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Pueri Economicus: A study of pro-social behaviour by children and young people in an economic setting: a cross cultural study

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The Ultimatum Game is an experimental economic game, It was first developed in 1982 (Güth *et al*), and has since been widely used with adults to explore concepts of negotiation and reciprocity. Nowak *et al* (2000) have described it as one of the most common economics experiments, ‘catching up with the Prisoner’s Dilemma as a prime show-piece of apparently irrational behaviour’.

Its significance is that it challenges the received view of economic rationality. Standard economic theory is based on the conception of *homo economicus*, economic man, who makes ‘rational’ decisions based on maximising his (sic) self-interest. In the Ultimatum Game (UG), two players, who do not usually know each other, are invited to share a sum of money, typically \$10 at the time the game was played first. One of the two would be selected by chance to divide the sum into two portions, and to offer one of these to the other player. The second player could either accept the offer, in which case both players would receive their portion, or reject the offer, in which case neither would get anything (seen Burnham, 2002). The game was only played on a single occasion between two players. *Homo economicus* would behave, if they were the first player, by keeping the great majority of the sum, say 90%, for themselves, and only offering 10% to the other player. The second *homo economicus* would rationally, in their own self-interest, accept what was on offer, as being better than nothing.

Unfortunately for this economic theory, in practice the great majority of people do not behave in this way. Most offers made are of between 40 and 50%, while offers that are made of 20% or less are usually (Henrich *et al*, 2004; Oosterbeek *et al*, 2004). Most people make more generous offers than would be predicted, and most people would rather have nothing than accept what is perceived as an unfair distribution. The UG can thus be interpreted as showing that people have a tendency not to tolerate disproportionate distributions, and do not accept social inequalities, and behave towards other in a broadly pro-social manner. The UG game has been played extensively in cross-cultural studies (Roth *et al*, 1991), and although there are variations between cultures, these are generally quite minimal. One large study did attempt a cross-cultural studies working with people living in isolated ‘non-market’ economies, and found rather greater variations (but often showing a cultural predisposition to offer even larger sums (Henrich *et al*, 2005). Hill (2003) has remarked that “the game ... simply provid[es] counter-evidence to the general presumption that participation in a market economy (capitalism) makes a person more selfish.”

Surowiecki (2004) suggested that low proposals were rejected because the sums played for were relatively low: a split of just 5% of say ten million dollars might be accepted. But there have also been experiments where there have been relatively large sums involved: Cameron (1999) and Hoffman *et al*. (2000) have found that with high stakes offers were more often an even division, as in a \$100 game in Indonesia (where the average 1995 income per head was \$670). Offers of \$30 were rejected, even though this was about two weeks income.

Why do people behave in this way? Some researchers have suggested that the reputation of the proposer is significant: they do not want to appear mean (Gil-White, 2003). Others have attempted to explain the results through an 'inequity aversion' model, a preference for 'fairness' (Walster *et al*, 1978). Generous offers, which are not uncommon, have been explained by Zak *et al* (2007) as being motivated by empathy or by perspective taking. Rejections have been explained by adverse physiological reactions to mean offers (Sanfey *et al*, (2002).

A number of researchers have suggested that altruistic behaviour may be an evolutionary trait, developed to support social behaviour among humans. Gintis *et al* (2003), for example, point out that behaviour such as that shown in the UG cannot easily be explained in terms of kinship or reciprocal altruism, and postulate 'strong reciprocity' as an evolutionary stable strategy in the early stages of human evolution (also Gintis, 2003). Carpenter *et al* (2004) suggest that social reciprocity requires people to punish those who violate the norms of prosociability (such as making low offers). Bénabou and Tirole (2006) make a case that there is a heterogeneous mixture of human responses between individual altruism and greed, in which concerns for social reputation and self-respect can operate without extrinsic motivation, rewards or punishments.

But the cultural variations that have been described suggest that such behaviour may be socially constructed, or 'learned', in some way, rather than necessarily inherited. Is the reason that the *homo economicus* model fails that we have been encultured to be prosocial, and to value non-self-seeking behaviour? Does the 'economic child' - *pueri economicus* – maximise their own self-interests, and only learn through socialisation that such behaviour is not acceptable?

The UG has not often been attempted with children. Murnighan and Saxon (1998) conducted experiments, including the UG, with children in Illinois, USA, using sweets as the material to be bargained with. They worked with kindergarten (6 year olds), third and sixth (9 and 12 year old) grade children, but in a situation where the children knew their opponents, and in which players took part in several games. This (and possibly the use of sweets) violated the normal playing of the UG. They found that younger children made larger offers, and accepted smaller amounts, and that boys often took strategic advantages. Nine year olds in particular displayed a strong sense of fairness. Mittone (2003) looked at altruism in 9 and 12 year olds. He drew on Amartya Sen's (1986) concept of obligate ethical altruism, where behaviour is non-self-interested and driven by some form of moral obligation (rather than reciprocal behaviour, that might be construed as motivated through an anticipated response or pay-off). He did not use the UG, but other experiments that required cooperative behaviour, and concluded that children may be more orientated towards ethical altruism than adults, and that ethical altruism is more likely to be genetically inherited than culturally learnt (p 15). Sutter (2005, 2007) carried out UG with children (7 to 10, mean 9.2) and teenagers (11-15, mean 12.1). Again, players knew each other and were living together at summer camp. Both groups responded systematically to the perceived intentions of the other player, and were more likely to reject unequal offers than adults: there was "a considerable fraction of subjects with pure inequality aversion" (2005, p 8). He concluded "the nature of fair behaviour becomes more sophisticated with older age, such that intentions become relatively more prominent – compared to actual outcomes – in shaping our economic decisions (2005, p 8).

