

If Interdependent Preferences May Depend on Cognition

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Economists usually assume preferences as given. I argue that, at least in the case of interdependent preferences, this may be deeply misleading. I review work from framing studies, public goods experiments, attitudes towards risk, happiness measurement, consumption, the labour market and ethics and economics, suggesting that interdependent preferences may depend on cognitive factors.

Economists tend to assume preferences as given (Becker and Stigler, 1977). They are the ultimate exogenous variable - the basic and stable block on which economic models are built -. The exogeneity principle has been betrayed at times. Nevertheless, it is still the gate-keeper in support for the principle of parsimony of explanation, which economists have taken from Milton Friedman (1953) as their methodological Bible in justification of rational choice - notwithstanding any contrary evidence on bounded rationality -. This is why, in principle, preferences cannot be consented to depend on cognitive factors, for this would make something else at least as fundamental as preferences are.

Unfortunately, there are various cases in which the assumption that preferences do not depend on cognition seems, at best, a convenient simplification and, at worst, a deeply misleading one. I shall argue that it is time for economists to start taking cognitive psychology seriously.

Cooperation and Cognition.

There is one general class of experiments that generically call for the importance of cognitive effects - namely, the experiments dealing with so-called framing effects -. From the perspective

of standard rational choice, there is no reason why, if the same decision problem is truly described differently, different decisions should occur truly. Nevertheless, they do (Tversky and Kahneman, 1987). This produces striking results in coordination games and has even prompted a reformulation of rational choice to take frame salience into account (see Bacharach and Bernasconi, 1997). However, this is equivalent to admitting that the revealed preference (Varian, 1992) by the subject depends on cognitive processing.

In public goods provision experiments, where it would be individually rational not to cooperate and let the others contribute to the public good (e.g., by paying taxes), different frames can induce different cooperation rates (Cookson, 1997; Andreoni, 1988). Learning may actually *increase* the amount of observed cooperation (Cookson, 1997).

Why is this example interesting? I am an economist specialised in interdependent, or relativity-sensitive, preferences (Zizzo, 1997a). In a version of this framework, the utility of an agent depends not only on its own material payoff but also on the utility of some other agent, either positively (because of altruism, moral deservingness and so on) or negatively (because of envy, status or power-seeking, moral reasons). It is a way in which non-monetary factors may enter in the utility function - and, while, for non economists, a utility function non increasing in monetary payoffs may not be remarkable, it is so for many economists, who think that ignoring them entails only a small loss in predictive power (again, the parsimony argument) -.

Relativity-sensitivity does explain cooperation in public goods experiments if we assume

some positive weight on the other's utility. However, framing tells us something else. It tells us that the weight changes according to the subjective way the decision-maker perceives the problem.

A more amusing example, still from public goods experiments, in which preferences appear to depend on cognition - in this case, the way the agent perceives the social world around him - was first provided by a paper by Marwell and Ames (1981). Economists believe that people are purely self-interested all the time. This may be false - but it does produce an effect -: *they behave* more selfishly than everyone else in contributing to the public good. The outcome is that economics-trained subjects tend to get out from public goods experiments with less money than more naive subjects playing among themselves (for recent evidence, e.g. Frank, Gilovich and Regan, 1993).

Situational Risk Attitude.

The definition of interdependent preferences mentioned above is incomplete. If utility is relative to someone else's utility, who is the someone else? What determines the *reference group* and how does an agent relate to someone else, i.e. how is the *frame of reference* determined?

There is one obvious sense in which risk attitudes have been found cognition- dependent, namely a win-frame is not the same thing as a loss-frame (Tversky and Kahneman, 1979). A similar reference-dependence has been found for riskless choice (Tversky and Kahneman, 1991).

However, there is another sense in which preferences under risky choice are dependent on the cognitive frame: namely, if subject care for relative status, subjects trailing badly within their reference group will play in a riskier way than the others. This is in line with the security potential-aspiration theory which Lola Lopes has recently presented at a UCL conference, and which is based on work co-authored with Gregg Oden (Lopes, 1997). In this theory, utility depends not only on a psychophysical term, but also on the aspiration level of the subject. If subjects are relativity-sensitive, and they trail within their reference group, their aspiration

level is likely to be higher and hence more risk will be accepted to try to gain more money.

