reasoning reason for doing so.

Chapter 4

Introduction

Chapter 3 indicated that people show preferences for a maximum joint outcome in certain situations, and past research has shown that some people consider joint, or group, outcomes when engaging in decision making (Dawes, van de Kragt & Orbell, 1988; de Cremer & van Vugt, 1999; Kuhlman & Marshello, 1975; McClintock & Liebrand, 1988). Work on social value orientations indicates that some people have a predisposition to maximise outcomes for self and other, known in the literature as cooperation, (Kuhlman & Marshello, 1975; Liebrand, 1984; Liebrand & McClintock, 1988; McClintock & Liebrand, 1988), as opposed to individualistic behaviour (own gain maximisation) or competitive behaviour (relative gain maximisation).

Early models of prosocial behaviour (Griesinger & Livingston, 1973; McClintock & Liebrand, 1988) outlined preferences in terms of weights on own and other's payoffs. In such models, a purely prosocial decision maker would have equal weightings on his own and other's payoffs, whereas an individualist would have a weighting of one on his own payoff, and zero on anyone else's payoff, and different preferences would vary between these two extremes. Competitive behaviour can be illustrated by a weighting of *X* on own payoff, alongside a weighting of *-X* on other's payoff, thus maximising the simple function of (own payoff) – (other's payoff). Chapter 2 indicated that in certain situations people perceive equal payoffs as the best overall outcome, as well as the fairest, and Chapter 3 demonstrated that equality of payoffs is a powerful motivator in some people's preferences. Allison, McQueen and Schaerfl (1992) found equality to be a powerful motivator, and pure egalitarianism can be illustrated by minimising the absolute value of (own payoff) - (other's payoffs).

Van Lange (1999) outlined an integrated theory of social value orientation which takes account of people's desire for equality. In the integrated model, a prosocial decision maker would place weightings on own payoff, other's payoff and also equality of payoffs, when deciding on preferences between different payoff combinations. In fact, as outlined in Chapter 1, the third weighting was not necessary and the model can be expressed in terms of the first two weightings only. Nonetheless, this model could be used to take account of people's desire for relative gain over the others. The integrated model appears to take account of preferences which prosocials show for preferring outcomes such as mutual defection to unilateral cooperation in the Prisoner's Dilemma Game.

On first sight, it appears that team reasoning may be a special case of this model, with zero weighting on the equality of payoffs, and equal weightings on own and other's payoffs, or indeed an example of purely prosocial behaviour as outlined by the earlier model. However, these models take individuals' payoffs as separate from each other, and under these conditions a prosocial would prefer to maximise both of them individually. Essentially, this model still assumes individualistic reasoning, whereas team reasoning does not, and Hi-Lo can be used to illustrate the difference, as in Chapter 1. Team reasoning is solely concerned with the group's outcome, not levels of individual payoffs, and, as outlined in Chapter 1, Sugden (2000) clarifies that the best group outcome is not necessarily the same as the sum of individual payoffs.

Furthermore, the models of social value orientation appear to transform payoffs, using the relevant weightings for each decision maker, and substitute the transformed payoffs for the individual's payoff. A key aspect of team reasoning is that a team reasoner ceases to consider individual's payoffs, and instead focuses on overall group outcomes. The utility which a person derives from his own individual payoff may not be a clearly defined component of the utility which a group derives from the overall outcome, although in some cases it may be that the group's outcome utility is the sum of individual payoff utilities.

None the less, prosocial motivations are not entirely unrelated to team reasoning, in that in many cases the sum of individual payoffs may be the same as the best outcome for the group. While people who team reason would not use equality in individual payoffs as a motivating factor, van Lange (1999) suggests that many people consider the payoffs of both individuals, and equality in payoffs, when determining preferences for outcomes. In Chapter 3, a preference for maximum joint outcomes, with a team reasoning motivation, was shown at frequencies which were significantly greater than chance level. However, the maximum joint outcome in all vignettes consisted of payoffs which were different, but were the second most equal outcomes out of the five choices. Thus it was difficult to disentangle whether team reasoning preferences were due solely to the joint outcome, or whether the equality of the payoffs played a part as well. Although reasons given for preferring the greatest joint overall outcome mostly pointed to the overall outcome being the factor which determined the preference, it is possible that relative equality of payoffs was a secondary motivation for some people. If the inequality of payoffs in the maximum joint outcome had been greater, it is possible that the outcome would be less desirable for some people.

As a extension to Chapter 3, it would be useful to assess whether people who show preferences for maximum joint outcomes did so solely because it was the best outcome for the group, or whether the equality of the different payoffs play a role in preferences as well. If equality of payoffs does play a role, the direction of the inequality may determine the role it plays. Tversky and Kahneman's (1992) theory of loss aversion indicates that inequality of payoffs in favour of the other person would be less preferable than inequality of payoffs in favour of the self. This is also demonstrated in the usual responses of people in Ultimatum games. An Ultimatum game is perhaps the most basic two-person game. One player (the Proposer) suggests, or offers, a division of the payoff (such as money), and the other player (the Responder) either rejects the offer, in which case neither player receives anything, or accepts the offer, in which case each player receives a part of the overall payoff in line with the Proposer's original offer. According to individualistic payoff maximisation, the Responder should accept any offer where they receive any amount, however small, as rejection would lead to zero payoff. However, the Responder will usually reject an unequal offer in favour of the other person (i.e. the Proposer), even though rejection will lead to neither party receiving any payoff (Fehr & Schmidt, 1999). If increasing inequality of individual payoffs in the best total overall outcome leads people to show preferences for other outcomes, in a study similar to that described in Chapter 3, the case for the occurrence of team reasoning would be weakened.

Study 1

The first study will use vignettes from the study described in Chapter 3 which have already been shown to induce high levels of preferences for a maximum joint outcome, when given a variety of outcomes including one with nearly, or exactly, equal payoffs. A similar format will be used as in the study described in Chapter 3, but the maximum joint outcome will be varied across conditions, from equal payoffs to very unequal payoffs, in both directions.

The vignettes used are ones where participants would be contributing towards a specific cause, so a higher personal payoff would actually be represented by a higher personal contribution to the cause in question. It is assumed that, as the goal is to contribute to the cause, the direction of the payoffs represents the same motivations as when a person would be gaining personal payoffs. For example, an individualist would seek a large personal contribution towards a specific cause, as well as a large personal gain in a situation where there were positive personal payoffs.

Van Lange's (1999) model indicates that both equality of payoffs and levels of all individuals' payoffs (thus sum of payoffs) can play a role in preferences of outcomes, when decision makers are acting as individual agents. It is possible that such decision processes occurred in the study described in Chapter 3. As such, the first hypothesis for the current study is that the frequency of people who prefer the maximum joint payoff, and give team-reasoning reasons for doing so, will be significantly higher when the maximum joint payoff includes equal personal payoffs than when it contains unequal personal payoffs.

If inequality of payoffs does influence preferences for outcomes, it is also possible that the direction of the inequality will play a role. The second hypothesis for the current study is that the frequency of participants who prefer the maximum joint payoff, and give a team-reasoning reason for doing so, will be higher when the payoffs are unequal in favour of self than when they are unequal in favour of the other.

Method

Participants

190 participants took part in the experiment, 69 male and 121 female. Ages ranged from 16 to 52 years, with a mean age of 19.7 years (*SD* = 3.42). They were students and staff from the University of Leicester and Wyggeston and Queen Elizabeth I College, recruited in the University Cafeteria. The study was piloted on 3 students -- two postgraduate and one third-year student aged between 24 and 42.

Materials

A two-part questionnaire was used, consisting of two different vignettes (see Appendix 6), the order of which was alternated across questionnaires. The two vignettes have been shown in previous research to elicit high, but not ceiling, levels of team reasoning.

The following is the Headshave vignette:

> Various members of your class at your school are undertaking different sponsored activities to help raise funds for new computers. You and a friend decide to do a sponsored head shave. You each raise a certain amount of money. Which of the following would you prefer?

This was followed by five response alternatives defined by pairs of payoffs, in pounds sterling raised, labelled "You raise (other raises)".

The GM vignette is given below:

> You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend an hour each in the local town collecting names on a petition opposing the new test site. You each collect a certain number of names. Which of the following would you prefer?

This vignette was followed by five response alternatives defined by pairs of payoffs, in numbers of names collected, labelled "You collect (other collects)"

After each vignette the participant was asked to tick which of the five outcomes they most preferred, and to give a brief reason for their choice. The outcomes structure was based on that used in Chapters 2 and 3, and aimed to encompass the major social value orientations in the models of McClintock (1972) and van Lange (1999), with the addition of team reasoning. In the outcome structure used in Chapters 2 and 3, five mutually exclusive outcomes pertained to one of: *individualism* (maximising own payoff); *altruism* (maximising other's payoff); *competitiveness* (maximising own minus other's payoff); *equality-seeking* (minimising the absolute difference between own and other's payoff); and *team reasoning* (maximising joint payoff), with a qualitative response which enabled motivations behind preferences to be assessed.

In the present study, proportions of the payoffs which made up the maximum joint payoff were manipulated. There were six conditions for each vignette, with payoffs in the maximum joint outcome varying across conditions. The different proportions of the payoffs were: Very unequal in favour of the other person; Fairly unequal in favour of the other person; Slightly unequal in favour of the other person; Slightly unequal in favour of the self; Fairly unequal in favour of the self; Very unequal in favour of the self. (See Appendix 6 for the payoffs used in each condition.) Unfortunately the manipulation of the maximum joint outcome meant that the motivations which the other four outcomes were originally intended to satisfy were sometimes best represented by the team reasoning outcome instead. For example, the team reasoning outcome which was very unequal in favour of the self also maximised individual payoff, and thus could represent an individualistic motivation, and maximised the difference between own minus other's payoff, thus could also represent a competitive motivation. This led to an increased reliance on the qualitative responses to qualify motivations.

Design

A one-way, between-participants design was used.

Procedure

Participants were presented with a booklet containing the two vignettes, which were arranged in a quasi-random order across booklets. Each vignette was followed by a set of five response categories representing outcomes with different payoffs for the respondent and the other person in the vignette. There were six conditions for each vignette, with payoffs in the maximum joint outcome varying across conditions. The different proportions of the payoffs were: Very unequal in favour of the other person; Fairly unequal in favour of the other person; Slightly unequal in favour of the other person; Slightly unequal in favour of the self; Fairly unequal in favour of the self; Very unequal in favour of the self. The conditions in each vignette were quasi-randomly paired. Instructions were given to the participants to indicate which outcome each participant preferred in each vignette, and to give a brief reason for their preference. The questionnaire took about five minutes to complete.

Results

Frequencies of different responses in each condition were listed first, as shown in Tables 4.1 and 4.2.

Table 4.1: Frequencies of altruistic (A), competitive (C), equality-seeking (E), individualistic (I), and maximum joint payoff (J) outcome preferences across conditions in the Headshave vignette (*N* = 190). The numbers illustrating each condition refer to the payoffs to self and other (pounds sterling raised) in the maximum joint outcome.

Condition	Outcome preference				
(Self / Other)	A	C	E	I	J
10 / 160	-	-	10	8	18
60 / 110	-	-	11	5	18
80 / 90	-	-	3	3	20
90 / 80	-	-	4	1	18
110 / 60	-	1	12	7	15
160 / 10	-	-	10	9	17
Total	-	1	50	33	106

For the Headshave vignette, a chi-squared test of association of choices across conditions was carried out, ignoring the altruistic choice and combining competitive and individualistic choices, due to the similar nature of the two categories and low frequency of competitive choices. The test gave χ^2 (10) = 15.19, p = .13, thus there was no significant difference between frequencies of different choices across conditions.

Table 4.2: Frequencies of altruistic (A), competitive (C), equality-seeking (E), individualistic (I), and maximum joint payoff (J) outcome preferences across conditions in the GM vignette (*N* = 190). The numbers illustrating each condition refer to the payoffs to self and other (names collected) in the maximum joint outcome.

Condition	Outcome preference				
(Self / Other)	A	C	E	I	J
11 / 164	1	-	12	4	14
56 / 119	2	-	14	3	13
82 / 93	2	1	11	3	16
93 / 82	-	1	6	1	23
119 / 56	2	-	12	1	16
164 / 11	1	1	14	3	13
Total	8	3	69	15	95

For the GM vignette, a chi-squared test of association of choices across conditions was carried out, combining competitive and individualistic choices, due to the similar nature of the two categories and low frequency of competitive choices, and combining altruistic and team reasoning choices, due to the similar nature of the two categories and low frequency of altruistic choices. The test gave $\chi^2(10) = 9.65$, $p = .47$, thus there was no significant difference between frequencies of different choices across conditions.

Responses in each condition were grouped into team-reasoning and non-team-reasoning responses.

Team-reasoning responses were classified as those where the participant indicated a preference for the maximum joint outcome, and gave a team-reasoning reason (one which focussed on achieving the best outcome for the group) for doing so, such as

> "Because the amount of money raised overall is the most important not what individuals collect" (Participant 2, Headshave vignette, Condition 1),

"Combination raises the most money" (Participant 1, Headshave vignette, Condition 3),

and

"The more names that are collected, then the more impact the petition should have in opposition to the test site" (Participant 14, GM vignette, Condition 4).

Responses in which participants expressed a preference for any outcomes other than the maximum joint outcome, and those who chose the maximum joint outcome but gave a reason other than team reasoning for their preference, were classified as non-team-reasoning responses. Once participants' preferences had been categorised into team reasoning responses and non-team reasoning responses, a chi-squared analysis was carried out.

Table 4.3: Frequencies of team reasoning and non-team reasoning responses in the Headshave vignette, across conditions. The numbers illustrating each condition refer to the payoffs to self and other (pounds sterling) in the maximum joint outcome.

	Frequency across conditions					
Response	10/160	60/110	80/90	90/80	110/60	160/10
Team-reasoning	18	18	17	8	12	15
Non-team-reasoning	18	16	9	15	23	21

χ^2 (5) = 8.18, p = .15 , thus there is no significant difference in the frequencies of team-reasoning responses across conditions.

Table 4.4: Frequencies of team-reasoning and non-team-reasoning responses in GM vignette, across conditions. The numbers illustrating each condition refer to the payoffs to self and other (names collected) in the maximum joint outcome.

	Frequency across conditions					
Response	11/164	56/119	82/93	93/82	119/56	164/11
Team-reasoning	14	13	15	18	12	10
Non-team-reasoning	17	19	18	13	19	22

$\chi^2(5) = 5.11$, $p = .40$, thus there is no significant difference in the frequencies of team-reasoning responses across conditions.

In both vignettes, those participants who preferred the maximum joint outcome in the two conditions where the payoffs were unequal to a moderate or large extent in favour of the other person, always gave a team-reasoning reason for doing so. In the other conditions there were a variety of reasons given for preferring the maximum joint outcome. These reasons could be broadly categorised as falling into one of four main categories: some focussed on equality, some on individualistic motivations, some on competitive motivations and one on a slightly altruistic motivation. The first two of these categories can be further divided into sub-categories. The themes related to equality were:

- Equality of effort, for example:

  "Again it is a lot and we have both worked hard and nobody will feel let down by the other" (Participant 172, GM vignette, Condition 4),

- Equality of outcomes, for example:

  "Because we seem to collect roughly the same amount of names" (Participant 23, GM vignette, Condition 4),

- And fairly equal outcomes, but with own payoff slightly better than other person's, for example:

  "Similar amounts, but it's always nice to do a bit better sometimes" (Participant 102, Headshave vignette, Condition 4).

Individualistic reasons given as preferences for the maximum joint outcome fell into three main themes. These were:

- Individualistic, for example:

  "I would want to collect as many as possible regardless of what others collected" (Participant 2, GM vignette, Condition 5),

- Individualistic, but also mentioning competitive reasons, for example:

  "Because I'm very competitive at everything and need to excel in raising money or collective signatures, etc" (Participant 103, GM vignette, Condition 5),

- And individualistic, but also mentioning the maximum joint outcome as a motivating factor, for example:

  "Because I have the most, and it is the highest number of opposers" (Participant 39, GM vignette, Condition 6).

- A few participants gave competitive reasons for preferring the maximum joint outcome, as well as mentioning the level of the overall outcome, for example:

  "Very competitive but want us to both raise lots! and get the most" (Participant 6, Headshave vignette, Condition 5).

- One participant gave a slightly altruistic reason for preferring the maximum joint outcome:

"I'd like to boost my friend's "morale" – but not by too much!" (Participant 144, Headshave vignette, Condition 3).

Discussion

In this study, the first hypothesis, that the frequency of people who prefer the maximum joint payoff, and give team-reasoning reasons for doing so, would be significantly higher when the maximum joint payoff includes more equal personal payoffs than when it contains unequal personal payoffs, was not supported. Frequencies of participants showing preferences for the maximum joint payoff, and giving team-reasoning reasons for doing so, did not differ significantly as proportions of self/other payoffs in the maximum joint payoff changed. This also does not support the second hypothesis, that the frequency of participants who prefer the maximum joint payoff, and give a team reasoning reason for doing so, would be higher when the payoffs are unequal in favour of self than when they are unequal in favour of the other.

In summary, no evidence that preferences for maximum joint payoffs are affected by equality of individual payoffs was found, using a between-participants design, so neither of the experimental hypotheses were supported. Furthermore, the frequency of participants' preferences of outcomes, regardless of reasons given, did not differ significantly as proportions of self/other payoffs in the outcome with the maximum joint payoff changed.

This does not suggest that more people prefer maximum joint payoffs when payoffs are more equal than when they are less equal, as van Lange's (1999) model implies. It may be the case that inequality of payoffs leads to a lower personal utility than when the joint payoff is the same but payoffs are equal. However, if this is the case then the resulting reduction in utility does not appear to cause participants to prefer an outcome with a lower joint payoff but more equal payoffs.

Qualitative responses to why participants preferred the maximum joint payoff were primarily divided into team-reasoning reasons or non-team-reasoning reasons. However, further categorisation of the non-team-reasoning reasons given for preferences for the maximum joint payoff gave main categories of equality (subdivided into equal amounts of effort, equality of payoffs, fairly equal payoffs but self does slightly better), and individualistically orientated (subdivided into purely individualistic, individualistic but with a competitive orientation as well, individualistic but with the best joint payoff as well), with minor categories of purely competitive, and slightly altruistic (i.e. wanting the other person to do slightly better). None of the non-team-reasoning responses from those people who preferred the maximum joint payoff indicated that they were considering both the joint payoff and equality of payoffs, which also does not lend support to van Lange's (1999) model.

The lack of significant effects does not allow conclusions to be drawn about whether equality of payoffs affects levels of team reasoning. However, the qualitative results indicated that when people prefer the maximum joint payoff when the payoffs are fairly or very unequal in favour of the other person, they are likely to be doing so for team-reasoning reasons.

Study 2

Introduction

Study 1 showed no differences in frequencies of team-reasoning responses (a preference for the maximum joint payoff with a team reasoning-reason for doing so) across conditions. Study 2 approached the same problem in a slightly different way.

Participants were presented with the same vignettes as in Study 1 (the Headshave and GM vignettes), each followed by a set of five outcomes (Part 1). Each outcome uniquely and exclusively fulfilled one of the following motivations: Altruism (maximising the other's payoff, irrespective of own payoff); Competitiveness (maximising own payoff minus other's payoff, regardless of actual levels of payoffs); Egalitarianism (minimising the absolute difference between own payoff and the other's payoff, regardless of actual levels of payoffs); Individualism (maximising own payoff, irrespective of the other's payoff); And team reasoning (maximising overall combined payoffs, regardless of individual levels of payoff). Participants were asked which outcome they preferred and then asked to give a reason for their preference. After the response for each scenario, participants were given a further two outcome sets (Parts 2 and 3). Both sets presented six outcomes, ranging from equal payoffs with a moderate joint payoff, to very unequal payoffs with the highest joint payoff. In one set the inequality increased in favour of the self, in the other outcome set the inequality increased in favour of the other. Participants were asked to indicate which outcome from each set they preferred.

Hypothesis 1: Participants who give a team-reasoning response in Part 1 of each vignette will show a preference for the maximum joint payoff in Parts 2 and 3 significantly more frequently than any of the other outcomes in Parts 2 and 3.

Hypothesis 2: Participants who give a team-reasoning response in Part 1 will show a preference for the maximum joint payoff in Parts 2 and 3 significantly more frequently than participants who give a non-team-reasoning response in Part 1.

Method

Participants

189 participants took part in the experiment, 73 male, 114 female and two unclassified. Ages ranged from 17 to 28 years (*SD* = 1.90), with a mean age of 20.2 years. They were students and staff from the University of Leicester

and Wyggeston and Queen Elizabeth I College, recruited in the University Cafeteria. The study was piloted on 3 postgraduate students aged between 22 and 25.

Materials

A questionnaire was used, comprising the same two vignettes as in Study 1. The following is the Headshave vignette:

> Various members of your class at your school are undertaking different sponsored activities to help raise funds for new computers. You and a friend decide to do a sponsored head shave. You each raise a certain amount of money. Which of the following would you prefer?

This was followed by five response alternatives defined by pairs of payoffs, in pounds sterling, labelled "You raise (other raises)". In this vignette, the five response alternatives were £30 (£100), £60 (£65), £60 (£90), £80 (£50), and £60 (£10). The first of these options uniquely maximises the other's payoff (altruism); the second, equality of payoffs (equality seeking); the third, joint payoff (and therefore represents team reasoning); the fourth, own payoff (individualism); and the fifth, own minus other's payoff (competitiveness). Participants were requested to indicate which outcome they preferred and to give a brief reason for their preference.

The GM vignette is given below:

> You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend an hour each in the local town collecting names on a petition opposing the new test site. You each collect a certain number of names. Which of the following would you prefer?

This vignette was followed by five response alternatives defined by pairs of payoffs, in names, labelled "You collect (other collects)". In this vignette, the five response alternatives were 72 names (70 names), 93 names (58 names), 72 names (21 names), 72 names (103 names), and 20 names (119 names).

The first of these options uniquely maximises equality of payoffs (equality seeking); the second, own payoff (individualism); the third, own minus other's payoff (competitiveness); the fourth, joint payoff (and therefore represents team reasoning); and the fifth, other's payoff (altruism). Participants were requested to indicate which outcome they preferred and to give a brief reason for their preference.

Preferences in these outcome sets were used to classify responses as team reasoning responses (those in which participants indicated a preference for the maximum joint payoff, and gave a team-reasoning reason for doing so), and non-team reasoning responses (those in which participants either preferred the maximum joint payoff, but for a reason other than team reasoning, or those in which participants preferred other outcomes). Following the initial set of outcomes, a further two sets of outcomes for each scenario were presented, one varying from equal payoffs to unequal payoffs in favour of self (Part 2), the other varying from equal payoffs to unequal payoffs in favour of other (Part 3). In both Part 2 and Part 3, the most equal payoffs yielded the lowest joint payoff, and the least equal payoffs yielded the highest joint payoff, with equality of payoffs and joint payoff varying in the other four outcomes. In the Headshave vignette, the six response alternatives were "You raise (other raises)" £60 (£60), £100 (£50), £140 (£40), £180 (£30), £220 (£20) and £260 (£10) in Part 2, and "You raise (other raises)" £60 (£60), £50 (£100), £40 (£140), £30 (£180), £20 (£220) and £10 (£260) in Part 3. In the GM vignette, the six response alternatives were "You collect (other collects)" 61 names (60 names), 103 names (52 names), 139 names (42 names), 178 names (29 names), 221 names (18 names), and 259 names (10 names) in Part 2, and "You collect (other collects)" 60 names (61 names), 52 names (103 names), 42 names (139 names), 29 names (178 names), 18 names (221 names), and 10 names (259 names) in Part 3. Participants were asked to indicate which outcome they preferred from each set. For the complete questionnaire, see Appendix 7.

Design

The experiment is a between participants design, with the two categories used for analysis comprising those who gave a team-reasoning response in the first part of the question, and those who gave a non-team-reasoning response in the first part of the question. Therefore, these groups were self-selecting.

Procedure

Participants were presented with a booklet containing the two vignettes. In half of the booklets the GM vignette was presented before the Headshave vignette, and in the remaining booklets the Headshave vignette was presented before the GM vignette. Each vignette was followed by a set of five response categories representing outcomes with different payoffs for the respondent and the other person in the vignette. Instructions were given to the participants to indicate which outcome each participant preferred in each vignette, and to give a brief reason for their preference. Two further outcome sets followed the initial outcome set, and participants were again asked to indicate their preference for an outcome in each set. However, participants were not asked to give reasons for their preferences in the second and third outcome sets for each vignette. The questionnaire took about five minutes to complete.

Results

Participants' responses were first grouped according to the outcome for which they showed a preference in Part 1 of each vignette (see Table 4.5).

Table 4.5: Frequencies of altruistic (A), competitive (C), equality-seeking (E), individualistic (I), and maximum joint payoff (J) outcome preferences in Part 1 of both vignettes (*N* = 189).

Vignette	Outcome preference					Total
	A	C	E	I	J	
Headshave	9	3	47	41	89	189
GM	10	3	62	13	101	189

Following this grouping, a participant was classified as having given a team-reasoning response if they preferred the maximum joint payoff (J) and gave a team-reasoning reason (one which focussed on achieving the best payoff for the group) for doing so, for example:

> "We'd have the greatest number of signatures" (Participant 81, GM vignette),

> "The total collected is the highest (I think!) and seeing as we are protesting and need as many as possible then that would mean the choice resulting with the most petitioners" (Participant 90, GM vignette),

> "As we would raise the total most amount" (Participant 25, Headshave vignette)

and

> "Want to collect the most money collectively" (Participant 40, Headshave vignette).

Responses which indicated a preference for other outcomes, or which indicated a preference for the maximum joint payoff but did not give a team-reasoning reason, were classified as non-team-reasoning responses.

Out of 189 responses in the Headshave vignette, 81 were classified as team-reasoning responses, and 108 as non-team-reasoning responses. Eight participants showed a preference for the maximum joint payoff but gave a non-team-reasoning reason for their preference. In the GM vignette, 96 were classified as team-reasoning responses and 93 as non-team reasoning responses. Five participants showed a preference for the maximum joint payoff but gave a non-team-reasoning reason for their preference. 75% of responses were classified in the same categories in both vignettes. Frequencies of combinations of response classification in both vignettes are given in Table 4.6.

Table 4.6: Frequencies of combinations of team-reasoning (TR) and non-team-reasoning (Non-TR) responses in each vignette.

		GM vignette	
		TR	Non-TR
Headshave vignette	TR	65	16
	Non-TR	31	77

Frequencies of responses in Parts 2 and 3 of each vignette are given in Tables 4.7 to 4.10. Analyses of answers to the second and third parts of each vignette were carried out separately.

Table 4.7: Frequencies of outcome preferences in Part 2 of the Headshave vignette, by those who gave a team-reasoning response in Part 1 (TR) and those who gave a non-team-reasoning response in Part 1 (non-TR).

Outcome (self/other)	Preferences of TR	Preferences of non-TR
60/60	6	53
100/50	7	15
140/40	3	4
180/30	3	2
220/20	0	4
260/10	62	30

Table 4.8: Frequencies of outcome preferences in Part 3 of the Headshave vignette, by those who gave a team-reasoning response in Part 1 (TR) and those who gave a non-team-reasoning response in Part 1 (non-TR).

Outcome (self/other)	Preferences of TR	Preferences of non-TR
60/60	10	70
50/100	3	9
40/140	6	3
30/180	4	2
20/220	1	4
10/260	57	20

Table 4.9: Frequencies of outcome preferences in Part 2 of the GM vignette, by those who gave a team-reasoning response in Part 1 (TR) and those who gave a non-team-reasoning response in Part 1 (non-TR).

Outcome (self/other)	Preferences of TR	Preferences of non-TR
61/60	5	52
103/52	7	8
139/42	6	4
178/29	4	4
221/18	1	1
259/10	73	24

Table 4.10: Frequencies of outcome preferences in Part 3 of the GM vignette, by those who gave a team-reasoning response in Part 1 (TR) and those who gave a non-team-reasoning response in Part 1 (non-TR).

Outcome (self/other)	Preferences of TR	Preferences of non-TR
60/61	10	61
52/103	8	6
42/139	6	4
29/178	7	3
18/221	3	2
10/259	62	17

Analysis of responses to Parts 2 and 3 in the Headshave vignette

A chi-square test of association between the distributions of preferences in Part 2 and Part 3 of the Headshave vignette of those who gave a team-reasoning response in Part 1 of the Headshave vignette, showed no significant difference of preference distribution: χ^2 (5) = 4.95, p = .42. Likewise for the distribution of preferences in Part 2 and Part 3 of those who gave a non-team-reasoning response in Part 1: χ^2 (5) = 5.99, p = .31.

The correlation of preferences for payoff equality in Part 2 and Part 3, for all participants, gave r (189) = .743 , p < .001 , indicating that there was a significant correlation between participants' preferences in Part 2 and Part 3, such that those who preferred unequal payoffs with a higher joint payoff in Part 2 tended to prefer unequal payoffs with a higher joint payoff in Part 3, and those who preferred more equal payoffs with a lower joint payoff in Part 2 tended to prefer more equal payoffs with a lower joint payoff in Part 3. Tables 3.11 to 3.15 show the frequencies of participants' preferences in Parts 2 and 3 of the Headshave vignette, grouped according to outcome preference in Part 1.

Table 4.11: Frequencies of outcome preference combinations in Parts 2 and 3 of the Headshave vignette, of participants who preferred the altruistic outcome in Part 1 of the Headshave vignette.

		Outcome in Part 3 (own/other's payoff)					
		60/60	50/100	40/140	30/180	20/220	10/260
Outcome in Part 2 (own/ other's payoff)	60/60	1	-	-	-	-	3
	100/50	-	-	-	-	-	-
	140/40	-	-	-	-	-	-
	180/30	-	-	1	-	-	-
	220/20	-	-	-	-	-	-
	260/10	-	-	-	-	-	4

Table 4.12: Frequencies of outcome preference combinations in Parts 2 and 3 of the Headshave vignette, of participants who preferred the competitive outcome in Part 1 of the Headshave vignette.

		Outcome in Part 3 (own/other's payoff)					
		60/60	50/100	40/140	30/180	20/220	10/260
Outcome in Part 2 (own/ other's payoff)	60/60	1	-	-	-	-	-
	100/50	-	-	1	-	-	-
	140/40	-	-	-	-	-	-
	180/30	-	-	-	-	-	-
	220/20	-	-	-	-	-	-
	260/10	1	-	-	-	-	-

Table 4.13: Frequencies of outcome preference combinations in Parts 2 and 3 of the Headshave vignette, of participants who preferred the equality-seeking outcome in Part 1 of the Headshave vignette.

		Outcome in Part 3 (own/other's payoff)					
		60/60	50/100	40/140	30/180	20/220	10/260
Outcome in Part 2 (own/ other's payoff)	60/60	33	1	-	-	-	-
	100/50	3	3	-	-	-	-
	140/40	-	-	1	-	1	-
	180/30	-	-	-	-	-	-
	220/20	-	-	-	-	-	-
	260/10	-	-	-	-	-	5

Table 4.14: Frequencies of outcome preference combinations in Parts 2 and 3 of the Headshave vignette, of participants who preferred the individualistic outcome in Part 1 of the Headshave vignette.

		Outcome in Part 3 (own/other's payoff)					
		60/60	50/100	40/140	30/180	20/220	10/260
Outcome in Part 2 (own/ other's payoff)	60/60	12	-	-	-	-	-
	100/50	5	2	-	-	-	-
	140/40	1	-	-	-	-	-
	180/30	-	-	-	-	-	-
	220/20	-	-	-	1	2	-
	260/10	12	1	-	-	-	5

Table 4.15: Frequencies of outcome preference combinations in Parts 2 and 3 of the Headshave vignette, of participants who preferred the maximum joint payoff in Part 1 of the Headshave vignette.

		Outcome in Part 3 (own/other's payoff)					
		60/60	50/100	40/140	30/180	20/220	10/260
Outcome in Part 2 (own/ other's payoff)	60/60	6	1	1	-	-	-
	100/50	3	2	1	2	-	-
	140/40	-	1	1	1	1	-
	180/30	-	-	1	2	1	-
	220/20	-	-	-	-	-	1
	260/10	2	1	2	-	-	59

A chi-squared goodness of fit test of preferences in Part 2 of those participants who gave a team-reasoning response, between the maximum joint payoff (expected frequency 13.5) and all the other five outcomes (expected frequency 67.5) gave $\chi^2(1) = 209.09$, $p < .001$, thus participants who gave a team-reasoning response in Part 1 preferred the maximum joint payoff significantly more frequently than they preferred all the other outcomes in Part 2.

A chi-squared goodness of fit test of preferences in Part 3 of those participants who gave a team-reasoning response, between the maximum joint payoff (expected frequency 13.5) and all the other five outcomes (expected frequency 67.5) gave $\chi^2(1) = 168.20$, $p < .001$, thus participants who gave a team-reasoning response in Part 1 preferred the maximum joint payoff significantly more frequently than they preferred all the other outcomes in Part 3.

These tests support the first hypothesis, for the Headshave vignette.

Responses to Part 2 were combined to make four separate categories: the most equal, and minimum joint payoff, the second most equal payoffs (which had the second lowest joint payoff), the third, fourth and fifth most equal payoffs (due to low frequencies) and the maximum joint payoff (which had the least equal payoffs). A chi-squared test of association between preferences in Part 2 of those participants who gave a team-reasoning response in Part 1, and those participants who gave a non-team-reasoning response in Part 1, gave χ^2 (3) = 49.64, p < .001, thus there was a significant difference between preferences in Part 2 of those participants who gave a team-reasoning response in Part 1, and those participants who gave a non-team-reasoning response in Part 1. Adjusted residuals showed that the difference was due to those who gave a team-reasoning response in Part 1 preferring the maximum joint payoff significantly more frequently than expected, and the most equal payoffs significantly less frequently than expected, and those who gave a non-team-reasoning response in Part 1 preferring the maximum joint payoff significantly less frequently than expected, and the most equal payoffs significantly more frequently than expected.

Responses to Part 3 were combined to make four separate categories: the most equal, and minimum joint payoff, the second most equal payoffs (which had the second lowest joint payoff), the third, fourth and fifth most equal payoffs (due to low frequencies) and the maximum joint payoff (which had the least equal payoffs). A chi-squared test of association between preferences in Part 2 of those participants who gave a team-reasoning response in Part 1, and those participants who gave a non-team-reasoning response in Part 1, gave χ^2 (3) = 63.42, p < .001, thus there was a significant difference between preferences in Part 2 of those participants who gave a team-reasoning response in Part 1, and those participants who gave a non-team-reasoning response in Part 1. Adjusted residuals showed that the difference was due to those who gave a team-reasoning response in Part 1 preferring the maximum joint payoff significantly more frequently than expected, and the most equal payoffs significantly less frequently than expected, and those who gave a non-team-reasoning response in Part 1 preferring the maximum joint payoff significantly less frequently than expected, and the most equal payoffs significantly more frequently than expected.

These tests support the second hypothesis, for the Headshave vignette.

Analysis of responses to Parts 2 and 3 in the GM vignette

A chi-square test of association between the distributions of preferences in Part 2 and Part 3 of the GM vignette of those who gave a team-reasoning response in Part 1 of the GM vignette, showed no significant difference of preference distribution: $\chi^2(5) = 4.45$, $p = .49$. Likewise for the distribution of preferences in Part 2 and Part 3 of those who gave a non-team-reasoning response in Part 1: $\chi^2(5) = 2.67$, $p = .75$. Correlation of preferences in Part 2 and Part 3, for all participants, gave r (189) = .771 , $p < .001$, indicating that there was a significant correlation between participants' preferences in Part 2 and Part 3, such that those who preferred unequal payoffs with a higher joint payoff in Part 2 tended to prefer unequal payoffs with a higher joint payoff in Part 3, and those who preferred more equal payoffs with a lower joint payoff in Part 2 tended to prefer more equal payoffs with a lower joint payoff in Part 3. Tables 4.16 to 4.20 show the frequencies of participants' preferences in Parts 2 and 3 of the GM vignette, grouped according to outcome preference in Part 1.

Table 4.16: Frequencies of outcome preference combinations in Parts 2 and 3 of the GM vignette, of participants who preferred the altruistic outcome in Part 1 of the GM vignette.

		Outcome in Part 3 (own/other's payoff)					
		60/61	52/103	42/139	29/178	18/221	10/259
Outcome in Part 2 (own/ other's payoff)	61/60	-	1	-	1	-	3
	103/52	-	-	-	-	-	-
	139/42	-	-	-	-	-	-
	178/29	-	1	-	-	-	-
	221/18	-	-	-	-	-	-
	259/10	-	-	-	-	-	4

Table 4.17: Frequencies of outcome preference combinations in Parts 2 and 3 of the GM vignette, of participants who preferred the competitive outcome in Part 1 of the GM vignette.

		Outcome in Part 3 (own/other's payoff)					
		60/61	52/103	42/139	29/178	18/221	10/259
Outcome in Part 2 (own/ other's payoff)	61/60	-	-	-	-	-	-
	103/52	-	-	-	-	1	-
	139/42	-	-	-	-	-	-
	178/29	-	-	-	-	-	-
	221/18	-	-	-	-	-	-
	259/10	2	-	-	-	-	-

Table 4.18: Frequencies of outcome preference combinations in Parts 2 and 3 of the GM vignette, of participants who preferred the equality-seeking outcome in Part 1 of the GM vignette.

		Outcome in Part 3 (own/other's payoff)					
		60/61	52/103	42/139	29/178	18/221	10/259
Outcome in Part 2 (own/ other's payoff)	61/60	43	1	-	-	-	-
	103/52	2	-	-	1	-	-
	139/42	-	1	2	-	-	-
	178/29	1	-	-	-	-	-
	221/18	-	-	-	-	1	-
	259/10	2	1	-	-	-	7

Table 4.19: Frequencies of outcome preference combinations in Parts 2 and 3 of the GM vignette, of participants who preferred the individualistic outcome in Part 1 of the GM vignette.

		Outcome in Part 3 (own/other's payoff)					
		60/61	52/103	42/139	29/178	18/221	10/259
Outcome in Part 2 (own/ other's payoff)	61/60	-	-	-	-	-	-
	103/52	3	-	1	-	-	-
	139/42	-	-	1	-	-	-
	178/29	1	-	-	-	-	-
	221/18	-	-	-	-	-	-
	259/10	4	1	-	-	-	2

Table 4.20: Frequencies of outcome preference combinations in Parts 2 and 3 of the GM vignette, of participants who preferred the maximum joint payoff in Part 1 of the GM vignette.

		Outcome in Part 3 (own/other's payoff)					
		60/61	52/103	42/139	29/178	18/221	10/259
Outcome in Part 2 (own/ other's payoff)	61/60	8	-	-	-	-	-
	103/52	3	4	-	-	-	-
	139/42	1	1	3	1	-	-
	178/29	-	-	1	3	1	-
	221/18	-	-	-	1	-	-
	259/10	1	3	2	3	2	63

A chi-squared goodness of fit test of preferences in Part 2 of those participants who gave a team-reasoning response, between the maximum joint payoff (expected frequency 16) and all the other five outcomes (expected frequency 80) gave $\chi^2(1) = 243.68$, $p < .001$, thus participants who gave a team-reasoning response in Part 1 preferred the maximum joint payoff significantly more frequently than they preferred all the other outcomes in Part 2.

A chi-squared goodness of fit test of preferences in Part 3 of those participants who gave a team-reasoning response, between the maximum joint payoff (expected frequency 16) and all the other five outcomes (expected frequency 80) gave $\chi^2(1) = 158.70$, $p < .001$, thus participants who gave a team-reasoning response in Part 1 preferred the maximum joint payoff significantly more frequently than they preferred all the other outcomes in Part 3.

These tests support the first hypothesis, for the GM vignette.

Responses to Part 2 were combined to make four separate categories: the most equal, and minimum joint payoff, the second most equal payoffs (which had the second lowest joint payoff), the third, fourth and fifth most equal payoffs (due to low frequencies) and the maximum joint payoff (which had the least equal payoffs). A chi-squared test of association between preferences in Part 2 of those participants who gave a team-reasoning response in Part 1, and those participants who gave a non-team-reasoning response in Part 1, gave $\chi^2(3) = 63.74$, $p < .001$, thus there was a significant difference between preferences in Part 2 of those participants who gave a team-reasoning response in Part 1, and those participants who gave a non-team-reasoning response in Part 1. Adjusted residuals showed that the difference was due to those who gave a team-reasoning response in Part 1 preferring the maximum joint payoff significantly more frequently than expected, and the most equal payoffs significantly less frequently than expected, and those who gave a non-team-reasoning response in Part 1 preferring the maximum joint payoff significantly less frequently than expected, and the most equal payoffs significantly more frequently than expected.

Responses to Part 3 were combined to make four separate categories: the most equal, and minimum joint payoff, the second most equal payoffs (which had the second lowest joint payoff), the third, fourth and fifth most equal payoffs (due to low frequencies) and the maximum joint payoff (which had the least equal payoffs). A chi-squared test of association between preferences in

Part 3 of those participants who gave a team-reasoning response in Part 1, and those participants who gave a non-team-reasoning response in Part 1, gave χ^2 (3) = 64.48, $p < .001$, thus there was a significant difference between preferences in Part 2 of those participants who gave a team-reasoning response in Part 1, and those participants who gave a non-team-reasoning response in Part 1. Adjusted residuals showed that the difference was due to those who gave a team-reasoning response in Part 1 preferring the maximum joint payoff significantly more frequently than expected, and the most equal payoffs significantly less frequently than expected, and those who gave a non-team-reasoning response in Part 1 preferring the maximum joint payoff significantly less frequently than expected, and the most equal payoffs significantly more frequently than expected.

These tests support the second hypothesis, for the GM vignette.

Both Hypothesis 1, that participants who gave a team-reasoning response in Part 1 would show a preference for the maximum joint payoff in Parts 2 and 3 significantly more frequently than any of the other outcomes in Parts 2 and 3, and Hypothesis 2, that participants who gave a team-reasoning response in Part 1 would show a preference for the maximum joint payoff in Parts 2 and 3 significantly more frequently than participants who give a non-team-reasoning response in Part 1, were supported.

Discussion

The results indicate that those participants whose responses were categorised as team-reasoning responses in Part 1, preferred the maximum joint payoff in Parts 2 and 3 significantly more frequently than any of the other outcomes in Parts 2 and 3. Those participants whose responses were categorised as team-reasoning responses in Part 1 preferred the maximum joint payoff in Parts 2 and 3 significantly more frequently than expected and the most equal payoffs in Parts 2 and 3 significantly less frequently than expected. Those participants whose responses were categorised as non-team-reasoning responses in Part 1, preferred the maximum joint payoff in Parts 2 and 3 significantly less frequently than expected and the most equal payoffs in Parts 2 and 3 significantly more frequently than expected. Also, there was no significant difference between responses in Part 2 and Part 3, for either group of participants.

The high frequency of preferences for the maximum joint payoff in both Parts 2 and 3 by participants whose responses in Part 1 had been categorised as team-reasoning responses possibly suggests that once a person has decided that team reasoning is a suitable motivation for a particular situation, the preference for the maximum joint payoff is likely to continue regardless of relative sizes of individual payoffs. Furthermore, this does not lend support to van Lange's (1999) integrated model of Social Value Orientation. That model suggests that people would tend to prefer a moderately large joint payoff with fairly equal payoffs over a very large joint payoff with very unequal payoffs, as the utility derived from the maximum joint payoff would at some point be cancelled out by the loss of utility from the inequality of payoffs. A number of participants in Study 2 preferred the more equal options. However, most of these did not indicate a preference for the maximum joint payoff in Part 1. The problem of social desirability of participants' responses must be taken into account, however. Inconsistency in responses may be seen by some participants as an undesirable trait.