The use of the Ultimatum Game described in the following papers is part of a four-country project in a European Science Foundation ECRP programme (06 ECRP FP007 Citizens of the future: the concerns and actions of young people around current European and global issues: funding Poland, Turkey and Spain) and a British Academy Small Grants Award (SG SG49353: funding the UK).

Part of the project – an analysis of children's hopes and fears - was described in an earlier symposium (Citizens of the Future) (Holden, 2008; Dooley *et al*, 2008; Krywosz-Rynkiewicz *et al*, 2008). This paper sets out how we designed this iteration of the Ultimatum Game.

In each of the four countries involved (Poland, Spain, Turkey and the United Kingdom) we had researchers working in two locations: one a large urban setting, the other a smaller town. In each of these eight locations, we recruited subjects in schools who were aged 11, 14 and 17 years old.

In the first iteration of the game, we sought to establish a baseline of responses. Each game was played with two classes of 11 year olds, two of 14 year olds, and two of 17 years old. This in each location there were about 50 – 60 players of each age, playing between 25 and 30 games. So in each country, there were about 100 to 120 children of each age group. These games were played face-to-face, with children

who were in the same class. While we avoided (where possible) matching pupils who were close friends, it was inevitable that the relationship between the pair would affect the results. There were necessarily relationships between the pair that pre-existed the experiment, and that would carry on after the experiment, and these would have an effect on the results. A preliminary meeting of all the experimenters took place, in which a set of protocols for the management of the game were agreed, and a data collection schedule devised.

Children were taken in pairs to a nearby room, and shown a standard description of the UG, prepared as a powerpoint sequence. This was translated into each language, and ensured that a consistent set of instructions were given. In each case, ten coins were placed on the table between the players (matching the description in the powerpoint), and the proposer was asked to physically create two piles of coins, and push one to the other player. Normally, there were two researchers with each pair of pupils, and immediately after the conclusion of the game, a researcher would briefly interview each player, asking two standard questions: ‘Why did you decide to make that offer?’/‘Why did you decide to accept (reject) that offer?’; and ‘‘How do you feel about the result?’’ The responses were recorded on a data sheet.

In the second and third iterations of the game (which were operated approximately in parallel), the players did not play face-to face. The same number of children were involved, of the same ages and in the same locations. They were a different set of children, however, so no pupil played the game more than once. Half the pupils played pupils of the same age in the same country in the other city or town. The other half played pupils of the same age in a different country. The UK and Turkey, and Poland and Spain were paired up for this purpose. It was originally intended to allow the games to take place simultaneously, using mobile phone or skype links between schools. This was too complex to coordinate, with different school dates and times (and three time zones), so it was decided to collect all the decisions from one class, and then e-mail them to the partner school, where they could be presented to the pupils and individual responses collected. Thus a whole class made a set of offers, and a whole class responded. This involved two visits to the ‘proposing school’, once to collect the offers, and once to relay the responses (and make the necessary pay-offs), and a single visit to the ‘responding school’.

The instructions were modified to show the multi-stage, multi-location nature of the game., and shown to the whole class at the beginning of the session. Then pupils were withdrawn, one at a time, to make their offer. Again, the ten coins were physically on the table, and they made an actual division. In the corresponding class, pupils were also withdrawn one at a time, and told the name, gender and offer that was being put to them. This was placed on the table – two piles of coins, one being offered to them, the other being retained for the proposer. When these responses were relayed back to the proposing school, each pupil was withdrawn again, and reminded of their offer – again, all ten coins were physically on the table, in the original two piles.

We thus have, for each country, three sets of results:

(1) Pupils playing in a face-to-face situation, with approximately the following numbers of offers and responses:

	11 years		14 years		17 years		total
	offers	responses	offers	responses	offers	responses	
Poland large city	30	30	30	30	30	30	180
Poland smaller town	30	30	30	30	30	30	180
Spain large city	30	30	30	30	30	30	180
Spain smaller town	30	30	30	30	30	30	180
Turkey large city	30	30	30	30	30	30	180
Turkey smaller town	30	30	30	30	30	30	180
UK large city	30	30	30	30	30	30	180
UK smaller town	30	30	30	30	30	30	180
Total	240	240	240	240	240	240	1440

(2) Pupils playing at a distance with pupils from the same country, of the same age, in a different location

	11 years		14 years		17 years		total
	offers	responses	offers	responses	offers	responses	
Poland large city	0	30	30	0	30	0	90
Poland smaller town	30	0	0	30	0	30	90
							3

Spain large city	30	0	0	30	0	30	90
Spain smaller town	0	30	30	0	30	0	90
Turkey large city	0	30	0	30	0	30	90
Turkey smaller town	30	0	30	0	30	0	90
UK large city	30	0	0	30	0	30	90
UK smaller town	0	30	30	0	30	0	90
Total	120	120	120	120	120	120	720

(3) Pupils playing at a distance with pupils from a different country, of the same age

	11 years		14 years		17 years		total
	offers	responses	offers	responses	offers	responses	
Poland large city	0	30	30	0	30	0	90
Spain large city	30	0	0	30	0	30	90
Poland smaller town	30	0	0	30	0	30	90
Spain smaller town	0	30	30	0	30	0	90
UK smaller town	0	30	0	30	0	30	90
Turkey smaller town	30	0	30	0	30	0	90
UK large city	30	0	0	30	0	30	90
Turkey large city	0	30	30	0	30	0	90
Total	120	120	120	120	120	120	720

The first set of responses are in situations where there are probably reciprocal relationships, running over a period of time/

The second and third sets are non-reciprocal: each child knew no more than the name, gender, and approximate location of the person they were playing.

In the second set, they knew that they were playing a person in the same country as themselves.

In the third set, they knew they were playing with a person from a different, named country.

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