In the first part of a pooling experiment with 46 subjects that I performed in 1996 (see Zizzo, 1997a, ch. 5), 8 subjects (7 in two sessions) played a series of multiple-choice bets chosen from a menu in which bets were ranked in order of riskiness. After each choice, the bet was played out and the corresponding real monetary gains were awarded (overall, the experiment was aimed to yield an average of 6 U.K. pounds of winnings). In half of the groups (control), subjects played bets without knowledge about what was happening to the other subjects. In the other half of the groups (experimental), the bets chosen, their outcome and the amount of money won up to then by each subject was announced loudly after each round of betting. What I found, both by standard statistical tests and multinomial regression analysis, was that the bottom two subjects of the experimental groups consistently played riskier bets - whoever happened to be on the bottom two rank positions each round -. The salient reference group was made up of the session members, and the bottom two subjects pressed hard to improve in rank - their aspiration level was higher -. Nothing of this kind was apparent in the control group - where no relative information was provided -. Brenner (1987) has applied this idea of situational risk attitudes to a variety of cases - including growth and market competition -.

I should mention that, in this pooling experiment, the design was not ideal, because a further manipulation in the experimental group was applied. A money "gift" was given to the top half of the subjects participating in the session in these experimental groups, according to an arbitrary criterion (namely, top in the alphabetical order of their surnames) designed to induce feelings of unfairness. Nevertheless, the statistical evidence was quite strong in pointing out that the big leap in risk attitude occurred with the bottom *two* subjects - not with the entire bottom half of the group (i.e., all those who, more likely than not, were unfairly disadvantaged) -. Hence, there was indeed a pure rank effect on the aspiration level, the cognitive frame of the subjects,

although further experimentation is obviously required.

How happy are you?

Easterlin (1974) first brought empirical evidence that an increase in GDP may not be correlated with a corresponding increase in happiness by the agents because they care for their relative position as well as for their absolute welfare. If the reference group of a relatively poor person in United States has an average higher income, as it seems plausible, than the reference group of a relatively rich person in a Third World country, the second will be happier than the first. Not that this is the only factor which, obviously, may determine an aspiration level and whether a person is happy or not, as the literature on relative deprivation and cognition (Olson and Hafer, 1995) tends to show. Van de Stadt et al. (1985) estimate a relative utility model on the first two waves of a panel of 775 households in Holland (1980 and 1981). They find that not only does relative utility matter, but it is uncertain whether absolute utility matters. Clark and Oswald (1996) use panel data on 5000 workers: satisfaction levels are found to be inversely related to their comparison wage, i.e. the wage rates within the reference group rates. That relative utility is dependent on the reference group, and happiness may simply increase not very much with an increase in GDP, has most recently been shown with survey data by Oswald (1997).

Hirsch (1976) and Frank (1985) explore the implications of this. If subjects try to be happier doing relatively better than the others within the reference group, they may end up wasting their energies - for, if anyone exerts proportionally more effort, they'll end up in the same relative position -! Frank (1997) thus focuses the issue on how the determination of the frame of reference can bring about changes in happiness. No doubt it does, but this is tantamount to saying that cognition determines preferences, that we are in trouble with the philosophical justification of rational choice, and - by the way - that we are in need of psychologists willing to give a hand to economists with such alien monsters as reference frames.

Yet, in the shape of consumption relative to others in the reference group, it is an old monster, dating at least - in its modern form - to Duesenberry (1949). It has also been applied to explain consumption of snob goods - goods bought to show off to other members in the reference group, for which demand may be *increasing* in price (such as expensive BMW cars; see Veblen, 1953, originally 1899; Bagwell and Bernheim, 1996) -.

Strange Things Lurk in the Labour Market.

No matter that the labour market should be central to economists. The labour market has always been weird. For example, how to explain the high unemployment rates that characterise many OECD economies? If the wage is rigid downward and is above the market-clearing wage, why should it be so?