In each vignette, a large number of inconsistencies in preferences for equality of payoffs and size of joint payoff in Parts 2 and 3 came from those who preferred the altruistic, competitive or individualistic outcomes in Part 1 (see Tables 4.11 to 4.20). This is not suprising, as the maximum joint payoff fulfils these motivations in one of but not both Parts 2 and 3.

A number of those participants who preferred the maximum joint payoff in Parts 2 and 3 expressed preferences for the equality-seeking outcome in Part 1. This may be because they derive utility from equality of payoffs, so long as the joint payoff does not suffer too much. However, when the joint payoff suffers to a great extent at the expense of equality (as in Parts 2 and 3) then utility might be diminished, so the desire for the maximum joint payoff overtakes the desire for equality of payoffs. This suggests that some people tend to trade equality off against maximising joint payoffs.

The significant positive correlation between preferences in Parts 2 and 3 indicates consistency in choices. There is a certain amount of variability amongst those who preferred the maximum joint payoff in Part 2, where the inequality was biased in favour of self. Some of these people preferred more equal options in Part 3, where the inequality was biased in favour of the other person, but for the most part participants preferred the same level of inequality and joint outcome in Parts 2 and 3 -- usually either completely equal payoffs, or the maximum joint payoff, with very few answers in between.

General Discussion

In the light of these two studies, there is no evidence that people who express preferences for the maximum joint payoff and give team reasoning reasons for doing so change their preferences when individual payoffs are very unequal. On the whole, preferences for the maximum joint payoff tended to remain fairly consistent regardless of the relative levels of individual payoffs, and there is a significant and positive correlation between preferences for differing levels of equality of payoffs and size of joint payoffs, irrespective of the direction of the inequality.

The preferences shown in these two studies raise further doubts about the inclusiveness of van Lange's (1999) integrated model of social value orientation. Certainly the preferences of some of the participants, and some of the qualitative responses would fit well into the model -- in Study 2 one participant actually stated his reason for preferring the maximum joint payoff in Part 1 of the Headshave vignette as "About equal amounts and a lot of money" (Participant 5, Study 2), which appears to be an example of van Lange's model in action. (This participant went on to state preferences for the maximum joint payoff in both Parts 2 and 3 of the Headshave vignette.) However, there was a large proportion of participants who were solely concerned with the joint payoff, rather than levels of separate payoffs, and there is no room for such preferences in van Lange's model.

The overall picture of people's preferences shows a considerable number of people revealing preferences for equality of payoffs over maximum joint payoff, maximum personal payoff for self (individualistic preferences) and other (altruistic preferences) and maximising the difference in payoff (competitive preferences). Some of these participants mentioned equality of effort put into the task in the vignette as the reason for their preference (as mentioned earlier, both of the vignettes required an active input from the hypothetical characters involved), and some mentioned the importance of equality of individual payoffs. Preferences for individualistic outcomes were more frequent in the Headshave vignette than in the GM vignette. Qualitative responses pointed to this partially being context dependent. When asked the reason for their preference, many participants responded that they would want to raise a lot of money for something as drastic as having their hair cut off. For example:

> "I would prefer to raise as much as I can since I'm shaving my head and that means a lot to me so I must have a very good payoff in exchange for it..." (Participant 184, Study 2)

and

> "I'd prefer to collect as much money as possible if I shaved my head. This is no competition either, it's a question of vanity! I would only shave my head for things that are really important to me" (Participant 171, Study 2).

However, the fact that there was a "real cost" involved (that of cutting one's hair) in a sense enhances the team-reasoning responses. Those who gave team-reasoning responses did so despite the "cost" of cutting their hair off, and not collecting a very large amount of money for doing so.

In both the vignettes, relatively few participants expressed preferences for competitive or altruistic outcomes.

In hindsight, there is a potential problem with using these particular vignettes to distinguish between a desire for equal payoffs and a desire for the maximum joint payoff. The payoffs are both contributions towards a specific cause, and as such the immediate individual benefit could be seen to be measured in pride from achieving a high payoff. Redistribution of payoffs to give higher equal payoffs would be meaningless, as payoffs are not for direct personal use by those involved, and none of the participants indicated that they considered this an option. However, ultimately the payoffs would be used to achieve a goal which, one would assume, both parties involved would benefit from equally. In the GM vignette, both would benefit by not having a test site in their area, in the Headshave vignette, both would benefit by having improved access to computers. Thus, an increased joint payoff would ultimately mean that both people involved would benefit more. Participants did not appear to consider this in their qualitative responses, and references to equality tended to refer to collecting the same amount of money or names, but it is an important point that limits conclusions which can be drawn from these results, and which should be considered in further research. It is possible to be a member of a team without directly benefiting from the outcome, for example, to be part of a group doing charity work or collections for something or someone with which they have no connection, and as such it would be useful to use other scenarios to address such problems.

Overall, the results of these two studies present no evidence that inequality of individual payoffs affects preferences for maximum joint payoffs, particularly with those people who give a team-reasoning reason for doing so. Thus team reasoning appears robust under the influence of egalitarian motives. From the outcome set defined, in the two vignettes specifically designed to encourage preferences for the maximum joint payoff, the three outcomes that people tended to prefer were the maximum joint payoff, the equality seeking outcome and the individualistic outcome. The robustness of team reasoning is especially striking when considered in the light of its total omission from current Social Value Orientation Theory (van Lange, 1999).

Chapter 5

Introduction

In the study described in Chapter 3, vignettes which encouraged preferences for joint payoff maximisation with team-reasoning motivations were developed intuitively. The basis used for the development of such vignettes was use of situations in which payoffs go into a common pool and the players benefit jointly from a given outcome. Situations such as this are already primed to encourage preferences for joint payoff maximisation, thus are more likely to induce team-reasoning motivations. While it was necessary to show empirically that preferences for maximising joint payoffs for team-reasoning motivations do occur in some situations at least, it is also of interest (and of use) to determine in a more methodical manner which characteristics of any given situation encourage such preferences. In some cases, vignettes may not fulfil the previous criteria used for construction of the vignettes in Chapter 3, although it may be possible to increase preferences for joint payoff maximisation with team-reasoning motivation in some vignettes by manipulating other variables.

It cannot be denied that there is some relationship between cooperative decision making and team reasoning. Cooperation is defined in *the Concise Oxford Dictionary of Current English* as "the process of working together to the same end" (Thompson, 1995, p. 294). This could be seen as the essential factor behind team reasoning. However, the game-theoretic definition of cooperation is slightly more ambiguous; in social dilemmas it is generally assumed to be the decision which, if everyone adheres it, will result in everyone being better off than if they had all followed a different course of action. Van Lange (1999) defines a cooperative Social Value Orientation as that which transforms one's own outcome preference into a function of own payoff and other's payoff, with equal weightings on both payoffs. This is subtly different from team reasoning, as the essential premise is still of individualistic reasoning -- or acting as a sole agent -- and making one's decision in the light of what other decision makers might do, whereas team reasoning has an underlying assumption that everyone else is team reasoning also, and the team or set of decision makers is acting as an agent. Furthermore, individual payoffs cease to be considered as separate when a decision maker is team reasoning, and most crucially, what is best for the team (therefore the outcome which a team reasoner will be working towards) is not necessarily what is best for everyone individually. It may be that each decision maker prefers a different outcome to that which is best overall, but the individually preferred outcomes all involve least preferred payoffs for other individuals. The best team outcome may be a moderately good outcome for all concerned, yet at the same time be no one individual's most preferred outcome. Sugden (2000) illustrates this with an example of a family's preference for a type of walk. One member of the family prefers long walks over rough terrain; another member of the family prefers very short easy walks which pass near to a gift shop. The walk which the whole family prefers is of moderate length along easy but uncrowded paths, which does not coincide exactly with any individual's preference, but is most suitable for the whole family.

It nonetheless remains true that an individual team member's preferred outcome may sometimes be the same as the team's preferred outcome. Using the example given above, a further member of the family may have a preference for walks of moderate length along easy but uncrowded paths, so that what the family, or team, prefers matches that individual's preference. It is true that, in this case, that member would be seen as not having compromised their personal payoff for the interests of the team, but team reasoning focuses on how to achieve the goal or goals of the team, and whether or not any given individual has to sacrifice something from his or her own personal payoff to achieve the team goal is irrelevant. Of course, empirically speaking it would be extremely useful to distinguish between the two.

The motivations behind cooperative behaviour and team-reasoning behaviour are also similar, in that neither is selfish; they both consider more than just the payoff to the self. It could also be argued that neither is comparative; neither considers the difference between own and other's payoff, although in some cases it is suggested that cooperation is linked to a desire for equality of payoffs (e.g., van Lange, 1999). However, team reasoning and cooperation are relatively similar in terms of motivation, so it follows that factors which could increase cooperation might also increase team-reasoning motivations.

There is a wealth of existing literature on factors which affect cooperation levels in the Prisoner's Dilemma Game (for reviews see Argyle, 1991; Colman, 1982b, 1995, Chapter 7; Davis, Laughlin & Komorita, 1976; Good, 1991; Grzelak, 1988; Pruitt & Kimmel, 1977; Rabbie, 1991; Rapoport, 1989, Chapter 12; Wrightsman, O'Connor & Baker, 1972) and more recently in multi-person social dilemmas (for reviews see Colman, 1982, Chapter 9, 1995, Chapter 9; Dawes & Orbell, 1981; Messick & Brewer, 1983; Schroeder, 1995; van Lange, Liebrand, Messick & Wilke, 1992). While there have been plenty of experiments on the Chicken Game as well, this is not so interesting with respect to team reasoning as the PDG. In Chicken, the "nice" or "cooperative" option is also the safest option -- the maximin option, which maximises the minimum possible payoff, and avoids the worst possible payoff. This opens up further motivations for choosing a cooperative option. The cooperative option in the PDG game, by contrast, is not the 'safe' option, in that it does not avoid the worst possible payoff, nor could it lead to the best individual payoff. The cooperative option in PDG is also strongly dominated by the defection option. If the game is iterated, there are still the possibilities of choosing cooperation as part of a long-term individualistic strategy, such as lulling the other person into a false sense of security, in order to take advantage of them in a later game. It cannot be said that a cooperative choice in the PDG will always be for cooperative reasons (it could also be chosen by those seeking the highest payoff which fulfils a condition of equality, and there are other possible reasons for choosing it), but there appear to be fewer individualistic reasons, particularly in the short term, for choosing cooperation in PDG than in Chicken. Following some brainstorming sessions alongside literature searches on cooperation in the PDG, 16 factors which might affect levels of team reasoning (both in two-person games and more broadly) were identified, as follows: Certainty of receipt of payoff from the interaction; Future Benefit expected from the other in the interaction; Past benefit received from the other in the interaction; Future interactions expected with the other; Publicity of contributions made in the interaction; Who will know about the final outcome of the interaction; Liking for others in the interaction; Type of relationship with others in the interaction; Whether there is competition from an outgroup; Whether there was a strong level of group identity in the interaction; Number of others involved in the interaction; Value of payoffs; Importance of payoffs; Transferability of payoffs; Who benefits from the interaction; Personal sacrifice involved in the interaction.

- CR: Certainty of receipt of payoffs from the interaction

  An element of uncertainty regarding whether or not the payoffs which the decision maker's actions will have led to will be received, may have a bearing on people's preferences for motivations.

  Tversky and Kahneman (1981) outlined the different preferences which people show when presented with two different outcomes, each with the same expected utility, but one being a certain outcome and the other was a risky outcome, with a given probability. An interaction with the framing of the outcome (whether the outcomes were presented as gains or losses) was present, such that when the outcomes were presented as gains (for example, in terms of percentage of the population saved from dying), participants tended to prefer certain outcomes over risky outcomes, but when the same outcomes were presented as losses (for example, in terms of percentage of the population who would die), participants tended to prefer risky outcomes over certain outcomes. That the certainty of receiving an outcome affects preferences for that outcome is well documented, but whether it will affect preferences for a particular outcome over another (for example, for the maximum joint payoff over altruistic, competitive, equality-seeking, and individualistic outcomes) cannot be easily judged. However, it is possible that some interaction may be present, bearing in mind the well-documented and pronounced effect of the so-called "risky shift", where decisions made in a group, with some discussion, tend towards riskier outcomes than those which are made by individuals, or by those in a group who do not discuss their decisions (for example, Malamuth & Fesbach, 1972; Wallach & Kogan, 1965).

- FB: Future benefit expected from the other in the interaction
- PB: Past benefit received from other in the interaction
- FI: Future interactions expected with the other

These factors are variations of the idea of reciprocity: past benefit in that one considers how to repay any benefit that has been received from the other party; future benefit in that one considers how to repay in the present any benefit that is likely to be received in the future, especially if the future benefit is not conditional on the current action; and future interactions in that one considers how to ensure that interactions in the future will be of benefit to the self, by setting in motion the norm of reciprocity. Axelrod (1990) outlined how reciprocity is a successful base from which to increase cooperation in the long run, although the motivation for this increase in cooperation appears to be from fear of punishment, rather than from a genuine desire to repay beneficial actions. Sell and Wilson (1999) comment that the knowledge that group members will be making several decisions together can enhance cooperation, but Caporael, Dawes, Orbell and van de Kragt (1989) suggest that this type of process is one way in which cooperation can become a selfish choice. Further research that links reciprocity to cooperation also fails to clarify this point (Kormita, Hilty & Parks, 1991; Kormita, Parks & Hulbert, 1992; Liebrand, Wilke, Vogel, Wolters, 1986). Furthermore, Liebrand et al found in a number of N-person social dilemma games that defection from others led to a subsequent decrease in cooperation, but cooperation from others did not produce a corresponding increase in cooperation. The suggested reason for this was that the feedback that the others were defecting gave those players who wanted to defect, but were cooperating for reasons of social desirability, an outlet to practise their desired defection. Nemeth (1970) suggested that low levels of positive reciprocity were due to the paradigms usually used to investigate cooperation. However, somewhat in contradiction to previous literature, Komorita and Barth (1985) and Komorita (1987) found that expectations that other players would be able to reward cooperation increased participants' levels of cooperation. As such, the issue of reciprocity is an important factor that needs to be looked at in relation to team reasoning as well as to cooperation. Admittedly, the processes that have been outlined in past research tend to concentrate on the other being given the chance to reciprocate, and how that affects current decisions. Also of interest is whether people cooperate as a reciprocal action, because someone has cooperated with them in the past. Gallucci and Perugini, (2000) described reciprocity as "a norm...a basic internal motivation" (p. 369) and found that participants reciprocated cooperative actions. Dickinson (2000) outlined empirical support for Rabin's (1993) theory of reciprocal kindness, in that people derive personal utility from reciprocating others' actions, and as such will reciprocate kind and cooperative actions.

It is also possible that a positive interaction with someone in the past, or an expected interaction with them in the future, may make it more likely that a decision maker will think in terms of the group, or "us", as a decision agent, rather than just "me", and through this process be more likely to induce a team-reasoning motivation. Interactions from which a positive outcome has already been achieved, or is expected through prior arrangement, would be unlikely to induce cooperation through fear of later defection, although expected interactions with an as-yet-undecided outcome would be more likely to induce cooperation through fear of defection in the future, in the processes outlined by Axelrod (1990).

- PC: Publicity of individual contributions made in the interaction

The issue of anonymity is pertinent in group behaviour. Situational norms appear to influence behaviour when decision makers are identifiable more than when they are not (Bohnet & Frey, 1994; Bohnet & Frey, 1999) and identifiability has been shown to increase cooperation levels (Bixenstine, Levitt & Wilson, 1966; Jorgenson & Papciak, 1981). The issues to do with reciprocity as discussed above become irrelevant when a decision maker cannot be identified. Similarly, indirect reciprocity by reputation (Nowak & Sigmund, 1998) could not develop under conditions of anonymity. Generally, less cooperation has been found in larger groups than in smaller groups (Fox & Guyer, 1977; Hamburger, 1977; Hamburger, Guyer & Fox, 1975; Kormita & Lapworth, 1982; Marwell & Schmitt, 1972) and one of the many possible reasons put forward for this occurrence is the process of deindividuation and perceived anonymity (Hamburger, Guyer & Fox, 1975), with less cooperation observed under conditions of anonymity than under public choice conditions (Fox & Guyer, 1978).

- WK: Who will know about the final outcome of the interaction

The publicity surrounding contributions leads naturally onto the publicity surrounding outcomes, although it is possible that different sets of motivational processes would be in operation. American universities often have plaques showing the names of benefactors, and they are often carefully graded in size and prominence to match the relative magnitudes of the contributions. The publicity of the outcome could add a further parameter to the payoff structure, either by increased prestige from being involved with a high-profile project (prestige could increase both cumulatively -- such that more people are aware of one's participation -- and qualitatively -- such that the more people that know about the project, the higher profile the project becomes, and the more desirable to be involved in), or by indirect reciprocity. This, in effect, changes the value of the outcome, which will be discussed in more detail below.

- LD: Liking for others in the interaction
- RT: Type of relationship with others in the interaction

Standard decision theory sees decision makers as rational, individualistic and selfish agents, and as such fails to take account of social relationships which often occur between decision makers (Sally, 2001). The role of friendship has been shown to affect cooperation in a variety of group tasks (Jehn & Shah, 1997). Trust is often cited as a factor in the development of friendships and social interactions (e.g. Green & Brock, 1998; Monsour, 1992; Parker & Devries, 1993; Roy, Benenson & Lilly, 2000; Schonsheck, 1997), and it has been suggested that trust has an important role to play in the development of evolutionarily stable cooperation (Güth & Kliemt, 2000; Macy & Skvoretz, 1998). Past research has indicated that high levels of trust lead to increased cooperation in PDG (Tsuji, 2000), and more specifically, under certain conditions such as a low sucker's payoff (Parks & Hulbert, 1995), with feedback of other's actions (Sato, 1989) and in small groups (Sato, 1988). Low levels of trust relate to a reluctance to respond to cooperative communication and increased negative responses to noncooperative behaviour in a Prisoner's Dilemma bargaining task (Cotterell, Eisenberger & Speicher, 1992). As well as a causal factor in cooperative decisions, trust is also a product of initial impressions of and experiences with other decision makers (Komorita & Mechling, 1967; Quigley-Fernandez, Malkis & Tedeschi, 1985). Friendships, in which one could reasonably assume there have been a number of positive interactions, would be likely to involve trust at some level. Similarly, relationships which have involved a number of interactions, but which do not progress to the level of friendship, such as a purely working relationship, would also be likely to involve trust.

Ongoing relationships may also bring into play reciprocity (as talked about previously) and social identity effects (see below)

- OG: Whether there is competition from an outgroup
- GI: Whether there was a strong level of group identity in the interaction

The minimal group paradigm (Tajfel, 1970) indicates that decision makers will show bias towards co-members of even basic, nominal groups. Such processes often result in hostility and competition towards outgroups (Insko & Schopler, 1987; Insko, Schopler, Hoyle, Dardis & Graetz, 1990; Polzer, 1996; Tajfel, 1978; Tajfel & Turner, 1986) Furthermore, competition between groups can enhance ingroup cohesion (Sherif, 1966; Sherif, Harvey, White, Hood & Sherif, 1961), although this ingroup cohesion is usually at the expense of increased hostility towards the outgroup, especially on zero-sum tasks, where one group's gain is necessarily another group's loss. Salience of group membership has been shown to increase cooperation in mixed-motive games with groups of up to eight people (Brewer & Kramer, 1986; Dawes, van de Kragt & Orbell, 1988; de Cremer & van Vugt, 1999; Kramer & Brewer, 1984; Miller, Downs & Prentice, 1998), although Brewer and Kramer found the opposite effect in very large groups of 32 players. Within group cooperation levels have also been shown to increase with between group competition in PDG (Bornstein & Ben-Yossef, 1994), and intergroup competition has been shown to enhance ingroup efficacy and productivity (Mulvey & Ribbens, 1999).

It is generally assumed that group membership and social identity fulfils an individualistic motive of improving self-esteem (Hogg & Abrams, 1988; Luhtanen & Crocker, 1992; Tajfel, 1978). However, if the ends of such behaviour lead to increased cooperation it could be that there will be some effect on preferences for team-reasoning motivations.

- NT: Number of other people involved in the interaction

There is a substantial literature showing that increasing the number of people involved in interactions such as social dilemmas has a negative effect on cooperation. Significant differences have been found in cooperation between two- and three-person groups (Hamburger, 1977; Komorita & Lapworth, 1982; Marwell & Schmitt, 1972), between three- and six- or seven-person groups (Fox & Guyer, 1977; Hamburger, Guyer & Fox, 1975; Komorita & Lapworth, 1982) and between three-, six- and nine-person groups on two out of three tasks (Bonacich, Shure, Kahan & Meeker, 1976). However, once the group size expands past about seven, little difference is found in levels of cooperation (Fox & Guyer, 1977; Liebrand, 1984). It appears that around this number of group members, a ceiling effect occurs whereby the processes which act as cooperation inhibitors stop increasing along with group size (van Lange, Liebrand, Messick & Wilke, 1992).

A number of different reasons have been proposed for this decrease in cooperation as group size increases. Sato (1988) suggested that the effects of trust on cooperation decreased as group size increased. This links in to the bad apple theory (Colman, 1995), which takes account of the assumption by decision makers that the larger the group, the more likely that there will be at least one defector, who will take advantage of all the cooperators and make it impossible for the collective goal to be achieved, so cooperating may be seen as pointless.

Another possible reason for the decrease in cooperation as group size increases is the degree of interpersonal control. Reciprocity, as discussed above, can be an effective deterrent against defection when interacting a pairs, but the effectiveness would seemingly reduce when the group size increases to more than two, due to variability between others' responses. This would still not explain the difference between groups of three and seven people. Under conditions of more personal control than in the standard social dilemma model, Boyd and Richerson (1992) outlined how it is theoretically possible for cooperation to evolve as a result of punishment by others for defection, when there is enough interpersonal control to direct punishment only at those who warrant it. Lubell and

Scholz (2001) found that punishment of non-cooperation increased cooperation in those who initially defected, but actually decreased cooperation in those who initially cooperated, so in practice the effectiveness of such punishment strategies may be limited. Gintis (2000) found that, despite lack of evidence that retaliating against noncooperators may not be beneficial in the long term, cooperative decision makers still punish, which could indicate that the perceived level of control is higher, or it could merely indicate a sense of fairness and justice which has little to do with long term outcomes. However, models which do not allow for discrimination in punishment tend to be unsuccessful in use of reciprocity to increase cooperation in multi-person groups (Boyd & Richerson, 1992).

The leading suggestion as to why cooperation decreases in larger groups is that of perceived efficacy -- how effective a decision maker believes his cooperation is in achieving the desired aim. Cortazar (1997) introduced the idea of a non-redundant group, where everyone's contributions are needed to achieve the group aim, and shows that in certain conditions collective action will be pursued, and many studies have shown that cooperation can be driven by task interdependency (Jorgenson & Papciak, 1981; Samuelson, Messick, Rutte & Wilke, 1984; Sherif, 1966; Sherif, Harvey, White, Hood & Sherif, 1961; van de Kragt, Orbell & Dawes, 1983; Wageman & Baker, 1997), and goal interdependence can enhance performance on a given task (Resick & Bloom, 1997). Allison and Kerr (1994) found that past success of the group in similar tasks influences cooperative behaviour in social dilemmas, and Busch (1996) found that students with higher self-efficacy showed more helping behaviour towards other group members. Positive relationships have been found between cooperation levels and how effective participants believed the group can be in achieving its goals (collective efficacy), with seven person groups having both lower collective efficacy and lower cooperation than three person groups (Seijts & Latham, 2000; Seijts, Latham & Whyte, 2000). Perceived self-efficacy has been shown to decrease as group sizes increases (Kerr, 1989; Rapoport, Bornstein & Erev, 1992). However, Kerr and Kaufman-Gilliland (1997) suggested that reports of lower self-efficacy were a result of, or an excuse for, non-cooperation in social dilemmas.

- VP: Value of payoffs
- IP: Importance of payoffs

In Chapter 3, it was suggested that the difference in responses to the two vignettes designed to encourage altruistic motivations may have been due to the magnitude of the payoffs, as one vignette dealt with tens of pounds and one dealt with tens of thousands of pounds.

Research on the effect of incentive value on cooperation has been limited by availability of funds. However, the issue that small or imaginary incentives might lead to decision makers not taking tasks seriously enough first arose in the 1960s. Gallo and McClintock (1965) suggested that low levels of monetary incentives might be the reason for low levels of cooperation in the Prisoner's Dilemma game. A number of experiments on payoff types in the two-person Prisoner's Dilemma game yielded a variety of results. Stahelski and Kelley (1969) found that monetary payoffs yielded higher levels of cooperation than points, whereas Gumpert, Deutsch and Epstein (1969) found the opposite effects, that monetary payoffs led to more competitive behaviour. Further studies (e.g. Oskamp & Kleinke, 1970; Wrightsman, 1966) found no significant difference between reward conditions. Knox and Douglas (1972) found no significant difference between average levels of cooperation in a high incentive game versus low incentive game, but the variances of cooperation were vastly different. High incentives appeared to skew some people towards cooperation and others towards competition, whereas low incentives appeared to have no such effect. As such, incentive magnitude appears to have no consistent effect, and may interact with any number of things to cause the variety of effects which have been demonstrated empirically.

When dealing with multi-person social dilemmas the picture becomes slightly clearer. Increasing the payoff for cooperation tends to encourage cooperative behaviour (e.g. Bonacich, Shure, Kahan & Meeker, 1976; Kelley & Grzelak, 1972; Komorita, Sweeney & Kravitz, 1980; Messick & Brewer, 1983), and a number of field studies reviewed by van Lange, Liebrand, Messick and Wilke (1992) have indicated that monetary rewards increase conservation behaviour in resource dilemmas. However, all these studies focused on increasing the reward for cooperation (and in some cases, decreasing the reward for defection), so altered the payoff structure to a certain extent, rather than just increasing the magnitude of all the payoffs.

In effect, the importance of the payoff is another way of manipulating the value of the payoff. Due to the inconclusive results regarding the effect of payoff magnitude on cooperation in social dilemmas, it seems reasonable to investigate it with regard to team reasoning.

- TP: Transferability of payoffs

Cortazar (1997) outlined how contributing towards a collective good can occur when that good is "lumpy" or a non-divisible product. If a good was divisible, in that each person received a part of the overall outcome, individual payoffs could be transferable, in that they could pass from person to person and each person could receive benefit from possessing that payoff (such as money), or non-transferable, in that they could not meaningfully be transferred from person to person (such as points). It seems intuitively obvious that if a good is non-divisible, then people will automatically prefer the greatest collective payoff, in the absence of any other available motivations. Following on from this, it might be the case that there is more preference for the greatest joint payoff when the individual payoffs are transferable, in that it makes more sense to sum the two payoffs. This idea was touched upon in Chapter 3, when the two vignettes which yielded no preferences for the maximum joint payoff both had individuals' points as the payoffs, which cannot be meaningfully summed.

- WB: Who benefits from the interaction

The idea of a "collective good" is that everyone involved benefits from the provision of that good. The two vignettes designed to encourage preferences for maximum joint payoff both could be said to fulfil this criterion. Sugden (1993, 2000) clarified that a team reasoner acts in such a way so as to promote the outcome which is perceived as best for the group, and what is best for the group is not necessarily what is best for everyone individually. Thus, if the whole group will benefit from the outcome, rather than just a proportion of people involved, it may be more likely that decision makers will prefer outcomes which promote the collective interest. Fiske (1992) outlined the concept of a communal sharing relationship, in which people who belong to the same group share both inputs and outputs -- it is possible that the sharing of outputs between all involved would encourage team reasoning. When the outcome that is being worked towards is a collective good, people might be more likely to team reason than if only one person, or a few people, would benefit from the outcome.

- PS: Personal sacrifice involved in the interaction

Both the vignettes which were designed to encourage preferences for the maximum joint payoff for team-reasoning reasons in Chapter 3 involved situations which required some input from the decision maker. However, it was assumed that as the ultimate goal was to achieve a certain payoff, the unit which made that payoff greater (whether one's own payoff, or the joint payoff) would be the key factor which the decision maker was trying to maximise, irrespective of the sacrifice made in working towards that payoff. The qualitative responses afterwards would help to identify anyone who was concerned about the effort or time required. However, it could be that the less time that was required, the more people might be prepared to consider payoffs other than their own.

The sixteen factors discussed above are all in need of empirical testing. The study outlined in this chapter used a similar format to that in Chapter 3; each participant was presented with a number of vignettes and asked to indicate a preference from five outcomes for each vignette, and to give a reason for each preference. In each vignette, response alternatives were designed to be mutually exclusive as regards social value orientations, in the sense that a response that expressed a preference for maximising the decision maker's individual payoff (hence satisfying the social value orientation of individualism) would not allow maximisation of any of the following, representing other social value orientations: the other's payoff (altruism), the difference between own and other's payoff (competitiveness), the equality of payoffs (equality seeking), or the joint payoff (team reasoning). In the same way, each of the other response alternatives invariably satisfied one and only one social value orientation. A preference for the maximum joint payoff, where participants gave a team-reasoning reason for their preference, was classified as a team-reasoning response. Each of the 16 factors mentioned above was represented by a different vignette, and each vignette had a number of conditions (between two and five, depending on the variable), in order to manipulate the relevant factor.

The hypotheses are that levels of team-reasoning responses will vary across conditions in the sixteen different vignettes. The different conditions in each vignette are described in the method section.

Method

Participants

The participants were randomly divided into two groups. Group 1 (N=132, 77 female, 55 male, age range from 17 to 75 years, mean of 27.15, *SD* = 12.37) completed questionnaires which covered eight of the variables, and Group 2 (N=124, 90 females, 34 males, age range from 16 to 71 years, mean of 28.35, *SD* = 13.31) completed questionnaires which covered the other eight variables. The reason for this split was that testing sessions would have been too long and tiresome for participants if all 16 variables had been covered by all participants. In Group 1, 52.3% of participants were students, 42.4% were working, and the remaining 5.3% were either unemployed or retired. In Group 2, 50.8% of participants were students, 42.7% were working, and the remaining 6.4% were either unemployed or retired. Those who were working came from a wide variety of occupations. Participants were selected on an opportunistic basis; a few were known to the experimenter and most were family, friends and colleagues of people who were known to the experimenter.

Materials and independent variable manipulation

Each participant completed a questionnaire, with eight different vignettes presented in pseudo-random order, in pseudo-random combinations of conditions of each vignette. The division of vignettes into two groups was undertaken with consideration of not putting similar vignettes in the same questionnaire, as far as was possible. In Questionnaire 1, the factors looked at were:

- Certainty of receipt of payoffs from the interaction (CR, two levels: certain return on your investment, risky return on your investment);
- Future benefit expected from the other in the interaction (FB, two levels: will receive future benefit, very unlikely to receive future benefit);
- Past benefit received from other in the interaction (PB, two levels: have received past benefit from other, have not received past benefit from other);
- How public the contributions made in the interaction are (PC, two levels: public contributions, anonymous contributions);

- Liking for others in the interaction (LD, three levels: like the other people, neither like or dislike the other people, dislike the other people);
- Whether there is competition from an outgroup (OG, three levels: no outgroup, outgroup but not competing for the same resources, outgroup and competing for limited resources);
- Who benefits from the interaction (WB, four levels: only self benefits, only one other benefits, many others benefit but not self, many others and self benefit);
- Who will know about the outcome of the interaction (WK, five levels: no one will know, only self will know, only the group involved in the interaction will know, a limited, specialist audience will know, a wide, general audience will know).

In Questionnaire 2, the factors looked at were:

- Future interactions expected with the other (FI, two levels: future interactions expected, future interactions not expected);
- Whether there was a strong level of group identity in the interaction (GI, two levels: strong group identity, weak group identity);
- The importance of the payoff (IP: two levels; important payoff, relatively unimportant payoff);
- The value of the payoff (VP, two levels: small payoffs, large payoffs)
- The personal sacrifice involved in the interaction (PS, three levels: low input of time, medium input of time, large input of time);
- The transferability of payoffs (TP, three levels: non-divisible and non-transferable, divided but non-transferable, divided and transferable);
- The type of relationship with others in the interaction (RT, four levels: are friends with the others involved and have worked with them on this type of interaction before, have worked with others involved on this type of interaction but do not know them socially, are friends with the others involved but have not worked with them on this type of interaction, do not know the others involved and have not worked with them previously);

- The number of other people involved in the interaction (NT, five levels: one other, four others, nine others, nineteen others, forty-nine others).

In Questionnaire 1, the vignette in which the certainty of receipt of payoffs (CR) was manipulated involved a group of friends pooling a certain amount of money to invest. The manipulation was that the money was invested either in a building society, which would provide a "respectable rate of interest and certain return", (certain return) or that the money would be used to buy shares, which would provide an "uncertain rate of return" (uncertain return Participants were asked to indicate which amounts of money they would prefer themselves and another person in the group to invest.

The vignette in which future benefit expected from the other in the interaction (FB) was manipulated involved clubbing together with a fellow holiday maker to cook a barbecue at the end of the holiday, and each person spends a certain amount of money on food. The manipulation was that the other person either lived in the same area as the participant, and had invited them over for a barbecue when both people returned home from holiday (expected future benefit), or that the other person lived on the other side of the country and the participant was unlikely to see them again (no expected future benefit). Participants were asked to indicate which amounts of money they would prefer themselves and the other person to spend on food.

The vignette in which past benefit received from the other in the interaction (PB) was manipulated involved working on a task at university with other people, and individual grades are summed to make an overall group grade. The manipulation was that the participant had either received help with work from the group before (past benefit), or had never worked with them before (no past benefit). Participants were asked to indicate which grades they would prefer themselves and another person in the group to achieve.

The vignette in which publicity of contributions made in the interaction (PC) was manipulated involved a friend collecting sponsorship money for comic relief. The manipulation was that the money was either donated anonymously in a tin (anonymous contributions), or the amount of the donation was written down on a list with the name of the donor (public contributions). Participants were asked to indicate which amounts of money they would prefer themselves and someone else to donate.

The vignette in which liking for others in the interaction (LD) was manipulated involved the participant working at a travel agents, and a record being kept of how many holidays have been sold each month. The manipulation was that the participant either liked their workmates and got on with them well (like the other people), was not particularly friendly with their workmates, but did not dislike them either (neither like nor dislike the other people), or disliked their workmates and did not get on well with them (dislike the other people). Participants were asked to indicate how many holidays they would prefer themselves and one of their workmates to have sold over a month.

The vignette in which competition from an outgroup (OG) was manipulated involved a sports club applying for a grant for training for individual members of the club. The manipulation was that they were the only club applying for the grant (no outgroup), other clubs were applying for the grant, but the grants were non-competitive (outgroup, but no competition for the same resources), and other clubs were applying for only one available grant (outgroup, with competition for the same resources). Participants were asked to indicate how many hours coaching they would prefer themselves and someone else in the same club to receive as part of the grant.

The vignette in which who benefits from the interaction (WB) was manipulated involved a group of friends working together to set up an art studio. The manipulation was that the studio was to be for the sole use of the participant (only self benefits), the studio was to be for the sole use of another member of the group of friends (only one other benefits), the studio was to be for the use of the whole group of friends, but the participant would be moving away from the area so would not be using it (many others benefit but not self), and the studio was to be for the use of the whole group of friends (many others and self benefit). Participants were asked to indicate how many hours they would prefer themselves and another person in the group to spend setting up the art studio.

The vignette in which who knows about the outcome of the interaction (WK) was manipulated involved a conservation group planting trees on a remote island. The manipulation was no one monitored the progress of the trees which were planted (no one knows about the outcome), the participant monitors the progress of the trees but does not inform the others in the group (self only knows about the outcome), the conservation group monitors the progress of the trees (only the group involved in the interaction knows about the outcome), an environmental newsletter covers the progress of the trees (a limited, specialist audience knows about the outcome), and the national newspapers cover the progress of the trees (a wide, general audience knows about the outcome). Participants were asked to indicate how many trees they would prefer themselves and another member of the conservation group to plant.

In Questionnaire 2, the vignette in which future interactions expected with the others in the interaction (FI) was manipulated involved a group of people taking part in a quiz. The manipulation was that the quiz was part of a university induction day, and the team members would be the participant's classmates over the next 3 years (future interactions expected), or that the quiz was part of a one-day workshop in London, and the team members were people that the participant would be unlikely to see again (no future interactions expected). Participants were asked to indicate how many points each they would prefer themselves and another person in their team to score.

The vignette in which the level of group identity in the interaction (GI) was manipulated involved the participant and another person helping people at university deal with computer viruses, The manipulation was that this activity was undertaken as part of a named group set up specifically for this task (strong group identity) or that the activity was undertaken on an individual basis (weak group identity). Participants were asked to indicate how many computers they would prefer themselves and the other person to disinfect.

The vignette in which the importance of the payoffs (IP) was manipulated involved a basketball game against another team. The manipulation was that the game was either a friendly against another local team (relatively unimportant outcome), or the league national final (important outcome). Participants were asked to indicate how many goals they would prefer themselves and another of their team mates to score.

The vignette in which the value of the payoffs was manipulated (VP) involved the participant's sister losing her job, through no fault of her own, and shortly afterwards the participant and the sister each win some money in a prize draw. The manipulation was that the prizes were either in tens of pounds (small payoffs), or in tens of thousands of pounds (large payoffs). Participants were asked to indicate how much money they would prefer themselves and the sister to win.

The vignette in which personal sacrifice in the interaction (PS) was manipulated involved a group of people collecting names on a petition. The manipulation was that they either spent an hour collecting names (low input of time), a day collecting names (medium input of time), or a week collecting names (high input of time). Participants were asked to indicate how many names each they would prefer themselves and another person to collect.

The vignette in which transferability of payoffs (TP) was manipulated involved the participant and another person taking part in a pub quiz. The manipulation was that the payoff was either in points scored by the team (non-divisible and non-transferable payoff), or in points scored by each person in the team (divided and non-transferable payoff), or in money won by each person in the team (divided and transferable payoff). Participants were asked to indicate how any points or how much money they would prefer themselves and another team member to score or win.

The vignette in which the type of relationship with others in the interaction (RT) was manipulated involved a group of people who were going door-knocking for Children in Need week. The manipulation was that the people were either close friends who had done charity work together before (friends with the others, and have interacted with them previously in a similar situation to this one), or close friends who have not done charity work together before (friends with the others involved but have not interacted with them in this type of situation before), or not involved with each other socially, but sometimes do charity work together (have interacted with the others in this type of situation before but do not know them socially), or have never met the others before (have not interacted with the others in this type of situation before, and do not know them socially). Participants were asked to indicate how much money they would prefer themselves and another member of the group to raise.

The vignette in which the number of others involved in the interaction (NT) was manipulated involved a group of people working on an allotment. The manipulation was that there was either one other person, four other people, nine other people, nineteen other people, or forty-nine other people involved in the allotment. Participants were asked to indicate how many hours a week they would prefer themselves and another person in the group to spend working on the allotment.

For the complete set of vignettes from both questionnaires, see Appendix 8.

Design

The experiment was a between-participants design; each factor that was predicted to affect levels of team thinking had a number of different conditions (ranging from two to five) and each participant took part in one condition of each of the eight vignettes which was covered by their questionnaire.

Procedure

The study was presented to participants as a study on decision making. Participants were presented with a booklet containing eight vignettes, arranged in a different quasi-random order in each questionnaire. Each vignette was followed by a set of five response categories representing outcomes with different payoffs for the respondent and another person in the vignette. Instructions were given to the participants to indicate which outcome they preferred in each vignette, and to give a brief reason for their preference. In each case, the five response alternatives uniquely reflected individualism, equality-seeking, altruism, competitiveness and team reasoning. The questionnaire took about 15 minutes to complete. Questionnaires were completed anonymously, and returned to the experimenter in a sealed envelope.

Results

Responses were classified in the same way as in the studies described in Chapter 4. Those responses which consisted of a preference for the maximum joint payoff, with a team-reasoning reason for the preference, were classified as team-reasoning responses. Those which indicated a preference for the maximum joint payoff, but with a non-team-reasoning reason for the preference, and those which consisted of a preference for any of the other four outcomes, were classified as non-team-reasoning responses. For the purposes of analysis, the occupation of participants was classified into two groups: working or retired people (of which there were 61 who completed Questionnaire 1 and 58 who completed Questionnaire 2), and students or unemployed people (of which there were 71 who completed Questionnaire 1 and 66 who completed Questionnaire 2). The ages of participants classified as working and retired people in Group 1 ranged from 18 to 75 years, with a mean age of 35.13 years, $SD = 14.06$, and in Group 2 the ages ranged from 16 to 71, with a mean age of 39.91, $SD = 14.06$. The ages of those classified as students and unemployed people in Group 1 ranged from 17 to 37, with a mean age of 20.30 years, $SD = 3.69$, and in Group 2 the ages ranged from 18 to 60 with a mean age of 20.82, $SD = 6.23$.

Frequencies of response types in each vignette across conditions and occupation are given in Tables 5.1 to 5.16 below. TR responses refer to those classified as team-reasoning responses, and non TR to those classified as non-team-reasoning responses. Occupation type of student refers to both students and unemployed people, and working to both working and retired people.

