Altruism in Experiments

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By James Andreoni, William T. Harbaugh, and Lise Vesterlund

ABSTRACT:

We call an act altruistic when it is a sacrifice that benefits others. We discuss how experiments have demonstrated that altruistic choices appear to follow the same regularity conditions as those assumed for private goods. In particular they vary rationally in response to changes in prices and circumstances. We show how experiments have distinguished between different economic models of how concern for others enters utility functions, and have explored the implications of those models for charitable giving, labor markets, and trust. We also discuss the experimental evidence for differences in altruism by gender, and work on altruism's cultural, developmental, and neural foundations.

Unlike experiments on markets or mechanisms, experiments on altruism are about an individual motive or intention. This raises serious obstacles for research. How do we define an altruistic act, and how do we know altruism when we see it?

The philosopher Thomas Nagel provides this definition of altruism: 'By altruism I mean not abject self-sacrifice, but merely a willingness to act in the consideration of the interests of other persons, without the need of ulterior motives' (1970, p. 79). Notice that there are two parts to this definition. First, the act must be in the consideration of others. It may or may not imply sacrifice on one's own part, but it does require that the consequences for someone else affect one's own choice. The second aspect is that one does not need 'ulterior motives' rooted in selfishness to explain altruistic behaviours. Of course, ulterior motives may exist alongside altruism, but they cannot be the only motives.

If this is our definition of altruism, then how do we know altruism when we see it? The answer, unfortunately, is necessarily a negative one – we only know when we do not see it. Altruism is part of the behaviour that you cannot capture with a specifically defined ulterior motive. Experimental investigation of altruism is thus focused around eliminating any possible ulterior motives rooted in selfishness. One of the central motives that potentially confounds altruism is the warm-glow of giving, that is, the utility one gets simply from the act of giving *without* any concern for the interests of others (Andreoni, 1989; 1990). While it is possible that warm-glow exists apart from altruism, it seems most likely that the two are complements – the stronger your desire to act unselfishly, the greater the personal satisfaction from doing so. Indeed, the two may be inextricably linked. Having a personal identity as an altruist may necessarily precede altruistic acts, and maintaining that identity can only come from actually being generous.

In what follows we will highlight the main experimental evidence regarding choices made in the interests of others, and the systematic attempts in the literature to rule out ulterior motives for these choices. Since these serious and repeated attempts to rule out ulterior motives have not been totally successful, the experimental evidence, like Thomas Nagel, favours the possibility of altruism.

Laboratory experiments with evidence of altruism

In describing the games below, we adopt the convention of using Nash equilibrium to refer to the prediction that holds if all subjects are rational money-maximizers.

Prisoner dilemma

There have been thousands of studies using prisoner's dilemma (PD) games in the psychology and political science literatures, all exploring the stubborn nature of cooperation (Kelley and Stanelski, 1970). Roth and Murnigham (1978) explored PD games under paid incentives and with a number of different payoff conditions. Their study confirmed to economists that cooperation is robust.

Sceptics noted, however, that cooperation need not be caused by altruism. First, inexperience and initial confusion may cause subjects to cooperate. Second, subjects in a finitely repeated version of the game may cooperate if they each believe there is a chance someone actually is altruistic. Behaviourally this 'sequential equilibrium reputation hypothesis' (Kreps et al., 1982) does not actually require subjects to be altruistic, but only that they believe that they are sufficiently likely to encounter such a person.

Andreoni and Miller (1993) explore these two factors by asking subjects to play 20 separate ten-period repeated PD games. A control treatment had subjects constantly changing partners, thus unable to build reputations. They find significant evidence for reputations, but that these alone cannot explain the level of cooperation, especially at the end of the experiment. Rather, they estimate that about 20 per cent of subjects actually need to be altruistic to support the equilibrium findings. This finding is corroborated in other repeated games, such as Camerer and Weigelt's (1988) moral hazard game, McKelvey and Palfrey's (1992) centipede game, and in a two-period PD of Andreoni and Samuelson (2006).

Public goods

Linear public goods games have incentives that make them resemble a many-person PD game. Individuals have an endowment *m* which they each must allocate between themselves and a public account. Each of the *n* members of the group earns α for each dollar allocated to the public account. By design, $0 < \alpha < 1$, so giving nothing is a dominant strategy, but $\alpha n > 1$, so giving *m* is Pareto efficient.

The results of these games are that average giving is significantly above zero, even as we change *n*, *m* and *α* (Isaac and Walker, 1988; Isaac, Walker and Williams; 1994) and whether the play is with the same group of 'partners' or with randomly changing groups of 'strangers' (Andreoni, 1988). Hence, reputations play little role in public goods games (Andreoni and Croson,forthcoming; Palfrey and Prisbrey, 1996).