Other anomalies exist (see Zizzo, 1997b). One is the failure of the *two-tier wage structures* (same job, different salaries) attempted by some companies in the 1980s (Akerlof and Yellen, 1990). Another is *wage compression* within the firm, i.e. the fact that within-firm wage structure is far more egalitarian than would be expected by marginal productivity differentials (Frank, 1985, ch. 3-4). Still another is that on *interindustry wage differentials* (Dickens and Katz, 1987; Krueger and Summers, 1988). Why should a secretary employed by Shell be paid, on average, some 50% more than that paid working in a Department of Economics at some university? Yet, the above authors found, for example, a +38% extra wage in the petroleum industries and a -19% in the education industry for the *same* job profiles. These results are quite strong across time and countries (see Zizzo, 1997a, 1997b, for references). I stress that the job profiles are the *same* because a referee used the example of university to say that non-monetary rewards matter. Sure they do, but it is unclear to me, and to economists in general, why a secretary in a department should have non-monetary rewards unrelated to frame-dependent relativity-sensitive utility, of the order of half a salary less.

Schlicht (1992) finds that in the German labour market not only actual wages usually ex-

ceed union wages by over 10%, but that - anyway - actual wages are closely related with a mark-up to the union-bargained wages. He shows that this only makes sense assuming that the effective wage is determined as a sort of fair wage, where the reference frame for fairness is determined mainly with respect to a salient indicator, the union wage. This is connected with another anomaly, the *fairness-sensitivity* of wages. An author of an important neoclassical labour economics textbook, Rees (1993) admits that, when he was employed in various industrial relations positions, the one factor that played an overwhelming role was fairness, and what a fair wage was measured by relative wage comparisons, with other unions, employers or persons. The evidence on equity theory (Adams, 1965, Mowday, 1991) and also that showing that equity theory is not enough (such as Blount, 1995) obviously applies (see also Zizzo, 1997a, ch. 5). Economists have also collected evidence that fairness is important in the labour market and is determined relative to a reference frame (e.g., Strom, 1995). Fehr, Kirchsteiger and Riedl (1993) describe evidence from experimental markets with monetary incentives that fair wages can prevent market clearing, inasmuch as subject share a cognition of what is fair.

A reasonable assumption is that subjects attach a greater weight (in absolute terms) to their interdependent preferences component with respect to a nearer group than with respect to a broader, less identified group. In the labour market this can be applied in an empirically plausible way: 1) the “closest” reference group is that made up by other subjects doing the same job in the same firm; 2) the firm is the second most important reference group; 3) the industry to which one belongs follows.

If agents care about their relative position, and first of all they look at colleagues doing the same job in the same firm, two-tier wage structure are untenable, because disadvantaged subjects will be envious of the advantaged ones (Fehr and Kirchsteiger, 1994). If the firm is the second most salient reference group, Frank (1985) shows that within-firm wage compression immediately follows. To understand why, Frank imagines a competitive market in which firms

pay their employees exactly their marginal product. Is this an equilibrium if agents care about status in different degrees, and if their status is dependent upon their relative standing within a firm? The answer is no, since low-ranked agents with a high taste for status are willing to shift to another firm in which they would be high-ranked, and to sacrifice some income for this. So, if they are to be kept at a low rank, they must be paid a wage premium. A similar argument applies to high-ranked agents who accept wage discounts. If the industry is the next most salient reference group, a similar modelling approach can be used to show that wage compression occurs within the industry: but, given that different industries have different profitability (for example, the petrochemical industry is immensely more profitable than the education industry), this directly entails interindustry wage differentials. In all these cases what constitutes a *fair* wage is determined by reference framing.

Nevertheless, perceptions of fairness can be more complex than this. The frame often depends on what information is *available* (Kahneman and Varey, 1991). Institutional arrangements - such as the presence of union wage bargaining fixing a base wage - may determine the reference level relative to which (with a mark-up) the fair wage is determined, such as in Schlicht (1992).

I have shown elsewhere (Zizzo, 1997a) how this perspective can also explain the usefulness of so-called heterodox stabilisation policies (social agreements on price controls made by all relevant price-setters in the national reference group) in controlling hyperinflationary processes in Latin American countries (see, for example, Winograd, 1996).