Table 5.1: Response type across conditions and job type in the Certainty of Return vignette

Condition	Occupation	Response	
		TR	Non TR
Certain return	Student	4	29
	Working	5	34
Uncertain return	Student	-	38
	Working	-	22

Table 5.2: Response type across conditions and job type in the Future Benefits vignette

Condition	Occupation	Response	
		TR	Non TR
Some future benefit expected	Student	1	32
	Working	2	31
No future benefit expected	Student	1	37
	Working	1	27

Table 5.3: Response type across conditions and job type in the Future Interactions vignette

Condition	Occupation	Response	
		TR	Non TR
Some future interactions expected	Student	6	21
	Working	8	17
No future interactions expected	Student	9	30
	Working	8	25

Table 5.4: Response type across conditions and job type in the Group Identity vignette

Condition	Occupation	Response	
		TR	Non TR
Strong group identity	Student	7	27
	Working	8	15
Weak group identity	Student	6	26
	Working	5	30

Table 5.5: Response type across conditions and job type in the Importance of Payoff vignette

Condition	Occupation	Response	
		TR	Non TR
Unimportant payoff	Student	13	18
	Working	22	10
Important payoff	Student	16	19
	Working	15	11

Table 5.6: Response type across conditions and job type in the Liking for Others Involved vignette

Condition	Occupation	Response	
		TR	Non TR
Like others involved	Student	0	27
	Working	2	16
Neither like nor dislike others involved	Student	1	22
	Working	2	19
Dislike others involved	Student	0	21
	Working	2	20

Table 5.7: Response type across conditions and job type in the Number of People Involved vignette

Condition	Occupation	Response	
		TR	Non TR
1 other involved	Student	1	16
	Working	0	13
4 others involved	Student	1	9
	Working	0	8
9 others involved	Student	0	10
	Working	1	13
19 others involved	Student	0	14
	Working	1	11
49 others involved	Student	0	15
	Working	0	11

Table 5.8: Response type across conditions and job type in the Outgroup vignette

Condition	Occupation	Response	
		TR	Non TR
No outgroup involved	Student	0	23
	Working	1	16
Outgroup involved, with no competition	Student	1	18
	Working	2	14
Outgroup involved, with competition	Student	2	27
	Working	7	21

Table 5.9: Response type across conditions and job type in the Past Benefit vignette

Condition	Occupation	Response	
		TR	Non TR
No past benefit received	Student	2	36
	Working	3	25
Past benefit received	Student	3	30
	Working	9	24

Table 5.10: Response type across conditions and job type in the Publicity of Contributions vignette

Condition	Occupation	Response	
		TR	Non TR
Anonymous contributions	Student	10	28
	Working	10	17
Public contributions	Student	6	27
	Working	14	20

Table 5.11: Response type across conditions and job type in the Personal Sacrifice Involved vignette

Condition	Occupation	Response	
		TR	Non TR
Small personal sacrifice	Student	15	11
	Working	13	7
Medium personal sacrifice	Student	15	6
	Working	14	2
Large personal sacrifice	Student	10	9
	Working	13	9

Table 5.12: Response type across conditions and job type in the Value of Payoff vignette

Condition	Occupation	Response	
		TR	Non TR
Large payoff	Student	5	33
	Working	5	15
Small payoff	Student	2	26
	Working	5	33

Table 5.13: Response type across conditions and job type in the Transferability and Divisibility of Payoffs vignette

Condition	Occupation	Response	
		TR	Non TR
Non-divisible outcome	Student	15	8
	Working	12	6
Divided and transferable payoff	Student	6	17
	Working	7	20
Divided and non-transferable payoff	Student	3	17
	Working	8	5

Table 5.14: Response type across conditions and job type in the Type of Relationship vignette

Condition	Occupation	Response	
		TR	Non TR
Friends and working relationship	Student	9	12
	Working	16	5
Working relationship only	Student	14	6
	Working	11	3
Friends only	Student	10	2
	Working	12	3
No previous relationship	Student	3	10
	Working	3	5

Table 5.15: Response type across conditions and job type in the Who Benefits From the Outcome vignette

Condition	Occupation	Response	
		TR	Non TR
All involved benefit	Student	1	11
	Working	0	18
All involved except self benefit	Student	1	21
	Working	0	14
Only one other person benefits	Student	2	14
	Working	2	9
Only self benefits	Student	2	19
	Working	3	15

Table 5.16: Response type across conditions and job type in the Who Will Know About the Outcome vignette

Condition	Occupation	Response	
		TR	Non TR
Coverage in national newspapers	Student	6	8
	Working	8	4
Coverage in special interest literature	Student	8	7
	Working	5	9
Only group monitors outcome	Student	6	7
	Working	5	4
Only self monitors outcome	Student	5	9
	Working	10	4
No one monitors outcome	Student	7	8
	Working	7	5

Responses to each vignette were analysed separately. A hierarchical loglinear analysis was run on each vignette, using the condition, the occupation of participants (working/retired and student/unemployed) and response type (team-reasoning and non-team-reasoning responses) as independent variables and a significance level of .05. There were three vignettes in which the best model had a generating class of Choice x Condition; these were CR (certainty of return), TP (transferability of payoffs) and RT (type of relationship). In these cases, the treatment conditions had a significant effect on choices made. In the CR vignette, participants in the certain return condition gave more team-reasoning responses than participants in the uncertain return condition. In the TP vignette, participants in the non-divisible outcome condition gave more team-reasoning responses than participants in the divided and transferable condition, and the divided and non-transferable condition. In the RT vignette, participants in all the conditions where there was some prior relationship gave more team-reasoning responses than participants in the condition where there was no prior relationship.

However, in six vignettes the best model had a generating class of Choice x Job, indicating that the occupation of the participant had an effect on the choice which was made. These vignettes were IP (importance of payoff), such that working people gave proportionally more team-reasoning responses than non-team-reasoning responses, and students gave more non-team-reasoning responses than team-reasoning responses; LD (liking for others), such that working people gave proportionally more team-reasoning responses than students gave; OG (presence of an outgroup) such that working people gave proportionally more team-reasoning responses than students gave; PC (publicity of contributions), such that working people gave proportionally more team-reasoning responses than students gave; RT (type of relationship) such that, in three of the four conditions, working people gave proportionally more team-reasoning responses than students gave; PB (past benefit) such that working people gave proportionally more team-reasoning responses than students gave.

When considering these results, age needs to be taken into account as well, as the mean age of the working group was considerably higher (albeit with a larger standard deviation as well) than the mean age of the student group. To find out whether the age or occupational classification off the participant had an effect on the overall number of team-reasoning responses which was given, multiple regressions of age and occupation onto number of team-reasoning responses were run for both Questionnaire 1 and Questionnaire 2.

A multiple regression of age and occupation onto number of team-reasoning responses in Questionnaire 2 gave:

TR Responses = .183 + .171(age) + .145(occupation)

However, the significance of the regression coefficients were $p = .618$ for the constant, $p = .108$ for age and $p = .173$ for occupation, thus indicating that the level of these coefficients may be attributed to chance.

A multiple regression of age and occupation onto number of team-reasoning responses in Questionnaire 2 gave:

TR Responses = 1.621+ .252 (age) + .019 (occupation)

The significance of the regression coefficients $p < .01$ for the constant, $p < .05$ for age and $p = .866$ for occupation, thus indicating that the coefficient for occupation may be attributed to chance. The only predictor which appears to have a significant effect on the number of team-reasoning responses was that of age, in Questionnaire 2, with older participants showing a greater propensity than younger participants for team-reasoning responses. Neither age nor occupational classification had a significant effect on the number of team-reasoning responses in Questionnaire 1, and occupational classification did not have a significant effect on the number of team-reasoning responses in Questionnaire 2.

Discussion

The results support the experimental hypotheses behind three of the factors which were considered in the different vignettes: CR (Certainty of receipt of payoffs from the interaction), TP (divisibility and transferability of payoffs) and RT (type of relationship with others in the interaction). All these factors increased preferences for a maximum joint payoff, with team-reasoning motivations. A vignette which described a certain end outcome (a predefined rate of interest on an amount of money invested with a building society) yielded more team-reasoning responses than an uncertain outcome (an uncertain potential rate of return on an amount of money invested in shares). Vignettes which described some sort of prior relationship with the others in the interaction (friends who have or have not worked together previously, and people who have worked together previously but do not know each other socially) yielded more team-reasoning responses than no prior relationship with the others in the interaction. A vignette which described non-divisible outcomes (one set of points between a pair of players) yielded more team-reasoning responses than divisible payoffs (a certain number of points per player) and transferable payoffs (a certain amount of money per player).

It must be remembered that the results of this experiment only indicate preferences for outcomes, and as such do not show whether such factors actually increase levels of team reasoning. This will form the basis of the next experiment.

It is interesting that the RT vignette (type of relationship with others in the interaction) showed no difference between the conditions where there was friendship involved, and where the relationship was just a working relationship. The case for friendship affecting team-reasoning responses seems intuitively compelling. However, it may be that previous experience of working with a group of people on a particular type of task is as effective as friendship in promoting team-reasoning responses on a similar type of task. It would be useful to investigate whether the similarity of the task in which the previous interaction took place to the present task had any bearing on the level of team-reasoning preferences or behaviour. Alternatively, as with many of the items in this study, it may be that the outcome preference method used was too crude to pick up any real differences between the conditions, or that the vignettes used presented unsuitable situations to study the factors. An effort was made to keep numbers of participants high, particularly as some of the vignettes had five conditions. In nearly all cases there were over 20 participants in each condition, but naturally in the vignettes with more conditions there were fewer participants in each condition than in vignettes with only two or three conditions. Of course, it is often desirable to have more participants, but within the constraints of time and resources, realistic boundaries have to be adhered to.

No further interactions between condition and choice were found in any other vignettes, which is perhaps surprising given the range of factors which were investigated. The method used to investigate these provided a useful starting point within the constraints of time and resources, and provided some suggestions about which factors might encourage team-reasoning behaviour. However, there are a number of problems which must be commented on.

Four of the vignettes showed floor effects regarding preferences for the greatest joint payoff -- few participants gave team-reasoning responses for the FB (future benefits), LD (liking for others), WB (who benefits) and NT (number of others) situations. This suggests that situational norms had arisen from the basic vignettes and as such, these vignettes were not suitable vehicles from which to assess changes in preferences for joint maximum payoffs with team-reasoning motivations. The NT vignette presented a certain number of people sharing an allotment, and the participants were asked to express a preference for a number of hours which themselves and one other person put in. The responses showed a clear preference for equality of input across all conditions. Similarly, the WB vignette involved a number of people setting up an art studio for either yourself, one other person, everyone else but you, or everyone to use. Again, preferences were fairly biased towards equality of input, although in the condition where only you would use the studio, there were a high number of individualistic responses (with self doing as much work as possible). The FB vignette asked the participants to imagine that they had met another person on holiday who either lived just around the corner from them at home, and had already invited them over for a barbecue when you both arrived back, or the other person lived in a totally different town and you were never likely to meet them again. You had decided to club together for a joint meal while still on holiday, and asked to indicate how much you would like each person to spend. Again, an overwhelming preference for the equal payoff prevailed, with a small minority in favour of the individualistic payoff. Reasons given for this included those indicating reciprocity in advance, such as

> "Realise that they will be spending more for the barbecue" (Questionnaire 1, Participant 44, Future Benefits vignette, Will get future benefit condition)

and

> "I spend slightly more than them, as they will be paying for the BBQ when arrive home, making it fair" (Questionnaire 1, Participant 126, Future Benefits vignette, Will get future benefit condition).

All of these appear to illustrate preferences for equity and fairness in payoffs, which has been well documented (for example, Deutsch, 1970; Lind & Tyler, 1988), and there is also evidence to suggest that in ongoing relationships equity can be spread over a number of interactions (Fiske, 1992).

The LD vignette asked the participants to imagine themselves working in a travel agent's with people they either like, dislike, or are ambivalent towards. They, and another member of staff, each sell a certain number of holidays. In the "like" condition, the majority of participants expressed a preference for the equal payoff, with a substantial minority expressing a preference for the individualistic payoff. In both the other conditions, the majority of participants expressed a preference for the individualistic payoff. The business, or economic, setting of the vignette possibly induced less cooperative behaviour, as has been suggested by Eiser and Bhavnani (1974), Colman (1982), and Furnham and Quilley (1989). The business orientation was similar to that in the Hotdog vignette in Chapter 3 which, although it was designed to elicit preferences for a competitive payoff, actually elicited more preferences for an individualistic payoff. The liking factor could be related in some way to the type of relationship factor. One would assume that friendship is at least partially characterised by mutual liking, and as such one would possibly expect the effect of liking the others involved in the interaction to have a similar effect on team-reasoning preferences to being friends with the others involved. Disliking the other person, however, may encourage someone to be more concerned with actually sabotaging the other person, rather than simply not acting as if they were a member of the same team. This is a factor that would certainly benefit from more investigation, especially as the particular vignette used showed floor effects of team-reasoning responses.

In the PB vignette (past benefit received from the other person), levels of team-reasoning responses were rather low, although the effect was marginally significant and in the expected direction; that is that more people gave team-reasoning responses in the condition where past benefit had been received than in the condition where no past benefit had been received. This is certainly a factor which would benefit from further investigation. It is possible that it could be linked to a factor which did show some significant effects, that of a prior relationship, as receiving a benefit from someone in the past would necessarily indicate some form of previous interaction with the other person.

The results for the OG (outgroup competition) vignette also approached significance, and in the expected direction (that is, that more people gave team-reasoning responses in the condition where there was an outgroup involved with competition than in the conditions where there was no competition involved, either with or without an outgroup being present. Once again, levels of team reasoning responses were low, so it would certainly be worthwhile investigating this factor further with either another vignette or a different method entirely. Competition is another intuitively obvious factor that would seem to encourage team reasoning. Sugden (2000) illustrates the way team reasoning might work with an example of footballers. Sports teams would seem to be an obvious development ground for team reasoning. Competition would encourage the team to act as an single agent, with individuals making decisions based on the team's objective in order to achieve the obvious competitive team aim of winning. In most sports teams, the team's best chance of winning would come if everyone team reasoned, and acted in the best interests of the team.

A number of the factors investigated showed no direct effects on team-reasoning responses, without an apparent excuse of floor effects. It may be that some of these may not affect team reasoning at all. The list of factors which was originally composed was deliberately wide-ranging. The aim was to cover as much ground as possible, even though this was at the expense of some detail. Of course, it is possible that the design of the experiment did not allow any evidence of such effects to appear. It would be preferable to look at each of these 16 factors in more detail, but the immediate priority was to identify those factors which appeared to have a strong effect on team-reasoning preferences, and to use them as the basis for a further study looking at team-reasoning choices. Further studies could usefully look more carefully at most of these factors, possibly with more consideration of content of any vignettes used, or moving away from the vignette approach entirely.

The loglinear analyses for six of the vignettes showed a significant interaction between occupation of the participant and choice. These vignettes were IP (importance of payoff); LD (liking for others); OG (presence of an outgroup); PC (publicity of contributions); RT (type of relationship); PB (past benefit). In all of these vignettes working/retired people gave proportionally greater levels of team-reasoning responses than students/unemployed people. However, the multiple regressions suggest that the occupational classification of participants did not have a significant effect on the *overall* number of team-reasoning responses given in either questionnaire, and the age of participants only had a significant effect on the *overall* number of team-reasoning responses given in Questionnaire 2, but not in Questionnaire 1.

The greater preference for the greatest joint overall payoff for team-reasoning reasons shown by the working group in the above vignettes could have been related to experiences of a working environment, which may have included occasions on which working as a group was required. Having potentially had more experience of team work in the past, it may be that a team-reasoning motivation comes more easily to working or retired people than to students, who come from a background where much of the work is done individually, and outcomes tend to be considered as individual payoffs, rather than overall payoffs. However, over the course of their lifetime older people may have been exposed more frequently to a wider variety of decision processes and so it is possible that they have encountered the "greatest joint payoff" idea more frequently than younger people. Unfortunately these two factors are inextricably intertwined, as older people are more likely to have spent longer in a working environment than younger people.

More specifically, the PC vignette described a friend collecting sponsorship money for Comic Relief, and the RT vignette described a door-to-door collection for Children in Need. These were the only two vignettes involving collection of money for charity. It is possible that older, working people (who are likely to be more solvent) may be more likely to be involved in contributing to charities more than younger students, and therefore more concerned with the overall outcome of such ventures. The LD vignette described holidays being sold in a travel agents, and was the only directly work-related vignette. It could reasonably be supposed that working people would have more experience of employment than students, and working in a team as part of one's job may be a more familiar situation to working people than to students. The PB vignette described people working on a project at university, which would result in everyone's individual marks being pooled to make a group grade. This was the only vignette describing academic work at university. It relates to a situation that students are likely to be familiar with, although it is possible that students may be more concerned with doing well individually than the group doing well. The idea of group achievement in such situations may be more familiar to older, working people who may have come across it more frequently in employment. The IP vignette described a basketball match, and the OG vignette described a sports club applying for a grant for extra coaching. These were the only two vignettes involving sport. Older people could have more experience of playing in sports teams, or alternatively may have supported sports teams for long enough to see many changes in line-ups of players, and therefore could be said to support the teams, rather than the individual players. Both these factors could have a bearing on older, working people giving proportionally more team-reasoning responses in these vignettes than students.

By its very nature, in that the aim was to cover as much ground as possible, this study outlined in this chapter was somewhat complicated to design, carry out and analyse. Some of the factors considered appear to be conceptually related to each other, for example: Type of relationship; Liking or disliking the others; And past benefit received from the others. Within the bounds of this study, it was impossible to consider interactions between such factors. Other factors which appear intuitively likely to affect team reasoning appeared not to, for example, competition from an outgroup. A number of the factors may have no effect on team reasoning at all, but this is impossible to conclude following a study which only skims over the surface of any possible effects. While this chapter served a purpose in identifying some factors which effect team-reasoning preferences, there is potential for any following research to investigate these factors much further. The vignette approach used in this and previous chapters provides a useful starting point by looking at team-reasoning preferences, because one would assume that if people did not prefer a maximum joint outcome for team-reasoning reasons, they would be unlikely to display team reasoning when it came to actual decision making. However, for a more in-depth investigation of any factors which might encourage team reasoning, it would be necessary to move on from just looking at preferences to looking at behaviour in decision-making contexts. Most of the factors considered in this chapter would benefit from further, more methodical investigation, but unfortunately there was not the time or resources to undertake that within the bounds of this thesis.

In conclusion, while it was not possible to assess the impact of four of the factors on levels of team-reasoning responses due to floor effects, three of the factors which were investigated showed significant effects on levels of team-reasoning responses. These were: divisibility of payoffs, such that non-divisible outcomes yielded more team-reasoning responses than divided payoffs (either transferable or non-transferable); certainty of return, such that a certain value of the end product yielded more team-reasoning responses than an uncertain value of the end product; and relationship with the others in the vignette, such that having a previous relationship (either working or friendship) with the others yielded more team-reasoning responses than having no prior relationship with the others in the vignette. More generally, further research could look at all 16 of these factors in much more detail, with more consideration given to the content of the vignettes used (considering that some showed floor effects on levels of team-reasoning responses), or possibly moving away from the vignette approach altogether. While this chapter has outlined a few factors which appear to affect team-reasoning responses, it was not possible to look at all of the factors in as much detail as would be desirable.

Chapter 6

Introduction

In Chapter 5, three factors were shown to have a significant effect on preferences for the maximum joint payoff for team-reasoning reasons. These effects were that:

- A prior relationship with the other in the scenario (either friendship or working relationship) led to more preferences for maximum joint payoffs with team-reasoning reasons than when decision makers had not prior relationship with the other in the scenario;

- Certain receipt of the payoffs led to more preferences for maximum joint payoffs with team-reasoning reasons than when receipt of payoffs was uncertain;

- Payoffs which were neither divisible nor transferable led to more preferences for maximum joint payoffs with team-reasoning reasons than payoffs which were divisible, or payoffs which were divisible and transferable.

However, all the previous studies have looked at preferences which the participants have indicated, not at actual behaviour.

There has been no consistent effect of real versus imaginary payoffs shown in experimental literature on Prisoner's Dilemma (see Chapter 5). While the use of hypothetical scenarios is suitable for establishing preferences, it has long been established that personal reports of attitude do not necessarily enable accurate prediction of behaviour, depending on how the attitude was acquired (Regan & Fazio, 1977; Fazio & Zanna, 1981; Fazio, Chen, McDonel & Sherman, 1982), on how accessible the attitude is (Fazio & Williams, 1986), and on subjective norms regarding the behaviour in question (Fishbein & Ajzen, 1975). Furthermore, the difference between preferences for outcomes and behavioural choice of strategies is more profound than that between attitude and behaviour in the classic literature of experimental social psychology. In the traditional literature, comparisons are made between attitudes assessed by, for example, attitude scales, and behaviour, and discrepancies often emerge. However, it is essentially the same thing which is being assessed. Regarding team reasoning, preferences for outcomes and choices of strategies are not measures of the same thing, because outcomes are usually the result of more than one person's strategy and are therefore out of the individual's sole control. For example, in the Prisoner's Dilemma game, a player may prefer the outcome of unilateral cooperation to unilateral non-cooperation, but that same player may still choose non-cooperation (particularly if he has reason to suspect that the other player may also not cooperate!). In this case, there is no real conflict between attitude and behaviour. As a result, it was important to establish whether factors which affect people's preferences for team-reasoning outcomes also affect levels of team-reasoning behaviour.

This study will apply the results of the previous study to cooperation in Prisoner's Dilemma, Hi-Lo, Chicken, Stag Hunt and Centipede -- games where participants have a choice of behaviours, leading to interdependent payoffs. Reasonable financial payoffs will be used, in order to create a real incentive. There will be three studies, and manipulations will correspond to the effects that were found in the previous chapter. In Study 1, payoffs will be presented as either non-divisible and non-transferable (as a single outcome between the two players), or as both divisible and transferable (as separate payoffs which the players will have the opportunity to redistribute between them after the games have finished), or as divisible but non-transferable (as separate payoffs which the players will have no opportunity to redistribute). There is no fourth condition in which payoffs are transferable but not divisible, because payoffs which are transferable between players (those which can be redistributed after a game has finished) are, necessarily divisible, unless transferred in their entirety, as redistribution normally means that they would be able to be divided between players. Study 2 will have two conditions, one where the participants are informed that they will definitely receive the payoffs, and one in which they will be informed that they have a one in four chance of receiving the payoffs. Study 3 will also have two conditions: in one the participants will be playing with people they know, in the other participants will be told a name of the person they are playing against, which will be a fictional person so that they are under the impression that they are playing someone they do not know.

In most of the games it is expected that cooperation will be affected by the experimental manipulations, but in Hi-Lo it is expected that most people will cooperate across all conditions. The seemingly obvious choice (although not strictly rational in game theoretic terms -- as explained in Chapter 1) has resulted in a complete lack of experimental literature on this game (Colman & Bacharach, 1997). While there is not likely to be much difference in choices in Hi-Lo across conditions, qualitative responses which participants will be asked to give as reasons for their choices will be of use in looking at key motivations behind people's choices.

Hypotheses:

Study 1: There will be significantly higher levels of cooperation in the neither divisible nor transferable condition than in the divisible and transferable condition, and significantly higher levels of cooperation in the divisible and transferable condition than in the divisible and non-transferable condition, in all games except Hi-Lo.

Study 2: There will be significantly higher levels of cooperation in the certain return condition then in the 1 in 4 chance of return condition, in all games except Hi-Lo.

Study 3: There will be significantly higher levels of cooperation in the Friends condition than in the Strangers condition, in all games except Hi-Lo.

Method

Participants

Ninety-eight participants were recruited from an undergraduate population. Participants volunteered for the experiment, and were informed that they would receive course credits for their participation, and have the opportunity to earn some money. Seventy-nine females and 19 males took part, with ages ranging from 19 to 34 years, with a mean of 20.86 years, and a standard deviation of 2.44 years.

Materials

Each participant was given a booklet which contained general instructions, four two-person, one-shot games (Prisoner's Dilemma, which was Game 1; Hi-Lo, which was Game 2; Chicken, which was Game 3; and Stag-Hunt, which was Game 4) and a Centipede game, which was Game 5. The general instructions outlined that participants would have the opportunity to win real money, explained how the experiment would be run, how points would be allocated and how the amount of money which participants would be paid was determined by the points which they would receive. Instructions for each of Games 1 to 4 explained that participants had a choice between two courses of action, that neither player would know what the choice other player would make, and that points received would depend on the combination of choices which the players made. The matrix for the relevant game was then presented, showing the points received for each combination of decisions, followed by an explanation in words of the four possible outcomes. The matricies used are shown in Figures 6.1 to 6.4.

Figure 6.1: Payoff matrix used for Game 1 (Prisoner's Dilemma)

OTHER
(Score in brackets)

		X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

Figure 6.2: Payoff matrix used for Game 2 (Hi-Lo)

OTHER
(Score in brackets)

		X	Y
YOU	X	3 (3)	0 (0)
	Y	0 (0)	1 (1)

Figure 6.3: Payoff matrix used for Game 3 (Chicken)

OTHER
(Score in brackets)

		X	Y
YOU	X	6 (6)	1 (10)
	Y	10 (1)	0 (0)

Figure 6.4: Payoff matrix used for Game 4 (Stag Hunt)

		OTHER (Score in brackets)	
		X	Y
YOU	X	3 (3)	0 (1)
	Y	1 (0)	1 (1)

The instructions for Game 5 (Centipede) outlined how the game worked, presented the payoffs in the diagram shown in Figure 6.5, and gave a description in words of the different outcomes.

Figure 6.5: Payoff structure used for Game 5 (Centipede)

```
Player 1------GO------Player 2-------GO------Player 1------GO------3 (9)
 I                     I                      I
 I                     I                      I
STOP                  STOP                   STOP
0 (0)                 -1 (5)                 4 (4)
```

In Games 1 to 4, participants were asked after each game to write their decision (X or Y) and to give a reason for their choice. In Game 5 (Centipede), participants were asked to indicate their decision(s) on the table provided, and to give reasons for their choices. For the full set of instructions for all studies, see Appendices 9, 10 and 11. In brief, the instructions varied across conditions as follows:

In Study 1, in the Neither divisible nor transferable condition, the instructions stated that the identity of the other player would remain unknown until after the experiment, that in each game, the combination of decisions made by the players would determine the score, which would then be converted to money, and that the money would be given to the participants as a pair after the scores had been calculated. In this condition, scores for each game were presented to participants as a single score, or outcome, for each combination of decisions. The payoff matrix for the Prisoner's Dilemma game in this condition is shown in Figure 6.6.

Figure 6.6: Payoff matrix for the Prisoner's Dilemma game in Study 1, neither divisible nor transferable condition

		OTHER	
		X	Y
YOU	X	6	5
	Y	5	4

and the payoffs were described as points scored as a pair.

In Study 1, in the Divisible but not transferable condition, the instructions outlined that the identity of the other player would remain unknown, that in each game, the combination of decisions made by the players would determine the score, which would then be converted to money, and that the money would be presented to each player individually and that as they would not know the identity of the other person they would be unable to discuss how much each of them had won. In this and all subsequent conditions and studies, outcomes were presented as separate payoffs for each player, as shown in Figures 6.1 to 6.5, and payoffs were described in terms of points scored by one player and points scored by the other player. After the instructions for each game in Study 1, Divisible but not transferable condition, participants were reminded that they would not be able to discuss the payoffs with the other player.

In Study 1, Divisible and transferable condition, the instructions outlined that the identity of the other player would remain unknown until after the experiment, that in each game, the combination of decisions made by the players would determine the score, which would then be converted to money, and that participants would have an opportunity after the experiment to discuss how much each had won, and whether they would like to redistribute the money in the light of the decisions which they would have made. After the instructions for each game, participants were reminded that there would be time after the experiment to discuss the distribution of the payoffs.

In Study 2, Certain payoff condition, instructions stated that in each game, the combination of decisions made by each player would determine the score, which would then be converted to money, and that the money would be paid to individual participants. After the instructions for each game, participants were reminded that their score in each game would count towards the money they would be paid at the end of the experiment.

In Study 2, Risky payoff condition, the instructions outlined that in each game, the combination of decisions made by each player would determine the score, and that at the end of the experiment, participants would be entered into a prize draw and one quarter of them would win an amount of money determined by the score in their experiment. After the instructions for each game, participants were reminded that they had a one in four chance of winning some money, which the score in the game would count towards.

In Study 3, Friends condition, participants had signed up with a friend, and arrived together. The instructions outlined that participants would be playing a number of experimental games with the friend with who they signed up. The instructions referred to the other player as "your friend" throughout, and outlined that the scores in each game would be determined by both player's decisions, and would be converted into money at the end of the experiment.

In Study 3, Strangers condition, participants were asked to read the name of Player 2, which was already written on the sheet as Alex Stranks, and if they knew that person to let the experimenter know so that they could be reassigned to another player. The instructions referred to the other player as "the other person", and outlined that the scores in each game would be determined by both player's decisions, and would be converted into money at the end of the experiment.

Each point earned participants a total of 20 pence, and the total amount of money paid out in this experiment was £322.80, which was provided by the ESRC Research Training Support Grant.

Design

In effect, three different studies took place. All studies consisted of a between-participants design, and had the number of cooperative decisions as a dependent variable, with qualitative responses as an additional measure. In every study, points were awarded for each game (depending on the combination of pairs of decisions) and each point was converted into 20 pence to determine the total payoff. Study 1, which looked at the effect of divisibility and transferability on cooperative decision making, had three levels of the independent variable: payoffs given to both participants as a lump sum; participants given individual payoffs and also given the opportunity to redistribute their individual payoffs after the experiment if they so wished; and participants given individual payoffs with no opportunity to redistribute). Study 2, which looked at the effect of certainty of receipt of the payoff upon cooperative decision making had two levels of the independent variable: participants were sure of receiving the payoff; and participants had a one in four chance of receiving the payoff (determined by a prize draw). Study 3, which looked at the effect of whether the other person involved in the interaction was known to the participant, had two levels: participants attended the experiment with a friend; and participants arrived separately, were shown the name of "Player 2", and asked to confirm that they did not know them. (The name which they were actually shown was "Alex Stranks", chosen from a list of graduates from several years previously, on the basis of its indeterminate gender.)

Procedure

Participants were tested two at a time. Each one was tested in a separate room, and they did not see each other or know who the other person was until after the experiment (if at all), with the exception of the condition when they arrived with their friend. A table and chair was in each room, and the instructions and games were in a booklet which was placed on the table. The experimenter told each participant (one after the other) the following:

"Please read through the instruction sheet on the front, and fill in the details. There are five different tasks, please work through the first four as soon as you are ready, then read the instructions for the fifth one, and when you are ready to start Task 5 please let me know, as I have to act as a go-between between the two participants. I shall just be out in the corridor. If you have any problems, any questions, or anything you don't understand, again, please let me know. Thanks very much."

Once the experimenter had spoken to each of the participants, she waited in the corridor. Once a participant said that they were ready to start Task 5, the experimenter entered the room and asked whether they were all clear with the instructions, and what was their first choice. The experimenter told the first person who was ready to start that the other participant was not ready yet, so there may be a short wait before they would receive the other participant's response. Once the first participant had told the experimenter their decision, the experimenter returned to the corridor to wait for the other participant to indicate that they were ready. In actual fact, each participant was "Player 1" and, in Centipede, was playing with an imaginary "Player 2", who always said "go". This was to avoid the choice of an opponent affecting the choice of any one player, and giving each player a chance to make as many go decisions as they felt appropriate. In this way the number of "go" and "stop" choices made by any one player was entirely down to them, and everyone faced exactly the same choices of the other player. Once the second participant had indicated that they were also ready to start, the experimenter returned to the first participant with the go choice from the imaginary "Player 2", and indicated that they would just let the other participant know their response, and went through and again gave the go choice from the imaginary "Player 2". Once the process had been completed (i.e. each participant had been visited twice, once for choice one and once for choice three (assuming they chose go on choice one, which most players did) the participants were either debriefed, informed of the deception, told the arrangements for collecting the money and asked to leave one at a time (so each other's identities were not revealed) or, in the case of Study 1, Divisible but not transferable condition, they were asked to go through to one room, where the scores for games one to four were calculated, and the money that those scores represented, and were told that they could discuss redistribution of the money if they wished. At this time they were also informed of the deception, that everyone played an imaginary Player 2 in Task 5, and why, and as a result the payoffs which each player received in Task 5 would not be included in the redistribution of payoffs. (It should be noted though, that their experience of actually playing the Centipede game was the same as participants' experiences in other conditions.) It was made clear to them that it did not matter to the experimenter what they decided to do with the money, as the experimenter was looking at the decision behaviour in the games, not how they divided up the money. Once the discussion process was complete, and the experimenter recorded what conclusion was reached, the participants were debriefed and told the arrangements for collecting the money. Each participant's email address was taken, and they were contacted between two and four weeks after doing the experiment to inform them of how much money they had earned and where they could pick it up from.

Results

Quantitative results

Study 1: Transferability and divisibility of payoffs

There were three conditions in Study 1, as follows:

Condition 1: Neither divisible nor transferable. The payoffs are presented as one single outcome for the group per decision set.

Condition 2: Divisible, but not transferable. The payoffs are presented individually. As neither decision maker can know who the other decision maker is, the payoffs cannot be transferred.

Condition 3: Divisible and transferable. The payoffs are presented individually, but decision makers have the opportunity to meet up and discuss redistribution of payoffs after the session.

Cooperation levels across the three conditions for the five games are presented below. Each game was analysed separately. In the first four games, Conditions 2 and 3 were joined to make a 2 x 2 contingency table, and Fisher's exact statistic was used. It was decided that conditions two and three would be collapsed together, as they were qualitatively the most similar pair of conditions, and yielded similar levels of cooperation throughout. In Game 5, Centipede, ANOVA was used.

Table 6.1: Frequencies of cooperative choices across conditions in Prisoner's Dilemma, Hi-Lo, Chicken and Stag Hunt games

		Frequency			
Game	**Choice**	**Neither divisible nor transferable condition**	**Divisible but not transferable condition**	**Divisible and transferable condition**	***p* value**
Prisoner's	**Cooperate (C)**	**14**	**8**	**8**	**$p < .005$**
Dilemma	**Defect (D)**	**0**	**6**	**6**	
Hi-Lo	**C**	**14**	**13**	**14**	**$p = .667$**
	D	**0**	**1**	**0**	
Chicken	**C**	**13**	**9**	**10**	**$p = .075$**
	D	**1**	**5**	**4**	
Stag Hunt	**C**	**14**	**10**	**11**	**$p < .05$**
	D	**0**	**4**	**3**	

In the Prisoner's Dilemma game, Fisher's exact statistic gave $p < .005$, thus there was a significant difference between frequencies of choice in the non-divisible condition, and the divisible (both transferable and non transferable) conditions, such that there was more cooperation and less defection in the neither divisible nor transferable condition than in the divisible but not transferable condition, and the divisible and transferable condition.

In the Hi-Lo game, Fisher's exact statistic gave $p = .667$, thus there was no significant difference between frequencies of choice in the non-divisible condition, and the divisible (both transferable and non transferable) conditions.

In the Chicken game, Fisher's exact statistic gave $p = .075$, thus there was no significant difference between frequencies of choice in the non-divisible condition, and the divisible (both transferable and non transferable) conditions, although the difference was in the same direction as in the Prisoner's Dilemma and Stag Hunt games, and was close to significance.

In the Stag Hunt game, Fisher's exact statistic gave $p < .05$, thus there was a significant difference between frequencies of choices in the non-divisible condition, and the divisible (both transferable and non transferable) conditions, such that there was more cooperation and less defection in the neither divisible nor transferable condition than in the divisible but not transferable condition, and the divisible and transferable condition.

In the Centipede game, mean number of cooperative choices in each of the three conditions are presented in Table 6.2. Participants could either make no cooperative choices (stop on the first decision), one cooperative choice (go on the first decision but stop on the second decision) or two cooperative choices (go on both the first and second decisions).

Table 6.2: Mean number of cooperative choices in the Centipede game in Study 1 (*N* = 14 in each condition)

	Mean	*SD*
Neither divisible not transferable condition	1.929	.267
Divisible but not transferable condition	1.143	.535
Divisible and transferable condition	1.357	.497

A one way, between groups ANOVA gave $F(2,39) = 11.464$, $p < .001$, with an effect size of $\eta^2 = 0.370$. Post hoc Tukey HSD tests showed there to be significant differences between the neither divisible nor transferable condition, and the divisible but not transferable condition, and between the neither divisible nor transferable condition, and the divisible and transferable condition, but not between the divisible but not transferable condition, and the divisible and transferable condition.

Study 2: Certain payoff or risky payoff

There were two conditions in Study 2, as follows:

Condition 1: Certain payoff condition. Participants will definitely receive the payoffs.

Condition 2: Risky payoff condition. Participants have a 1 in 4 chance of receiving the payoffs.

Cooperation levels across the three conditions for the five games are presented below. In Prisoner's Dilemma and Chicken chi squared tests were used. In Hi-Lo and Stag Hunt, Fisher's exact statistic was used.

Table 6.3: Frequencies of cooperative choices across conditions in Prisoner's Dilemma, Hi-Lo, Chicken and Stag Hunt games.

		Frequency		
Game	**Choice**	**Certain payoff condition**	**Risky payoff condition**	***p* value**
Prisoner's	**Cooperate (C)**	**9**	**5**	***p* = .131**
Dilemma	**Defect (D)**	**5**	**9**	
Hi-Lo	**C**	**14**	**13**	***p* = .500**
	D	**0**	**1**	
Chicken	**C**	**9**	**9**	**N/a**
	D	**5**	**5**	
Stag Hunt	**C**	**14**	**10**	***p* < .05**
	D	**0**	**4**	

In the Prisoner's Dilemma game, $\chi^2(1) = 2.286$, $p = .131$, thus there was no significant difference between frequencies of choice in the Certain payoff condition, and the Risky payoff condition.

In the Hi-Lo game, Fisher's exact statistic gave $p = .500$, thus there was no significant difference between frequencies of choice in the Certain payoff condition, and the Risky payoff condition.

In the Chicken game, a significance test is inappropriate, as there is no difference between frequencies of choice in the Certain payoff condition, and the Risky payoff condition.

In the Stag Hunt game, Fisher's exact statistic gave $p < .05$, thus there was a significant difference between frequencies of choice in the Certain payoff condition and the Risky payoff condition, such that there was more cooperation and less defection in the Certain payoff condition than the Risky payoff condition.

In the Centipede game, mean number of cooperative choices in each of the two conditions are presented in Table 6.4. Participants could either make no cooperative choices (stop on the first decision), one cooperative choice (go on the first decision but stop on the second decision) or two cooperative choices (go on both the first and second decisions).

Table 6.4: Mean number of cooperative choices in the Centipede game in Study 2 ($N = 14$ in each condition)

	Mean	***SD***
Certain payoff condition	**1.214**	**.426**
Risky payoff condition	**1.143**	**.663**

Levene's test for equality of variances showed no significant difference between variances: $F(26) = 1.364$, $p = .253$. An independent t-test gave $t(26) = .34$, $p = .737$, with an effect size of $r = .066$, thus there was no significant difference between the number of cooperative choices in the Certain payoff condition and the Risky payoff condition.

Study 3: Know the other person or don't know the other person

There were two conditions in Study 3, as follows:

Condition 1: Friends condition. Participants carry out the experiment with a friend.

Condition 2: Starngers condition. Participants are led to believe they are playing 'Alex Stranks', whom none of them knows.

Cooperation levels across the three conditions for the first four games are presented in Table 6.5. Fisher's exact statistic was used to calculate levels of significance.

Table 6.5: Frequencies of cooperative choices across conditions in Prisoner's Dilemma, Hi-Lo, Chicken and Stag Hunt games.

		Frequency		
Game	**Choice**	**Friends condition**	**Strangers condition**	***p* value**
Prisoner's	**Cooperate (C)**	**12**	**8**	**$p = .104$**
Dilemma	**Defect (D)**	**2**	**6**	
Hi-Lo	**C**	**14**	**14**	**N/a**
	D	**0**	**0**	
Chicken	**C**	**13**	**10**	**$p = .163$**
	D	**1**	**4**	
Stag Hunt	**C**	**14**	**12**	**$p = .241$**
	D	**0**	**2**	

In the Prisoner's Dilemma game, Fisher's exact statistic gave $p = .104$, thus there was no significant difference between frequencies of choice in the Friends condition, and the Strangers condition.

In the Hi-Lo game, a significance test is inappropriate, as there was no difference between frequencies of choice in the Friends condition, and the Strangers condition. Furthermore, there were no non-cooperative choices.

In the Chicken game, Fisher's exact statistic gave $p = .163$, thus there was no significant difference between frequencies of choice in the Friends condition, and the Strangers condition.

In the Stag Hunt game, Fisher's exact statistic gave $p = .241$, thus there was no significant difference between frequencies of choice in the Friends condition, and the Strangers condition.

Mean number of cooperative choices in each of the two conditions in the Centipede game, are presented in Table 6.6. Participants could either make no cooperative choices (stop on the first decision), one cooperative choice (go on the first decision but stop on the second decision) or two cooperative choices (go on both the first and second decisions).

Table 6.6: Mean number of cooperative choices in the Centipede game in Study 3 ($N = 14$ in each condition)

	Mean	SD
Friends condition	1.357	.497
Strangers condition	1.143	.535

Levene's test for equality of variances showed no significant difference between variances: $F(26) = .735$, $p = .399$. An independent t-test gave $t(26) = 1.100$, $p = .282$, with an effect size of $r = .211$, thus there was no significant difference between the number of cooperative choices in the Friends condition and the Strangers condition.

Qualitative results

After each decision, participants were asked to provide a brief reason for their choice. A number of categories were generated when reading through the reasons people had given. Each answer belonged to one or more of the following categories:

- ALT (Altruistic, benefiting the other player), for example:

"To give the other player a chance to score points" (Participant 37, Study 1, Divisible and transferable condition, cooperative choice in the Stag Hunt game).

- ANTI-EX (Avoiding exploiting the other), for example:

"I get a decent amount of points, at the same time as being compliant" (Participant 82, Study 3, Friends condition, cooperative choice in the Prisoner's Dilemma game).

- ARG (Avoiding relative gain), for example:

"I have chosen X as the points will either be equal for both participants (if the other has chosen X) or Y then the participant will get more points. Selection may even out in later games and I'm happy to make this decision" (Participant 16, Study 1, Divisible but not transferable condition, cooperative choice in the Prisoner's Dilemma game).

- ARL (Avoiding relative loss), for example:

"Because you could loose a lot of points if you put X and the other puts Y – this is more even" (Participant 59, Study 2, Risky payoff condition, non-cooperative choice in the Chicken game).

- AW (Avoiding the worst payoff for self), for example:

"Although I may lose out to the other participant, X is the only option which guarantees at least one point" (Participant 29, Study 1, Divisible and transferable condition, cooperative choice in the Chicken game).

- AW-B (Avoiding the worst payoff, for both players individually), for example:

"Points will be awarded for both participants if X is selected rather than Y, which is a better choice than Y" (Participant 16, Study 1, Divisible but not transferable condition, cooperative choice in the Chicken game).

- AW-TR (Avoiding the worst payoff for the group), for example:

"We will win nothing if we stop now" (Participant 2, Study 1, Neither divisible nor transferable condition, cooperative choice on Decision 1 in the Centipede game).

- CUR (Curiosity), for example:

"Because interested in what other person will do + would like to score more points" (Participant 6, Study 1, Neither divisible nor transferable condition, cooperative choice on Decision 1 in the Centipede game).

- DOM (Dominance argument), for example:

"Because if the other person chooses X I get more points if the other person chooses Y I get more than I would if I had chosen X" (Participant 91, Study 3, Strangers condition, non-cooperative choice in the Prisoner's Dilemma game).

- ES (Equality seeking), for example:

"Again – there is a good chance that we would get equal amounts" (Participant 39, Study 1, Divisible and transferable condition, cooperative choice in the Stag Hunt game).

- EX (Exploiting the other), for example:

"Hopefully the other person will choose X to be guaranteed of winning something. Therefore if I choose Y and they choose X I get 10 but if not – I'll get nothing!" (Participant 17, Study 1, Divisible but not transferable condition, non-cooperative choice in the Chicken game).

- FP (Focal point), for example:

"Gives most points, and seems likely that the other person will also think similarly" (Participant 60, Study 2, Risky payoff condition, cooperative choice in the Hi-Lo game).

- INCP (Rationally incomplete argument), for example:

"To score more points" (Participant 6, Study 1, Neither divisible nor transferable condition, cooperative choice in the Hi-Lo game).

- IR (Insufficient reasoning, attributing unfounded probabilities to other's choice of behaviour), for example:

"Higher chance of getting more points from choosing 'X'" (Participant 5, Study 1, Neither divisible nor transferable condition, cooperative choice in the Stag Hunt game).

- MAX (Maximax reasoning, making a decision on the basis that it is the one which can lead to the best payoff, but with no consideration of the alternatives), for example:

"Can score maximum points" (Participant 87, Study 3, Strangers condition, cooperative choice in the Hi-Lo game).

- MIP (Maximising individual payoff), for example:

"By choosing Y, I have a chance to win more points" (Participant 32, Study 1, Divisible and transferable condition, non-cooperative choice in the Prisoner's Dilemma game).