In his review of this literature, Ledyard (1995) notes that with a dominant strategy of giving zero, any error or variance in the data could mistakenly be viewed as altruism. Thus, to determine what drives giving one needs to confirm that subjects understand the dominant strategy but choose to give anyway.

Andreoni (1995) develops a design to separate 'kindness' from 'confusion' in linear public goods games. Rather than paying subjects for their absolute performance, in one treatment he paid subjects by their relative performance. Converting subjects' ranks into their payoffs converts a positive-sum game to a zero-sum game. It follows that even altruists have no incentive to cooperate when paid by rank (that is, under the usual definition of altruism where people love themselves at least as much as they love others). Cooperation by subjects in the treatment group, therefore, provides a measure of

confusion. Andreoni finds that both kindness and confusion are significant, and about half all cooperation in public goods games is from people who understand free riding but choose to give anyway.

To establish that giving is deliberate, however, does not necessarily mean it is based in altruism; it could, instead, be from warm-glow. Two papers, using similar experimental designs but different data analysis methods, explore this question by separating the marginal net return that a gift to the public good has for the giver and for the recipient. The 'internal return' experienced by the giver should affect warm-glow and altruism, but the 'external return' received by the others affects only altruism. Palfrey and Prisbrey (1997) find that warm-glow dominates altruism, while Goeree, Holt and Laury (2002) find mostly altruism. Combining this evidence, it appears that both motives are likely to be significant.

Another way to test for the presence of altruism and warm-glow is to choose a manipulation that would have different predictions in the two regimes. Andreoni (1993) looks at the complete crowding out hypothesis, which states that a lump-sum tax, used to increase government spending on a public good, will reduce an altruist's voluntary contributions by the amount of the tax. He employs a public goods game with an interior Nash equilibrium. Suppose subjects care only about the payoffs of other subjects (altruism). Then if we force subjects to make a minimum contribution below the Nash equilibrium, this should simply crowd out their chosen gift, leaving the total gift unchanged. If they get utility from the act of giving (warm-glow), by contrast, crowding out should be incomplete. Andreoni finds crowding at 85 per cent, which is significantly different from both zero and 100 per cent. This confirms the findings from the last

paragraph; both warm-glow and altruism are evident in experiments on public goods. Similar findings are presented in Bolton and Katok (1998) and Eckel, Grossman and Johnston (2005).

Dictator games

This line of research began with the ultimatum game, where a proposer makes an offer on the split of a sum of money. If the responder accepts, the offer is implemented, while if she rejects both sides get nothing. Guth, Schmittberger and Schwarze (1982) find that proposers strike fair deals and leave money on the table. Is this altruism, or just fear of rejection? To answer this question Forsythe et al. (1994) also examine behaviour in a dictator game that cuts out the second stage, leaving selfish proposers free to keep the whole pie for themselves, and leaving altruists unconstrained to give a little or a lot. While keeping the entire endowment is the modal choice in the dictator game, a significant fraction of people give money away. On average, people share about 25 per cent of their endowment. This seems to indicate significant altruism.

Again, researchers have explored numerous non-altruistic explanations. One is that, while the dictator's identity is unknown to the recipient, it is not unknown to the researcher. This lack of 'social distance' could cause the selfish but self-conscious subjects to give when they would prefer not to. Hoffman et al. (1994) take elaborate steps to increase the anonymity and confidentiality of the subjects so that even the researcher cannot know their choices for sure. They find that this decreases giving to about 10 per cent of endowments. However, this 'double anonymous' methodology creates problems of its own. Bolton, Katok and Zwick (1998) argue that greater anonymity makes the

participants sceptical about whether the transfers will be carried out. Bohnet and Frey (1999) find that reducing the social distance increases equal splits greatly, but in their anonymous treatments giving again averages 25 per cent (see also Rege and Telle, 2004).

Andreoni and Miller (2002) take a different approach. They note that if altruism is a deliberate choice, then it should follow the neoclassical principles of revealed preference. They gave subjects a menu of several dictator 'budgets', each with different 'incomes' and different 'prices' of transferring this income to another anonymous subject. By checking choices against the generalized axiom of revealed preference, they show that indeed most subjects are rational altruists, that is, they have consistent and well-behaved preferences for altruistic giving in a dictator game. They also show substantial heterogeneity across subjects, with preferences ranging from utilitarian (maximizing total payments to both subjects) to Rawlsian (equalizing payments to both subjects). Interestingly, men and women are on average equally altruistic in this study, but vary significantly in response to price. Andreoni and Vesterlund (2001) show that men are more likely to be utilitarian, and women are more likely to be Rawlsian. This implies that men are significantly more generous when giving is cheap (that is, it costs the giver less than one to give one), but women are significantly more altruistic when giving is expensive (costs greater than or equal one to give one). Which is the fairer sex, therefore, depends on the price of giving (see also Eckel and Grossman, 1998), on dictator games when the price is one).