Another anomaly in the labour market is *group identification*. Banerjee (1990) and Stark (1987) both recognise the importance of the relative utility weight manipulation by the employer in trying to have the workers feel “part of the company”. This may mean the diffusion of a corporate culture, team-spirit enhancing activities, participation schemes, perks etc.. This recipe is used more in some capitalistic countries with a “collectivist” tradition - such as Japan, Taiwan, Singapore or Germany - than in others

(e.g., Koike, 1987). In Japan, industrialisation occurred using traditional social structures - hierarchical leadership and close-knit group linked to strong group identification (Argyle, 1991) -. The recipe for success has been commitment and loyalty to the firm (Stark, 1987). Therefore, group identification is culture-dependent, and this reflects differences in educational systems which are likely to shape children's cognition, affecting future preferences (see Miller, 1991; Stevenson, 1991).

A referee observed that, while my model is plausible, I do not consider whether it is better than alternative explanations. This is true - for space constraints -, but the interested reader should look at Zizzo (1997b, available on request) for an analysis of why the alternative explanations (such as the non-shirking wages model of efficiency wages) do not work.

Morality and Cognitive Science.

There are broader issues in which cognitive science and neuroscience might be helpful to interpret economic decision-making. I'll just mention a few of them.

Neuromodulators affect the way the neural network in our brain thinks and, by neural plasticity, is. The way they operate may have an effect on social preferences and behaviour, something that anyone aware, for example, of the literature on the correlation between serotonin and status probably knows (Madsen, 1994).

At a higher level, the outcome of the ongoing war in cognitive science and Artificial Intelligence between the classical approach and connectionism (see McCauley, 1996) might have repercussions in how we are to think about how economic choice occurs. One example is the dependence of preferences on morally relevant information, such as that shown by fairness-sensitivity. There is no convincing story today of why an economically rational man should be moral, e.g. on why Harsanyi's (1977) moral preferences should coincide with the personal preferences. The reason is the same as for public goods contribution: it is individually rational to free ride on the public good. To call for social norms as a foundation for morality is not a solution, if we

are not able to explain how the social norms are internalised by the subjects (something which would require a knowledge of the cognitive mechanisms involved). To call for social sanctions to enforce social norms rings true, but only translates the free-riding problem to who should enforce the social sanctions and why - and, besides, to reduce morality to social pressure is to deny that morality exists, not to explain it -. "Extended" rationality theorists variously plug morality in the objective function, for example by adding a moral utility function (Etzioni, 1988) or considering the moral valence of the act choice rather than simply the material outcomes (Sen, 1997). The problem is that either agents always reason like this, in a Kantian fashion - and then they should always behave morally, which they don't -, or we are to recognise that moral cognition is a more complex issue.

More in general, the view of morality held even by "extended" rationality economists denies the fact that moral cognition emerging from neural networks learning is complex, probably not condensable in a "tractable set of summary principles or moral rules" (May et al., 1996, p. 7). The moral psychology of every-day life may be more a cognitively mediated skill than simply a matter of following any simple rule, be that social utility, minimax, primary goods or whatever (Flanagan, 1996). Given the fact that the ethics and economics literature has so often just leapt from "fairness matters" to rationalist, analytical moral philosophy (e.g., MacPherson and Hausman, 1993), the Churchlands' statement on the "lasting and liberating impact" of a neuro-computational perspective (P.M. Churchland and P.S. Churchland, 1996) may very well apply. Unfortunately, space constraints prevent me expanding this point.

But, even if the connectionist perspective were unsatisfactory, the neuroscience evidence that shows how emotions and "lower" cognition may be essential for "higher" cognition (Damasio, 1994) should warn economists that the disembodied, Cartesian view of mind, rationality and morality that they hold may need revising and integrating.

Conclusions.

Economists tend to ignore cognitive psychology. Recent models of so-called information-dependent games have tried to get beyond this point but only in very restrictive ways (see Rabin, 1993). Evidence for information costs and bounded rationality is typically ignored. The skeptics' justification is the virtue of parsimony. But, at least in explaining interdependent preferences, this won't do. If such preferences depend on cognition in important ways, such as those involved by a frame of reference or moral cognition, we cannot start from preferences alone, without an understanding of the role of cognitive processes for decision-making.

The study of the kind of cognitive processes that translate information into interdependent preferences is a next logical step if the main thrust of this paper is accepted. This is where economists may need the help of cognitive psychologists and scientists. For, anyway, economists *need* to deal with cognitive processes.

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