- MJP (Maximising joint payoff), for example:

"Because if they choose X, it is the highest amount of points" (Participant 14, Study 1, Neither divisible nor transferable condition, cooperative choice in the Prisoner's Dilemma game).

- MJP-I (Maximising joint payoff, with clearly individualistic reasoning), for example:

"It seems most logical to get (each) the maximum points" (Participant 88, Study 3, Strangers condition, cooperative choice in the Prisoner's Dilemma game).

- MJP-TR (Maximising joint payoff, clearly reasoning in terms of the group, or team reasoning), for example:

"Same as before, if we both pick X then the collective score will be greater than if one picks Y and the other X or both Y" (Participant 69, Study 2, Risky payoff condition, cooperative choice on the Chicken game).

- NR (No reason to do otherwise, as in Centipede, when a player stops on Decision 1, the outcome is zero), for example:

"We both get nothing so no reason to stop yet" (Participant 81, Study 3, Friends condition, cooperative choice on Decision 1 in the Centipede game).

- REC (Reciprocity), for example:

"As other person was generous, I decided to be too!" (Participant 31, Study 1, Divisible and transferable condition, cooperative choice on Decision 2 in the Centipede game).

- TST (Trusting the other player), for example:

"I hope that (Player 2) will choose X as well. I trust her not to 'rip me off'" (Participant 77, Study 3, Friends condition, cooperative choice in the Prisoner's Dilemma game).

- INC (Incoherent comment or argument).

Some responses given by participants fitted into more than one of the above categories. Such cases are given a code of both categories in Tables 6.7 to 6.18, with the categories listed in the order in which they appear in the response. Generally, a team-reasoning response was taken to be one in which the participant acted so as to promote what they perceived as the best interests of everyone involved in the interaction -- whether that was aiming for the best payoff, avoiding the worst payoff and so on. Thus, any category listed in Tables 6.7 to 6.18 which is suffixed by "tr" represents team-reasoning responses of some description, and Table 6.19 includes frequencies of such responses. Similarly, any response category suffixed by "I" represents clear reasoning in terms of individual's payoffs. Responses will be presented game by game, for each game the cooperative responses will be summarised, then the non-cooperative responses. The code for the conditions in each study remains the same across all tables. In Study 1, Condition 1 refers to the neither divisible nor transferable condition, Condition 2 refers to the divisible but not transferable condition, and Condition 3 refers to the divisible and transferable condition. In Study 2, Condition 1 refers to the certain payoff condition, and Condition 2 refers to the risky payoff condition. In Study 3, Condition 1 refers to the friends condition, Condition 2 refers to the strangers condition.

Prisoner's Dilemma

Table 6.7: Frequencies of reasons given for a cooperative choice in the Prisoner's Dilemma Game.

Study	1			2		3	
Condition	1	2	3	1	2	1	2
Reason							
ANIT-EX	-	-	-	-	-	1	-
ANTI-EX & TST	-	-	-	-	-	1	-
ARG	-	1	-	-	-	-	1
DOM	4	-	-	-	-	-	-
ES	-	2	2	1	-	3	3
ES & INC	-	-	1	-	-	-	-
ES & MJP	-	-	-	-	-	1	-
FP	-	-	-	-	-	1	-
MIP	-	1	-	-	-	-	-
MJP	5	-	1	1	1	-	1
MJP-I	-	-	-	1	-	-	1
MJP-TR	3	2	2	3	3	3	2
MJP & DOM	1	-	-	-	-	-	-
MJP & ES	-	1	-	2	1	-	-
MJP-TR & DOM-TR	1	-	-	-	-	-	-
MJP-TR & ES	-	-	1	-	-	1	1
TST	-	-	-	-	-	1	-
INC	-	1	1	1	-	-	-

In every condition across the three studies, a total of either two, three or four people gave a reason for cooperating which was classified as MJP-TR (aiming for the maximum joint payoff, with clear reasoning in terms of the group, or team), or as MJP-TR alongside another category, for example:

> "If we both put X then that is the max amount of points" (Participant 66, Study 2, Certain payoff condition, cooperative response in the Prisoner's Dilemma game).

In Study 1, Neither divisible nor transferable condition (where participants were given a single outcome between them), X was universally chosen and most of the reasons given focused on the maximum joint payoff in some respect. However, five participants mentioned the dominance of the X choice (DOM), either on it's own or in combination with mentioning the maximum joint payoff, such as:

> "It gives the higher points, whether the other player picks X or Y" (Participant 8, Study 1, Neither divisible nor transferable condition, cooperative response in the Prisoner's Dilemma game).

This is a useful illustration of how viewing the Prisoner's Dilemma game matrix in the light of single outcomes alters the entire structure of the game. In a standard Prisoner's Dilemma game, Y is strongly dominant. Here, however, X becomes strongly dominant.

Throughout the studies equality seeking (ES) was a commonly cited motivation for an X choice, either on it's own or in combination with other reasons, such as:

> "If both choose X -- fairest and higher reward" (Participant 36, Study 1, Divisible and transferable condition, cooperative response in the Prisoner's Dilemma game).

In terms of an X choice in Prisoner's Dilemma game, where equality seeking was mentioned as a motivation, it was assumed to be because an X (X) choice would give a higher payoff than the Y (Y) choice, which also yields equal payoffs. In many cases, such as the example above, this was explicitly stated.

A number of people gave a double motivation for choosing X: because it was the maximum joint payoff and it was equal (ES & MJP, MJP & ES, MJP-TR & ES), for example:

"This choice would enable us both to score maximum points, evenly splitting the points available to us both" (Participant 30, Study 1, Divisible and transferable condition, cooperative choice in the Prisoner's Dilemma game).

In most of the conditions across all three of the studies, similar types of reasons were given for cooperative choices. A few notable exceptions to this were the dominance argument (DOM) in Study 1, Neither divisible nor transferable condition (brought about by the changing structure of the game) as outlined above, and in Study 3, Friends condition (where participants played their friends) trust in the other person (TST) was given as a motivation, for example:

"I hope that (Player 2) will choose X as well. I trust her not to 'rip me off'." (Participant 77, Study 3, Friends condition)

and two people gave not wanting to exploit the other person (ANTI-EX) as a motivation, in the following example this also linked in to the trust theme:

"I don't want to screw him and I don't think he'd do the same to me -- not for 1 point anyway" (Participant 72, Study 3, Friends condition).

Table 6.8: Frequencies of reasons given for a non-cooperative choice in the Prisoner's Dilemma Game

Study	1			2		3	
Condition	1	2	3	1	2	1	2
Reason							
ARL	-	-	-	-	1	-	-
AW	-	-	-	2	-	-	1
DOM	-	1	1	1	2	-	4
DOM-I	-	1	-	-	-	-	-
ES	-	-	-	-	1	-	-
ES & MJP	-	1	1	-	-	-	-
EX	-	-	1	-	1	-	-
EX & ARL	-	1	-	-	-	-	-
MAX	-	1	-	-	2	-	-
MIP	-	1	2	1	2	1	1
INC	-	-	1	1	-	1	-

With the exception of Study 1, Neither divisible nor transferable condition, where there were no Y choices, there were a variety of motivations given for non-cooperative decisions. Being motivated by the maximum individual payoff (MIP) was a theme which occurred in all of the conditions where there were Y choices, for example:

> "By choosing Y, I have a chance to win more points" (Participant 32, Study 1, Divisible and transferable condition, non-cooperative decision in the Prisoner's Dilemma game).

Dominance (DOM) was also a commonly occurring theme, for example:

> "Will score either 4 or 2 points which is higher than the possible 3 or 1 point" (Participant 95, Study 3, Strangers condition, non-cooperative decision in the Prisoner's Dilemma game),

although dominance did not appear in Study 3, Friends condition, when participants played their friends.

Hi-Lo

Table 6.9: Frequencies of reasons given for a cooperative choice in the Hi-Lo Game

Study	**1**			**2**		**3**	
Condition	**1**	**2**	**3**	**1**	**2**	**1**	**2**
Reason							
AW	**1**	**-**	**-**	**-**	**-**	**1**	**-**
AW-TR	**-**	**-**	**-**	**-**	**-**	**1**	**-**
AW & IR	**-**	**-**	**1**	**-**	**-**	**-**	**-**
ES & MIP	**-**	**1**	**-**	**-**	**-**	**-**	**-**
ES & MJP	**-**	**-**	**-**	**-**	**1**	**1**	**-**
FP	**-**	**2**	**4**	**2**	**5**	**1**	**5**
INCP	**1**	**-**	**-**	**-**	**-**	**-**	**-**
IR	**4**	**2**	**1**	**-**	**-**	**1**	**-**
IR-I	**-**	**1**	**-**	**-**	**-**	**-**	**-**
MAX	**-**	**3**	**2**	**2**	**4**	**4**	**4**
MAX-I	**-**	**1**	**-**	**-**	**-**	**-**	**-**
MIP	**-**	**-**	**1**	**2**	**-**	**-**	**-**
MIP & FP	**-**	**-**	**1**	**-**	**1**	**-**	**-**
MJP	**4**	**-**	**1**	**2**	**1**	**-**	**-**
MJP-TR	**4**	**2**	**2**	**4**	**1**	**5**	**5**
MJP & ES	**-**	**1**	**1**	**-**	**-**	**-**	**-**
MJP & FP	**-**	**-**	**-**	**1**	**-**	**-**	**-**
MJP-TR & FP	**-**	**-**	**-**	**1**	**-**	**-**	**-**

In Hi-Lo, most of the choices made were cooperative, and the two non-cooperative choices were backed up by incoherent explanations of motivations. Therefore, this section will only focus on cooperative responses.

Across all conditions in all the studies, a number of participants appeared to be considering the maximum joint outcome for team-reasoning motivations, either on it's own or alongside consideration of focal points (MJP-TR, MJP-TR & FP), for example:

> "Nothing to lose. Other player could choose X or Y, the only way we get points is if we choose the same if we both pick X we get more" (Participant 91, Study 3, Strangers condition, cooperative decision in the Hi-Lo game).

In all the studies across all conditions (again, with the exception of Study 1, Neither divisible nor transferable condition, where payoffs were presented as a single outcome) maximax reasoning, aiming for the highest score with no apparent consideration of a dependence on the other person's decision (MAX) was mentioned as a frequent motivator for an X choice, for example:

> "Because X carries the most points" (Participant 79, Study 3, Friends condition, cooperative decision in the Hi-Lo game).

The category of focal points, either alone or in combination with other motivations (FP, MIP & FP, MJP & FP, MJP-TR & FP) also arose in every condition across all studies, excepting Study 1, Neither divisible nor transferable condition, for example:

> "More likely that other person will choose X too" (Participant 15, Study 1, Divisible but not transferable condition, cooperative decision in the Hi-Lo game).

Chicken

Table 6.10: Frequencies of reasons given for a cooperative choice in the Chicken Game

Study	1			2		3	
Condition	1	2	3	1	2	1	2
Reason							
ARG	-	-	-	-	-	-	1
ARL	-	-	-	-	1	-	-
AW	-	2	4	4	5	3	6
AW-I	-	1	-	-	-	-	-
AW-TR	2	3	-	-	-	2	2
AW & DOM	1	-	-	-	-	-	-
AW & ES	-	-	1	-	-	-	-
DOM	2	-	-	-	-	-	-
DOM-I	1	-	-	-	-	-	-
DOM-TR	2	-	-	-	-	-	-
ES	-	-	-	-	-	2	-
ES & AW	-	1	-	-	-	-	-
ES & MIP	-	1	-	-	-	-	-
INCP	1	-	-	-	-	-	-
MIP & ES	-	1	-	-	-	-	-
MJP	1	-	2	1	-	-	-
MJP-I	1	-	-	-	-	-	-
MJP-TR	2	-	2	2	3	-	1
MJP & ES	-	-	-	2	-	-	-
MJP-TR & AW	-	-	-	-	-	1	-
MJP-TR & AW-TR	-	-	-	-	-	2	-
MJP-TR & ES	-	-	1	-	-	1	-
TST	-	-	-	-	-	1	-
INC	-	-	-	-	-	1	-

By far the most common reason given for cooperation in the Chicken game was avoiding the worst payoff, either on it's own or in combination with other reasons (AW, AW-I, AW-TR, AW & DOM, AW & ES, ES & AW, MJP-TR & AW, MJP-TR & AW-TR), for example:

> "Although I may lose out to the other participant, X is the only option which guarantees at least 1 point" (Participant 29, Study 1, Divisible and transferable condition, cooperative choice in the Chicken game).

In some cases this type of reasoning was given but with regards to avoiding the worst outcome for the group (AW-TR, MJP-TR & AW-TR), for example:

> "As a pair we will either get 12 or 11 points, no chance of 0 points if I choose X" (Participant 5, Study 1, Neither divisible nor transferable condition, cooperative choice in the Chicken game)

and

> "If I choose Y and my opponent does we won't gain anything" (Participant 24, Study 1, Divisible but not transferable condition, cooperative choice in the Chicken game).

While three people in Study 1, Divisible but not transferable condition cited this type of motivation, no one in that condition gave the more standard team-reasoning motivation which includes aiming for the greatest joint overall payoff, either on its own or along side other motivations (MJP-TR, MJP-TR & AW, MJP-TR & AW-TR, MJP-TR & ES), such as:

> "Same as before, if we both pick X then the collective score will be greater than if one picks Y and the other X or both Y" (Participant 69, Study 2, Risky payoff condition, cooperative choice in the Chicken game).

This type of motivation occurred in all other conditions, in a few cases alongside a motivation to avoid the worst payoff (MJP-TR & AW, MJP-TR & AW-TR), for example:

> "Because if [Player 2] chooses X we get the greatest combined score, but if she chooses Y the combined score is still high although most of it will be [Player 2's]. If I chose Y and [Player 2] also does this, we both end up with nothing so X is a better

choice" (Participant 84, Study 3, Friends condition, cooperative choice in the Chicken game).

Again, in Study 1, Neither divisible nor transferable condition the conversion of the matrix to one which gives a single outcome per pair of decisions changes the structure of the game to one where a cooperative choice is strongly dominant. This was reflected in the reasons which people gave in that condition, many of which had an element of dominance awareness in (DOM, DOM-I, DOM-TR, AW & DOM), for example:

"If other person chooses X or Y we'll still score higher when combinations are compared" (Participant 10, Study 1, Neither divisible nor transferable condition, cooperative choice in the Chicken game).

Table 6.11: Frequencies of reasons given for a non-cooperative choice in the Chicken Game

Study	1			2		3	
Condition	1	2	3	1	2	1	2
Reason							
ARL	-	-	1	1	2	-	1
ARL-I	-	1	-	-	-	-	-
ARL & MAX	-	-	-	-	1	-	-
EX	-	2	-	-	1	-	1
MAX	-	-	2	4	1	1	2
MAX-I	-	-	1	-	-	-	-
MIP	-	2	-	-	-	-	-
INC	1	-	-	-	-	-	-

The majority of reasons given for a defection in Chicken were either avoiding relative loss, either on its own or alongside other motivations (ARL, ARL-I, ARL & MAX), such as:

"Can get 10 points to their 1 or will both get the same 0. X may result in only one point to their 10" (Participant 95, Study 3, Strangers condition, non-cooperative choice in the Chicken game) or maximax reasoning, either on its own or alongside other motivations (MAX, MAX-I, ARL & MAX), such as:

> "I could win 10 points" (Participant 52, Study 2, Certain payoff condition, non-cooperative choice in the Chicken game).

Stag Hunt

Table 6.12: Frequencies of reasons given for a cooperative choice in the Stag Hunt Game

Study	**1**			**2**		**3**	
Condition	**1**	**2**	**3**	**1**	**2**	**1**	**2**
Reason							
ALT	**-**	**-**	**1**	**-**	**-**	**-**	**-**
AW	**-**	**-**	**-**	**-**	**-**	**-**	**1**
ES	**-**	**-**	**1**	**-**	**-**	**1**	**-**
ES & MIP	**-**	**1**	**-**	**-**	**-**	**-**	**-**
ES & MJP	**-**	**-**	**-**	**-**	**1**	**-**	**-**
FP	**-**	**-**	**-**	**2**	**3**	**2**	**1**
FP & MJP	**-**	**-**	**-**	**1**	**-**	**-**	**-**
INCP	**1**	**1**	**-**	**-**	**-**	**-**	**-**
IR	**2**	**-**	**-**	**-**	**-**	**3**	**-**
IR-TR	**1**	**-**	**-**	**-**	**-**	**-**	**-**
MAX	**-**	**-**	**-**	**4**	**2**	**3**	**7**
MAX & ES	**-**	**-**	**1**	**-**	**-**	**-**	**-**
MIP	**-**	**-**	**1**	**-**	**-**	**-**	**-**
MIP & ES	**-**	**1**	**-**	**-**	**-**	**-**	**-**
MJP	**5**	**3**	**1**	**1**	**2**	**-**	**-**
MJP-I	**1**	**1**	**-**	**-**	**-**	**-**	**1**
MJP-TR	**2**	**2**	**6**	**5**	**-**	**3**	**2**
MJP & ES	**-**	**-**	**-**	**1**	**-**	**-**	**-**
MJP & FP	**-**	**-**	**-**	**-**	**1**	**-**	**-**
MJP-TR & ES	**-**	**-**	**-**	**-**	**-**	**1**	**-**
MJP-TR & FP	**-**	**-**	**-**	**-**	**1**	**-**	**-**
TST	**-**	**-**	**-**	**-**	**-**	**1**	**-**
INC	**2**	**1**	**-**	**-**	**-**	**-**	**-**

The majority of reasons given for cooperative decisions in staghunt were maximum joint payoff, often with evidence of team reasoning, either on its own or in combination with other motivations (MJP, MJP-I, MJP-TR, MJP &

ES, MJP & FP, MJP-TR & ES, MJP-TR & FP, ES & MJP, FP & MJP), such as:

> "Again it seems logical so we can make the most points" (Participant 80, Study 3, Friends condition, cooperative choice in the Stag Hunt game).

In Studies 2 and 3, but not in Study 1 in any of the three conditions, there were a number of cases of focal point reasoning, either on its own or in combination with other motivations (FP, FP & MJP, MJP & FP, MJP-TR & FP), for example:

> "You get the most points out of it, so you think that the other person is bound to put that down too" (Participant 48, Study 2, Certain payoff condition, cooperative choice in the Stag Hunt game).

Similarly, maximax reasoning was present to a high degree throughout Studies 2 and 3 (MAX), for example:

> "Highest point value among choices" (Participant 92, Study 3, Strangers condition, cooperative choice in the Stag Hunt game),

but it was only mentioned by one participant in Study 1, and this was in Condition 3, in conjunction with equality seeking motivation (MAX & ES), as follows:

> "Because we both get an equal amount of maximum points" (Participant 33, Study 1, Divisible and transferable condition, cooperative choice in the Stag Hunt game).

Table 6.13: Frequencies of reasons given for a non-cooperative choice in the Stag-Hunt Game

Study	1			2		3	
Condition	1	2	3	1	2	1	2
Reason							
ARL	-	-	-	-	1	-	1
ARL-I	-	1	-	-	-	-	-
AW	-	1	3	-	3	-	1
AW-I	-	2	-	-	-	-	-

Non-cooperative choices were fairly infrequent and did not occur at all in Study 1 in the neither divisible nor transferable condition (Study 1, Condition 1), in Study 2 in the certain payoff condition (Study 2, Condition 1), or in Study 3 in the Friends condition (Study 3, Condition 1). However, the reason given for the majority of non-cooperative choices was to avoid the worst payoff (AW, AW-I), for example:

> "Eliminates chance of getting 0 points" (Participant 97, Study 3, Strangers condition, non-cooperative choice in the Stag Hunt game).

Centipede

Table 6.14: Frequencies of reasons given for a non-cooperative choice in Decision 1 of the Centipede Game

Study	1			2		3	
Condition	1	2	3	1	2	1	2
Reason							
ARL	-	-	-	-	1	-	1
ES	-	1	-	-	1	-	-

Only four participants overall chose to stop on the first choice (these were in Study 1 in the divisible but not transferable condition, in Study 2 in the risky payoff condition and in Study 3 in the strangers condition). The reasons given for this were either avoiding relative loss (ARL), for example:

> "As it is impossible to beat the opponent on points" (Participant 87, Study 3, Strangers condition, non-cooperative choice on Decision 1 of the Centipede game)

or equality seeking (ES), for example:

> "So we're both equal" (Participant 24, Study 1, Divisible but not transferable condition, non-cooperative choice on Decision 1 of the Centipede game).

Table 6.15: Frequencies of different types of reasons given for a cooperative choice on Decision 1 of the Centipede game, by participants who made two cooperative choices overall

Study	1			2		3	
Condition	1	2	3	1	2	1	2
Reason							
AW	5	-	2	3	3	-	3
AW-I	2	-	-	-	-	-	-
AW-TR	3	1	-	-	-	2	-
CUR	1	-	-	-	-	-	-
MIP	-	2	-	-	-	1	-
MJP	1	-	1	-	-	-	-
MJP-TR	1	-	-	-	-	1	-
NR	-	-	2	-	-	-	-
TST	-	-	-	-	1	1	-

Table 6.16: Frequencies of different types of reasons given for a cooperative choice on Decision 1 of the Centipede game, by participants who made one cooperative choice overall

Study	1			2		3	
Condition	1	2	3	1	2	1	2
Reason							
AW	1	1	5	5	6	-	2
AW-TR	-	-	1	-	-	-	4
ES	-	-	-	2	-	-	-
ES & AW	-	-	1	-	-	-	-
INCP	-	1	-	-	-	-	-
MAX	-	-	-	1	-	1	2
MIP	-	8	-	1	-	-	-
MJP	-	-	1	-	-	-	-
MJP-TR	-	-	-	-	1	2	-
NR	-	-	1	2	1	3	1
TST	-	-	-	-	-	1	1
TST & ES	-	-	-	-	-	2	-

Many participants who made one cooperative decision, and those who made two cooperative decisions, gave avoiding getting zero points as the reason for a cooperative decision on Decision 1, either as a reason on its own or in conjunction with an equality-seeking motivation (AW, AW-I, AW-TR, ES & AW), for example:

> "If I stopped at beginning I don't win anything at all regardless" (Participant 68, Study 2, Risky payoff condition, cooperative decision on Decision 1 of the Centipede game)

and many acknowledged the risk inherent in this decision, for example:

> "If I stop here neither of us gains anything, but the potential payout if we continue is worth the risk of Player 2 stopping next go" (Participant 89, Study 3, Strangers condition, cooperative decision on Decision 1 of the Centipede game).

In some cases participants gave avoiding the worst payoff for the group as their motivation for choosing go on Decision 1 (AW-TR), for example:

> "Because we'd both get nothing if I stopped" (Participant 97, Study 3, Strangers condition, cooperative decision on Decision 1 of the Centipede game).

Along similar lines as wanting to avoid getting no points, no reason to do otherwise was also given as a motivation for choosing go on Decision 1 (NR), for example:

> "We both get nothing so no reason to stop yet" (Participant 81, Study 3, Friends condition, cooperative decision on Decision 1 of the Centipede game).

However, this type of reasoning was given more frequently by those who only made one cooperative decision, rather than two.

Trust in the other player was occasionally given as a motivation, either on its own or in conjunction with an equality-seeking motivation (TST, TST & ES), for example:

> "Because I think she would say go too (or I hope!)" (Participant 79, Study 3, Friends condition, cooperative decision on Decision 1 of the Centipede game).

Maximising individual payoffs was cited as a reason for a cooperative choice on Decision 1 (MIP), most frequently in Study 1, Divisible but not transferable condition, for example:

> "If player 2 decides to go then I get 4 points" (Participant 28, Study 1, Divisible but not transferable condition, cooperative decision on Decision 1 of the Centipede game).

Table 6.17: Frequencies of different types of reasons given for a cooperative choice on Decision 3

Study	1			2		3	
Condition	1	2	3	1	2	1	2
Reason							
AW-TR	1	-	-	-	-	-	-
CUR	1	-	-	-	-	-	-
ES	-	1	-	-	-	-	-
MIP	-	-	2	-	-	-	-
MJP	6	-	-	-	-	1	1
MJP-I	-	-	-	-	-	-	1
MJP-TR	4	2	2	1	2	3	1
NR	1	-	-	-	-	-	-
REC	-	-	1	1	-	1	-
INC	-	-	-	1	2	-	-

Reasons given for cooperative choices on Decision 3 were most frequently aiming for the maximum joint payoff (MJP, MJP-I, MJP-TR) often with consideration that this would be best for the group (MJP-TR), for example:

> "Decision 3 is go because we get 4 more points than with stop" (Participant 71, Study 3, Friends condition, cooperative decision on Decision 3 of the Centipede game)

and

> "I chose to go because this gives us a greater combined score (12) than if I chose to stop" (Participant 84, Study 3, Friends condition, cooperative decision on Decision 3 of the Centipede game).

Reciprocity (REC) featured to a small extent in the reasons given for a cooperative choice on Decision 3, for example:

> "As the other person was generous, I decided to be too!" (Participant 31, Study 1, Divisible and transferable condition, cooperative decision on Decision 3 of the Centipede game).

Table 6.18: Frequencies of different types of reasons given for a non-cooperative choice on Decision 3

Study	1			2		3	
Condition	1	2	3	1	2	1	2
Reason							
ARL	-	1	1	-	-	-	2
ES	-	6	7	8	2	5	5
ES & ARL	-	-	-	1	2	1	1
MIP	-	2	-	2	4	3	2
MIP & ES	-	1	1	-	-	-	-
INC	1	-	-	-	-	-	-

Many of the participants who only made one cooperative decision, and chose stop on Decision 3, gave an equality seeking reason for their non cooperative choice, either on its own or in combination with other reasons (ES, ES & ARL, MIP & ES), for example:

> "Then we both get the same score and it's fair" (Participant 18, Study 1, Divisible but not transferable condition, non-cooperative decision on Decision 3 of the Centipede game)

and

> "So that we both have an equal amount of points" (Participant 53, Study 2, Certain payoff condition, non-cooperative decision on Decision 3 of the Centipede game).

In some cases the participant explicitly outlined that they wanted to be equal, and avoid relative loss (ES & ARL), for example:

> "I chose stop so that we would get equal points & he / she wouldn't get more than me" (Participant 52, Study 2, Certain payoff condition, non-cooperative decision on Decision 3 of the Centipede game).

Aside from avoiding relative loss and equality seeking, the other reason which participants gave for a non cooperative choice on Decision 3 was to maximise individual payoff, either on it's own or in combination with an equality-seeking motivation (MIP, MIP & ES), such as

> "Because I get 4 points rather than 3" (Participant 54, Study 2, Certain payoff condition, non-cooperative decision on Decision 3 of the Centipede game).

Frequencies of all responses which included some element of team-reasoning motivation, such as maximising the joint payoff with consideration of the group, or collective payoff (MJP-TR), avoiding the worst payoff for the group (AW-TR), the dominance argument in terms of the group's payoff (DOM-TR), and responses which included such motivations in combination with other motivations, are given in Table 6.19.

Table 6.19: Summary of frequencies of team-reasoning responses across the studies in the different games

Study	1			2		3	
Condition	1	2	3	1	2	1	2
Game							
Prisoner's Dilemma	4	2	3	3	3	4	3
Hi-Lo	4	2	2	5	1	6	5
Chicken	6	3	2	2	3	6	3
Stag Hunt	3	2	6	5	1	4	2
Centipede Decision 1	4	1	1	0	1	5	4
Centipede Decision 3	5	2	2	1	2	3	1
Total	26	12	16	16	11	28	18

Discussion

The first two hypotheses, that there would be significantly higher levels of cooperation in the non-divisible condition than in the divisible and transferable condition, and significantly higher levels of cooperation in the divisible and transferable condition than in the divisible and non-transferable condition, in all games apart from Hi-Lo, in Study 1, and that there would be significantly higher levels of cooperation in the certain return condition then in the 1 in 4 chance of return condition, across all the games except Hi-Lo, in Study 2, were partially supported, and the third hypothesis, that there would be significantly higher levels of cooperation in the Friends condition than in the Strangers condition, in all games except Hi-Lo, was not supported.

Study 1 found significantly higher levels of cooperation in the neither divisible nor transferable condition, where outcomes were presented as a single payoff per pair, than in the divisible but not transferable condition, and the divisible and transferable condition in the Prisoner's Dilemma game, Stag Hunt and Centipede, but not in Hi-Lo and Chicken. In Hi-Lo, a ceiling effect on cooperation was observed, and in Chicken the effect was in the expected direction, but was only marginally significant. It was unfortunate that the frequencies were too low to enable a chi-square analysis across all three separate conditions. It was felt necessary to provide payoffs large enough to provide a "real" incentive, thus limited funds affected the number of participants. However, when superficially comparing cooperative choices in all the games, there appears to be very little difference between the divisible but not transferable condition, and the divisible and transferable condition. The neither divisible nor transferable condition produced extremely high levels of cooperation, due to the payoffs being combined into one single outcome. Here, in the absence of any conflicting motives, Player 1 may be likely to assume that Player 2 is aiming for the best outcome. Thus, given that assumption, it makes sense to choose the course of action for them which will enable that best outcome to be achieved.

In Study 2, no differences in cooperation between the conditions were found in Hi-Lo, where a ceiling effect was observed, or in Chicken and Centipede. The results for Prisoner's Dilemma were in the expected direction, but non-significant at $p = .131$. However, Stag Hunt yielded greater levels of cooperation in certain payoffs condition, where the participants knew they would definitely receive the payoffs, than in the risky payoffs condition, where there was a one in four chance that they would receive the payoffs. Stag Hunt could be seen as a game of risk; a cooperative choice will either lead to the best joint payoff, and the best personal payoff, or to the worst joint payoff, and the worst personal payoff. A non-cooperative choice will only enable the decision maker, and the pair of players as a whole, to do moderately well, but the payoff is guaranteed and there is no possibility of getting nothing. In their classic framing studies, Tversky & Kahneman (1981) and Kahneman & Tversky (1984) show that there is a general preference for risk averse gains over risky gains which have an equal expected utility. However, although it is impossible to derive from the results of the current study, it may be that people's choices are a function of the probability of receiving the payoff at the end of the game (either 1 or 1/4), and the levels of payoffs and the perceived probability of receiving those payoffs. The added dimension of the probability of receiving the payoffs at the end of the game may be enough to swing some people's preferences from a cooperative, risky choice to a non-cooperative, safe choice.

It is also possible that a certain amount of risk is acceptable to people, and once that level of risk has been reached then a decision maker will try to avoid any further unnecessary risk. In the risky payoff condition, there is only a one in four chance that the payoff will be received. If the choice between a certain payoff magnitude, or an uncertain payoff magnitude (which would either end up as a large payoff or a non existent payoff) was presented, it is possible that decision makers may prefer to avoid adding the extra element of uncertainty to an already risky outcome. Three of the four participants who made a non-cooperative choice indicated that avoiding the worst payoff was their reason for doing so, which indicates that participants were motivated by risk avoidance. In the certain payoffs condition the decision makers know that the payoff will be received, so it is possible that they are prepared to include a certain amount of risk in the form of the actual level of the payoff. In the certain payoffs condition, three people mentioned their awareness of the risk inherent in a cooperative choice, for example

> "You either get all or nothing" (Participant 43, Study 2, Certain payoff condition)

and one person did in the risky payoffs condition:

> "To gamble and go for maximum points" (Participant 59, Study 2, Risky payoff condition).

However, in general, reasons given for cooperative choices did not mention the possibility of receiving a poor payoff, and focussed on the best outcome of mutually cooperative choices. Nonetheless, it would be premature to discard the acceptance of a certain level of risk as an idea on the basis that few people mentioned it, as risk is unlikely to be a reason for their choice, but instead something despite which they make their choice. Participants may have chosen despite the risk, rather than in the face of it. Chicken is also a risky game, in that one of the choices will lead to either the best personal payoff or the worst personal payoff, but the riskier choice is the non-cooperative one, with the added disincentive (to some people) of taking advantage of the other person. To someone who is considering joint payoffs, or overall outcomes in Chicken, cooperation becomes the dominant choice, whereas in Stag Hunt the situation is not so clear cut to someone who is considering joint payoffs. In both Prisoner's Dilemma and Centipede cooperation is also the dominant choice when considering joint payoffs or overall outcomes. It is possibly due to this that Stag Hunt appears to be affected by the chance factor in receipt of payoffs, whereas the other games do not. This possibility must be considered alongside consideration of individual payoffs, as well as joint payoffs. In Prisoner's Dilemma there is a risk of receiving the lowest personal payoff with a cooperative choice. This risk, when combined with the risk of not receiving a payoff, may be too much for some people. The results for the Prisoner's Dilemma game did not show a significant difference in the frequency of people cooperating and not cooperating between the conditions, although the difference was in the expected direction and approaching marginal significance. However, if the risk of receiving low personal payoffs was a factor in determining people's cooperative choices in situations where the payoffs were risky, one might expect cooperative choices in Centipede to be affected as well. In Centipede, a cooperative choice on Decision 1 could lead to the worst personal payoff (in this case –1 points, rather than 0 points from a non-cooperative decision), or better personal payoffs (3 or 4 points). Of course, players may wish to avoid a non-cooperative choice to start with to avoid getting nothing. Tables 6.15 and 6.16 suggest that avoiding a zero payoff was a popular reason given for a cooperative choice on Decision 1. The desire to avoid getting no payoff may outweigh the risk associated with getting a small negative payoff in Centipede, and cancel out any effect which the probability of receiving the payoff at the end of the game might have had. Prospect theory (Tversky & Kahneman, 1981) states that people are more likely to take risks to avoid loss, which could account for this, particularly as in this game of Centipede the possible loss is very small. In Chicken there is no such clash of objectives; the cooperative choice can lead to the best joint payoff and avoids the worst joint payoff and worst individual payoff. The results from this study only show cooperation being affected in Stag Hunt, which might suggest that the key issue of avoiding the worst joint payoff, above a certain level of risk, is more likely than avoiding the worst personal payoff. However, the results for Prisoner's Dilemma approached marginal significance, and in Centipede the motivation to avoid both personal and joint payoffs of zero may have confused the picture. Of course, it is impossible to conclude that any of these processes is at work, but the possibility is worth considering.

Study 3 yielded no significant results. There were no significant differences in cooperation in any of the games between the friends condition, where participants were friends with the person they were playing, and the strangers condition, where participants believed they were playing against someone they did not know, although cooperation levels were slightly skewed in the expected direction in Prisoner's Dilemma and Chicken. It seems surprising that friendship would not increase cooperative behaviour. Cooperation levels, and occurrences of qualitative team-reasoning responses were fairly high in both the conditions, so it is possible that being made aware of the other person's name helps to decrease anonymity and increase a desire to cooperate, through a process of individuation. However, levels of cooperation and qualitative team-reasoning responses were also fairly high in Study 2, Certain payoff condition, where participants were not given the name of the person they were playing. In the condition where participants believed they were playing against someone they did not know, each player was in a separate room and did not see each other at all. This was to avoid participants recognising each other and realising that the other player was not "Alex Stranks". Ensuring that two participants had no prior relationship would have been a very difficult task within the confines of this study. However, were two complete strangers to briefly meet before playing the games, the lack of any previous relationship might be more salient than if neither player saw the other at all before the game. In Chapter 5, the type of relationship factor on which this study was based showed differences in team-reasoning preferences between vignettes where people had no prior relationship, and a variety of conditions where people knew each other in some capacity (whether task-related, friendship or a combination of the two), but not between the separate conditions where people knew each other. In this study, participants might have assumed that "Alex Stranks" was likely to be on the same course as them (recruitment was mostly undertaken in the Psychology department, although a lot of participants in the friendship condition in Study 3 were from other courses), and as such they might know "Alex Stranks" and even have interacted with them without knowing their name.

Table 6.19 shows the number of team-reasoning responses (classified using qualitative responses) given across all the games in each decision. The overall total for Study 3, in the Friends condition is considerably higher than that for Study 3, Strangers condition. Although there is only a slight difference in each game, the difference is consistently in favour of the condition where each participant played a friend, which is worth noting.

Looking at the specific games, levels of cooperation in Hi-Lo and Chicken were not affected at all. Hi-Lo showed ceiling effects on cooperation throughout, which is of no great surprise, and it is the qualitative responses in this game which are of more interest. However, no such ceiling effect was observed, or expected, in Chicken; Rapoport & Chammah (1969) reported cooperation levels to be around 65 per cent in early trials of iterated games, and in the current studies cooperation rates varied from 64 per cent to 93 per cent across the different conditions.

Across all the studies, there was a substantial number of participants who mentioned aiming for the maximum joint payoff as a reason for their cooperative choice. Furthermore, a proportion of these appeared to be considering the maximum joint payoff because it would benefit both players, or all involved in the interaction. This appears to support the existence of team reasoning in actual decisions involving real payoffs, and as such moves on from previous studies in the thesis which have indicated that people express a preference for a team-reasoning outcome, and give a team-reasoning motivation to support that preference. In this set of studies real payoffs are involved which are the result of interdependent choices, similar to situations in real life, which is a more definite indication of the existence of team reasoning than has been given previously.

In Study 1, there tended to be more qualitative responses which indicated some level of team reasoning in the neither divisible nor transferable condition, where the payoffs were presented as a single outcome, than in the divisible but not transferable condition, where the payoffs were presented separately with no opportunity to redistribute them, and the divisible and transferable condition, where payoffs were presented separately but with an opportunity to redistribute them (see Table 6.19). Generally, levels of this type of qualitative response were similar in the divisible but not transferable condition, and the divisible and transferable condition. This was with the exception of Stag Hunt, where there were more qualitative responses which indicated some level of team reasoning in the divisible and transferable condition than in the neither divisible nor transferable condition and the divisible but not transferable condition. Aside from Stag Hunt, these qualitative results indicate that team reasoning might be more prevalent in conditions where there is one single outcome for the group. The divisible and transferable condition enabled individual's payoffs to be redistributed after the game, which may have led to more of a "group orientation", and more team-reasoning motivations in Stag Hunt than in the divisible but not transferable condition, where payoffs could not be redistributed. However, this does not explain why there were less team-reasoning motivations in the neither divisible nor transferable condition, where payoffs were presented as a single outcome for the group, which could have been more likely to have led to a "group orientation" than the divisible and transferable condition, nor does it explain why this difference was only observed in Stag Hunt and not in any of the other games.

In Study 2, levels of qualitative team-reasoning responses tended to be fairly similar in both conditions, with the exception of Hi-Lo and Stag-Hunt, where there were more qualitative responses which indicated some level of team reasoning in the certain payoff condition, when players would definitely receive the payoffs, than in the risky payoff condition, when players had a one in four chance of receiving the payoffs (see Table 6.19). Stag Hunt is the most similar to Hi-Lo of all the other games, in that the best payoff for both individuals and the group stems from mutual cooperation, the second best payoff (equal second best in Stag Hunt, but clear second best in Hi-Lo) stems from mutual non-cooperation, and the worst payoffs for both players stem from non-coordination. Thus Stag Hunt is nearer to a game of coordination than Chicken and Prisoner's Dilemma, with the best payoff for each player falling in the same cell. Sugden (1993) described how team reasoning could be used to solve such problems. This does not explain why there are more team-reasoning responses in the Certain payoff condition than in the uncertain payoff condition, although it is possible that there may be some interaction between using such strategies to solve coordination games and the certainty of the receipt of payoff.

In Study 3, there were similar levels of qualitative responses which indicated team reasoning across both conditions, though slightly higher levels occurred in the friends condition, where participants played with a friend, than in the strangers condition, where participants believed that they played with someone who they did not know (see Table 6.19). Levels of qualitative responses which indicated team reasoning were relatively high in this study, compared to the other studies. It is possible that knowing the name of the other player, even if it is someone who the participant does not know, may provide enough information for the participant to consider the other player as part of the same team. It may be that team reasoning in an interaction where something is known about the other person, even if it is only a name, is more likely than in interactions where nothing is known about the other player. Being given the name of the other player could make it easier to think of the co-player as an actual person, thus make it easier to consider oneself in a team with them. This is a case of how much extra cooperation and team-reasoning behaviour acquaintance would give, over and above that which individuation would give. Ideally, one would want to compare conditions in which participants were given no indication of who the other person was, with ones where participants played people with whom they had varying degrees of acquaintance, from slight acquaintance to close relations. In this study, however, the actual level of friendship was not controlled, in that there was no record of how well participants actually knew each other. It may be that very close friends, or even relatives, would be more likely to team reason than people who know each other a little, and also more than people who are just aware of each other's names.

In Study 1, Neither divisible nor transferable condition, in Prisoner's Dilemma and Chicken, the qualitative responses indicated that a few people picked up on the dominance of an X choice, which resulted from the structure of the game changing when outcomes were presented as joint payoffs only. In a standard Prisoner's Dilemma game, Y (or non-cooperation) is the dominant choice, because no matter what the other player chooses Y will always give a better payoff than X. When outcomes are presented as joint payoffs, as in Study 1, Neither divisible nor transferable condition, then X (or cooperation) is dominant, because no matter what the other player chooses X will always give a better joint payoff than Y. However, in Hi-Lo and Stag-Hunt, an X choice was not dominant when the payoffs were summed; which choice to make for the best payoff depended upon which course of action the other player took. In Chicken and Centipede, avoiding the worst outcome was occasionally cited as a reason for cooperative choices (in both these games there was a considerable difference between the worst and the best outcomes) but aside from this most of reasons which people gave appeared to be related to the maximum outcome, either indirectly (such as picking up on the dominance issue) or directly, by stating explicitly that they were aiming for the maximum outcome.

In the only two cases where the action which led to the best joint outcome overall was not chosen in Study 1, Neither divisible nor transferable condition, the participants gave an incoherent reason for their choice. One of these choices was in Chicken, the other was in Centipede.

Aside from qualitative team-reasoning responses, there was a variety of reasons given for cooperative responses. Trust and wanting to avoid exploiting the other player were only given as reasons in Study 3, Friends condition, with one exception in Study 2, Risky payoff condition in Centipede, Decision 1. In Study 3, Friends condition the participants were playing with their friends, so had already developed an ongoing relationship with their co-player. Trust is often cited as a factor in the development of friendships and social interactions (e.g. Green & Brock, 1998; Monsour, 1992; Parker & De Vries, 1993; Roy, Benenson & Lilly, 2000; Schonsheck, 1997), as such it is unsurprising to see it arising in reasons for cooperative decision making in this condition.

Throughout the studies, a lot of people were motivated by equality of payoffs. Egalitarianism has been well documented in different measures and to different extents (for a review see Fiske, 1992). In all the games used in the current studies the maximum joint payoff also had equal individual payoffs. Some participants reported their reason for a cooperative choice as a combination of these two factors, which is a useful illustration of the motivations which van Lange (1999) outlined in his integrated model of Social Value Orientation. However, equality-seeking motivations were not very prevalent in Chicken, people seemed more concerned with avoiding the worst payoff than achieving equal payoffs. This is possibly because there is no Nash equilibrium where payoffs are equal, both the Nash equilibria in the game arise from one player cooperating, and receiving 1 point, and the other defecting, and receiving 10 points.