Trust games and gift exchange

When someone buys a loaf of bread from a baker, there is a moment when one party has both the bread and the money and the incentive to take both. Why don't they? Similarly, why are some car mechanics truthful, and why do some workers put in an honest effort even when they are not monitored? These questions have been studied under names of trust games and gift exchange.

In the trust game, two players are endowed with M each. A sender chooses to pass x to a receiver. A receiver receives kx, where $k > 1$. The receiver then chooses a y to pass back to the sender. Senders earn $M - x + y$, while receivers earn $M + kx - y$. Since $y = 0$ is a dominant strategy for receivers, $x = 0$ is the subgame perfect equilibrium strategy for senders. That is, since the baker keeps both the bread and the money, no exchange is attempted. Despite this dire prediction, x and y are often positive, and y is typically increasing in x. While there is tremendous variance, the average y is often slightly below the average x (Berg, Dickhaut and McCabe, 1995).

The gift exchange game is a non-linear version of the trust game above. Fehr, Kirchsteiger and Riedl (1993) adapted the Akerlof (1982) labour market model of efficiency wages. Some subjects play the roles of firms and offer labour contracts to workers. The contracts stipulate a wage and an expected effort level of workers. Since effort is costly and unobservable, it should be minimal. The subjects playing the role of firms should expect low effort, and offer low wages. However, in the experiment wages are high and effort rises with the wage offer, just as Akerlof predicted.

Trust and gift exchange games are often used to argue for the importance of reciprocity. Reciprocity is, however, an ulterior motive – giving in order to either

generate or relieve an obligation is not altruism by the definition in our introduction. How much of the exchange can be attributed to altruism alone? Cox (2004) separates these motives by comparing senders in a trust game with those in a dictator game. As dictators have no ulterior motive of generating an obligation, their behaviour can be used to estimate the altruism of senders. For receivers he uses a control group whose *x* is determined at random by the experimenter. These receivers have no obligation to the sender, thus their transfers serve as a measure of the receivers' altruism. Cox finds that 60 per cent of an average sender's *x* and 42 per cent of the average receiver's *y* is motivated by altruism. Thus, while reciprocity is clearly present, altruism is not replaced in this exchange (see also Charness and Haruvy, 2002; Gneezy, Guth and Verboven, 2000).

While some have criticized whether gift exchange in the laboratory is robust to small changes in parameters and presentation (Charness, Frechette and Kagel, 2006), others have challenged gift exchange in the field. List (2006) looks for gift exchange on the trading floor of a sports card market. He conducts a series of experiments that move incrementally from a standard laboratory game with a neutral presentation to actual exchanges on the floor. While he finds that gift exchange (higher quality product in return for higher price) is not totally extinguished in the actual market, he also finds that reputation is far more important in determining the quality provided by sellers. Gneezy and List (2006) follow up with a labour market experiment. They recruited students to do a one-day job working in a library. The treatment group was told, unexpectedly, that their wage would be 167 per cent of the agreed wage. These subjects were significantly more productive in the first 90 minutes of work than the control subjects. However, after a one-hour lunch break, there was no difference between the productivity of treatment and

control. They conclude that gift exchange in actual labour markets may have no long-term effects.

Conclusion

There is ample consistent evidence of altruism in experiments. This follows both from studies that have taken great effort to remove any ulterior motives, as well as studies that provide manipulations that should influence altruism. While the existence and importance of altruism seem well established in the laboratory, many questions that could help us understand and amplify altruism remain unanswered.

First, where do altruistic preferences come from? One notion is that they come from culture. Evidence of this is suggested by differences in behaviour in experiments in different countries (Roth et. al., 1991; Henrich et al., 2001). Another notion is that they are acquired as part of psychological development and socialization, as seen in economic experiments using children as subjects (Harbaugh and Krause, 2000). A third possibility for altruism is that we are innately wired to care. Harbaugh, Mayr and Burghart (2007) use fMRI to show that neural activation in the ventral striatum is very similar when money goes to the subject and when it goes to a charity, and that the relative activations actually predict who will give. Tankersley, Stowe and Huettel (2007) show that posterior superior temporal sulcus activation is higher for people who report more helping behavior outside the lab.

Second, is altruism significant outside the laboratory? The laboratory is, after all, a unique environment. Field experiments on fundraising, such as List and Lucking-Reiley

(2002) show the potential of this method for finding good evidence of altruism outside the laboratory, but without giving up all experimental control.

Finally, how does altruism combine with other ulterior motives? Are warm-glow and altruism inextricably linked, and can we use mechanisms that act on warm-glow to amplify altruism and overcome free riding? Does voting to force everyone to provide a public good provide a warm-glow benefit to the voters? Economic experiments may be a productive method for answering these questions, and for using the knowledge of altruism that results to improve the institutions within which altruist economic agents interact.

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See also:

altruism (history of the concept)

Experimental Economics

Experiments, history of

Public Good Experiments

Public Goods

charitable giving

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