A particularly valuable part of the current studies is the qualitative responses which people gave as reasons for cooperation in Hi-Lo (see Table 6.9). Most of the reasons given for cooperative choices fell under one of three categories: team reasoning (as outlined above), focal point reasoning, or maximax reasoning. Maximax reasoning is when the decision maker goes for the payoff which can lead to the maximum possible payoff, but with no apparent consideration of the alternatives. While it is not a sensible strategy, failing to take what the other person may do into account, it occurs in certain situations and it appears that participants in this study used it. The prevalence of the strategy explanations for cooperative choices in Hi-Lo may be due to attempts to explain an intuitively obvious choice in a game which, as has been covered before, cannot be solved within the boundaries of rational and individualistic game theory. The category of focal points arose in both Hi-Lo in all studies, and in Stag Hunt in Studies 2 and 3, but not in Stag Hunt in Study 1. Schelling (1960) introduced the idea of focal points as responses which have some property of salience which can be recognised by all involved, and Mehta, Starmer & Sugden (1994) demonstrated that people appear to use focal points to solve coordination problems, as do the qualitative responses in the current studies. In Hi-Lo and Stag Hunt, selection of a focal point does not present many problems because there are only two choices for each of two players, and each choice will lead to one of four outcomes, with varying payoffs. Several people, in both the games, gave their reason for seeing X as a focal point as it enabling the players to achieve a higher score, for example:

> "I chose X because I think he will choose the same, because it is the only way of getting the highest score" (Participant 71, Study 3, Friends condition - Hi-Lo)

and

> "Most points available & I reckon that will make the other person choose this" (Participant 68, Study 2, Risky payoff condition - Stag Hunt).

However, in some pure coordination games other than Hi-Lo, the situation might be a little less clear cut, for example one with n choices, where $n > 2$, and the payoffs for one single coordination point are less than the payoffs for the other $n - 1$ coordination points. In this case, the deviance from the norm, rather than the absolute value of the single, low payoff coordination point, could make it more salient than all the other coordination points. This is an apt illustration of how focal points are dependent on the situation, the presentation of the situation and indeed the people involved. The role of labelling of choices in selection of focal points can override the actual structure of the game, for example, when people are asked to select heads or tails, with equal payoffs if they coordinate, most will choose heads, which shows just how subject to framing effects focal points are. As such, prediction of focal points is not subject to a standard set of rules and they can be difficult to determine with any level of accuracy. It is for this reason that Sugden (1995) concluded that no theory of focal points can ever be complete.

Amongst the reasons which participants gave for cooperative choices in Chicken, avoiding the worst payoff was by far the most frequent. In Chicken the temptation to defect is balanced by a severe punishment payoff, which many people strive to avoid. As such, cooperative choices in Chicken are not necessarily made through other-orientated motives. The majority of people who chose non-cooperative options in Chicken gave maximax reasons for their choice, although there were some people who gave avoiding relative loss as a reason for their choice. While this is a valid reason for a non-cooperative choice (in that the non-cooperator will either beat his co-player by a large margin, or have equal points) it is interesting that relatively few participants gave the same reason for a non-cooperative choice in Prisoner's Dilemma. Theoretically a non-cooperative choice in Prisoner's Dilemma has the same qualities as a non-cooperative choice in Chicken that would appeal to a competitive person, with the added bonus that it avoids the worst payoff. It is possible that the difference between the temptation payoff and sucker's payoff in Prisoner's Dilemma was not large enough to encourage competition.

Throughout these studies, participant numbers were very low, but financial constraints meant that larger groups were impossible to achieve without decreasing the incentive. It was felt necessary to have an incentive that was large enough to encourage people to treat the games as decisions which mattered, and to bring into play motivations that might arise in real life. A further drawback with the studies is the layout and the structure of the games. The mutually cooperative, greatest joint outcome is always in the top left corner of the payoff matrix, all the games are symmetrical and the greatest joint outcome always has equal individual payoffs. Although the studies in Chapter 4 found no effect of equality of payoffs on preference for the greatest joint outcome, it is impossible to conclude from this that equality does not have effect preferences for joint outcomes.

Following the results from this chapter, it would be useful in particular to investigate the issue of friendship in more detail. As suggested earlier, more careful manipulation of how well participants knew each other is needed, as is the investigation of individuation versus acquaintance. Although no significant results were found in Study 3, the consistent difference between team-reasoning responses in the friendship condition and the stranger conditions points to the possible existence of some effect of this kind. Moving on from the two-person games which were used would also be beneficial. With respect to the other two studies, the problem of the highest joint payoff always corresponding to the highest equal payoffs needs to be addressed. It would be relatively simple to come up with two-person games in which the maximum joint payoff did not involve equal payoffs, and involved some sacrifice in payoffs on behalf of each player. Furthermore, larger participant numbers would be required to investigate differences between the divisible and transferable condition, and divisible and not transferable conditions in Study 1. It would be worthwhile taking all of the conditions these studies looked at out of two-person games and considering them in other group decision contexts, more analogous to real-life situations. The evidence indicates that team reasoning occurs, so now it would be desirable to look in more detail at the processes which lie behind team reasoning. This in turn may help to shed light on circumstances that lead to team reasoning.

To conclude, presenting payoffs as a single joint outcome as opposed to separate payoffs, significantly increases cooperation in Prisoner's Dilemma, Stag Hunt and Centipede, and in Chicken with marginal significance. As expected, no such effect was found in Hi-Lo, due to ceiling effects. The ceiling effect on Hi-Lo was present throughout all the studies. When participants would definitely receive the payoffs, cooperation was higher in Stag Hunt than when they had a one in four chance of receiving the payoff. No such effect was found in Prisoner's Dilemma, Hi-Lo, Chicken or Centipede. It was suggested that the risk of receiving a low joint payoff when cooperating in Stag Hunt may have had some bearing on this result. No effect of whether the participants knew the other player was found on cooperation in any of the five games. This may have been because the lack of any previous relationship was not emphasised enough in the condition where players did not know each other, or that providing participants with the other player's name was enough incentive for cooperation, or that how well participants knew each other in the friends condition was not controlled for. Nonetheless, qualitative responses from this study showed more team reasoning responses across all the games from those in the condition where players were friends than from those in the condition where players thought that they were playing a stranger.

Overall, a variety of qualitative responses were given for people's choices, and these responses indicated that people do appear to aim for the maximum joint outcome with the overall outcome of the group in mind; in other words, self reports indicated that people team reason.

Chapter 7

Team reasoning is a relatively new theoretical development in the decision theory literature and as such has little supporting experimental literature. Starting from such a clean slate was both exciting and somewhat intimidating, with no ready-developed protocols to follow. The studies described in Appendix 1 embodied problems which can arise from such a situation. However, these studies were useful in that they clarified certain issues to do with investigating the concept of team reasoning.

The possibility that team reasoning would be subject to framing effects was taken as the starting point for the experimental section of the thesis. Sugden (1993, 2000) and Gilbert (2001) discussed how people may come to view themselves as part of a team, and from there moved towards a theory of team reasoning. Sugden (2000) recognised that the key to developing the theory is essentially framing effects – how people view problems, how they decide what team to belong to and what that team's objectives are.

The studies described in Appendix 1 revealed that the Prisoner's Dilemma game (and probably other mixed-motive games) were not suitable vehicles with which to start studying framing effects and team reasoning, a motivation and a behaviour about which so little was known. The problem with Prisoner's Dilemma particularly, was that a cooperative decision could be made for a number of reasons, which would not necessarily involve team reasoning. Qualitative responses outlining why participants made their decisions were helpful in some respects, by enabling categorisation of responses to a greater extent than just the original cooperative or non-cooperative decision would allow. It was clear that subsequent studies would do well to include some sort of qualitative responses to give an insight into motivations.

The attempt to distinguish between team reasoning and group identification was ill-conceived and inadequately thought through, with little attempt made to clarify why the modes of presentation would yield different results. Furthermore, there was little justification to suppose that the different conditions would yield different results, as it would be possible that both team reasoning and group identification would result in cooperation in the Prisoner's Dilemma game, with the only difference being subtly shown in the motivation. With hindsight, these shortcomings suggested that more thought and preparatory investigation would be needed before supposing that any particular factors might have an effect on team reasoning. It was also necessary to find more suitable ways in which to identify team reasoning before any effect on it could be determined.

The attitudinal questionnaire items in the studies described in Appendix 1, which were supposed to relate to team-reasoning motivations, clearly distinguished between those who made cooperative choices and those who made non-cooperative choices. However, it would need further work to decide whether they distinguished between cooperators who had a team-reasoning motivation and cooperators with other motivations. It was perhaps too early to consider developing such attitudinal scales in relation to team reasoning, considering the lack of experimental evidence on such motivations. This would possibly be a useful avenue to pursue when more is known about team reasoning, and it is possible to empirically categorise and describe team reasoning.

Following the shortcomings of the studies outlined in Appendix 1, the studies described in Chapters 2 and 3 were developed using a different viewpoint. Once again, framing effects were at the root of the studies, but the problem was approached in a more fundamental way. The issue of distinguishing between motivations for cooperative behaviour in mixed-motive games was overcome by developing a new framework with which to start assessing motivations. The major social value orientations of altruism, competition, egalitarianism and individualism, alongside team reasoning, were the basis of a structured outcome set which was used in a large proportion of the thesis. While the outcome set enabled only preferences to be studied, rather than actual behaviours, it was a useful tool with which to look at potential motivations which might lie behind behaviour in other situations.

The outcome set presented five different outcomes, in the form of own payoff and other's payoff. Each of the outcomes maximised one of the following: Own payoff (thus representing individualism); Other's payoff (thus representing altruism); Own payoff minus other's payoff (thus representing competition); Equality of payoffs, or minimising own payoff minus other's payoff (thus representing egalitarianism); and Joint payoff (thus representing team reasoning). In Chapters 2 and 3, outcome sets which conformed to this structure were presented as a list of possible outcomes to each of ten different scenarios. The scenarios were intuitively designed to elicit one of five motivations conforming to those which the outcomes represented.

Chapter 2 asked participants to consider the outcome sets for each scenario and to indicate which outcome they thought was the fairest, which outcome they thought was the most selfish, which outcome they thought was the most unfair, which outcome they thought was the best total overall outcome, and which outcome they thought was the most equal. The results showed that, while opinions of which outcome was the most equal were not subject to framing effects, opinions of which were the most selfish, the most unfair, and the fairest outcomes were subject to framing effects. Of more importance to this thesis, though, was that the concept of the "best total overall outcome" was subject to framing effects. It was originally hypothesised that this would universally be considered to be the outcome which maximised joint payoff. The maximum joint payoff was considered to be the best total overall outcome by the majority of participants in all except three vignettes. However, in many vignettes the egalitarian outcome was considered to be the best total overall outcome by a significant proportion of respondents, and in three vignettes (the two designed to elicit egalitarian motivations and one designed to elicit competitive motivations) by more than those who considered the maximum joint payoff to be the best total overall outcome. In one of the vignettes designed to elicit altruistic motivations, a significant number of participants considered the altruistic outcome to be the best total overall outcome. This framing effect is important. While the opinion that the maximum joint payoff represents the best total overall outcome is not in itself evidence of a team-reasoning motivation, it can reasonably be presumed that it is a pre-requisite for team reasoning when using such outcome sets. This would imply that team reasoning itself might be subject to framing effects, in that in certain situations it may be deemed more appropriate to team reason than in other situations. Similarly, Sugden (2000) admitted that his theory of team agency is likely to be subject to framing effects. Structurally identical problems could encourage different types of reasoning and decision making, depending upon the context in which they are presented. While team reasoning may occur in one situation, it would not necessarily occur with in another situation with essentially the same problem.

The lack of qualitative responses in Chapter 2 placed some severe limitations on what could be inferred from the data. However, due to each participant being asked 50 questions, it was felt that the quality of a full set of qualitative responses would be limited due to boredom effects.

Chapter 3 used the same ten vignettes and the same outcome sets as in Chapter 2, but simply asked which outcome for each vignette participants preferred, and why. Responses indicated that in the vignettes designed to encourage team-reasoning motivations, a significant proportion of participants preferred the maximum joint payoff, and more importantly gave a team-reasoning reason for doing so. While it is important to remember that this is not evidence of team-reasoning behaviour, it indicates that the idea of team reasoning is present in people's cognitive processes, and gives rise to suspicion that team reasoning could occur in certain decision-making processes. It could reasonably be assumed that a preference for the maximum joint outcome, with team-reasoning reasons for that preference, is a pre-requisite for exhibiting team-reasoning behaviour. Furthermore, preferences for the maximum joint payoff for team-reasoning reasons were also shown to be subject to framing effects, which again indicates that if team reasoning occurs, it is likely to be context-dependent.

The difference outcome preferences shown in Chapter 3 were interesting aside from the team-reasoning responses. There was a marked difference between responses in the two vignettes which were designed to elicit altruistic motivations. In the Bingo vignette, which described going out to play bingo with a friend who had just been burgled, and each person winning a certain amount of money, the outcomes were represented by tens of pounds. In the Lottery vignette, which described the participant and their terminally ill sister receiving some lottery winnings, the outcomes were represented as tens of thousands of pounds. In the Bingo vignette, most participants preferred the altruistic outcome, which would give them a very low payoff and the other person a very high payoff, but in the Lottery vignette, preferences were mostly divided between the altruistic outcome, the equality-seeking outcome, and the maximum joint payoff. It is possible that the magnitude of the payoffs caused this difference in preferences. This could be because when the payoff was small, it was easier to be generous and prefer the other person to have more, than when the payoff was large. Alternatively, with larger payoffs, if the other person already has several thousand pounds, a few extra tens of thousands of pounds would not make a noticeable difference to their fortunes, so it is not perceived as being especially necessary or helpful. Of course, the reason could be a combination of these two aspects, or it could be unrelated. The magnitude of payoffs was considered further in Chapter 5, and while the effect was non-significant, the direction of the effect was that there were more team reasoning responses in the larger payoff condition.

In the vignettes designed to elicit competitive motivations, the competitive outcome was rarely preferred, and the individualistic outcome was the most popular. The individualistic outcome obviously gave the highest personal payoff, but also gave a considerable difference between the two payoffs. Thus it may have fulfilled both competitive and individualistic motivations, as the competitive outcome did not offer an exceptionally high individual payoff. Of course, it may be that people consider it socially undesirable to be seen to prefer someone else's failure, even at the expense of personal profit, but it is unlikely that social desirability affected responses in this study, as all responses were anonymous. Qualitative responses indicated that some people preferred the individualistic at least partly for competitive reasons, which both has implications for this type of outcome set, and provides an interesting insight into motivations. It seems that the having a large difference between payoffs is important to some people, but having a good personal payoff is important alongside this. Preferences for the competitive outcome were relatively infrequent, even in the vignettes designed to encourage competitive motivations, which suggests that purely increasing the difference between payoffs at the expense of all else is not as common as one might expect. The extent to which levels of individual payoffs override differences between payoffs would be an interesting concept to study further. A further question raised by this study is that of outcome preference rank. Consideration of orders of preference in which outcomes are ranked in different situations would provide information about the relationship between individualistic and competitive motivations, as well as helping to address questions about the relationship between preferences for the maximum joint outcome and the equality-seeking outcome.

In Chapter 3, significant positive correlations were found between frequencies of preferences for the maximum joint payoff and preferences for equal payoffs. In all the outcome sets, the maximum joint payoff was also the outcome with the second most equal payoffs. This brought to light the possibility that preferences for the maximum joint payoff may be partially due to the relatively equal nature of the payoffs.

Chapter 4 attempted to address this issue, and tried to investigate the relationship between preferences for the maximum joint payoff and equality of payoffs. Two vignettes from Chapters 2 and 3 were used, both of which were the ones designed to encourage team-reasoning motivations. These had already been shown to induce relatively high levels of preferences for the maximum joint payoff, for team-reasoning reasons, when payoffs were fairly equal, so gave plenty of scope for frequencies of such preferences to decrease when payoffs became less equal. However, neither of the studies in Chapter 4 gave any evidence that equality of payoffs affected preferences for the maximum joint payoff, irrespective of reasons given for the preference. In the second study in Chapter 4, participants who preferred the maximum joint payoff in the original outcome sets tended to prefer the maximum joint payoff in other outcome sets for the same vignettes, irrespective of inequality of payoffs. Taken alongside the positive correlation between frequencies of preferences for maximum joint payoff and equal payoffs in Chapter 3, this suggests the possibility that, although preferences for equal payoffs in some situations and maximum joint payoffs in other situations move together, people may not always try to achieve a compromise between maximising both joint payoffs and equality of payoffs in their preferences.

With hindsight, the vignettes used in these studies had both merits and disadvantages. Both involved some sort of personal sacrifice in order to achieve a good outcome: The GM vignette in terms of time and effort put in to collect the signatures on a petition; And the Headshave vignette in terms of effort put in to collect the sponsorship money. The goals were to prevent the GM test site going ahead in the GM vignette, and raise as much money as possible for computers for the school in the Headshave vignette, so it was assumed that the direction of the payoffs would represent the same motivations as when a person would be receiving personal payoffs. That each individual would clearly benefit from the team goal in these vignettes is indisputable. In the GM vignette the individual would not want a GM test site in his area, in the Headshave vignette he would benefit from having increased access to computers in his school. Although the individual could be seen to have sacrificed a certain amount of pride in not achieving their own maximum personal contribution in the maximum joint payoff, their ultimate personal benefit would be increased by an higher maximum joint payoff (for example, an increased chance that there will be no GM test site in the area, or increased access to computers within the school). This again leads to an increased dependence on qualitative responses to qualify genuine team-reasoning responses. This problem could perhaps be at least lessened, if not avoided altogether, by including some sort of personal gain aspect, for example, a reward for the best contribution. In this way, the maximum joint outcome would involve relinquishing such a reward, so any team reasoning would seem more genuine as it would involve some the sacrifice of something personal and tangible. This may, however, create problems of measuring payoffs in two different units: That of the ultimate end goal which the contributions are designed to accomplish; And that of the reward for the best personal contribution, which may be something separate, and therefore measured in different units. This would then have problems for comparisons of utility derived from these separate payoffs.

It could be argued that an element of personal sacrifice is useful when studying team-reasoning, as it is then easier to attribute the preference to a real desire for the team to do well. The Headshave vignette described more self-sacrifice than the GM vignette, in that it described the people involved being sponsored to cut all their hair off, although this held constant no matter which outcome was preferred. Nonetheless, it should once again be clarified that although a clear empirical illustration of team reasoning would require some element of self-sacrifice, in order to distinguish it from individualistic behaviour, it is not necessarily the case that when an individual's goals correspond to the team's goals, that individual is not team reasoning.

Chapter 5 moved away from the issue of equality of payoffs, and began to look at the question of what factors encourage team-reasoning motivations. The vignettes used in Chapters 2, 3 and 4 were all developed intuitively, using social and cultural norms to encourage different motivations. Chapter 5 attempted to take a more methodological approach to determining what encourages team-reasoning motivations. Sixteen different factors were identified which were considered to be likely to encourage team-reasoning motivations, and vignettes in which these factors were manipulated were developed. The same presentation format for the problems was used as in previous chapters, with participants being presented with a vignette, then being given a set of five outcomes and asked to indicate a preference for one of the outcomes and to give a reason for the preference. Responses were once again classified as team-reasoning responses (where participants showed a preference for the maximum joint payoff for team-reasoning reasons) and non-team-reasoning responses (where participants showed a preference for other outcomes, or for the maximum joint payoff for any reason other than team reasoning). A number of the vignettes showed floor effects, in that only a very few or no participants showed a preference for the maximum joint payoff, irrespective of reason given, and it has to be considered that these vignettes were not the best vehicles with which to look at preferences for the maximum joint payoff. The design of the studies did not enable interactions between factors to be looked at, though it would perhaps be premature to look at interactions at this stage. However, three of the factors did show some significant effects on team-reasoning responses. These were divisibility and transferability of payoffs, certainty of receipt of payoffs, and existence of a previous relationship with others involved in the interaction, all of which were positively related to preference for maximising joint payoffs.

Although these factors did not enable development of an exhaustive set of defining factors of what makes people likely to show team-reasoning type preferences, they gave some insight into what factors may affect team-reasoning behaviour.

By its nature, this chapter only gave a broad and shallow overview of factors which may effect team reasoning. It would be worthwhile taking all the factors which were considered in Chapter 5 and looking at them in more detail. The chapter succeeded in its attempt to identify some factors which affected preferences for the maximum joint outcome for team-reasoning reasons. While many of the factors yielded no significant results in this particular experiment, it would be worthwhile to look at all of them in more depth. Consideration would need to be given to the content of any vignettes used, in order to avoid floor effects, but while the vignettes are useful as a starting point to identify preferences for the maximum joint outcome, any methodical and comprehensive study of the factors in Chapter 5 would move on to look at behaviour, rather than just preferences. Once more information had been obtained about the separate factors, relationships between them could then be looked at in more detail. Some of the factors seem linked by concept, for example, liking or disliking the others involved in the interaction, and the type of relationship, and some of the factors seem intuitively likely to be subject to interactions, for example the number of people involved in the interaction and who would benefit from the outcome. However, it would be useful to find out more about each individual factor on its own, before looking at interactions.

As outlined in Chapter 6, the link between preferences for outcomes and behaviour in decision making is complicated by the fact that one's own behaviour in decision making is not only governed by outcome preferences, but also by the likely behaviour of others involved in the decision-making process. It is this which made the jump from the outcome-preference approach to the two-person decision matrix so interesting.

In Chapter 6, participants played five two-person games: Prisoner's Dilemma, Hi-Lo, Chicken, Stag Hunt and Centipede, all with monetary payoffs. Three studies were carried out, and conditions were manipulated according to the factors which were found to affect levels of team-reasoning responses in Chapter 5. There has been very little experimental gaming literature on either Hi-Lo or Centipede, the former because it is thought to be obvious which choice players will make, although there is no rational justification for it within traditional decision theory, and the latter game is comparatively newly discovered and seems to be relatively unknown. In all of the games, and particularly Hi-Lo, the qualitative responses were of great interest. Theoretically, team reasoning provides a rational solution to Hi-Lo and it was interesting to look at the qualitative responses in the light of this.

In Chapter 6, divisibility of payoffs (whether payoffs were presented and awarded as a lump sum per pair of participants, or as separate payoffs to each player) affected cooperation levels in all the games except Hi-Lo, where cooperation was not expected to be affected, and Chicken, where a marginally significant effect was found. Certainty of receipt of payoffs showed significant effects on cooperation levels only in Stag Hunt, and prior relationship of the players showed no significant effects in any games. However, in all games and in all conditions, qualitative responses indicated that some participants were using team reasoning as a basis for making their decisions. Team reasoning has been suggested to be a means of rational solution for Hi-Lo, and hence for any game with a payoff dominant equilibrium, and qualitative responses indicated that this might be the case. Some participant's responses, however, indicated that they were not being strictly rational when making decisions in Hi-Lo!

The absence of any significant effect on cooperation in Study 3 in Chapter 6, which looked at the effect of friendship on cooperation levels, was somewhat surprising and disappointing. It is possible that giving participants the name of the other player in the stranger condition enabled participants to create an image of the other person, and in this way perhaps imagine themselves to be linked in some way (a case of individuation as opposed to complete anonymity), or alternatively perhaps to envisage that they knew them. Most participants in this study were recruited in the same department, so it may be that they assumed that the other participant was likely to be someone they knew and had interacted with, but just did not know their name. To avoid this participants would have to meet face to face, which may have an effect of increasing salience of them being strangers, but would be more likely to create problems of making assumptions about the other person based on their appearance, and using such assumptions as a basis for decisions. Furthermore, it would also be difficult to control for any previous interactions which participants may have had. This is another factor which may have influenced the results. Participants who signed up in the friends condition were merely asked to sign up with "a friend", and no attempt was made to control for or measure the level of friendship or how deep the relationship was in any way. It would be worthwhile to consider this factor in more detail, alongside the difference between individuation and anonymity. Despite the lack of significant effects upon cooperation in this game, however, it should be noted that frequencies of team-reasoning responses were consistently higher in the friendship condition than they were in the stranger condition, across all games, which results in a noticeable difference in frequencies of team-reasoning responses between conditions across the whole study. This is encouraging, and points to the fact that the issue of friendship or relationship would be worth considering further in relation to team reasoning.

In Chapter 6, Study 2 the certainty of receiving the payoffs was manipulated; participants either had a one in four chance of receiving them, or would definitely receive them. It was considered that the risk inherent in aiming for the maximum joint payoff in Stag Hunt may have interacted with the uncertainty of receiving the payoffs to produce significant effects on cooperation in this game but not others. The effect of uncertainty of receipt of payoffs, and interactions with the risk involved in choices in different games, on cooperation is something that would be interesting to investigate further, with or without regard to team reasoning.

Across all the chapters, equality of payoffs seemed to be an important motivating factor for some participants. Reasons given for this tended to include fairness, indications of similar amounts of input, and a simple statement of a desire for equal outcomes. The presence of such a motivator is not a surprise: Fiske (1992), for example, has suggested that equality matching is one of the four basic styles of social interaction, and has cited a large body of evidence to back up this suggestion.

In Chapter 3, frequencies of preferences for equality of payoffs were not only positively correlated with frequencies of preferences for maximum joint payoffs, but also negatively correlated with frequencies of preferences for competitive outcomes and individualistic outcomes. The contradictory principles of such motivating factors are likely to lead to such connections – equality takes into account all payoffs, whereas the latter two are concerned with self-promotion, either standing alone, or by comparison with another.

Despite the prevalence of a desire for equality of payoffs, this thesis found no evidence that it was a part of team-reasoning motivations. Theoretically, team reasoning and egalitarianism are separate, since the former is concerned with how best to achieve the best group outcome, irrespective of any individual's roles, and the latter is concerned with equal payoffs for all, irrespective of the outcome for the group as a whole, and qualitative responses did not give rise to the suspicion that these two motivations were often considered alongside each other. However, it must be considered that in some cases team reasoning may be indistinguishable from a desire for maximum equal payoffs. It may be that people aim for the best joint payoff in order to sum and redistribute the payoffs equally. It is striking that was never given as a reason for preferring the maximum joint payoff in early chapters, although there are a number of possible reasons for this. Firstly, it may be that participants did not consider this to be permitted within what they perceived as the rules of the experiment. Secondly, the vignettes which were designed to encourage equality-seeking behaviour had a strong emphasis on fairness. One described chopping wood and getting paid certain amounts of money, and the other described amounts of money which were left in a will. Qualitative responses to these vignettes in Chapter 3 placed a strong emphasis on fairness, and it could be that any extra utility derived from an increased payoff would be offset by the perceived unfairness of unequal payoffs. Thirdly, the vignettes which were designed to encourage team-reasoning motivations described collecting money for school computers and names on a petition. These were of a nature where the individual benefit derived from the payoffs could be considered as pride in how much was collected, so any redistribution of payoffs would be meaningless, but also and more crucially, both participants would ultimately benefit equally from the outcome in terms of either access to computers, or from no GM crop test site in the area. In this way, the payoffs were automatically being summed and redistributed. This weakens the evidence for team preferences against equality-seeking motivations, although participants did not mention an awareness of this in their responses, but it is nonetheless an important point to be considered, and any future work would do well to bear it in mind.

The findings of this thesis thus give some empirical support to Sugden's (1993, 2000) theory. Sugden separated his theory of team reasoning into three parts. Firstly, he suggested that individuals might partake in what he called team-directed reasoning. Sugden described team-directed reasoning as what an individual engages in when playing their own part in trying to achieve the best outcome for a group, or team. A team-directed reasoner will appraise different arrays of actions of all those in the team, in relation to team objectives, and choose the action which fulfils his own part in the array which leads to the best outcome for the team. Team-directed reasoning can be carried out regardless of beliefs about what others in the team are doing. Furthermore, Sugden pointed out that individualistic reasoning is merely a special case of team-directed reasoning where there is only one person in the team. The individual appraises their own, individual, alternative actions in the light of their own, individual objective. Bacharach (1999) also touched on this idea.

For a person to engage in team-directed reasoning, that person must see themselves as part of a team. Sugden suggested that taking oneself to be a member of a team indicated certain beliefs about others in the team. However, it is not necessary to explain why it is or is not rational for a person to be in any given team, it is enough that a person sees himself as a team member. Sugden put forward the idea that a team exists when people believe themselves to be members of it, so in believing oneself to be a member of a team, one would also believe that the other members believe themselves to be members of the team as well. The assumption follows that if people believe themselves to be members of a team, they can be expected to engage in team-directed reasoning, that is, to follow the set of actions which will best achieve the team's objective. A belief that everyone in the team is using team-directed reasoning, and that everyone in the team believes that everyone in the team is using team-directed reasoning, and so on (until the process can go no further) is referred to by Sugden as full team confidence. It is when everyone in the team is engaging into team-directed reasoning towards a team objective, and there is full team confidence, that the team itself can be said to be team reasoning. Team reasoning, as described by Sugden, requires both a set of common beliefs and that everyone is engaging in team-directed reasoning. It is what the team itself, as an agency, engages in.

This brings to the fore the question of how to decide that everyone else in the team is using team-directed reasoning. Brase (2001) discussed the cues which people use to make assumptions about group membership, and the way in which they make inferences determined by such cues. He considered how different types of cues tend to indicate group membership in different situations, for example, transient or covert cues such as special handshakes or signs, or markers which can be selectively displayed, tend to be associated with more unstable groups or those in an unclear position when it comes to power. However, more overt, permanent markers tend to be associated with more stable groups, and can be seen to imply threats or power. If such cues are used to determine group membership, and common group membership often leads to cooperative behaviour, it could be that such cues influence on team-reasoning behaviour. Of course, some cues are open to misinterpretation, in that they are unintentionally produced, or that they are misunderstood by an observer, and as such may influence behaviour in ways that a decision-maker might regret with more complete knowledge of others involved. While such cues as Brase discussed may influence team reasoning, it is also possible that team reasoning and cooperative behaviour might, in itself, act as an indicator of group membership. If a person looks to behaviour to determine group membership, it could easily be assumed that those who cooperate with each do so because they are in the same group. It would be interesting to assess what impact observations of cooperative behaviour would have, alongside visual information which does not suggest mutual group membership. The question of whether cooperative behaviour would override conflicting indicators of whether individuals are in the same coalition is an interesting one. It is possible that people may attribute cooperative behaviour to individualistic motivation if other cues do not suggest that people are in the same group, but if easily observable visual cues suggest mutual group membership, then cooperative behaviour may more likely to be interpreted as team-reasoning behaviour.

The evolutionary benefits of cooperative behaviour are discussed by Axelrod (1990), amongst others. Helping one's kin, and thereby promoting ones own genetic inheritance, is often put forward as a reason for cooperation, as is reciprocal altruism, which takes the view that if you help someone in some way, then at some point they are likely to help you. As long as the benefit of being helped outweighs the cost of helping, and non-reciprocators are publicly identifiable, this can help explain the spread of cooperation. Evolutionary arguments such as kin selection and reciprocal altruism imply cooperation is essentially individualistic, and as such sit uneasily alongside the principles of team reasoning. However, such ideas can contribute towards the formation of a coherent theory of team reasoning.

Nowak and Sigmund (1998) discuss indirect reciprocity by reputation, and while this would rely upon accessing information about the past behaviour of others, such cues as Brase (2001) discussed may contribute to the formation of assumptions about the past behaviour of others, and their likely behaviour in the future, without having any information about a person's past behaviour. If a decision-maker perceives someone as belonging to a certain group of people, assumptions could be made about their potential behaviour by considering past behaviour of others from the same group, which could then in turn influence whether a decision maker decides to team reason. The link back to social identity theory (Tajfel and Turner, 1986) is also apparent here, with activation of group membership contributing towards behaviour.

In Chapter 6, presenting outcomes as lump sums, rather than as individual payoffs, appeared to increase cooperation levels, with high levels of team reasoning apparent in qualitative responses. Brewer and Kramer (1986) used a common fate variable as a manipulation for group identity, and this was found to increase cooperation in social dilemmas, under certain conditions. The common fate referred to in Brewer and Kramer's manipulation involved the determination of the monetary value of points (in the common fate condition, it was determined for all participants by a single draw, as opposed to each participant having their own individual draw), and did not refer to the actual points which were received. In Chapter 6, the common fate could be seen as extremely salient, because participants received the same payoff, as a pair. Conceptually, this is slightly different to Brewer and Kramer's manipulation, but it has similarities, including the resultant increase in cooperation. This raises the question of whether manipulations of group identity, such as Brewer and Kramer's, that have been shown to increase cooperation, do so through a process of increasing team reasoning. This harks back to the studies in Appendix 1, and once again brings to the fore the importance of reasons which back up behaviour.

In Chapter 6, participants were playing games and receiving monetary payoffs. Qualitative responses indicated that team reasoning was going on, but an alternative concept could be considered. In such experiments, it may be that participants aim to take as much from the game, or from the experimenter, as possible, and instead of seeing themselves as an individual playing another individual, may have perceived the situation as the participants playing the experimenter. This raises interesting points about the nature of team reasoning. Firstly, if participants consider themselves as part of a team, whose objective is to make the game, or experimenter, give up as much as possible, that could still be a case of team reasoning. The team would be constructed of the participants, and the team's objective could be to take as much as possible from whoever or whatever is providing the payoffs. While team reasoning may at first seem a friendly, cooperative concept, it relies on the principle that individuals are aiming to promote the interests of the team, whatever those interests may be. Such aims may inconvenience, injure or otherwise act against the interests of those who are not members of the team in question. The content of the team aim is, in a sense, irrelevant; what matters is that there is a team aim and team members are trying to achieve it. In football, for example, which Sugden (2000) used to illustrate team reasoning, the objective of any given team is to win, and by implication, for the opposing team to lose. It does not necessarily follow that one person's gain, or one team's gain, must be another person's or team's loss, but it is not difficult to think of plenty of real-life scenarios where this is the case, and situations may occur where the aim is not personal or team gain, but the inconvenience of another person or team.

Alternatively, cases where an individual is trying to fulfil his own personal motivation of maximising another's loss, and using the actions of a team or group of people to fulfil this personal motivation, could not be viewed as team reasoning, because the motivation has to be that of the team. This then boils down one again to the empirical question of how to distinguish between personal motivations, what "I want or desire", and team motivations, of what "we want or desire". A team preference, or ranking of team outcomes, is illustrated by team reasoning, so when all the members of a team have the same team-directed preference, the team itself can be said to have a team preference. Gilbert (1994, 2001) also outlined the idea of a collective preference, and suggested that what the group itself wants is not the same as what each individual group member wants. Sugden discussed this concept, and outlined that it is not necessary to talk about the individual objectives of each team member when constructing the team objective, nor is it necessary to refer to an individual's preference as a reason for being a member of a certain team. The idea of outcome preferences leading to behaviour choices is nothing new, in that it comes from standard individualistic decision theory. Sugden merely applied it to his theory and developed the idea of team preferences. While Gilbert (1994, 2001) and Sugden (1993, 2000) discussed the conceptual differences between individual preferences and team preferences, as has this thesis, it still remains to make a clear empirical distinction between the two. As has been suggested previously, introducing an element of mutual sacrifice into the best team outcome could be a useful approach to this problem.

This thesis has provided some empirical support for what Sugden called team-directed reasoning. However, Sugden's theory does not explain when team reasoning, or mutual confidence in others' reasoning processes will occur. Bacharach's (1999) stochastic model of team reasoning at least builds in a key determinant, namely expectations that enough other co-players are likely to team reason. The question of what activates team agency is one which Sugden left open, and he asked how it could be determined when an individual sees a problem not as a problem for himself, but instead as a problem for the team. Sugden pointed out that looking at how people frame problems, decide which team to belong to, and what the team objectives are could be the key to developing the theory of team reasoning further. This thesis has made a small step towards answering such questions, particularly in Chapters 5 and 6.

Gilbert (2001) picked up the discussion on activating team agency. She focused on the point where people move from talking about "what I want" and "my objective" to talking about "what we want" and "our objective". She suggested that mutual observation of behaviour can lead to certain conclusions about others' preferences and reasoning. Gilbert also discussed how obligations and agreements can lead to team reasoning. She suggested that once a person has a joint commitment to an objective, as part of a group, they cannot escape the commitment by just changing their mind. This is because others are involved in the group, and the commitment of the group, as an entity or agency, to use Bacharach's (1999) and Sugden's (2000) terminology, is more than just the commitment of each individual in that group. If this is the case, looking at how such commitments and agreements are activated could provide some insight into how team reasoning develops.

This thesis has produced a starting point for empirical studies of team reasoning, but there is much room for development and improvement. There is no doubt that team reasoning is theoretically distinct from many other constructs in the field of decision making, but clear empirical distinction will be harder to establish with certainty. This thesis has established a number of points about motivations behind preferences, and to a certain extent, behind behaviour, and the mixture of qualitative and quantitative approaches was extremely beneficial. Looking in more depth at people's behaviour in a greater variety of situations is certainly necessary. The issue of an empirical distinction between equality reasoning, in that team members are likely to benefit equally as individuals from a good team outcome, has to be considered. It has been clearly demonstrated that team reasoning is theoretically different from standard individualistic decision theory, however, it would be desirable to be able to distinguish empirically between an outcome which is the greatest sum of individual payoffs, and a separate outcome which is the best overall for the group as a whole. Whether this is possible remains to be seen. Obviously, for a particular individual, the outcome that is best for the team (defined, for example, as the sum of all the individuals' payoffs) is not necessarily what is best for that individual. Some sacrifice may be involved. Given a suitable set of outcomes, this could apply to everyone. It might be difficult to have an outcome which is the best overall for the group as a whole which is not the greatest sum of individual payoffs, and assessing the motivation behind behaviour would be central to any empirical study of team reasoning, but if it were possible it could prove an extremely useful way to demonstrate the theoretical difference between team reasoning and individualistic reasoning.

Appendix 1

Introduction

These preliminary experiments arose from original thoughts on the theoretical difference between individualistic decision making, decision making under conditions of group identification and team reasoning. Standard decision theory assumes that individuals act selfishly, in that they promote their own interests, and individualistically, in that each decision maker operates as a single unit, and not in conjunction with other people. However, social identity theory suggests that group membership leads individuals to become biased in favour of the ingroup as opposed to the outgroup (Tajfel & Turner, 1986) and this can be reflected in decision-making tasks (Brewer & Kramer, 1986; Miller, Downs & Prentice, 1998). Group identification is thought to be a self-serving action, in that it can boost self-esteem (Cialdini & Richardson, 1980). Under conditions of group identification, the individual takes on the group's goals as his own (success of the group being linked to his own goal of achieving higher self-esteem), however, decisions are still made on an individual basis. Chapter 1 illustrated how this differs theoretically from team reasoning, in that when an individual team reasons he considers the best outcome for the group or team, and how he can best help achieve that. Team reasoning focuses on what the team desires, and there is an implicit assumption that all those in the team have the same perception of what is best for the team as a whole. As Sugden (2000) illustrates, this may not necessarily be the same as what is best for the individual.

Not everyone who team reasons would necessarily view themselves as a member of a team. Gilbert (2001) questioned whether team reasoning is the ideal term, since a family, for example, is not usually thought of as a team, and Sugden (2000) neatly illustrates what he calls team reasoning with an example of a family's decision. However, one definition of a team is a "two or more persons working together" (Thompson, 1995, p. 1429) and as such it might be expected that something described as a team would be more likely to team reason than something described as a group, which has no such pre-requisite of working together and in that sense is more arbitrary. The label that Sugden gave is appropriate in that team reasoning is what one would expect people to do if they were in a team. This does not exclude others, who are not necessarily members of any given team, from team reasoning.

Social identification processes are thought to occur under minimal group conditions, where an arbitrary, nominal group is enough to produce intergroup discrimination (Tajfel, 1970). However, it is possible that if one were placed in a group with friends, group identification would become stronger, since there could already be a baseline level of identification created by the friendship group. Similarly, the effect of being in a team might also become stronger, since the friendship may lead to greater levels of trust (e.g. Green & Brock, 1998; Monsour, 1992; Parker & Devries, 1993; Roy, Benenson & Lilly, 2000; Schonsheck, 1997), greater liking for other team members and therefore greater willingness to act in the interests of the team.

Following the discussion presented above, it is possible that a perception of being in a team when playing the Prisoner's Dilemma game may lead to higher levels of cooperation than under conditions where just group membership is made salient.

The studies described in this appendix looked at cooperation levels in a one-shot prisoner's dilemma. One-shot games are useful in that they avoid reciprocity effects and decisions not affected by the other player's previous moves. Furthermore, participants do not have to be paired at the time of testing, and this reduces effects of face-to face interaction.

Study 1

Participants were given an outline of the Prisoner's Dilemma game and then presented with a hypothetical scenario which was constructed around the game. Two variables in the hypothetical scenario were manipulated: the level of group, or team, identity and the relationship of the hypothetical other to the participant. After the outline of the game, participants were given a short questionnaire, to provide a measure of how strongly they felt that they were part of a team.

The hypotheses are

Hypothesis 1: That levels of cooperation will be higher in the team conditions than in the group conditions, and higher in the group conditions than in the individualistic conditions.

Hypothesis 2: That cooperation levels will be higher in the friendship conditions than in the stranger conditions.

Hypothesis 3: That questionnaire scores will be higher in the team conditions than in the group conditions, and higher in the group conditions than in the individualistic conditions.

Method

Participants

136 participants were used: 30 male and 106 female. All were first-year psychology students at the University of Leicester, aged between 17 and 45 years with a mean age of 18.94 years (*SD* = 2.68). The study was piloted on three students, aged between 18 and 19 years.

Materials

Each participant was given a questionnaire, an example of which is given below. The basic two-person Prisoner's Dilemma game was outlined, followed by a hypothetical scenario, based around the Prisoner's Dilemma game. The participant was asked to imagine himself in the scenario, and indicate which course of action he would take, and why. The final part of the questionnaire consisted of a series of 7 statements describing motivations linked to team membership and team reasoning. Participants were asked to indicate, on 6-point Likert scales, how applicable the statements were to them when they were making their choice. The scenario used outlined a pair of students trying to decide whether to share notes which had been prepared for a presentation. The scenario was developed with accessibility in mind, in that it is a situation in which the participants could feasibly find themselves, or easily imagine that they might be in that situation.

Page 1 of the questionnaire:

Consider an interaction between two members of a team. Each has a choice between two courses of action - X or Y. Neither knows what choice their partner will make.

After the interaction, each team member will receive a certain payoff, or number of points, depending upon the relative choices. These could be shown in a matrix as follows:

		PARTNER (Score in Brackets) X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both team members choose X both score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both choose Y they both score 2 points.

Your objective is to earn as many points as possible, but the number of points allocated for each combination of choices poses a dilemma. If you choose Y you will score higher than if you choose X, whichever choice your partner makes. However, your partner is likely to use similar reasoning - if both of you choose Y you will both be worse off than if you both choose X.

Page 2 of the questionnaire:

Now consider an example of students preparing presentations. There are two of you in a team working on the same topic - you and your best friend. You have discussed each looking at different papers and pooling your notes so that you have more information to include in your presentations. You have to decide whether to let your partner see your notes (X) or whether to keep your notes to yourself (Y). Your best friend has to make the same decision, but neither of you knows what your partner is going to do.

There are 4 possible outcomes:

YOU	OTHER	
Y 4 points	X 1 point	You do not let your partner see your notes but they let you see their's. You are able to produce an original and informative presentation. Your partner has only enough information for a poor presentation, which isn't very original as all the material they have used is included in your presentation.
X 3 points	X 3 points	You let your partner see your notes and they let you see theirs. You are both able to produce informative presentations but as both of you have used the same source material they are not particularly different.
Y 2 points	Y 2 points	You do not let your partner see your notes and they do not let you see theirs. Each of you only has enough information to produce a poor presentation, however, as you are using different material the presentations are at least different.
X 1 point	Y 4 points	You let your partner see your notes and they do not let you see their's. You only have enough information for a poor presentation, which is not very original as the material you have used is included in your partner's presentation. Your partner is able to produce an informative and original presentation.

You have to decide whether to give your partner your notes or whether to keep your notes to yourself. The dilemma is as before - if you keep your notes to yourself you will be better off whatever the other team member decides to do.

However, if you both keep your notes to yourselves you will both be worse off than if you had both let each other see them.

Page 3 of the questionnaire:

Please provide the following personal information in confidence:

Full Name:____________________________________

Age:____

Male or Female:_________________________________

Please write your decision, X or Y, in the box below.

Please explain briefly in your own words why you chose the above option.

Page 4 of the questionnaire:

Please answer the following questions on a scale of 1 to 6, where 1 is NOT AT ALL and 6 is VERY MUCH SO. Circle whichever number you feel most applies to you.

When making my choice;

I felt myself to be a member of a team:

Not at all 1 2 3 4 5 6 Very much so

I thought solely about my own payoff:

Not at all 1 2 3 4 5 6 Very much so

I tried to play my part in ensuring the best overall payoff for us both:

Not at all 1 2 3 4 5 6 Very much so

I felt as though the solution to the problem rested with both myself and the other person:

Not at all 1 2 3 4 5 6 Very much so

I felt as though I was acting together with the other person to achieve a common goal:

Not at all 1 2 3 4 5 6 Very much so

I felt that I and the other person had to solve the problem together for both our sakes:

Not at all 1 2 3 4 5 6 Very much so

I felt that we both had an important part to play in solving the problem:

Not at all 1 2 3 4 5 6 Very much so

Design

There were six different versions of the questionnaire, involving a 3 (individualistic / group / team orientation) x 2 (interacting with best friend / stranger in the hypothetical situation) factorial, between participants design. The example given above is the team / best friend version. The individualistic / group / team orientation was manipulated by referring to the two decision makers as "people" in the individualistic orientation, "group members" in the group orientation and "team members" in the team orientation. The best friend / stranger orientation was manipulated by referring to the other person in the hypothetical scenario as being "your best friend" or "a person you have never met before". The response sheets for the decision in the Prisoner's Dilemma game and the likert scale responses were identical across all conditions. For copies of all the questionnaires, see Appendix 2. The experiment had a between-participants design.

Procedure

Participants were recruited in a lecture. The experimenter and two assistants gave out the consent forms and questionnaires. The participants were asked not to look at each other's instruction sheets and to remain silent until everyone had finished and all the instruction sheets had been collected in again. Each participant completed a single questionnaire, with a one-shot decision in the Prisoner's Dilemma game, in one of the six treatment conditions. When all participants had finished, the sheets were collected in and participants were thanked and debriefed.

Results

Frequencies of cooperation and non-cooperation can be seen in Table A1.1.

Table A1.1: Frequencies of cooperators and non-cooperators across conditions

Team variable	Relationship variable	Choice	Frequency
Individualistic	Best friend	Cooperate	17
Individualistic	Best friend	Defect	7
Individualistic	Stranger	Cooperate	16
Individualistic	Stranger	Defect	7
Group	Best friend	Cooperate	20
Group	Best friend	Defect	3
Group	Stranger	Cooperate	14
Group	Stranger	Defect	8
Team	Best friend	Cooperate	18
Team	Best friend	Defect	5
Team	Stranger	Cooperate	14
Team	Stranger	Defect	7

A hierarchical loglinear analysis was used to assess any main effects and interactions between decision, relationship variable and team variable. The final model had a generating class of choice only, suggesting that there were no significant effects of the team variable or the relationship variable.

Responses to questionnaire items across conditions can be seen in Tables A1.2 and A1.3.

Table A1.2: Mean scores on the questionnaire items across conditions from participants who cooperated. Scores were given on a six point scale, with 1 being "not at all" and 6 being "very much so".

Questionnaire item	Team variable	Relationship variable	Mean score	Standard Deviation
1 "I felt myself to be a member of a team."	Individualistic	Best Friend	4.82	1.01
	Individualistic	Stranger	4.38	1.50
	Group	Best Friend	4.55	1.23
	Group	Stranger	4.64	1.15
	Team	Best Friend	4.55	1.54
	Team	Stranger	3.93	1.73
2 "I thought solely about my own payoff." (scores reversed)	Individualistic	Best Friend	4.29	1.31
	Individualistic	Stranger	4.88	1.20
	Group	Best Friend	4.60	1.14
	Group	Stranger	4.86	.86
	Team	Best Friend	4.67	1.19
	Team	Stranger	4.50	1.65
3 "I tried to play my part in ensuring the best overall payoff for both of us."	Individualistic	Best Friend	5.29	1.10
	Individualistic	Stranger	5.19	.98
	Group	Best Friend	5.30	1.03
	Group	Stranger	5.36	.93
	Team	Best Friend	5.22	.81
	Team	Stranger	5.00	1.36
4 "I felt as though the solution to the problem rested with both myself and the other person."	Individualistic	Best Friend	5.12	1.36
	Individualistic	Stranger	5.25	.58
	Group	Best Friend	5.25	.79
	Group	Stranger	5.36	1.15
	Team	Best Friend	5.33	.69
	Team	Stranger	5.29	1.38
5 "I felt as though I was acting together with the other person to achieve a common goal."	Individualistic	Best Friend	5.12	1.22
	Individualistic	Stranger	5.31	.70
	Group	Best Friend	4.85	.67
	Group	Stranger	5.14	.95
	Team	Best Friend	5.28	.75
	Team	Stranger	4.71	1.73
6 "I felt that I and the other person had to solve the problem together for both our sakes."	Individualistic	Best Friend	4.82	1.51
	Individualistic	Stranger	5.00	1.15
	Group	Best Friend	4.70	1.30
	Group	Stranger	4.57	1.65
	Team	Best Friend	4.83	1.34
	Team	Stranger	4.86	1.70
7 "I felt that we both had an important part to play in solving the problem."	Individualistic	Best Friend	5.29	1.16
	Individualistic	Stranger	5.06	.85
	Group	Best Friend	5.05	.83
	Group	Stranger	5.43	.94
	Team	Best Friend	5.44	1.04
	Team	Stranger	5.14	1.29

Table A1.3: Mean scores on the questionnaire items across conditions from participants who chose non-cooperation. Scores were given on a 6-point likert scale, with 1 being "not at all" and 6 being "very much so".

Questionnaire item	Team variable	Relationship variable	Mean score	Standard Deviation
1 "I felt myself to be a member of a team."	Individualistic	Best Friend	2.71	1.80
	Individualistic	Stranger	2.57	1.90
	Group	Best Friend	1.67	.58
	Group	Stranger	2.75	.89
	Team	Best Friend	3.20	1.48
	Team	Stranger	2.57	1.13
2 "I thought solely about my own payoff." (scores reversed)	Individualistic	Best Friend	3.00	1.53
	Individualistic	Stranger	2.57	1.40
	Group	Best Friend	2.00	.00
	Group	Stranger	2.75	1.17
	Team	Best Friend	3.20	1.30
	Team	Stranger	2.86	1.68
3 "I tried to play my part in ensuring the best overall payoff for both of us."	Individualistic	Best Friend	3.14	1.68
	Individualistic	Stranger	3.71	1.25
	Group	Best Friend	1.67	.58
	Group	Stranger	3.88	1.64
	Team	Best Friend	3.40	1.95
	Team	Stranger	3.29	1.25
4 "I felt as though the solution to the problem rested with both myself and the other person."	Individualistic	Best Friend	3.57	1.90
	Individualistic	Stranger	5.00	1.15
	Group	Best Friend	5.00	1.73
	Group	Stranger	4.25	1.58
	Team	Best Friend	3.60	1.82
	Team	Stranger	4.14	1.46
5 "I felt as though I was acting together with the other person to achieve a common goal."	Individualistic	Best Friend	3.14	1.46
	Individualistic	Stranger	2.86	1.07
	Group	Best Friend	2.00	1.00
	Group	Stranger	3.13	1.55
	Team	Best Friend	3.80	1.30
	Team	Stranger	3.29	1.60
6 "I felt that I and the other person had to solve the problem together for both our sakes."	Individualistic	Best Friend	3.00	1.63
	Individualistic	Stranger	2.86	1.57
	Group	Best Friend	4.67	2.31
	Group	Stranger	3.50	1.60
	Team	Best Friend	4.20	1.10
	Team	Stranger	3.57	1.72
7 "I felt that we both had an important part to play in solving the problem."	Individualistic	Best Friend	3.14	1.57
	Individualistic	Stranger	4.14	1.77
	Group	Best Friend	5.33	1.15
	Group	Stranger	3.50	1.41
	Team	Best Friend	4.20	1.10
	Team	Stranger	4.00	1.63

3 way factorial ANOVAs were carried out on the questionnaire item responses between the 3 x 2 conditions and choices made by participants on the

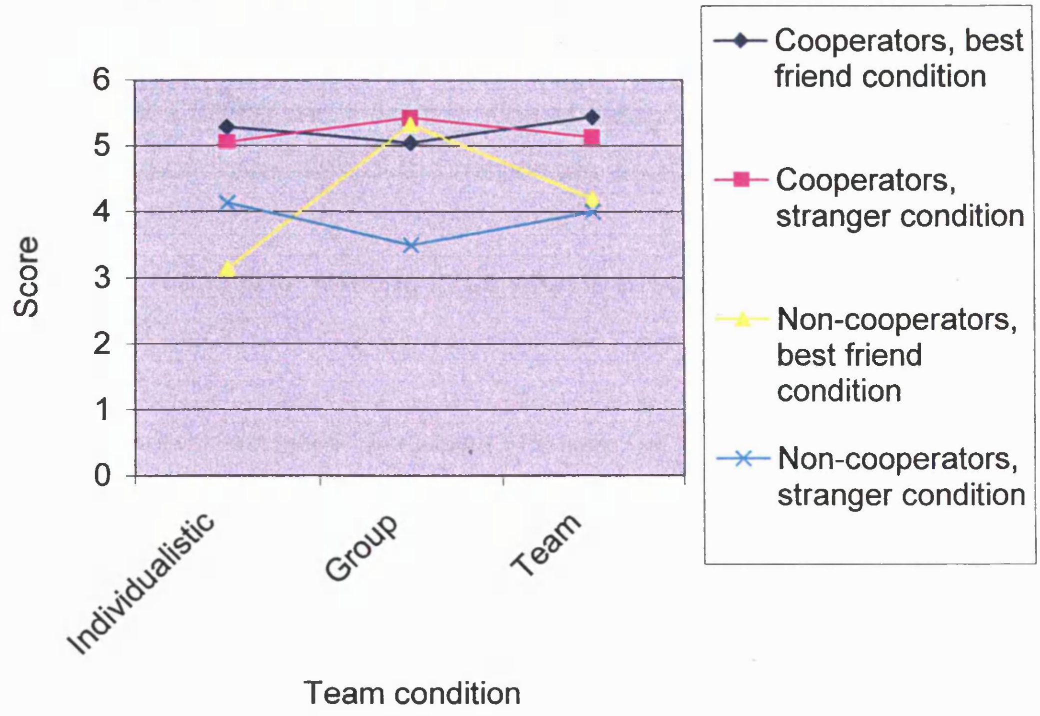
Prisoners Dilemma game. A summary of the ANOVA results for each questionnaire item can be seen in Table A1.4. No questionnaire item yielded significant results on the main effects of the team or relationship variables, or on any interactions between the type of conditions, except for a significant three-way interaction between choice, relationship and team on Item 7. Figure A1.1 illustrates the interaction. A one-way ANOVA with Tukey post-hoc tests was carried out on the means of responses to Item 7 from the twelve different groups (formed by the team, relationship and choice variables). This showed that those who chose non-cooperation in the individualistic / best friend condition gave a significantly lower mean response on Item 7 of the questionnaire than those who chose to cooperate, in all six conditions, and those who chose to defect in the group / stranger condition gave a significantly lower mean response on Item 7 of the questionnaire than cooperators in the individualistic / best friend, group / stranger, team / best friend and team / stranger conditions.

On all the questionnaire items there was a significant main effect of choice, such that cooperators had higher mean scores on the questionnaire items than defectors.

Table A1.4: Results of ANOVAs on the effects of conditions and choice on the questionnaire scores

Question number	Main effects summary			Interaction		
	Effect	*F* value	*p* value	Interaction	*F* value	*p* value
1	Relationship	.16	$p > .05$	2 way summary	.89	$p > .05$
	Team	.21	$p > .05$			
	Choice	47.19	$p < .001$	3 way	.25	$p > .05$
2	Relationship	.38	$p > .05$	2 way summary	.53	$p > .05$
	Team	.42	$p > .05$			
	Choice	51.19	$p < .001$	3 way	.29	$p > .05$
3	Relationship	2.52	$p > .05$	2 way summary	1.64	$p > .05$
	Team	.37	$p > .05$			
	Choice	76.68	$p < .001$	3 way	1.57	$p > .05$
4	Relationship	.97	$p > .05$	2 way summary	1.15	$p > .05$
	Team	.76	$p > .05$			
	Choice	17.60	$p < .001$	3 way	1.67	$p > .05$
5	Relationship	.03	$p > .05$	2 way summary	1.30	$p > .05$
	Team	1.44	$p > .05$			
	Choice	78.88	$p < .001$	3 way	.67	$p > .05$
6	Relationship	1.08	$p > .05$	2 way summary	1.03	$p > .05$
	Team	1.06	$p > .05$			
	Choice	15.16	$p < .001$	3 way	.12	$p > .05$
7	Relationship	.71	$p > .05$	2 way summary	.93	$p > .05$
	Team	1.15	$p > .05$			
	Choice	25.54	$p < .001$	3 way	4.47	$p < .05$

Figure A1.1: Mean responses on questionnaire item number 7, across team and relationship conditions and choice.



The significant 3-way interaction on Item 7, "I felt that we both had an important part to play in solving the problem", across team and relationship conditions and choice, is shown in Figure A1.1. This interaction is due to non-cooperators in the best friend condition agreeing more strongly with the statement than any other non-cooperators.

The three hypotheses: That levels of cooperation will be higher in the team conditions than in the group conditions, and higher in the group conditions than in the individualistic conditions; That cooperation levels will be higher in the friendship conditions than in the stranger conditions; And that questionnaire scores will be higher in the team conditions than in the group conditions, and higher in the group conditions than in the individualistic conditions, were not supported.

Qualitative results

Answers to the question on why subjects made their choices were categorised first of all by decision made, then by type of reason.

Reasons given for cooperative decisions fell into nine main categories, with a few responses falling into a combination of categories. Categories which were developed upon inspection of the responses were as follows:

- Altruistic reasoning, wanting to do what is best for the other person, for example:

  "In order to help best friend" (Participant 115, team / best friend condition).

- Anticipating future reciprocity from the other, for example:

  "I always like to copy work so if I let someone copy my work they might let me copy theirs next time I can't be arsed to do it" (Participant 127, team / stranger condition).

- Avoiding selfish behaviour, for example:

  "Because it is selfish to keep your notes to yourself if you see theirs" (Participant 12, individual / best friend condition).

- Aiming for equal outcomes, for example:

  "Because we would both want an equal presentation where we have both seen each others notes" (Participant 65, group / best friend condition).

- Evidential reasoning, assuming that one's own behaviour will affect the other person's choice, for example:

  "If I give someone my notes they're more likely to give me theirs. Thus my presentation would be more informative than if they hadn't given me notes" (Participant 89, group / stranger condition).

- Expecting cooperation from the other player, for example:

  "I would expect my best friend to do the same for me" (Participant 18, individual / best friend condition).

- Joint payoff maximisation, for example:

"Greater overall benefit" (Participant 26, individual / stranger condition).

- Moral reasoning, cooperating because it is the "right" thing to do, for example:

"There is no reason to keep the notes for myself. If the other person doesn't show me his / her notes then its his problem. At least I will feel I've done the right thing " (Participant 87, group / stranger condition).

- Context dependent, or incoherent, or no reason given.

Responses of those who chose non-cooperation fell into eight main categories, as follows:

- Risk avoidance, for example:

"Least risk involved" (Participant 27, individual / stranger condition).

- Individualistic thinking, for example:

"Because you are each using your own material and working independently and you don't have to rely on the other person and they are not relying on you" (Participant 78, group / stranger condition).

- Avoiding the sucker's payoff, for example:

"This way, my presentation will be reasonable whatever the other person does" (Participant 51, group / best friend condition).

- Maximising the minimum possible payoff, for example:

"Because the lowest points I can get is two, whereas with X it is one. The other student still has a 50% chance of getting equal points as me" (Participant 2, individual / best friend condition).

- Maximising own payoff, for example:

"Y gives best chance overall. X is either OK (3) or bad (1), whilst Y is either OK (2) or good (4). Cannot get maximum score using X" (Participant 82, group / stranger condition).

- Succumbing to the temptation to take advantage of the other player, for example:

"So I am able to gain a better presentation than everyone else if I see their notes but they do not see mine" (Participant 74, group / stranger condition).

- Context dependent, or incoherent, or no reason given

Study 2

The previous study looked at hypothetical scenarios. Although care was taken to make the scenarios as believable and as lifelike as possible, it may be that leading participants to believe that they are *actually* carrying out a certain task and not just having to imagine what they would do if they were in a certain situation would produce different results. Bearing this in mind, a similar experiment was carried out, but instead of giving participants a hypothetical situation, they were told that they would be "randomly paired" with another participant for a one-off Prisoner's Dilemma game. This time the manipulation was only across one level, a similar individualistic / group / team variation as before. The nature of the task description made manipulation of the relationship variable infeasible.

The hypotheses were as follows

Hypothesis 1: The frequency of cooperative choices will be highest in the team condition and lowest in the individualistic condition.

Hypothesis 2: Scores on the questionnaire items will be highest in the team condition and lowest in the individualistic condition.

Method

Participants

79 participants were used, 24 male, 53 female and 2 unknown. All were second-year psychology students at the University of Leicester, aged between 19 and 37 years, mean age 20.57 years ($SD = 2.81$). The study was piloted on 2 undergraduate students, both aged 19 years.

Materials

Each participant was given a questionnaire (see example below), which described the two-person Prisoner's Dilemma game and included a payoff matrix. The three different versions of the description told the participants they would be "paired with", or "placed in a group with", or "placed in a team with" another participant, in order to determine the points which each person would score. Following the description of the Prisoner's Dilemma game, participants were asked to indicate which choice (X or Y) they preferred and to give a brief reason for their choice. The final part of the questionnaire consisted of the same series of 7 statements describing motivations linked to team membership and team reasoning as in Study 1. Participants were asked to indicate, on 6-point Likert scales, how applicable the statements were to them when they were making their choice. The questionnaire given below is from the team condition. For a full set of questionnaires, see Appendix 4.

Page 1 of the questionnaire:

In this experiment you will be placed in a team with another participant whose identity will remain unknown to you. You each have a choice between two courses of action - X or Y. Neither of you knows which choice your partner will make.

After you have made your decisions, each team member will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each member of the team are shown in the following matrix:

		PARTNER (Score in brackets) X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both of you choose X you both score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both of you choose Y you both score 2 points.

Your objective is to earn as many points as possible. If both of you choose X you will each score higher than if you both choose Y. However, if one team member chooses Y and the other team member chooses X, then the one choosing Y will get the best possible payoff and their partner will receive the worst possible payoff.

Page 2 of the questionnaire:

Please provide the following personal information in confidence:

Full Name:____

Age:____

Male or Female:____________________________________

Please write your decision, X or Y, in the box below.

Please explain briefly in your own words why you chose the above option.

Page 3 of the questionnaire:

Please answer the following questions on a scale of 1 to 6, where 1 is NOT AT ALL and 6 is VERY MUCH SO. Circle whichever number you feel most applies to you.

When making my choice;

I felt myself to be a member of a team:

Not at all 1 2 3 4 5 6 Very much so

I thought solely about my own payoff:

Not at all 1 2 3 4 5 6 Very much so

I tried to play my part in ensuring the best overall payoff for us both:

Not at all 1 2 3 4 5 6 Very much so

I felt as though the solution to the problem rested with both myself and the other person:

Not at all 1 2 3 4 5 6 Very much so

I felt as though I was acting together with the other person to achieve a common goal:

Not at all 1 2 3 4 5 6 Very much so

I felt that I and the other person had to solve the problem together for both our sakes:

Not at all 1 2 3 4 5 6 Very much so

I felt that we both had an important part to play in solving the problem:

Not at all 1 2 3 4 5 6 Very much so

Design

The experiment was a between-participants, one-way design. The independent variable was manipulated in the instructions of the first page of the questionnaire, by informing participants that they would be "paired with another participant" (individualistic condition), or "placed in a group with another participant", (group condition) or "placed in a team with another participant" (team condition).

Procedure

Participants were recruited in a lecture. The experimenter and two assistants gave out the consent forms and questionnaires. The participants were asked not to look at each other's instruction sheets and to remain silent until everyone had finished and all the instruction sheets had been collected in again. Each participant completed a single questionnaire, with a one-shot decision in the Prisoner's Dilemma game, in one of the three treatment conditions. When all participants had finished, the sheets were collected in and participants were thanked and debriefed.

Results

The frequencies of cooperative choices and non-cooperative choices across conditions can be seen in Table A1.5, and mean scores on the questionnaire items across conditions by cooperators can be seen in Table A1.6, and by non-cooperators in table A1.7.

Table A1.5: Participants' choices across conditions

		Cooperate	Defect
Condition	Individualistic	15	12
	Group	18	9
	Team	16	9

A chi square test of association showed no significant difference in frequencies of cooperation across conditions: $\chi^2(2) = 0.77$, $p > .05$.

Table A1.6: Mean scores on the questionnaire items across conditions, given by those who chose cooperation. Scores were given on a 6-point likert scale, with 1 being "not at all" and 6 being "very much so".

Questionnaire item	Condition	Mean score	Standard Deviation
1: "I felt myself to be a member of a team."	Individualistic	2.47	1.77
	Group	3.61	1.61
	Team	3.56	1.75
2: "I thought solely about my own payoff." (scores reversed)	Individualistic	3.33	1.72
	Group	3.89	1.60
	Team	4.63	1.02
3: "I tried to play my part in ensuring the best overall payoff for both of us."	Individualistic	4.33	1.72
	Group	4.83	1.29
	Team	4.94	1.48
4: "I felt as though the solution to the problem rested with both myself and the other person."	Individualistic	5.13	1.25
	Group	5.00	.91
	Team	4.31	1.74
5: "I felt as though I was acting together with the other person to achieve a common goal."	Individualistic	3.93	1.83
	Group	4.28	1.49
	Team	4.50	1.63
6: "I felt that I and the other person had to solve the problem together for both our sakes."	Individualistic	4.00	1.65
	Group	4.67	1.14
	Team	3.75	1.81
7: "I felt that we both had an important part to play in solving the problem."	Individualistic	4.87	1.46
	Group	4.89	1.02
	Team	4.25	1.39

Table A1.7: Mean scores on the questionnaire items across conditions, given by those who chose non-cooperation. Scores were given on a 6-point likert scale, with 1 being "not at all" and 6 being "very much so".

Questionnaire item	Condition	Mean score	Standard Deviation
1: "I felt myself to be a member of a team."	Individualistic	2.00	1.13
	Group	1.89	1.17
	Team	2.58	1.34
2: "I thought solely about my own payoff." (scores reversed)	Individualistic	2.17	1.03
	Group	1.67	1.00
	Team	1.62	.87
3: "I tried to play my part in ensuring the best overall payoff for both of us."	Individualistic	2.67	1.15
	Group	1.89	.60
	Team	1.75	1.04
4: "I felt as though the solution to the problem rested with both myself and the other person."	Individualistic	3.83	2.12
	Group	4.56	1.13
	Team	3.56	1.67
5: "I felt as though I was acting together with the other person to achieve a common goal."	Individualistic	2.67	1.44
	Group	2.11	1.05
	Team	1.84	.80
6: "I felt that I and the other person had to solve the problem together for both our sakes."	Individualistic	2.42	1.62
	Group	2.67	1.87
	Team	1.67	.71
7: "I felt that we both had an important part to play in solving the problem."	Individualistic	3.58	1.68
	Group	3.56	2.07
	Team	3.09	1.75

Two-way factorial ANOVAs (choice x condition) were carried out on the separate questionnaire items between the conditions, one on each questionnaire item. A summary of the results can be seen in Table A1.8. (Mean scores on the questionnaire items are given in Tables A1.6 and A1.7). There was a significant main effect of choice on the results of all the separate questionnaire items, but there was no significant main effect of condition, and no significant interactions of condition and choice.

Table A1.8: Results of ANOVAs on the effects of condition and choice on the questionnaire scores

Question number	Main effects summary			Two-way interaction	
	Effect	F value	p value	F value	p value
1	Condition	1.88	$p > .05$	1.05	$p > .05$
	Choice	8.65	$p < .005$		
2	Condition	.59	$p > .05$	3.07	$p > .05$
	Choice	48.16	$p < .001$		
3	Condition	.10	$p > .05$	2.39	$p > .05$
	Choice	70.13	$p < .001$		
4	Condition	1.91	$p > .05$	.53	$p > .05$
	Choice	5.68	$p < .05$		
5	Condition	.06	$p > .05$	1.42	$p > .05$
	Choice	34.31	$p < .001$		
6	Condition	2.32	$p > .05$	.20	$p > .05$
	Choice	28.14	$p < .001$		
7	Condition	2.42	$p > .05$	.02	$p > .05$
	Choice	12.76	$p < .005$		

The two hypotheses: That the frequency of cooperative choices would be highest in the team condition and lowest in the individualistic condition; And that scores on the questionnaire items would be highest in the team condition and lowest in the individualistic condition, were not supported.

Qualitative results

Answers to the question on why participants made their choice were categorised firstly by decision made, then by type of reason.

Reasons given for cooperative choices were categorised into six different groups, of which examples are given below. Some responses fitted into more than one category.

- Seeking an equal outcome, for example:

  "I hoped the other person would choose X as well and then we'd be equal. If they chose Y I would think they were slightly selfish. If we both choose X one wouldn't be more better off than the other. If everyone chose X, then no-one would benefit more than anyone else" (Participant 14, individual condition).

- Expecting cooperation from the other player, for example:

  "Because I believe the other person would also choose it" (Participant 8, individual condition).

- Aiming for an intermediate choice, for example:

  "Because it is the intermediate choice" (Participant 29, group condition).

- Aiming for the best joint outcome, for example:

  "If we both choose X highest possible combination of points" (Participant 7, individual condition).

- Cooperating for moral reasons, such as wanting to do the "right" thing, for example:

  "Because, hopefully, the other person is "decent" too. i.e. – one can't expect other people to always place an 'X' if one doesn't oneself" (Participant 26, group condition).

- Incoherent or no response given.

Reasons given for non-cooperative choices were categorised into eight groups, of which examples are given below. Again, some responses fell into more than one category.

- Avoiding relative loss, for example:

"Whatever my partner chooses when I have chose Y will give me the same or more points than my partner. If I choose X I would only get the same points if my partner also X, if they had chosen Y I would loose. So there's a greater chance of me getting more points" (Participant 24, individual condition).

- Avoiding the sucker's payoff, for example:

"As if I chose 'X' they would probably go for 'Y' as it gives them the most points and I would only get 1. At least I would get more points, most probably, with Y" (Participant 20, individual condition).

- Competitive behaviour, wanting to do better than the other player, for example:

"Because we did a similar experiment to this in the 1st year & the partner I was assigned to always chose the answer which earned her more money than me so now that's what I'm trying to do" (Participant 68, team condition).

- Dominance argument, for example:

"Whatever my partner chooses, I am more likely to score higher by choosing Y than X" (Participant 75, team condition.

- Expecting the other player to defect, for example:

"The best chance of achieving most points for myself and a belief that most people will choose Y" (Participant 19, individual condition).

- Maximising own payoff, for example:

It will allow for maximum points on more occasions, rather than X" (Participant 18, individual condition).

- Maximax reasoning, aiming for the best possible payoff with no apparent thought given to what the other player might choose, for example:

"Y is the best option because you can still get a greater chance of obtaining the most points" (Participant 22, individual condition).

- Succumbing to the temptation to take advantage of the other player, for example:

"Because I think that my fellow participant will choose X, so I'll get more points" (Participant 76, individual condition).

Discussion

In Study 1, the hypotheses that levels of cooperation will be higher in the team conditions than in the group conditions, and higher in the group conditions than in the individualistic conditions, that cooperation levels will be higher in the friendship conditions than in the stranger conditions and that questionnaire scores will be higher in the team conditions than in the group conditions, and higher in the group conditions than in the individualistic conditions were not supported. The only significant findings were from the questionnaire results, in that people who made a cooperative choice in the Prisoner's Dilemma game gave significantly higher responses (where high responses represent agreement with statements which describe team motivations) than people who chose to defect in the Prisoner's Dilemma game on all the questionnaire items, and there was a significant three-way interaction between the team variable, the friendship variable and choice with regard to responses on questionnaire item 7 ("I felt that we both had an important part to play in solving the problem"). Those in the best friend and group condition who chose not to cooperate, agreed with the statement more than non-cooperators in the best friend and individualistic or team conditions. There was not such a marked difference between responses from any of the cooperators in any conditions. Non-cooperators in all three of the stranger conditions agreed with the statement in question 7 less than cooperators. The difference between the non-cooperators' responses in the three stranger conditions (individualistic, group and team) was very slight, although in contrast to non-cooperators in the best friend condition, those in the stranger / group condition agreed with the statement less than those in the stranger / individualistic and team conditions. It is difficult to say why non-cooperators agreed with the statement more in the best friend / group condition than in any other conditions.

In Study 2, the two hypotheses; that the manipulation of conditions would affect cooperation levels and questionnaire responses, were not supported.

A variety of reasons were given for both cooperation and non-cooperation in both Study 1 and Study 2. Aiming for the maximum joint payoff, expecting cooperation, aiming for equal outcomes, and moral reasoning were frequently given as reasons for cooperation, and avoiding the sucker's payoff, aiming to take advantage of the other person, and maximising one's own payoff were frequently given as reasons for non-cooperation.

The conclusions that can be drawn from the above studies are very limited. Differences between social identity theory and team thinking have not been made apparent, and there is no evidence to show whether team reasoning can be encouraged by such simple manipulation of frames.

The studies were flawed on many accounts, and as such raised issues about the difficulty of studying team reasoning.

Firstly, the structure of a Prisoner's Dilemma game does not allow for interpretation of a cooperative choice as necessarily team reasoning behaviour. Team reasoning behaviour would result in a cooperative choice, but there are many motives which could lie behind cooperation. Some of these were evident in the qualitative responses, such as altruistic reasoning, avoiding selfish behaviour and aiming for equal outcomes. Qualitative responses do enable some degree of interpretation of motivations, and would be a useful avenue to pursue in future studies.

Secondly, the manipulation of conditions with regard to the individualistic, group identity and team reasoning motivations was somewhat spurious. No work had been done previously to show whether this manipulation would increase group identity on the one hand, or whether there was any reason to suppose that the 'team' manipulation would be any different from the 'group' manipulation. Again, a Prisoner's Dilemma game does not allow for rigorous assessment of any differences in motivation which may result from this manipulation, if indeed there are any differences.

Thirdly, the manipulation of the friendship variable is just one of many variables that may affect motivations, particularly with response to team reasoning. These factors need to be looked at more systematically in a framework which enables team reasoning to be distinguished more clearly.

The problem in Study 1 of the reality of the situation, in that the entire decision scenario was hypothetical, was partially addressed in Study 2 in that participants were told that their choice would be paired with someone else's, to result in a score. However, there was no provision to inform participants of their end score, so this manipulation was unlikely to change participants' perceptions of the scenario substantially. The issue of whether participants care about imaginary payoffs has been the source of much debate (e. g. Gumpert, Deutsch & Epstein, 1969; Oskamp & Kleinke, 1970; Stahelski & Kelley, 1969; Wrightsman, 1966), although the results from these studies are contradictory, and therefore inconclusive. However, the current studies are minimising any hopes that participants could be motivated by payoffs in that they are not even informed of the payoffs, thus increasing the likelihood that decisions they make will be arbitrary.

The differences in questionnaire response between those who chose cooperation and those who chose non-cooperation do not enable strong conclusions to be drawn about team reasoning. Cooperation is not equivalent to team reasoning, and as there is no evidence as to whether participants are team reasoning, it cannot be judged whether the questionnaires accurately reflect motivations that team reasoners are subject to, or just motivations that people who cooperate are subject to.

While these studies are flawed and poorly designed, they clarified the importance of various experimental features which need to be considered when attempting to study team reasoning, particularly the need to ensure that motivations for behaviour or preferences are distinctive. It would be potentially useful to return to two-person games in the future, but they are not suitable vehicles from which to start studying team reasoning.

Appendix 2: Materials for Appendix 1, Study 1

Page 1 of the Individualistic condition instructions (for both Best Friend and Stranger conditions):

Consider an interaction between two people. Each has a choice between two courses of action - X or Y. Neither knows what choice the other person will make.

After the interaction, each person will receive a certain payoff, or number of points, depending upon the relative choices. These could be shown in a matrix as follows:

		OTHER (Score in Brackets) X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both people choose X both score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both choose Y they both score 2 points.

Your objective is to earn as many points as possible, but the number of points allocated for each combination of choices poses a dilemma. If you choose Y you will score higher than if you choose X, whichever choice the other person makes. However, the other person is likely to use similar reasoning - if both of you choose Y you will be worse off than if you both choose X.

Page 2 of the Individualistic / Best Friend condition instructions:

Now consider an example of students preparing presentations. There are two of you working on the same topic - you and your best friend. You have discussed each looking at different papers and pooling your notes so you have more information to include in your presentations. You have to decide whether to let the other student see your notes (X) or whether to keep your notes to yourself (Y). Your best friend has to make the same decision, but neither of you knows what the other is going to do.

There are 4 possible outcomes:

YOU	(OTHER)	
Y 4 points	(X) (1 point)	You do not let the other student see your notes but they let you see their's. You are able to produce an original and informative presentation. The other student has only enough information for a poor presentation, which isn't very original as all the material they have used is included in your presentation.
X 3 points	(X) (3 points)	You let the other student see your notes and they let you see theirs. You are both able to produce informative presentations but as both of you have used the same source material they are not particularly different.
Y 2 points	(Y) (2 points)	You do not let the other student see your notes and they do not let you see theirs. Each of you only has enough information to produce a poor presentation, however, as you are using different material the presentations are at least different.
X 1 point	(Y) (4 points)	You let the other student see your notes and they do not let you see their's. You only have enough information for a poor presentation, which is not very original as the material you have used is included in the other student's presentation. The other student is able to produce an informative and original presentation.

You have to decide whether to give the other student your notes or whether to keep your notes to yourself. The dilemma is as before - if you keep your notes to yourself you will be better off whatever the other student decides to do. However, if you both keep your notes to yourselves you will be worse off than if you had both let each other see them.

Page 2 of the Individualistic / Stranger condition instructions:

Now consider an example of students preparing presentations. There are two of you working on the same topic - you and a student you have never met before. You have discussed each looking at different papers and pooling your notes so you have more information to include in your presentations. You have to decide whether to let the other student see your notes (X) or whether to keep your notes to yourself (Y). The student you have never met before has to make the same decision, but neither of you knows what the other is going to do.

There are 4 possible outcomes:

YOU	(OTHER)	
Y 4 points	(X) (1 point)	You do not let the other student see your notes but they let you see their's. You are able to produce an original and informative presentation. The other student has only enough information for a poor presentation, which isn't very original as all the material they have used is included in your presentation.
X 3 points	(X) (3 points)	You let the other student see your notes and they let you see theirs. You are both able to produce informative presentations but as both of you have used the same source material they are not particularly different.
Y 2 points	(Y) (2 points)	You do not let the other student see your notes and they do not let you see theirs. Each of you only has enough information to produce a poor presentation, however, as you are using different material the presentations are at least different.
X 1 point	(Y) (4 points)	You let the other student see your notes and they do not let you see their's. You only have enough information for a poor presentation, which is not very original as the material you have used is included in the other student's presentation. The other student is able to produce an informative and original presentation.

You have to decide whether to give the other student your notes or whether to keep your notes to yourself. The dilemma is as before - if you keep your notes to yourself you will be better off whatever the other student decides to do. However, if you both keep your notes to yourselves you will be worse off than if you had both let each other see them.

Page 1 of the Group condition instructions (for both Best Friend and Stranger conditions):

Consider an interaction between two members of a group. Each has a choice between two courses of action - X or Y. Neither knows what choice the other person will make.

After the interaction, each person will receive a certain payoff, or number of points, depending upon the relative choices. These could be shown in a matrix as follows:

		OTHER (Score in Brackets) X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both people choose X both score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both choose Y they both score 2 points.

Your objective is to earn as many points as possible, but the number of points allocated for each combination of choices poses a dilemma. If you choose Y you will score higher than if you choose X, whichever choice the other person makes. However, the other person is likely to use similar reasoning - if both of you choose Y you will be worse off than if you both choose X.

Page 2 of the Group / Best Friend condition instructions:

Now consider an example of students preparing presentations. There are two of you in a group working on the same topic - you and your best friend. You have discussed each looking at different papers and pooling your notes so you have more information to include in your presentations. You have to decide whether to let the other member of your group see your notes (X) or whether to keep your notes to yourself (Y). Your best friend has to make the same decision, but neither of you knows what the other is going to do.

There are 4 possible outcomes:

YOU	(OTHER)	
Y 4 points	(X) (1 point)	You do not let the other member of your group see your notes but they let you see their's. You are able to produce an original and informative presentation. The other member of your group has only enough information for a poor presentation, which isn't very original as all the material they have used is included in your presentation.
X 3 points	(X) (3 points)	You let the other member of your group see your notes and they let you see theirs. You are both able to produce informative presentations but as both of you have used the same source material they are not particularly different.

Y 2 points	(Y) (2 points)	You do not let the other member of your group see your notes and they do not let you see theirs. Each of you only has enough information to produce a poor presentation, however, as you are using different material the presentations are at least different.
X 1 point	(Y) (4 points)	You let the other member of your group see your notes and they do not let you see their's. You only have enough information for a poor presentation, which is not very original as the material you have used is included in the other member of your group's presentation. The other member of your group is able to produce an informative and original presentation.

You have to decide whether to give the other member of your group your notes or whether to keep your notes to yourself. The dilemma is as before - if you keep your notes to yourself you will be better off whatever the other member of your group decides to do. However, if you both keep your notes to yourselves you will be worse off than if you had both let each other see them.

Page 2 of the Group / Stranger condition instructions:

Now consider an example of students preparing presentations. There are two of you in a team working on the same topic - you and a student you have never met before. You have discussed each looking at different papers and pooling your notes so you have more information to include in your presentations. You have to decide whether to let the other member of your group see your notes (X) or whether to keep your notes to yourself (Y). The student you have never met before has to make the same decision, but neither of you knows what the other is going to do.

There are 4 possible outcomes:

YOU	(OTHER)	
Y 4 points	(X) (1 point)	You do not let the other member of your group see your notes but they let you see their's. You are able to produce an original and informative presentation. The other member of your group has only enough information for a poor presentation, which isn't very original as all the material they have used is included in your presentation.

X 3 points	(X) (3 points)	You let the other member of your group see your notes and they let you see theirs. You are both able to produce informative presentations but as both of you have used the same source material they are not particularly different.
Y 2 points	(Y) (2 points)	You do not let the other member of your group see your notes and they do not let you see theirs. Each of you only has enough information to produce a poor presentation, however, as you are using different material the presentations are at least different.
X 1 point	(Y) (4 points)	You let the other member of your group see your notes and they do not let you see their's. You only have enough information for a poor presentation, which is not very original as the material you have used is included in the other member of your group's presentation. The other member of your group is able to produce an informative and original presentation.

You have to decide whether to give the other member of your group your notes or whether to keep your notes to yourself. The dilemma is as before - if you keep your notes to yourself you will be better off whatever the other member of your group decides to do. However, if you both keep your notes to yourselves you will be worse off than if you had both let each other see them.

Page 1 of the Team condition instructions (for both Best Friend and Stranger conditions):

Consider an interaction between two members of a team. Each has a choice between two courses of action - X or Y. Neither knows what choice their partner will make.

After the interaction, each team member will receive a certain payoff, or number of points, depending upon the relative choices. These could be shown in a matrix as follows:

		PARTNER (Score in Brackets) X	PARTNER (Score in Brackets) Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both team members choose X both score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both choose Y they both score 2 points.

Your objective is to earn as many points as possible, but the number of points allocated for each combination of choices poses a dilemma. If you choose Y you will score higher than if you choose X, whichever choice your partner makes. However, your partner is likely to use similar reasoning - if both of you choose Y you will both be worse off than if you both choose X.

Page 2 of the Team / Best Friend condition instructions:

Now consider an example of students preparing presentations. There are two of you in a team working on the same topic - you and your best friend. You have discussed each look at different papers and pooling your notes so you have more information to include in your presentations. You have to decide whether to let your partner see your notes (X) or whether to keep your notes to yourself (Y). Your best friend has to make the same decision, but neither of you knows what your partner is going to do.

There are 4 possible outcomes:

YOU	OTHER	
Y 4 points	X 1 point	You do not let your partner see your notes but they let you see their's. You are able to produce an original and informative presentation. Your partner has only enough information for a poor presentation, which isn't very original as all the material they have used is included in your presentation.
X 3 points	X 3 points	You let your partner see your notes and they let you see theirs. You are both able to produce informative presentations but as both of you have used the same source material they are not particularly different.
Y 2 points	Y 2 points	You do not let your partner see your notes and they do not let you see theirs. Each of you only has enough information to produce a poor presentation, however, as you are using different material the presentations are at least different.
X 1 point	Y 4 points	You let your partner see your notes and they do not let you see their's. You only have enough information for a poor presentation, which is not very original as the material you have used is included in your partner's presentation. Your partner is able to produce an informative and original presentation.

You have to decide whether to give your partner your notes or whether to keep your notes to yourself. The dilemma is as before - if you keep your notes to yourself you will be better off whatever the other team member decides to do. However, if you both keep your notes to yourselves you will both be worse off than if you had both let each other see them.

Page 2 of the Team / Stranger condition instructions:

Now consider an example of students preparing presentations. There are two of you in a team working on the same topic - you and a student you have never met before. You have discussed each looking at different papers and pooling your notes so you have more information to include in your presentations. You have to decide whether to let your partner see your notes (X) or whether to keep your notes to yourself (Y). The student you have never met before has to make the same decision, but neither of you knows what your partner is going to do.

There are 4 possible outcomes:

YOU	OTHER	
Y 4 points	X 1 point	You do not let your partner see your notes but they let you see their's. You are able to produce an original and informative presentation. Your partner has only enough information for a poor presentation, which isn't very original as all the material they have used is included in your presentation.
X 3 points	X 3 points	You let your partner see your notes and they let you see theirs. You are both able to produce informative presentations but as both of you have used the same source material they are not particularly different.
Y 2 points	Y 2 points	You do not let your partner see your notes and they do not let you see theirs. Each of you only has enough information to produce a poor presentation, however, as you are using different material the presentations are at least different.
X 1 point	Y 4 points	You let your partner see your notes and they do not let you see their's. You only have enough information for a poor presentation, which is not very original as the material you have used is included in your partner's presentation. Your partner is able to produce an informative and original presentation.

You have to decide whether to give your partner your notes or whether to keep your notes to yourself. The dilemma is as before - if you keep your notes to yourself you will be better off whatever the other team member decides to do. However, if you both keep your notes to yourselves you will both be worse off than if you had both let each other see them.

Page 3 of all instructions:

Please provide the following personal information in confidence:

Full Name:____

Age:____

Male or Female:____________________________________

Please write your decision, X or Y, in the box below.

Please explain briefly in your own words why you chose the above option.

Page 4 of all instructions:

Please answer the following questions on a scale of 1 to 6, where 1 is NOT AT ALL and 6 is VERY MUCH SO. Circle whichever number you feel most applies to you.

When making my choice;

I felt myself to be a member of a team:

Not at all 1 2 3 4 5 6 Very much so

I thought solely about my own payoff:

Not at all 1 2 3 4 5 6 Very much so

I tried to play my part in ensuring the best overall payoff for us both:

Not at all 1 2 3 4 5 6 Very much so

I felt as though the solution to the problem rested with both myself and the other person:

Not at all 1 2 3 4 5 6 Very much so

I felt as though I was acting together with the other person to achieve a common goal:

Not at all 1 2 3 4 5 6 Very much so

I felt that I and the other person had to solve the problem together for both our sakes:

Not at all 1 2 3 4 5 6 Very much so

I felt that we both had an important part to play in solving the problem:

Not at all 1 2 3 4 5 6 Very much so

Appendix 3: Materials for Appendix 1, Study 2

Page 1 of the Individualistic condition instructions:

In this experiment you will be paired with another participant whose identity will remain unknown to you. You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER (Score in brackets) X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both of you choose X you both score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both of you choose Y you both score 2 points.

Your objective is to earn as many points as possible. If both of you choose X, you will score higher than if you both choose Y. However, if one person chooses Y and the other person chooses X, then the one choosing Y will get the best possible payoff and the other person will receive the worst possible payoff.

Page 1 of the Group condition instructions:

In this experiment you will be placed in a group with another participant whose identity will remain unknown to you. You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER (Score in brackets) X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both of you choose X you both score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both of you choose Y you both score 2 points.

Your objective is to earn as many points as possible. If both of you choose X, you will score higher than if you both choose Y. However, if one person chooses Y and the other person chooses X, then the one choosing Y will get the best possible payoff and the other person will receive the worst possible payoff.

Page 1 of the Team condition instructions:

In this experiment you will be placed in a team with another participant whose identity will remain unknown to you. You each have a choice between two courses of action - X or Y. Neither of you knows which choice your partner will make.

After you have made your decisions, each team member will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each member of the team are shown in the following matrix:

		PARTNER (Score in brackets) X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both of you choose X you both score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both of you choose Y you both score 2 points.

Your objective is to earn as many points as possible. If both of you choose X you will each score higher than if you both choose Y. However, if one team member chooses Y and the other team member chooses X, then the one choosing Y will get the best possible payoff and their partner will receive the worst possible payoff.

Page 2 of all instructions:

Please provide the following personal information in confidence:

Full Name:______________________________________

Age:____

Male or Female:__________________________________

Please write your decision, X or Y, in the box below.

Please explain briefly in your own words why you chose the above option.

Page 3 of all instructions:

Please answer the following questions on a scale of 1 to 6, where 1 is NOT AT ALL and 6 is VERY MUCH SO. Circle whichever number you feel most applies to you.

When making my choice;

I felt myself to be a member of a team:

Not at all 1 2 3 4 5 6 Very much so

I thought solely about my own payoff:

Not at all 1 2 3 4 5 6 Very much so

I tried to play my part in ensuring the best overall payoff for us both:

Not at all 1 2 3 4 5 6 Very much so

I felt as though the solution to the problem rested with both myself and the other person:

Not at all 1 2 3 4 5 6 Very much so

I felt as though I was acting together with the other person to achieve a common goal:

Not at all 1 2 3 4 5 6 Very much so

I felt that I and the other person had to solve the problem together for both our sakes:

Not at all 1 2 3 4 5 6 Very much so

I felt that we both had an important part to play in solving the problem:

Not at all 1 2 3 4 5 6 Very much so

Appendix 4: Materials for Chapter 2

Front-page for all booklets:

INSTRUCTIONS - please read carefully.

In the following pages you will be given a number of imaginary scenarios, each followed by a number of different possible outcomes. After each scenario you will be asked to indicate your response to a number of questions. Please answer by specifying the letter of the appropriate outcome. For example, if your answer to a question is outcome d, please write 'd' after the question. Please answer all the questions, and remember that there is no right or wrong answer, it is just important that you write down the letter which YOU THINK is most appropriate.

Male/Female (please ring)

Age________________________

Hotdog (competitive) vignette:

You and another person have each set up hot-dog stands in the town centre. You decide to keep an eye on the number of customers each of you serves in one afternoon. Here is a list of the possible options:

	Your stall serves	(Other stall serves)
option a	54 customers	(11 customers)
option b	23 customers	(82 customers)
option c	54 customers	(52 customers)
option d	71 customers	(29 customers)
option e	54 customers	(73 customers)

Which of these options would be the fairest?
Which of these options would be most selfish?
Which of these options would be most unfair?
Which of these options would lead to the best total overall outcome?
Which of these options would be the most equal?

Pool Game (competitive) vignette:

You and a drinking acquaintance play pool regularly in a local pub, keeping a count of how many games each of you wins. At the end of a month points are added up to determine the overall winner. Here is a list of the possible options:

	You win	(Other wins)
option a	70 winning games	(75 winning games)
option b	90 winning games	(60 winning games)
option c	20 winning games	(110 winning games)
option d	70 winning games	(20 winning games)
option e	70 winning games	(100 winning games)

Which of these options would be the fairest?
Which of these options would be most selfish?
Which of these options would be most unfair?
Which of these options would lead to the best total overall outcome?
Which of these options would be the most equal?

Prize Draw (individualistic) vignette:

You and your next door neighbour have entered a prize draw with 20 different prizes ranging from £10 to £100. There are two £10 prizes, two £20 prizes and so on up to two £100 prizes. The prizes are drawn and you and your next door neighbour each wins a prize. Here is a list of the possible options:

	You win	(Next door neighbour wins)
option a	£20	(£80)
option b	£50	(£50)
option c	£70	(£40)
option d	£50	(£10)
option e	£50	(£70)

Which of these options would be the fairest?
Which of these options would be most selfish?
Which of these options would be most unfair?
Which of these options would lead to the best total overall outcome?
Which of these options would be the most equal?

Computer (individualistic) vignette:

You and a classmate have completed an on-line test for potential employers to assess your computing abilities, the results of which could be a useful addition to your CV. Scores for the test are out of 100. Here is a list of the possible options:

	You score	(Classmate scores)
option a	65 points	(95 points)
option b	80 points	(50 points)
option c	65 points	(10 points)
option d	30 points	(100 points)
option e	65 points	(60 points)

Which of these options would be the fairest?
Which of these options would be most selfish?
Which of these options would be most unfair?
Which of these options would lead to the best total overall outcome?
Which of these options would be the most equal?

Headshave (Team Reasoning) vignette:

Various members of your class are undertaking different sponsored activities to help raise funds for new computers at the school. You and a friend decide to do a sponsored head shave. You each raise a certain amount of money. Here is a list of the possible options:

	You raise	(Friend raises)
option a	£30	(£100)
option b	£60	(£65)
option c	£60	(£90)
option d	£80	(£50)
option e	£60	(£10)

Which of these options would be the fairest?
Which of these options would be most selfish?
Which of these options would be most unfair?
Which of these options would lead to the best total overall outcome?
Which of these options would be the most equal?

GM (team reasoning) vignette:

You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend an hour each in the local town collecting names on petitions opposing the new test site. You each collect a certain number of names. Here is a list of the possible options:

	You collect	(Other group member collects)
option a	72 names	(70 names)
option b	93 names	(58 names)
option c	72 names	(21 names)
option d	72 names	(103 names)
option e	20 names	(119 names)

Which of these options would be the fairest?
Which of these options would be most selfish?
Which of these options would be most unfair?
Which of these options would lead to the best total overall outcome?
Which of these options would be the most equal?

Firewood (equality-seeking) vignette:

You and a friend have helped a mutual acquaintance collect and chop firewood for the winter. You have both worked hard for a couple of days. He pays you each a certain amount of money. Here is a list of the possible options:

	You are paid	(Friend is paid)
option a	£50	(£50)
option b	£50	(£70)
option c	£20	(£80)
option d	£70	(£40)
option e	£50	(£10)

Which of these options would be the fairest?
Which of these options would be most selfish?
Which of these options would be most unfair?
Which of these options would lead to the best total overall outcome?
Which of these options would be the most equal?

Will (equality-seeking) vignette:

An elderly friend of the family has died and left you and your brother a small amount of money each. Here is a list of the possible options:

	You are left	(Brother is left)
option a	£70	(£10)
option b	£70	(£70)
option c	£20	(£110)
option d	£70	(£100)
option e	£90	(£60)

Which of these options would be the fairest?
Which of these options would be most selfish?
Which of these options would be most unfair?
Which of these options would lead to the best total overall outcome?
Which of these options would be the most equal?

Burgled (altruistic) vignette:

Your best friend's flat has just been burgled and many of their possessions have been taken, unfortunately their insurance will not cover a lot of the items that have gone missing. You decide to go for a game of bingo with them to help cheer them up. You each come home with some money. Here is a list of the possible options:

	You come home with	(Friend comes home with)
option a	£65	(£85)
option b	£65	(£10)
option c	£35	(£105)
option d	£80	(£45)
option e	£65	(£60)

Which of these options would be the fairest?
Which of these options would be most selfish?
Which of these options would be most unfair?
Which of these options would lead to the best total overall outcome?
Which of these options would be the most equal?

Lottery (altruistic) vignette:

Your sister is terminally ill and has been given 6 months left to live. However, although there are a lot of things she would like to do she wants to try to maintain a fairly normal lifestyle for as long as possible. Shortly after you find out about her illness, you both win a prize on the lottery. Here is a list of the possible options:

	You win	(Sister wins)
option a	£50 thousand	(£50 thousand)
option b	£50 thousand	(£10 thousand)
option c	£20 thousand	(£90 thousand)
option d	£70 thousand	(£40 thousand)
option e	£50 thousand	(£70 thousand)

Which of these options would be the fairest?
Which of these options would be most selfish?
Which of these options would be most unfair?
Which of these options would lead to the best total overall outcome?
Which of these options would be the most equal?

Appendix 5: Materials for Chapter 3

Front-page of all booklets:

INSTRUCTIONS - please read carefully.

In the following pages you will be given a number of imaginary scenarios, each followed by a number of different possible outcomes. Please try to imagine yourself in each scenario and decide which of the given outcomes you would prefer. In each scenario, please choose one and only one outcome from the options that you are given. After making your decision please give a brief reason for it (one or two sentences is ample) and proceed on to the next scenario. PLEASE REMEMBER - there is no right or wrong answer, it is merely what you feel you would prefer in that situation.

Male/Female (please ring)

Age________________________

Hotdog (competitive) vignette:

You and another person have each set up hot-dog stands in the town centre. You decide to keep an eye on the number of customers each of you serves in one afternoon. Which of the following would you prefer?

Your stall serves	(Other stall serves)	Please tick your preferred outcome (one only)
54 customers	(11 customers)	
23 customers	(82 customers)	
54 customers	(52 customers)	
71 customers	(29 customers)	
54 customers	(73 customers)	

Please give a brief reason below for your choice, in the box below.

Pool Game (competitive) vignette:

You and a drinking acquaintance play pool regularly in a local pub, keeping a count of how many games each of you wins. At the end of a month points are added up to determine the overall winner. Which of the following would you prefer?

You win	(Other wins)	Please tick your preferred outcome (one only)
70 games	(75 games)	
90 games	(60 games)	
20 games	(110 games)	
70 games	(20 games)	
70 games	(100 games)	

Please give a brief reason below for your choice, in the box below.

Prize Draw (individualistic) vignette:

You and your next door neighbour have entered a prize draw with 20 different prizes ranging from £10 to £100. There are two £10 prizes, two £20 prizes and so on up to two £100 prizes. The prizes are drawn and you and your next door neighbour each wins a prize. Which of the following would you prefer?

You win	(Next door neighbour wins)	Please tick your preferred outcome (one only)
£20	(£80)	
£50	(£50)	
£70	(£40)	
£50	(£10)	
£50	(£70)	

Please give a brief reason below for your choice, in the box below.

Computer (individualistic) vignette:

You and a classmate have completed an on-line test for potential employers to assess your computing abilities, the results of which could be a useful addition to your CV. Scores for the test are out of 100. Which of the following would you prefer?

You score	(Classmate scores)	Please tick your preferred outcome (one only)
65 points	(95 points)	
80 points	(50 points)	
65 points	(10 points)	
30 points	(100 points)	
65 points	(60 points)	

Please give a brief reason below for your choice, in the box below.

Headshave (team reasoning) vignette:

Various members of your class at your school are undertaking different sponsored activities to help raise funds for new computers. You and a friend decide to do a sponsored head shave. You each raise a certain amount of money. Which of the following would you prefer?

You raise	(Friend raises)	Please tick your preferred outcome (one only)
£30	(£100)	
£60	(£65)	
£60	(£90)	
£80	(£50)	
£60	(£10)	

Please give a brief reason below for your choice, in the box below.

GM (team reasoning) vignette:

You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend an hour each in the local town collecting names on a petition opposing the new test site. You each collect a certain number of names. Which of the following would you prefer?

You collect	(Other group member collects)	Please tick your preferred outcome (one only)
72 names	(70 names)	
93 names	(58 names)	
72 names	(21 names)	
72 names	(103 names)	
20 names	(119 names)	

Please give a brief reason below for your choice, in the box below.

Firewood (equality-seeking) vignette:

You and a friend have helped a mutual acquaintance collect and chop firewood for the winter. You have both worked hard for a couple of days. He pays you each a certain amount of money. Which of the following would you prefer?

You are paid	(Friend is paid)	Please tick your preferred outcome (one only)
£50	(£50)	
£50	(£70)	
£20	(£80)	
£70	(£40)	
£50	(£10)	

Please give a brief reason below for your choice, in the box below.

Will (equality-seeking) vignette:

An elderly friend of the family has died and left you and your brother a small amount of money each. Which of the following would you prefer?

You are left	(Brother is left)	Please tick your preferred outcome (one only)
£70	(£10)	
£70	(£70)	
£20	(£110)	
£70	(£100)	
£90	(£60)	

Please give a brief reason below for your choice, in the box below.

Burgled (altruistic) vignette:

Your best friend's flat has just been burgled and many of their possessions have been taken, unfortunately their insurance will not cover a lot of the items that have gone missing. You decide to go for a game of bingo with them to help cheer them up. You each come home with some money. Which of the following would you prefer?

You come home with	(Friend comes home with)	Please tick your preferred outcome (one only)
£65	(£85)	
£65	(£10)	
£35	(£105)	
£80	(£45)	
£65	(£60)	

Please give a brief reason below for your choice, in the box below.

Lottery (altruistic) vignette:

Your sister is terminally ill and has been given 6 months left to live. However, although there are a lot of things she would like to do, she wants to try to maintain a fairly normal lifestyle for as long as possible. Shortly after you find out about her illness, you both win a prize on the lottery. Which of the following would you prefer?

You win	(Sister wins)	Please tick your preferred outcome (one only)
£50 thousand	(£50 thousand)	
£50 thousand	(£10 thousand)	
£20 thousand	(£90 thousand)	
£70 thousand	(£40 thousand)	
£50 thousand	(£70 thousand)	

Please give a brief reason below for your choice, in the box below.

Appendix 6: Materials for Chapter 4, Study 1

Front-page for all booklets:

INSTRUCTIONS - please read carefully.

In the following pages you will be given a couple of imaginary scenarios, each followed by a number of different possible outcomes. Please try to imagine yourself in each scenario and decide which of the given outcomes you would prefer. In each scenario, please choose one and only one outcome from the options that you are given. After making your decision please give a brief reason for it (one or two sentences is ample) and proceed on to the next scenario. PLEASE REMEMBER - there is no right or wrong answer, it is merely what you feel you would prefer in that situation.

Male/Female (please circle)
Age________________________

Headshave vignette, 10 / 160 condition:

Various members of your class at your school are undertaking different sponsored activities to help raise funds for new computers. You and a friend decide to do a sponsored head shave. You each raise a certain amount of money. Which of the following would you prefer?

You raise	Friend raises	Please tick your preferred outcome (one only)
£30	£100	
£60	£65	
£10	£160	
£80	£50	
£60	£10	

Please give a brief reason below for your choice, in the box below.

Headshave vignette, 60 / 110 condition:

Various members of your class at your school are undertaking different sponsored activities to help raise funds for new computers. You and a friend decide to do a sponsored head shave. You each raise a certain amount of money. Which of the following would you prefer?

You raise	Friend raises	Please tick your preferred outcome (one only)
£30	£100	
£60	£65	
£60	£110	
£80	£50	
£60	£10	

Please give a brief reason below for your choice, in the box below.

Headshave vignette, 80 / 90 condition:

Various members of your class at your school are undertaking different sponsored activities to help raise funds for new computers. You and a friend decide to do a sponsored head shave. You each raise a certain amount of money. Which of the following would you prefer?

You raise	Friend raises	Please tick your preferred outcome (one only)
£30	£100	
£60	£65	
£80	£90	
£80	£50	
£60	£10	

Please give a brief reason below for your choice, in the box below.

Headshave vignette, 90 / 80 condition:

Various members of your class at your school are undertaking different sponsored activities to help raise funds for new computers. You and a friend decide to do a sponsored head shave. You each raise a certain amount of money. Which of the following would you prefer?

You raise	Friend raises	Please tick your preferred outcome (one only)
£30	£100	
£60	£65	
£90	£80	
£80	£50	
£60	£10	

Please give a brief reason below for your choice, in the box below.

Headshave vignette, 110 / 60 condition:

Various members of your class at your school are undertaking different sponsored activities to help raise funds for new computers. You and a friend decide to do a sponsored head shave. You each raise a certain amount of money. Which of the following would you prefer?

You raise	Friend raises	Please tick your preferred outcome (one only)
£30	£100	
£60	£65	
£110	£60	
£80	£50	
£60	£10	

Please give a brief reason below for your choice, in the box below.

Headshave vignette, 160 / 10 condition:

Various members of your class at your school are undertaking different sponsored activities to help raise funds for new computers. You and a friend decide to do a sponsored head shave. You each raise a certain amount of money. Which of the following would you prefer?

You raise	Friend raises	Please tick your preferred outcome (one only)
£30	£100	
£60	£65	
£160	£10	
£80	£50	
£60	£10	

Please give a brief reason below for your choice, in the box below.

GM vignette, 11 / 164 condition:

You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend an hour each in the local town collecting names on a petition opposing the new test site. You each collect a certain number of names. Which of the following would you prefer?

You collect	Other group member collects	Please tick your preferred outcome (one only)
72 names	70 names	
93 names	58 names	
72 names	21 names	
11 names	164 names	
20 names	119 names	

Please give a brief reason below for your choice, in the box below.

GM vignette, 56 / 119 condition:

You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend an hour each in the local town collecting names on a petition opposing the new test site. You each collect a certain number of names. Which of the following would you prefer?

You collect	Other group member collects	Please tick your preferred outcome (one only)
72 names	70 names	
93 names	58 names	
72 names	21 names	
56 names	119 names	
20 names	119 names	

Please give a brief reason below for your choice, in the box below.

GM vignette, 82 / 93 condition:

You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend an hour each in the local town collecting names on a petition opposing the new test site. You each collect a certain number of names. Which of the following would you prefer?

You collect	Other group member collects	Please tick your preferred outcome (one only)
72 names	70 names	
93 names	58 names	
72 names	21 names	
82 names	93 names	
20 names	119 names	

Please give a brief reason below for your choice, in the box below.

GM vignette, 93 / 82 condition:

You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend an hour each in the local town collecting names on a petition opposing the new test site. You each collect a certain number of names. Which of the following would you prefer?

You collect	Other group member collects	Please tick your preferred outcome (one only)
72 names	70 names	
93 names	58 names	
72 names	21 names	
93 names	82 names	
20 names	119 names	

Please give a brief reason below for your choice, in the box below.

GM vignette, 119 / 56 condition:

You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend an hour each in the local town collecting names on a petition opposing the new test site. You each collect a certain number of names. Which of the following would you prefer?

You collect	Other group member collects	Please tick your preferred outcome (one only)
72 names	70 names	
93 names	58 names	
72 names	21 names	
119 names	56 names	
20 names	119 names	

Please give a brief reason below for your choice, in the box below.

GM vignette, 164 / 11 condition:

You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend an hour each in the local town collecting names on a petition opposing the new test site. You each collect a certain number of names. Which of the following would you prefer?

You collect	Other group member collects	Please tick your preferred outcome (one only)
72 names	70 names	
93 names	58 names	
72 names	21 names	
164 names	11 names	
20 names	119 names	

Please give a brief reason below for your choice, in the box below.

Appendix 7: Materials for Chapter 4, Study 2

Front-page for all booklets:

INSTRUCTIONS - please read carefully.

In the following pages you will be given a couple of imaginary scenarios, each followed by a number of different possible outcomes. Please try to imagine yourself in each scenario and decide which of the given outcomes you would prefer. In each scenario, please choose one and only one outcome from the options that you are given. After making your decision please give a brief reason for it, if requested, (one or two sentences is ample) and proceed on to the next question. PLEASE REMEMBER - there is no right or wrong answer, it is merely what you feel you would prefer in that situation.

Male/Female (please circle)

Age________________________

Headshave vignette, Part 1:

Various members of your class at your school are undertaking different sponsored activities to help raise funds for new computers. You and a friend decide to do a sponsored head shave. You each raise a certain amount of money. Which of the following would you prefer?

You raise	Friend raises	Please tick your preferred outcome (one only)
£30	£100	
£60	£65	
£60	£90	
£80	£50	
£60	£10	

Please give a brief reason below for your choice, in the box below.

Headshave vignette, Parts 2 and 3:

Now imagine yourself in the same scenario, but this time you must choose one outcome from a different set of possible outcomes. Which of the following outcomes would you prefer?

You raise	Friend raises	Please tick your preferred outcome (one only)
£60	£60	
£50	£100	
£40	£140	
£30	£180	
£20	£220	
£10	£260	

And which of these outcomes would you prefer?

You raise	Friend raises	Please tick your preferred outcome (one only)
£60	£60	
£100	£50	
£140	£40	
£180	£30	
£220	£20	
£260	£10	

GM vignette, Part 1:

You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend an hour each in the local town collecting names on a petition opposing the new test site. You each collect a certain number of names. Which of the following would you prefer?

You collect	Other group member collects	Please tick your preferred outcome (one only)
72 names	70 names	
93 names	58 names	
72 names	21 names	
72 names	103 names	
20 names	119 names	

Please give a brief reason below for your choice, in the box below.

GM vignette, Parts 2 and 3:

Now imagine yourself in the same scenario, but this time you must choose one outcome from a different set of possible outcomes. Which of the following outcomes would you prefer?

You collect	Other group member collects	Please tick your preferred outcome (one only)
61 names	60 names	
103 names	52 names	
139 names	42 names	
178 names	29 names	
221 names	18 names	
259 names	10 names	

And which of these outcomes would you prefer?

You collect	Other group member collects	Please tick your preferred outcome (one only)
60 names	61 names	
52 names	103 names	
42 names	139 names	
29 names	178 names	
18 names	221 names	
10 names	259 names	

Appendix 8: Materials for Chapter 5

Front-page for all booklets:

INSTRUCTIONS - please read carefully.

In the following pages you will be given a number of imaginary scenarios, each followed by a number of different possible outcomes. Please try to imagine yourself in each scenario and decide which of the given outcomes you would prefer. Even if you think that you would not be likely to find yourself in that particular situation, please try to imagine it. In each scenario, choose one and only one outcome from the options that you are given. After making your decision give a brief reason for it (one or two sentences is ample) and proceed on to the next scenario. PLEASE REMEMBER - there is no right or wrong answer, it is merely what you feel you would prefer in that situation.Thank you for your participation.

Male/Female (please ring)
Age__________________________________
Occupation______________________________

Questionnaire 1, Certainty of receipt of payoffs (CR) vignette, Condition 1 (certain receipt):

You and some of your neighbours have formed an investment group. You have decided to invest your money in a building society. With your summed investments, you will receive a respectable rate of interest, which will provide a certain return. You and another of your neighbours each invest a certain amount. Which of the following would you prefer?

You invest	(Your neighbour invests)	Please tick your preferred outcome (one only)
£5,100	(£2,900)	
£3,700	(£1,200)	
£3,700	(£5,300)	
£1,500	(£6,000)	
£3,700	(£3,700)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Certainty of receipt of payoffs (CR) vignette, Condition 2 (uncertain receipt):

You and some of your neighbours have formed an investment group. You have decided to invest your money in shares. With your summed investments, you can buy a large number of shares. However, the rate of return is uncertain. You and another of your neighbours each invest a certain amount. Which of the following would you prefer?

You invest	(Your neighbour invests)	Please tick your preferred outcome (one only)
£5,100	(£2,900)	
£3,700	(£1,200)	
£3,700	(£5,300)	
£1,500	(£6,000)	
£3,700	(£3,700)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Future benefit expected from the other (FB) vignette, Condition 1 (future benefit expected):

You are nearing the end of your holiday abroad and have decided to club together to cook a joint meal with another person who you have met on the holiday. The other person happens to live in the same area as you at home, and they have invited you over for a barbecue when you get back from holiday. You go out shopping together and each spend a certain amount of money on getting food for the meal. Which of the following would you prefer?

You spend	(The other person spends)	Please tick your preferred outcome (one only)
£17	(£9)	
£11	(£19)	
£11	(£10)	
£3	(£22)	
£11	(£1)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Future benefit expected from the other (FB) vignette, Condition 2 (no future benefit expected):

You are nearing the end of your holiday abroad and have decided to club together to cook a joint meal with another person you have met on the holiday. The other person lives on the other side of the country to you and you are never likely to see them again. You go out shopping together and each spend a certain amount of money on getting food for the meal. Which of the following would you prefer?

You spend	(The other person spends)	Please tick your preferred outcome (one only)
£17	(£9)	
£11	(£19)	
£11	(£10)	
£3	(£22)	
£11	(£1)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Past benefit received from the other (PB) vignette, Condition 1 (no past benefit received):

You are working with a group of people at university who you have never worked with before. The group task is to design an experiment, and you will be given individual grades which will go to make up an overall group score. The task does not count towards your overall degree class. You and another member of your group each score a certain percentage. Which of the following would you prefer?

You score	(Other group member scores)	Please tick your preferred outcome (one only)
65%	(10%)	
65%	(88%)	
65%	(65%)	
92%	(45%)	
28%	(95%)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Past benefit received from the other (PB) vignette, Condition 2 (past benefit received):

You are working with a group of people at university who have helped you with your work in the past. The group task is to design an experiment, and you will be given individual grades which will go to make up an overall group score. The task does not count towards your overall degree class. You and another member of your group each score a certain percentage. Which of the following would you prefer?

You score	(Other group member scores)	Please tick your preferred outcome (one only)
65%	(10%)	
65%	(88%)	
65%	(65%)	
92%	(45%)	
28%	(95%)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Publicity of contributions (PC) vignette, Condition 1 (anonymous contributions):

One of your colleagues, who you have worked with for the last year, is doing a sponsored bungee jump to raise money for the charity Comic Relief. He asks you and another friend to donate some money towards his jump, by putting the money anonymously in a tin. Both you and your friend donate some money. Which of the following would you prefer?

You donate	(Your friend donates)	Please tick your preferred outcome (one only)
£4.50	(£1.20)	
£5.90	(£3.30)	
£2.10	(£7.00)	
£4.50	(£4.50)	
£4.50	(£6.40)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Publicity of contributions (PC) vignette, Condition 2 (public contributions):

One of your colleagues, who you have worked with for the last year, is doing a sponsored bungee jump to raise money for the charity Comic Relief. He asks you and another friend to donate some money towards his jump, by writing your name and the amount you are giving down on a list of sponsors. Both you and your friend donate some money. Which of the following would you prefer?

You donate	(Your friend donates)	Please tick your preferred outcome (one only)
£4.50	(£1.20)	
£5.90	(£3.30)	
£2.10	(£7.00)	
£4.50	(£4.50)	
£4.50	(£6.40)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Liking for others (LD) vignette, Condition 1 (like the other people):

You work at a local travel agents near where you live. You like everyone who works there and get on with them very well. During each month, a record is kept of how many holidays have been sold. At the end of one month, you and one of your workmates look at how many holidays you have each sold. Which of the following would you prefer?

You sell	(Your workmate sells)	Please tick your preferred outcome (one only)
94 holidays	(12 holidays)	
94 holidays	(129 holidays)	
94 holidays	(94 holidays)	
132 holidays	(72 holidays)	
38 holidays	(146 holidays)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Liking for others (LD) vignette, Condition 2 (neither like nor dislike the other people):

You work at a local travel agents near where you live. You are not particularly friendly with the other people who work there, but you do not dislike them either. During each month, a record is kept of how many holidays have been sold. At the end of one month, you and one of your workmates look at how many holidays you have each sold. Which of the following would you prefer?

You sell	(Your workmate sells)	Please tick your preferred outcome (one only)
94 holidays	(12 holidays)	
94 holidays	(129 holidays)	
94 holidays	(94 holidays)	
132 holidays	(72 holidays)	
38 holidays	(146 holidays)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Liking for others (LD) vignette, Condition 3 (dislike the other people):

You work at a local travel agents near where you live. You dislike everyone who works there and do not get on with them very well. During each month, a record is kept of how many holidays have been sold. At the end of one month, you and one of your workmates look at how many holidays you have each sold. Which of the following would you prefer?

You sell	(Your workmate sells)	Please tick your preferred outcome (one only)
94 holidays	(12 holidays)	
94 holidays	(129 holidays)	
94 holidays	(94 holidays)	
132 holidays	(72 holidays)	
38 holidays	(146 holidays)	

Please give a brief reason below for your choice, in the box below

Questionnaire 1, Competition from an outgroup (OG) vignette, Condition 1 (no outgroup):

You are in a sports club and have applied for a grant to get a coach to come and do individual training with certain members of the club. You are the only club applying for a grant. You and another club member are each scheduled to receive a certain number of hours coaching when the grant comes through. Which of the following would you prefer?

You will receive	(Other club member will receive)	Please tick your preferred outcome (one only)
8 hours	(4 hours)	
1 hours	(10 hours)	
6 hours	(1 hours)	
6 hours	(6 hours)	
6 hours	(9 hours)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Competition from an outgroup (OG) vignette, Condition 2 (outgroup but not competing for the same resources):

You are in a sports club and have applied for a grant to get a coach to come and do individual training with certain members of the club. There are a number of clubs applying for grants, but the grants are non-competitive and are awarded solely on the merit of the individual clubs. You and another member of your club are each scheduled to receive a certain number of hours coaching when the grant comes through. Which of the following would you prefer?

You will receive	(Other club member will receive)	Please tick your preferred outcome (one only)
8 hours	(4 hours)	
1 hours	(10 hours)	
6 hours	(1 hours)	
6 hours	(6 hours)	
6 hours	(9 hours)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Competition from an outgroup (OG) vignette, Condition 3 (outgroup with competition for limited resources):

You are in a sports club and have applied for a grant to get a coach to come and do individual training with certain members of the club. There are a number of clubs applying for grants, but there is only one available grant, therefore the applications are competitive. If one club receives the grant, all the other clubs will lose out. You and another club member are each scheduled to receive a certain number of hours coaching when the grant comes through. Which of the following would you prefer?

You will receive	(Other club member will receive)	Please tick your preferred outcome (one only)
8 hours	(4 hours)	
1 hours	(10 hours)	
6 hours	(1 hours)	
6 hours	(6 hours)	
6 hours	(9 hours)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Who benefits (WB) vignette, Condition 1 (everyone involved benefits):

You and a group of your friends, who you have known for a couple of years and have a lot in common with, are all artistic. As such you have decided to join forces and build a studio for the group to use. You and one of your friends each spend a certain amount of time working on setting up the studio. Which of the following would you prefer?

You spend	(Your friend spends)	Please tick your preferred outcome (one only)
35 hours	5 hours	
35 hours	59 hours	
11 hours	69 hours	
35 hours	35 hours	
49 hours	28 hours	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Who benefits (WB) vignette, Condition 2 (everyone involved except self benefits):

You and a group of your friends, who you have known for a couple of years and have a lot in common with, are all artistic. As such you have decided to join forces and build a studio for the group to use. However, you will soon be moving away from the area so will not get to use the studio. You and one of your friends each spend a certain amount of time working on setting up the studio. Which of the following would you prefer?

You spend	(Your friend spends)	Please tick your preferred outcome (one only)
35 hours	5 hours	
35 hours	59 hours	
11 hours	69 hours	
35 hours	35 hours	
49 hours	28 hours	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Who benefits (WB) vignette, Condition 3 (Only one person in the group benefits):

You and your group of friends, who you have known for a couple of years and have a lot in common with, includes one person who is particularly artistic. You have all decided to join forces and build a studio for your friend to use. You and one of your friends each spend a certain amount of time working on setting up the studio. Which of the following would you prefer?

You spend	(Your friend spends)	Please tick your preferred outcome (one only)
35 hours	5 hours	
35 hours	59 hours	
11 hours	69 hours	
35 hours	35 hours	
49 hours	28 hours	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Who benefits (WB) vignette, Condition 4 (only self benefits):

Within your group of friends, who you have known for a couple of years and have a lot in common with, you are particularly artistic. You have all decided to join forces and build a studio for you to use. You and one of your friends each spend a certain amount of time working on setting up the studio. Which of the following would you prefer?

You spend	(Your friend spends)	Please tick your preferred outcome (one only)
35 hours	5 hours	
35 hours	59 hours	
11 hours	69 hours	
35 hours	35 hours	
49 hours	28 hours	

Please give a brief reason below for your choice, in the box below

Questionnaire 1, Who knows about the outcome (WK) vignette, Condition 1 (a wide, general audience will know):

You are part of a conservation group who are planting trees on a remote Scottish island in order to re-establish the original environment. It is not guaranteed that all the trees will survive, but the national newspapers will cover the progress of the project. You and another of the group members each plant a certain number of trees. Which of the following would you prefer?

You plant	(Other group member plants)	Please tick your preferred outcome (one only)
510 trees	305 trees	
410 trees	90 trees	
130 trees	680 trees	
410 trees	590 trees	
410 trees	410 trees	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Who knows about the outcome (WK) vignette, Condition 2 (a limited, specialist audience will know):

You are part of a conservation group who are planting trees on a remote Scottish island in order to re-establish the original environment. It is not guaranteed that all the trees will survive, but an environmental newsletter will cover the progress of the project. You and another of the group members each plant a certain number of trees. Which of the following would you prefer?

You plant	(Other group member plants)	Please tick your preferred outcome (one only)
510 trees	305 trees	
410 trees	90 trees	
130 trees	680 trees	
410 trees	590 trees	
410 trees	410 trees	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Who knows about the outcome (WK) vignette, Condition 3 (only the group involved in the interaction will know):

You are part of a conservation group who are planting trees on a remote Scottish island in order to re-establish the original environment. It is not guaranteed that all the trees will survive, but the conservation group will monitor the progress of the project. You and another of the group members each plant a certain number of trees. Which of the following would you prefer?

You plant	(Other group member plants)	Please tick your preferred outcome (one only)
510 trees	305 trees	
410 trees	90 trees	
130 trees	680 trees	
410 trees	590 trees	
410 trees	410 trees	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Who knows about the outcome (WK) vignette, Condition 4 (only self will know):

You are part of a conservation group who are planting trees on a remote Scottish island in order to re-establish the original environment. It is not guaranteed that all the trees will survive, but once the group has finished planting and disbanded, you alone will return to monitor the progress of the project. You and another of the group members each plant a certain number of trees. Which of the following would you prefer?

You plant	(Other group member plants)	Please tick your preferred outcome (one only)
510 trees	305 trees	
410 trees	90 trees	
130 trees	680 trees	
410 trees	590 trees	
410 trees	410 trees	

Please give a brief reason below for your choice, in the box below.

Questionnaire 1, Who knows about the outcome (WK) vignette, Condition 5 (no one will know):

You are part of a conservation group who are planting trees on a remote Scottish island in order to re-establish the original environment. It is not guaranteed that all the trees will survive, but once the group has finished planting and disbanded, the progress of the project will not be monitored. You and another of the group members each plant a certain number of trees. Which of the following would you prefer?

You plant	(Other group member plants)	Please tick your preferred outcome (one only)
510 trees	305 trees	
410 trees	90 trees	
130 trees	680 trees	
410 trees	590 trees	
410 trees	410 trees	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Future interactions expected with the other (FI) vignette, Condition 1 (future interactions expected):

You have just started university and are at a course induction day with your classmates - the people you will be working with over the next three years. As an icebreaker, you are divided into teams and each team completes a general knowledge quiz. You and another of your team members each answer some of the questions and each score a certain number of points towards the team's total score. Which of the following would you prefer?

You score	(Other team member scores)	Please tick your preferred outcome (one only)
22 points	(31 points)	
22 points	(23 points)	
7 points	(38 points)	
32 points	(11 points)	
22 points	(4 points)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Future interactions expected with the other (FI) vignette, Condition 2 (future interactions not expected):

You are at a one day workshop in London with a group of people who you are never likely to see again. As an icebreaker, you are divided into teams and each team completes a general knowledge quiz. You and another of your team members each answer some of the questions and each score a certain number of points towards the team's total score. Which of the following would you prefer?

You score	(Other team member scores)	Please tick your preferred outcome (one only)
22 points	(31 points)	
22 points	(23 points)	
7 points	(38 points)	
32 points	(11 points)	
22 points	(4 points)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Level of group identity (GI) vignette, Condition 1 (strong group identity):

You are at university and are very knowledgeable about computers. You are part of a group called 'Virus Busters' who have been set up to help people deal with viruses which have infected their computers. During a particularly busy period, you and another group member count up how many computers you disinfect in a week. Which of the following would you prefer?

You disinfect	(Other group member disinfects)	Please tick your preferred outcome (one only)
39 computers	(40 computers)	
39 computers	(67 computers)	
21 computers	(72 computers)	
58 computers	(33 computers)	
39 computers	(6 computers)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Level of group identity (GI) vignette, Condition 2 (weak group identity):

You are at university and are very knowledgeable about computers. Sometimes you help people deal with viruses that have infected their computers. During a particularly busy period, you and someone else who does a similar thing count up how many computers you disinfect in a week. Which of the following would you prefer?

You disinfect	(Other person disinfects)	Please tick your preferred outcome (one only)
39 computers	(40 computers)	
39 computers	(67 computers)	
21 computers	(72 computers)	
58 computers	(33 computers)	
39 computers	(6 computers)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Importance of payoff (IP) vignette, Condition 1 (relatively unimportant payoff):

You are in a basketball team and you are playing a friendly match against another local side. During the game both you and one of your team mates score a number of goals. Which of the following would you prefer?

You score	(Your team mate scores)	Please tick your preferred outcome (one only)
6 goals	(4 goals)	
5 goals	(8 goals)	
5 goals	(5 goals)	
2 goals	(9 goals)	
5 goals	(1 goal)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Importance of payoff (IP) vignette, Condition 2 (important payoff):

You are in a basketball team and you are playing in the final of the national basketball league. During the game both you and one of your team mates score a number of goals. Which of the following would you prefer?

You score	(Your team mate scores)	Please tick your preferred outcome (one only)
6 goals	(4 goals)	
5 goals	(8 goals)	
5 goals	(5 goals)	
2 goals	(9 goals)	
5 goals	(1 goal)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Value of payoff (VP) vignette, Condition 1 (large payoffs):

Your sister, with whom you get on well, has been made redundant from her job, through no fault of her own. She is a single mother and has a mortgage to keep up. Shortly after you find out about her redundancy, you both win a prize on the lottery. Which of the following would you prefer?

You win	(Sister wins)	Please tick your preferred outcome (one only)
£50 thousand	(£50 thousand)	
£50 thousand	(£10 thousand)	
£20 thousand	(£90 thousand)	
£70 thousand	(£40 thousand)	
£50 thousand	(£70 thousand)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Value of payoff (VP) vignette, Condition 2 (small payoffs):

Your sister, with whom you get on well, has been made redundant from her job, through no fault of her own. She is a single mother and has a mortgage to keep up. Shortly after you find out about her redundancy, you both win a prize on the lottery. Which of the following would you prefer?

You win	(Sister wins)	Please tick your preferred outcome (one only)
£50	(£50)	
£50	(£10)	
£20	(£90)	
£70	(£40)	
£50	(£70)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Personal sacrifice involved (PS) vignette, Condition 1 (low input of time):

You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend an hour each in the local town collecting names on a petition opposing the new test site. At the end of the hour, you have each collected a certain number of names. Which of the following would you prefer?

You collect	(Other group member collects)	Please tick your preferred outcome (one only)
72 names	(70 names)	
93 names	(58 names)	
72 names	(21 names)	
72 names	(103 names)	
20 names	(119 names)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Personal sacrifice involved vignette, Condition 2 (medium input of time):

You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend a day each in the local town collecting names on a petition opposing the new test site. At the end of the day, you have each collected a certain number of names. Which of the following would you prefer?

You collect	(Other group member collects)	Please tick your preferred outcome (one only)
72 names	(70 names)	
93 names	(58 names)	
72 names	(21 names)	
72 names	(103 names)	
20 names	(119 names)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Personal sacrifice involved (PS) vignette, Condition 3 (large input of time):

You are involved in a group of people who are against a proposed test site for genetically modified crops. You and another group member spend a week each in the local town collecting names on a petition opposing the new test site. At the end of the week, you have each collected a certain number of names. Which of the following would you prefer?

You collect	(Other group member collects)	Please tick your preferred outcome (one only)
72 names	(70 names)	
93 names	(58 names)	
72 names	(21 names)	
72 names	(103 names)	
20 names	(119 names)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Transferability and divisibility of payoffs (TP) vignette, Condition 1 (non-divisible and non-transferable payoffs):

You and a close friend have formed a team for the local pub quiz. You each answer some questions and end up with an overall team score. Which of the following would you prefer?

Overall team score	Please tick your preferred outcome (one only)
306 points	
195 points	
333 points	
299 points	
266 points	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Transferability and divisibility of payoffs (TP) vignette, Condition 2 (divided and transferable payoffs):

You and a close friend have formed a team for the local pub quiz. You each answer some questions and each win a certain amount of money. Which of the following would you prefer?

You win	(Your team mate wins)	Please tick your preferred outcome (one only)
£15.20	(£15.40)	
£15.20	(£4.30)	
£15.20	(£18.10)	
£18.70	(£11.20)	
£6.10	(£20.50)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Transferability and divisibility of payoffs (TP) vignette, Condition 3 (divided and non-transferable payoffs):

You and a close friend have formed a team for the local pub quiz. You each answer some questions and each score a certain number of points. Which of the following would you prefer?

You score	(Your team mate scores)	Please tick your preferred outcome (one only)
152 points	(154 points)	
152 points	(43 points)	
152 points	(181 points)	
187 points	(112 points)	
61 points	(205 points)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Type of relationship with others (RT) vignette, Condition 1 (friends and have worked together on this type of project):

You are part of an established group of close friends who sometimes do charity work in your area together. As it is Children In Need week, you are all going door-knocking in your area to collect money. You and one of your friends each collect a certain amount of money. Which of the following would you prefer?

You collect	(Your friend collects)	Please tick your preferred outcome (one only)
£20	(£68)	
£43	(£62)	
£43	(£11)	
£59	(£32)	
£43	(£44)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Type of relationship with others (RT) vignette, Condition 2 (have worked together on this type of project but do not know each other socially):

You are part of a group of people who sometimes do charity work in your area together, although you don't know each other very well. As it is Children In Need week, you are all going door-knocking in your area to collect money. You and one of the other group members each collect a certain amount of money. Which of the following would you prefer?

You collect	(Other group member collects)	Please tick your preferred outcome (one only)
£20	(£68)	
£43	(£62)	
£43	(£11)	
£59	(£32)	
£43	(£44)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Type of relationship with others (RT) vignette, Condition 3 (friends but have not worked together on this type of project):

You are part of an established group of close friends who have never done charity work together before. However, as it is Children In Need week, you are all going door-knocking in your area to collect money. You and one of your friends each collect a certain amount of money. Which of the following would you prefer?

You collect	(Your friend collects)	Please tick your preferred outcome (one only)
£20	(£68)	
£43	(£62)	
£43	(£11)	
£59	(£32)	
£43	(£44)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Type of relationship with others (RT) vignette, Condition 4 (have not worked together on this type of project and do not know each other socially):

You are one of a number of people who have recently responded to an advert for people in your area to do some work for charity. You don't know anyone else in the group. As it is Children In Need week, you are all going door-knocking in your area to collect money. You and another person each collect a certain amount of money. Which of the following would you prefer?

You collect	(Other person collects)	Please tick your preferred outcome (one only)
£20	(£68)	
£43	(£62)	
£43	(£11)	
£59	(£32)	
£43	(£44)	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Number of other people involved (NT) vignette, Condition 1 (one other involved):

You are one of two people who work on an allotment to grow and share food. You and your best friend each spend a certain amount of time every week on the allotment. Which of the following would you prefer?

You spend	(Your friend spends)	Please tick your preferred outcome (one only)
1 hours	8 hours	
5 hours	3 hours	
4 hours	1 hours	
4 hours	4 hours	
4 hours	7 hours	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Number of other people involved (NT) vignette, Condition 2 (four others involved):

You are one of five people who work on an allotment to grow and share food. You and your best friend each spend a certain amount of time every week on the allotment. Which of the following would you prefer?

You spend	(Your friend spends)	Please tick your preferred outcome (one only)
1 hours	8 hours	
5 hours	3 hours	
4 hours	1 hours	
4 hours	4 hours	
4 hours	7 hours	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Number of other people involved (NT) vignette, Condition 3 (nine others involved):

You are one of ten people who work on an allotment to grow and share food. You and your best friend each spend a certain amount of time every week on the allotment. Which of the following would you prefer?

You spend	(Your friend spends)	Please tick your preferred outcome (one only)
1 hours	8 hours	
5 hours	3 hours	
4 hours	1 hours	
4 hours	4 hours	
4 hours	7 hours	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Number of other people involved (NT) vignette, Condition 4 (nineteen others involved):

You are one of twenty people who work on an allotment to grow and share food. You and your best friend each spend a certain amount of time every week on the allotment. Which of the following would you prefer?

You spend	(Your friend spends)	Please tick your preferred outcome (one only)
1 hours	8 hours	
5 hours	3 hours	
4 hours	1 hours	
4 hours	4 hours	
4 hours	7 hours	

Please give a brief reason below for your choice, in the box below.

Questionnaire 2, Number of other people involved (NT) vignette, Condition 5 (forty-nine others involved):

You are one of fifty people who work on an allotment to grow and share food. You and your best friend each spend a certain amount of time every week on the allotment. Which of the following would you prefer?

You spend	(Your friend spends)	Please tick your preferred outcome (one only)
1 hours	8 hours	
5 hours	3 hours	
4 hours	1 hours	
4 hours	4 hours	
4 hours	7 hours	

Please give a brief reason below for your choice, in the box below.

Appendix 9: Materials for Chapter 6, Study 1

Page 1 of instructions for Condition 1 (undivided payoffs):

INSTRUCTIONS - please read carefully.

In this experiment you have the opportunity to win real money, by playing a number of experimental games with a person in another room whose identity will remain unknown to you until after you have finished the experiment. In each game you must make one or more decisions. The decisions that you and the other person make in each game will determine how much money you win, as a pair.

The first four games consist of one-off decisions. In each game both players will have to chose between X or Y. Each combination of choices in a game will lead to a certain outcome. However, you will not know what the other person has chosen until the end of the experiment. There will be a box for you to write your decision in after the explanation of each game. After making each decision please give a brief reason for it (one or two sentences is ample) and proceed on to the next game. At first sight the games may look very similar, but please read them carefully as they are all different.

The fifth game consists of each player making alternate decisions. An experimenter will act as a go-between for each pair of players.

After you have completed all the games, your decisions will be matched with the other player's, and your overall score from all five games will be calculated. This score will be divided by five (the number of games) in order to determine an average score for each game, and this average score will be how much, in pounds, you will be paid. You and the other player, as a pair, will be given the money which you have won once the scores have been calculated.

PLEASE REMEMBER - in each game there is no right or wrong answer, it is merely which decision you prefer.

Please fill in the following details:
Male/Female (please ring)
Name____
Email____
Age____

Page 2 of instructions for Condition 1 (undivided payoffs), Prisoner's Dilemma game:

Game 1

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, you will receive a certain payoff, or number of points, as a pair, depending upon the combination of your choices. The points for each possible outcome are shown in the following matrix:

		OTHER X	OTHER Y
YOU	X	6	5
	Y	5	4

So if both of you choose X you score 6 points as a pair, if one chooses X and the other chooses Y you score 5 points as a pair, and if both of you choose Y you score 4 points as a pair. Remember, you don't know what choice the other person will make.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 3 of instructions for Condition 1 (undivided payoffs), Hi-Lo game:

Game 2

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, you will receive a certain payoff, or number of points, as a pair, depending upon the combination of your choices. The points for each possible outcome are shown in the following matrix:

		OTHER	
		X	Y
YOU	X	6	0
	Y	0	2

So if both of you choose X you score 6 points as a pair, if one chooses X and the other chooses Y you score 0 points as a pair, and if both of you choose Y you score 2 points as a pair. Remember, you don't know what choice the other person will make.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 4 of instructions for Condition 1 (undivided payoffs), Chicken game:

Game 3

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, you will receive a certain payoff, or number of points, as a pair, depending upon the combination of your choices. The points for each possible outcome are shown in the following matrix:

		OTHER	
		X	Y
YOU	X	12	11
	Y	11	0

So if both of you choose X you score 12 points as a pair, if one chooses X and the other chooses Y you score 11 points as a pair, and if both of you choose Y you score 0 points as a pair. Remember, you don't know what choice the other person will make.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 5 of instructions for Condition 1 (undivided payoffs), Stag Hunt game:

Game 4

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, you will receive a certain payoff, or number of points, as a pair, depending upon the combination of your choices. The points for each possible outcome are shown in the following matrix:

		OTHER X	OTHER Y
YOU	X	6	1
	Y	1	2

So if both of you choose X you score 6 points as a pair, if one chooses X and the other chooses Y you score 1 point as a pair, and if both of you choose Y you score 2 points as a pair. Remember, you don't know what choice the other person will make.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 6 of instructions for Condition 1 (undivided payoffs), Centipede game:

Game 5

You will be making a series of decisions in pairs, playing for points that are worth £1 each. You are Player 1, and will make the first decision, the other person (Player 2) will make the second decision, and finally, if required, you will make the third decision.

Each time you make a decision you will choose between **GO** and **STOP**. As the labels suggest, if you choose **GO** the series of decisions continues, and if you choose **STOP**, the game ends at that point, with each player getting the payoffs which are linked to that particular **STOP** decision. In each case, a **GO** decision results in an additional four points to the score for the pair of players.

The series of payoffs is as follows, with each outcome given by the relevant decision:

Player 1------**GO**------Player 2-------**GO**------Player 1------**GO**------12

| | |

| | |

STOP   **STOP**   **STOP**

0   4   8

If Player 1 chooses **STOP** on the first decision, the game ends at that point, with the pair scoring 0 points. If Player 1 chooses **GO** on the first decision, the game continues, with the next decision being that of Player 2.

If Player 2 chooses **STOP** on the second decision, the game ends at that point, with the pair scoring 4 points. If Player 2 chooses **GO** on the second decision the game continues, with the next decision being that of Player 1.

If Player 1 chooses **STOP** on the third (and final) decision, the game ends at that point, with the pair scoring 8 points. If Player 1 chooses **GO** on the third decision, they reach the final outcome, with the pair scoring 12 points.

If you have any questions, please ask the experimenter. For the scoring sheet please turn the page.

Page 7 of instructions for Condition 1 (undivided payoffs), Centipede game continued:

An experimenter will act as a go-between, informing Player 2 of your choices, and you of Player 2's choices.

Please circle your first choice for decision 1 below. The experimenter will write down your choice and take it through to Player 2, then, if appropriate, return with Player 2's decision. Finally, if required, please circle your choice on Decision 3.

Decision 1 (Player 1)	Decision 2 (Player 2)	Decision 3 (Player 1)
GO Move to Decision 2 ⇨	GO Move to Decision 3 ⇨	GO End of game The pair scores 12 points
or...	or...	or...
STOP Game ends The pair scores 0 points	STOP Game ends The pair scores 4 points	STOP Game ends The pair scores 8 points

Please give a brief reason for your choice(s), in the box below.

Page 1 of instructions for Condition 2 (divided and non-transferable payoffs):

INSTRUCTIONS - please read carefully.

In this experiment you have the opportunity to win real money, by playing a number of experimental games with a person in another room whose identity will remain unknown to you. In each game you must make one or more decisions. The decisions that you and the other person make in each game will determine how much money each of you win.

The first four games consist of one-off decisions. In each game both players will have to chose between X or Y. Each combination of choices in a game will lead to a certain outcome. However, you will not know what the other person has chosen until the end of the experiment. There will be a box for you to write your decision in after the explanation of each game. After making each decision please give a brief reason for it (one or two sentences is ample) and proceed on to the next game. At first sight the games may look very similar, but please read them carefully as they are all different.

The fifth game consists of each player making alternate decisions. An experimenter will act as a go-between for each pair of players.

After you have completed all the games, your decisions will be matched with the other player's, and your overall score from all five games will be calculated. This score will be divided by five (the number of games) in order to determine an average score for each game, and this average score will be how much, in pounds, each of you will be paid. You and the other player will each be individually given the money which you have won once the scores have been calculated. You will not know the identity of the other person and will be unable to discuss how much each of you have won.

PLEASE REMEMBER - in each game there is no right or wrong answer, it is merely which decision you prefer.

Please fill in the following details:

Male/Female (please ring)

Name______________________________________

Email______________________________________

Age_______________________________________

Page 2 of instructions for Condition 2 (divided and non-transferable payoffs), Prisoner's Dilemma Game:

<u>Game 1</u>

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

OTHER
(Score in brackets)

		X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both of you choose Y you each score 2 points. Remember, you don't know what choice the other person will make, and will be unable to discuss the payoffs with them afterwards.

Please write your decision, X or Y, in the box below.

Please give a brief reason for your choice, in the box below.

Page 3 of instructions for Condition 2 (divided and non-transferable payoffs), Hi-Lo Game:

<u>Game 2</u>

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER (Score in brackets) X	Y
YOU	X	3 (3)	0 (0)
	Y	0 (0)	1 (1)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y you each score 0 points, and if both of you choose Y you each score 1 point. Remember, you don't know what choice the other person will make, and will be unable to discuss the payoffs with them afterwards.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 4 of instructions for Condition 2 (divided and non-transferable payoffs), Chicken Game:

<u>Game 3</u>

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER'S CHOICE (Score in brackets) X	Y
YOUR CHOICE	X	6 (6)	1 (10)
	Y	10 (1)	0 (0)

So if both of you choose X you each score 6 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 10 points, and if both of you choose Y you each score 0 points. Remember, you don't know what choice the other person will make, and will be unable to discuss the payoffs with them afterwards.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 5 of instructions for Condition 2 (divided and non-transferable payoffs), Stag Hunt Game:

Game 4

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER (Score in brackets) X	Y
YOU	X	3 (3)	0 (1)
	Y	1 (0)	1 (1)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y the first scores 0 points and the other scores 1 point, and if both of you choose Y you each score 1 point.

Remember, you don't know what choice the other person will make, and will be unable to discuss the payoffs with them afterwards.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 6 of instructions for Condition 2 (divided and non-transferable payoffs), Centipede Game:

Game 5

You will be making a series of decisions in pairs, playing for points that are worth £1 each. You are Player 1, and will make the first decision, the other person (Player 2) will make the second decision, and finally you will make the third decision.

Each time you make a decision you will choose between **GO** and **STOP**. As the labels suggest, if you choose **GO** the series of decisions continues, and if you choose **STOP**, the game ends at that point, with each player getting the payoffs which are linked to that particular **STOP** decision. In each case, a **GO** decision results in the decision-maker sacrificing one point from his own score and adding five points to the other player's score.

The series of payoffs is as follows, with your (Player 1's) payoffs given first, and Player 2's payoffs given in brackets:

Player 1------**GO**------	Player 2-------**GO**------	Player 1------**GO**------3 (9)
I	I	I
I	I	I
STOP	**STOP**	**STOP**
0 (0)	-1 (5)	4 (4)

If Player 1 chooses **STOP** on the first decision, the game ends at that point, with Player 1 scoring 0 points and Player 2 scoring 0 points. If Player 1 chooses **GO** on the first decision, the game continues, with the next decision being that of Player 2.

If Player 2 chooses **STOP** on the second decision, the game ends at that point, with Player 1 scoring -1 point and Player 2 scoring 5 points. If Player 2 chooses **GO** on the second decision the game continues, with the next decision being that of Player 1.

If Player 1 chooses **STOP** on the third (and final) decision, the game ends at that point, with Player 1 scoring 4 points and Player 2 scoring 4 points. If Player 1 chooses **GO** on the third decision, they reach the final outcome, with Player 1 scoring 3 points and Player 2 scoring 9 points.

If you have any questions, please ask the experimenter. For the scoring sheet please turn the page.

Page 7 of instructions for Condition 2 (divided and non-transferable payoffs), Centipede Game continued:

An experimenter will act as a go-between, informing Player 2 of your choices, and you of Player 2's choices.

Please circle your first choice for decision 1 below. The experimenter will write down your choice and take it through to Player 2, then, if appropriate, return with Player 2's decision. Finally, if required, please circle your choice on Decision 3. Remember, you will be unable to discuss the individual payoffs with the other player afterwards.

Decision 1 (Player 1)	Decision 2 (Player 2)	Decision 3 (Player 1)
GO Move to Decision 2 ⇨	GO Move to Decision 3 ⇨	GO End of game Player 1: 3 points (Player 2: 9 points)
or...	or...	or...
STOP Game ends Player 1: 0 points (Player 2: 0 points)	STOP Game ends Player 1: -1 point (Player 2: 5 points)	STOP Game ends Player 1: 4 points (Player 2: 4 points)

Please give a brief reason for your choice(s), in the box below.

Page 1 of instructions for Condition 3 (divided and transferable payoffs):

INSTRUCTIONS - please read carefully.

In this experiment you have the opportunity to win real money, by playing a number of experimental games with a person in another room whose identity will remain unknown to you until after you have finished the experiment. In each game you must make one or more decisions. The decisions that you and the other person make in each game will determine how much money each of you win.

The first four games consist of one-off decisions. In each game both players will have to chose between X or Y. Each combination of choices in a game will lead to a certain outcome. However, you will not know what the other person has chosen until the end of the experiment. There will be a box for you to write your decision in after the explanation of each game. After making each decision please give a brief reason for it (one or two sentences is ample) and proceed on to the next game. At first sight the games may look very similar, but please read them carefully as they are all different.

The fifth game consists of each player making alternate decisions. An experimenter will act as a go-between for each pair of players.

After you have completed all the games, your decisions will be matched with the other player's, and your overall score from all five games will be calculated. This score will be divided by five (the number of games) in order to determine an average score for each game, and this average score will be how much, in pounds, each of you will be paid. You and the other player will each be individually given the money which you have won once the scores have been calculated, but you will be allocated a further amount of time to discuss how much each of you has won, and whether you would like to redistribute the winnings at all in the light of your decisions.

PLEASE REMEMBER - in each game there is no right or wrong answer, it is merely which decision you prefer.

Please fill in the following details:
Male/Female (please ring)
Name____
Email____
Age____

Page 2 of instructions for Condition 3 (divided and transferable payoffs), Prisoner's Dilemma Game:

<u>Game 1</u>

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER (Score in brackets) X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both of you choose Y you each score 2 points. Remember, you don't know what choice the other person will make, but you will have time after the experiment to discuss the distribution of the payoffs.

Please write your decision, X or Y, in the box below.

Please give a brief reason for your choice, in the box below.

Page 3 of instructions for Condition 3 (divided and transferable payoffs), Hi-Lo Game:

<u>Game 2</u>

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER (Score in brackets) X	Y
YOU	X	3 (3)	0 (0)
	Y	0 (0)	1 (1)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y you each score 0 points, and if both of you choose Y you each score 1 point. Remember, you don't know what choice the other person will make, but you will have time after the experiment to discuss the distribution of the payoffs.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 4 of instructions for Condition 3 (divided and transferable payoffs), Chicken Game:

Game 3

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER'S CHOICE (Score in brackets) X	Y
YOUR CHOICE	X	6 (6)	1 (10)
	Y	10 (1)	0 (0)

So if both of you choose X you each score 6 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 10 points, and if both of you choose Y you each score 0 points. Remember, you don't know what choice the other person will make, but you will have time after the experiment to discuss the distribution of the payoffs.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 5 of instructions for Condition 3 (divided and transferable payoffs), Stag Hunt Game:

Game 4

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER (Score in brackets) X	Y
YOU	X	3 (3)	0 (1)
	Y	1 (0)	1 (1)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y the first scores 0 points and the other scores 1 point, and if both of you choose Y you each score 1 point. Remember, you don't know what choice the other person will make, but you will have time after the experiment to discuss the distribution of the payoffs.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 6 of instructions for Condition 3 (divided and transferable payoffs), Centipede Game:

Game 5

You will be making a series of decisions in pairs, playing for points that are worth £1 each. You are Player 1, and will make the first decision, the other person (Player 2) will make the second decision, and finally you will make the third decision.

Each time you make a decision you will choose between **GO** and **STOP**. As the labels suggest, if you choose **GO** the series of decisions continues, and if you choose **STOP**, the game ends at that point, with each player getting the payoffs which are linked to that particular **STOP** decision. In each case, a **GO** decision results in the decision-maker sacrificing one point from his own score and adding five points to the other player's score.

The series of payoffs is as follows, with your (Player 1's) payoffs given first, and Player 2's payoffs given in brackets:

```
Player 1------GO------Player 2-------GO------Player 1------GO------3 (9)
  |                     |                      |
  |                     |                      |
STOP                  STOP                   STOP
0 (0)                 -1 (5)                 4 (4)
```

If Player 1 chooses **STOP** on the first decision, the game ends at that point, with Player 1 scoring 0 points and Player 2 scoring 0 points. If Player 1 chooses **GO** on the first decision, the game continues, with the next decision being that of Player 2.

If Player 2 chooses **STOP** on the second decision, the game ends at that point, with Player 1 scoring -1 point and Player 2 scoring 5 points. If Player 2 chooses **GO** on the second decision the game continues, with the next decision being that of Player 1.

If Player 1 chooses **STOP** on the third (and final) decision, the game ends at that point, with Player 1 scoring 4 points and Player 2 scoring 4 points. If Player 1 chooses **GO** on the third decision, they reach the final outcome, with Player 1 scoring 3 points and Player 2 scoring 9 points.

If you have any questions, please ask the experimenter. For the scoring sheet please turn the page.

Page 7 of instructions for Condition 3 (divided and transferable payoffs), Centipede Game continued:

An experimenter will act as a go-between, informing Player 2 of your choices, and you of Player 2's choices.

Please circle your first choice for decision 1 below. The experimenter will write down your choice and take it through to Player 2, then, if appropriate, return with Player 2's decision. Finally, if required, please circle your choice on Decision 3. Remember, you will have time after the experiment to discuss the distribution of the payoffs.

Decision 1 (Player 1)	Decision 2 (Player 2)	Decision 3 (Player 1)
GO Move to Decision 2 ⇨	GO Move to Decision 3 ⇨	GO End of game Player 1: 3 points (Player 2: 9 points)
or...	or...	or...
STOP Game ends Player 1: 0 points (Player 2: 0 points)	STOP Game ends Player 1: -1 point (Player 2: 5 points)	STOP Game ends Player 1: 4 points (Player 2: 4 points)

Please give a brief reason for your choice(s), in the box below.

Appendix 10: Materials for Chapter 6, Study 2

Page 1 of instructions for Condition 1 (certain receipt of payoffs):

INSTRUCTIONS - please read carefully.

In this experiment you have the opportunity to win real money, by playing a number of experimental games with a person in another room whose identity will remain unknown to you. In each game you must make one or more decisions. The decisions that you and the other person make in each game will determine how much money you win.

The first four games consist of one-off decisions. In each game both players will have to chose between X or Y. Each combination of choices in a game will lead to a certain outcome. However, you will not know what the other person has chosen until the end of the experiment. There will be a box for you to write your decision in after the explanation of each game. After making each decision please give a brief reason for it (one or two sentences is ample) and proceed on to the next game. At first sight the games may look very similar, but please read them carefully as they are all different.

The fifth game consists of each player making alternate decisions. An experimenter will act as a go-between for each pair of players.

After you have completed all the games, your decisions will be matched with the other player's, and your overall score from all five games will be calculated. This score will be divided by five (the number of games) in order to determine an average score for each game, and this average score will be how much, in pounds, you will be paid.

PLEASE REMEMBER - in each game there is no right or wrong answer, it is merely which decision you prefer.

Please fill in the following details:

Male/Female (please ring)

Name______________________________________

Email______________________________________

Age_______________________________________

Page 2 of instructions for Condition 1 (certain receipt of payoffs), Prisoner's Dilemma game:

Game 1

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

OTHER

(Score in brackets)

		X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both of you choose Y you each score 2 points. Remember, you don't know what choice the other person will make. Your score in this game will count towards the money you will win at the end of the experiment.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 3 of instructions for Condition 1 (certain receipt of payoffs), Hi-Lo game:

Game 2

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

	OTHER (Score in brackets) X	OTHER (Score in brackets) Y
YOU X	3 (3)	0 (0)
YOU Y	0 (0)	1 (1)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y you each score 0 points, and if both of you choose Y you each score 1 point. Remember, you don't know what choice the other person will make. Your score in this game will count towards the money you will win at the end of the experiment.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 4 of instructions for Condition 1 (certain receipt of payoffs), Chicken game:

Game 3

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

	OTHER'S CHOICE (Score in brackets) X	OTHER'S CHOICE (Score in brackets) Y
YOUR CHOICE X	6 (6)	1 (10)
YOUR CHOICE Y	10 (1)	0 (0)

So if both of you choose X you each score 6 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 10 points, and if both of you choose Y you each score 0 points. Remember, you don't know what choice the other person will make. Your score in this game will count towards the money you will win at the end of the experiment.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 5 of instructions for Condition 1 (certain receipt of payoffs), Stag Hunt game:

Game 4

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

OTHER
(Score in brackets)

		OTHER X	OTHER Y
YOU	X	3 (3)	0 (1)
YOU	Y	1 (0)	1 (1)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y the first scores 0 points and the other scores 1 point, and if both of you choose Y you each score 1 point. Remember, you don't know what choice the other person will make. Your score in this game will count towards the money you will win at the end of the experiment.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 6 of instructions for Condition 1 (certain receipt of payoffs), Centipede game:

Game 5

You will be making a series of decisions in pairs, playing for points that are worth £1 each. You are Player 1, and will make the first decision, the other person (Player 2) will make the second decision, and finally you will make the third decision.

Each time you make a decision you will choose between **GO** and **STOP**. As the labels suggest, if you choose **GO** the series of decisions continues, and if you choose **STOP**, the game ends at that point, with each player getting the payoffs which are linked to that particular **STOP** decision. In each case, a **GO** decision results in the decision-maker sacrificing one point from his own score and adding five points to the other player's score.

The series of payoffs is as follows, with your (Player 1's) payoffs given first, and Player 2's payoffs given in brackets:

Player 1------**GO**------Player 2-------**GO**------Player 1------**GO**------3 (9)

I	I	I
I	I	I
STOP	**STOP**	**STOP**
0 (0)	-1 (5)	4 (4)

If Player 1 chooses **STOP** on the first decision, the game ends at that point, with Player 1 scoring 0 points and Player 2 scoring 0 points. If Player 1 chooses **GO** on the first decision, the game continues, with the next decision being that of Player 2.

If Player 2 chooses **STOP** on the second decision, the game ends at that point, with Player 1 scoring -1 point and Player 2 scoring 5 points. If Player 2 chooses **GO** on the second decision the game continues, with the next decision being that of Player 1.

If Player 1 chooses **STOP** on the third (and final) decision, the game ends at that point, with Player 1 scoring 4 points and Player 2 scoring 4 points. If Player 1 chooses **GO** on the third decision, they reach the final outcome, with Player 1 scoring 3 points and Player 2 scoring 9 points.

Remember, your score in this game will count towards the money you will win at the end of the experiment.

If you have any questions, please ask the experimenter. For the scoring sheet please turn the page.

Page 7 of instructions for Condition 1 (certain receipt of payoffs), Centipede game continued:

An experimenter will act as a go-between, informing Player 2 of your choices, and you of Player 2's choices.

Please circle your first choice for decision 1 below. The experimenter will write down your choice and take it through to Player 2, then, if appropriate, return with Player 2's decision. Finally, if required, please circle your choice on Decision 3. Remember, your score in this game will count towards the money you will win at the end of the experiment.

Decision 1 (Player 1)	Decision 2 (Player 2)	Decision 3 (Player 1)
GO Move to Decision 2 ⇨	GO Move to Decision 3 ⇨	GO End of game Player 1: 3 points (Player 2: 9 points)
or...	or...	or...
STOP Game ends Player 1: 0 points (Player 2: 0 points)	STOP Game ends Player 1: -1 point (Player 2: 5 points)	STOP Game ends Player 1: 4 points (Player 2: 4 points)

Please give a brief reason for your choice(s), in the box below.

Page 1 of instructions for Condition 2 (one-in-four chance of receipt of payoffs):

INSTRUCTIONS - please read carefully.

In this experiment you might win real money, by playing a number of experimental games with a person in another room whose identity will remain unknown to you. In each game you must make one or more decisions. The decisions that you and the other person make in each game will determine your score. At the end of the experiment, all the participants will be entered into a prize draw and one quarter of them will win an amount of money determined by their score in the experiment. This means that you have a one in four chance of winning an amount of money, which your score in the experiment would determine.

The first four games consist of one-off decisions. In each game both players will have to chose between X or Y. Each combination of choices in a game will lead to a certain outcome. However, you will not know what the other person has chosen until the end of the experiment. There will be a box for you to write your decision in after the explanation of each game. After making each decision please give a brief reason for it (one or two sentences is ample) and proceed on to the next game. At first sight the games may look very similar, but please read them carefully as they are all different.

The fifth game consists of each player making alternate decisions. An experimenter will act as a go-between for each pair of players.

After you have completed all the games, your decisions will be matched with the other player's, and your overall score from all five games will be calculated. This score will be divided by five (the number of games) in order to determine an average score for each game, and this average score will be how much, in pounds, you will be paid if you are one of the winners in the prize draw.

PLEASE REMEMBER - in each game there is no right or wrong answer, it is merely which decision you prefer.

Please fill in the following details:

Male/Female (please ring)
Name______________________________________
Email______________________________________
Age_______________________________________

Page 2 of instructions for Condition 2 (one-in-four chance of receipt of payoffs), Prisoner's Dilemma game:

Game 1

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

OTHER
(Score in brackets)

		X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both of you choose Y you each score 2 points. Remember, you don't know what choice the other person will make. There is a one in four chance of winning some money, which this score would count towards.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 3 of instructions for Condition 2 (one-in-four chance of receipt of payoffs), Hi-Lo game:

<u>Game 2</u>

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

OTHER
(Score in brackets)

		X	Y
YOU	X	3 (3)	0 (0)
	Y	0 (0)	1 (1)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y you each score 0 points, and if both of you choose Y you each score 1 point. Remember, you don't know what choice the other person will make. There is a one in four chance of winning some money, which this score would count towards.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 4 of instructions for Condition 2 (one-in-four chance of receipt of payoffs), Chicken game:

<u>Game 3</u>

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER'S CHOICE (Score in brackets) X	Y
YOUR CHOICE	X	6 (6)	1 (10)
	Y	10 (1)	0 (0)

So if both of you choose X you each score 6 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 10 points, and if both of you choose Y you each score 0 points. Remember, you don't know what choice the other person will make. There is a one in four chance of winning some money, which this score would count towards.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 5 of instructions for Condition 2 (one-in-four chance of receipt of payoffs), Stag Hunt game:

Game 4

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER (Score in brackets) X	Y
YOU	X	3 (3)	0 (1)
	Y	1 (0)	1 (1)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y the first scores 0 points and the other scores 1 point, and if both of you choose Y you each score 1 point. Remember, you don't know what choice the other person will make. There is a one in four chance of winning some money, which this score would count towards.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 6 of instructions for Condition 2 (one-in-four chance of receipt of payoffs), Centipede game:

Game 5

You will be making a series of decisions in pairs, playing for points that are worth £1 each. You are Player 1, and will make the first decision, the other person (Player 2) will make the second decision, and finally you will make the third decision.

Each time you make a decision you will choose between **GO** and **STOP**. As the labels suggest, if you choose **GO** the series of decisions continues, and if you choose **STOP**, the game ends at that point, with each player getting the payoffs which are linked to that particular **STOP** decision. In each case, a **GO** decision results in the decision-maker sacrificing one point from his own score and adding five points to the other player's score.

The series of payoffs is as follows, with your (Player 1's) payoffs given first, and Player 2's payoffs given in brackets:

```
Player 1------GO------Player 2-------GO------Player 1------GO------3 (9)
  I                     I                      I
  I                     I                      I
STOP                  STOP                   STOP
0 (0)                 -1 (5)                 4 (4)
```

If Player 1 chooses **STOP** on the first decision, the game ends at that point, with Player 1 scoring 0 points and Player 2 scoring 0 points. If Player 1 chooses **GO** on the first decision, the game continues, with the next decision being that of Player 2.

If Player 2 chooses **STOP** on the second decision, the game ends at that point, with Player 1 scoring -1 point and Player 2 scoring 5 points. If Player 2 chooses **GO** on the second decision the game continues, with the next decision being that of Player 1.

If Player 1 chooses **STOP** on the third (and final) decision, the game ends at that point, with Player 1 scoring 4 points and Player 2 scoring 4 points. If Player 1 chooses **GO** on the third decision, they reach the final outcome, with Player 1 scoring 3 points and Player 2 scoring 9 points.

Remember, there is a one in four chance of winning some money, which this score would count towards.

If you have any questions, please ask the experimenter. For the scoring sheet please turn the page.

Page 7 of instructions for Condition 2 (one-in-four chance of receipt of payoffs), Centipede game continued:

An experimenter will act as a go-between, informing Player 2 of your choices, and you of Player 2's choices.

Please circle your first choice for decision 1 below. The experimenter will write down your choice and take it through to Player 2, then, if appropriate, return with Player 2's decision. Finally, if required, please circle your choice on Decision 3. Remember, there is a one in four chance of winning some money, which this score would count towards.

Decision 1 (Player 1)	Decision 2 (Player 2)	Decision 3 (Player 1)
GO Move to Decision 2 ⇨	GO Move to Decision 3 ⇨	GO End of game Player 1: 3 points (Player 2: 9 points)
or...	or...	or...
STOP Game ends Player 1: 0 points (Player 2: 0 points)	STOP Game ends Player 1: -1 point (Player 2: 5 points)	STOP Game ends Player 1: 4 points (Player 2: 4 points)

Please give a brief reason for your choice(s), in the box below.

Appendix 11: Materials for Chapter 6, Study 3

Page 1 of instructions for Condition 1 (friend as other player):

INSTRUCTIONS - please read carefully.

In this experiment you have the opportunity to win real money, by playing a number of experimental games with the friend with whom you signed up. Your friend will be based in another room for the duration of the experiment. In all the following games, you will be Player 1 and your friend will be Player 2. In each game you must make one or more decisions. The decisions that you and your friend make in each game will determine how much money you win.

The first four games consist of one-off decisions. In each game both players will have to chose between X or Y. Each combination of choices in a game will lead to a certain outcome. However, you will not know what your friend has chosen until the end of the experiment. There will be a box for you to write your decision in after the explanation of each game. After making each decision please give a brief reason for it (one or two sentences is ample) and proceed on to the next game. At first sight the games may look very similar, but please read them carefully as they are all different.

The fifth game consists of each player making alternate decisions. An experimenter will act as a go-between for each pair of players.

After you have completed all the games, your decisions will be matched with your friend's, and your overall score from all five games will be calculated. This score will be divided by five (the number of games) in order to determine an average score for each game, and this average score will be how much, in pounds, you will be paid.

PLEASE REMEMBER - in each game there is no right or wrong answer, it is merely which decision you prefer.

Please fill in the following details:

Male/Female (please ring)
Name____
Email____
Age____
Player 2's Name_________________________________

Page 2 of instructions for Condition 1 (friend as other player), Prisoner's Dilemma game:

Game 1

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER (Score in brackets) X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both of you choose Y you each score 2 points. Remember, you don't know what choice your friend will make.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 3 of instructions for Condition 1 (friend as other player), Hi-Lo game:

Game 2

You each have a choice between two courses of action - X or Y. Neither of you knows which choice your friend will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER (Score in brackets) X	Y
YOU	X	3 (3)	0 (0)
	Y	0 (0)	1 (1)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y you each score 0 points, and if both of you choose Y you each score 1 point. Remember, you don't know what choice your friend will make.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 4 of instructions for Condition 1 (friend as other player), Chicken game:

Game 3

You each have a choice between two courses of action - X or Y. Neither of you knows which choice your friend will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

		OTHER'S CHOICE (Score in brackets) X	Y
YOUR CHOICE	X	6 (6)	1 (10)
	Y	10 (1)	0 (0)

So if both of you choose X you each score 6 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 10 points, and if both of you choose Y you each score 0 points. Remember, you don't know what choice your friend will make.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 5 of instructions for Condition 1 (friend as other player), Stag Hunt game:

<u>Game 4</u>

You each have a choice between two courses of action - X or Y. Neither of you knows which choice your friend will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

OTHER
(Score in brackets)

		X	Y
YOU	X	3 (3)	0 (1)
	Y	1 (0)	1 (1)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y the first scores 0 points and the other scores 1 point, and if both of you choose Y you each score 1 point. Remember, you don't know what choice your friend will make.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 6 of instructions for Condition 1 (friend as other player), Centipede game:

<u>Game 5</u>

You will be making a series of decisions in pairs, playing for points that are worth £1 each. You are Player 1, and will make the first decision, your friend (Player 2) will make the second decision, and finally you will make the third decision.

Each time you make a decision you will choose between **GO** and **STOP**. As the labels suggest, if you choose **GO** the series of decisions continues, and if you choose **STOP**, the game ends at that point, with each player getting the payoffs which are linked to that particular **STOP** decision. In each case, a

GO decision results in the decision-maker sacrificing one point from his own score and adding five points to the other player's score.

The series of payoffs is as follows, with your (Player 1's) payoffs given first, and Player 2's payoffs given in brackets:

```
Player 1------GO------Player 2-------GO------Player 1------GO------3 (9)
  I                     I                     I
  I                     I                     I
STOP                  STOP                  STOP
0 (0)                 -1 (5)                4 (4)
```

If Player 1 chooses **STOP** on the first decision, the game ends at that point, with Player 1 scoring 0 points and Player 2 scoring 0 points. If Player 1 chooses **GO** on the first decision, the game continues, with the next decision being that of Player 2.

If Player 2 chooses **STOP** on the second decision, the game ends at that point, with Player 1 scoring -1 point and Player 2 scoring 5 points. If Player 2 chooses **GO** on the second decision the game continues, with the next decision being that of Player 1.

If Player 1 chooses **STOP** on the third (and final) decision, the game ends at that point, with Player 1 scoring 4 points and Player 2 scoring 4 points. If Player 1 chooses **GO** on the third decision, they reach the final outcome, with Player 1 scoring 3 points and Player 2 scoring 9 points.

If you have any questions, please ask the experimenter. For the scoring sheet please turn the page.

Page 7 of instructions for Condition 1 (friend as other player), Centipede game continued:

An experimenter will act as a go-between, informing Player 2 of your choices, and you of Player 2's choices.

Please circle your first choice for decision 1 below. The experimenter will write down your choice and take it through to Player 2, then, if appropriate, return with Player 2's decision. Finally, if required, please circle your choice on Decision 3. Remember, you do not know in advance which choice your friend would make.

Decision 1 (Player 1)	Decision 2 (Player 2)	Decision 3 (Player 1)
GO Move to Decision 2 ⇨	GO Move to Decision 3 ⇨	GO End of game Player 1: 3 points (Player 2: 9 points)
or...	or...	or...
STOP Game ends Player 1: 0 points (Player 2: 0 points)	STOP Game ends Player 1: -1 point (Player 2: 5 points)	STOP Game ends Player 1: 4 points (Player 2: 4 points)

Please give a brief reason for your choice(s), in the box below.

Page 1 of instructions for Condition 2 (stranger as other player):

INSTRUCTIONS - please read carefully.

In this experiment you have the opportunity to win real money, by playing a number of experimental games with another person who you do not know. The other person will be based in another room for the duration of the experiment. Could you please read the name of Player 2 below, and if you know them let the experimenter know so that you can be reassigned with another player. In all the following games, you will be Player 1 and the other person will be Player 2. In each game you must make one or more decisions. The decisions that you and the other person make in each game will determine how much money you win.

The first four games consist of one-off decisions. In each game both players will have to chose between X or Y. Each combination of choices in a game will lead to a certain outcome. However, you will not know what the other person has chosen until the end of the experiment. There will be a box for you to write your decision in after the explanation of each game. After making each decision please give a brief reason for it (one or two sentences is ample) and proceed on to the next game. At first sight the games may look very similar, but please read them carefully as they are all different.

The fifth game consists of each player making alternate decisions. An experimenter will act as a go-between for each pair of players.

After you have completed all the games, your decisions will be matched with the other player's, and your overall score from all five games will be calculated. This score will be divided by five (the number of games) in order to determine an average score for each game, and this average score will be how much, in pounds, you will be paid.

PLEASE REMEMBER - in each game there is no right or wrong answer, it is merely which decision you prefer.

Please fill in the following details:

Male/Female (please ring)
Name______________________________
Email______________________________
Age______________________________
Player 2's Name________________________

Page 2 of instructions for Condition 2 (stranger as other player), Prisoner's Dilemma game:

Game 1

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

OTHER
(Score in brackets)

		X	Y
YOU	X	3 (3)	1 (4)
	Y	4 (1)	2 (2)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 4 points, and if both of you choose Y you each score 2 points. Remember, you don't know what choice the other person will make.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 3 of instructions for Condition 2 (stranger as other player), Hi-Lo game:

Game 2

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

OTHER
(Score in brackets)

		X	Y
YOU	X	3 (3)	0 (0)
	Y	0 (0)	1 (1)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y you each score 0 points, and if both of you choose Y you each score 1 point. Remember, you don't know what choice the other person will make.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 4 of instructions for Condition 2 (stranger as other player), Chicken game:

Game 3

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

OTHER'S CHOICE

(Score in brackets)

		X	Y
YOUR CHOICE	X	6 (6)	1 (10)
	Y	10 (1)	0 (0)

So if both of you choose X you each score 6 points, if one chooses X and the other chooses Y the first scores 1 point and the other scores 10 points, and if both of you choose Y you each score 0 points. Remember, you don't know what choice the other person will make.

Please write your decision, X or Y, in the box below.
Please give a brief reason for your choice, in the box below.

Page 5 of instructions for Condition 2 (stranger as other player), Stag Hunt game:

<u>Game 4</u>

You each have a choice between two courses of action - X or Y. Neither of you knows which choice the other person will make.

After you have made your decisions, each participant will receive a certain payoff, or number of points, depending upon the combination of your choices. The points for each person are shown in the following matrix:

OTHER

(Score in brackets)

		X	Y
YOU	X	3 (3)	0 (1)
	Y	1 (0)	1 (1)

So if both of you choose X you each score 3 points, if one chooses X and the other chooses Y the first scores 0 points and the other scores 1 point, and if both of you choose Y you each score 1 point. Remember, you don't know what choice the other person will make.

Please write your decision, X or Y, in the box below.

Please give a brief reason for your choice, in the box below.

Page 6 of instructions for Condition 2 (stranger as other player), Centipede game:

<u>Game 5</u>

You will be making a series of decisions in pairs, playing for points that are worth £1 each. You are Player 1, and will make the first decision, the other person (Player 2) will make the second decision, and finally you will make the third decision.

Each time you make a decision you will choose between **GO** and **STOP**. As the labels suggest, if you choose **GO** the series of decisions continues, and if you choose **STOP**, the game ends at that point, with each player getting the payoffs which are linked to that particular **STOP** decision. In each case, a **GO** decision results in the decision-maker sacrificing one point from his own score and adding five points to the other player's score.

The series of payoffs is as follows, with your (Player 1's) payoffs given first, and Player 2's payoffs given in brackets:

```
Player 1------GO------Player 2-------GO------Player 1------GO------3 (9)
  |                    |                      |
  |                    |                      |
STOP                 STOP                   STOP
0 (0)                -1 (5)                 4 (4)
```

If Player 1 chooses **STOP** on the first decision, the game ends at that point, with Player 1 scoring 0 points and Player 2 scoring 0 points. If Player 1 chooses **GO** on the first decision, the game continues, with the next decision being that of Player 2.

If Player 2 chooses **STOP** on the second decision, the game ends at that point, with Player 1 scoring -1 point and Player 2 scoring 5 points. If Player 2 chooses **GO** on the second decision the game continues, with the next decision being that of Player 1.

If Player 1 chooses **STOP** on the third (and final) decision, the game ends at that point, with Player 1 scoring 4 points and Player 2 scoring 4 points. If Player 1 chooses **GO** on the third decision, they reach the final outcome, with Player 1 scoring 3 points and Player 2 scoring 9 points.

If you have any questions, please ask the experimenter. For the scoring sheet please turn the page.

Page 7 of instructions for Condition 2 (stranger as other player), Centipede game continued:

An experimenter will act as a go-between, informing Player 2 of your choices, and you of Player 2's choices.

Please circle your first choice for decision 1 below. The experimenter will write down your choice and take it through to Player 2, then, if appropriate, return with Player 2's decision. Finally, if required, please circle your choice on Decision 3. Remember, you do not know in advance which choice the other person would make.

Decision 1 (Player 1)	Decision 2 (Player 2)	Decision 3 (Player 1)
GO Move to Decision 2 ⇨	GO Move to Decision 3 ⇨	GO End of game Player 1: 3 points (Player 2: 9 points)
or...	or...	or...
STOP Game ends Player 1: 0 points (Player 2: 0 points)	STOP Game ends Player 1: -1 point (Player 2: 5 points)	STOP Game ends Player 1: 4 points (Player 2: 4 points)

Please give a brief reason for your choice(s), in the box below.

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