THE IMPLICIT PSYCHOLOGY OF THE THEORY OF THE RATIONAL CONSUMER: AN INTERPRETATION*

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I. INTRODUCTION

The majority of economists perceive the standard theory of the rational consumer as a neutral, positive theory, free from any psychological framework. The starting point of this theory is that agents are assumed to be rational. The assumption of rationality is usually conceived as an obvious and simple assumption which does not itself involve any specific psychological characteristics. This is because the concept of rationality as is used in Neoclassical economics is seen as a general principle, the universal principle of all purposive action. In essence this conception has shielded the theory of rational consumer from any criticism and especially criticisms which are directed against its emperical validity.

The idea of the theory of the rational consumer as psychologically neutral can be traced back in the history of economic thought and especially in the writings of Pareto, Robbins and more recently of Samuelson and Friedman (see Pareto, 1971 (1908), Robbins 1932, Samuelson 1947 and Friedman 1953).

The works of Simon (1959), Katona (1963), Winter (1969), Shackle (1972), Leibenstein (1976), March (1978), Elster (1979), Boland (1981), Heiner (1983) and Earl (1983) challenged the established view and provided the basis for an alternative approach. Although these writers criticized the theory from a number of different angles, the aggregate effect of their work was that they cast doubt on its scientific and universal character. The most important consequence of the above was a trend towards the de-neutralization of the theory of rational consumer, which opened the way to discussions about its possible psychological basis.

As a first step towards this direction, one has to identify the implicit psychological connotations or assumptions of the theory. More specifically, the majority of theorists do not realise that apart from the explicit assumptions upon which the theory is built, there are a number of implicit points which might provide clues for a possible underlying psychological framework. These points fall into two categories: (a) about the agent's behaviour and (b) about the agent's environment. In this paper we will concentrate on the first kind and we will attempt to provide an assessment of their implications. In particular, we will attempt to identify the underlying psychological framework, and also to examine the possible consequences of introducing ideas which do not conform to that framework. However, the last exercise will be for illustrative purposes only and it will not aim at the construction of an alternative theory of the rational consumer.

II. THE STANDARD THEORY OF THE RATIONAL CONSUMER

The standard theory of the consumer as it is described by Neoclassical theorists starts from the premise that economic agents are rational. Since this first term is not adequate by itself to specify a theory, theorists feel that they have to supply a definition of the concept. Most of them adopt the standard conception of rational behaviour as consistent behaviour. (This approach is used in other sciences too). Clearly the definition of rationality as consistency attaches a scientific prestige to the foundations of the theory of rational consumer (for an epistemological discussion of this approach see Lawson, 1987). A representative analysis of the meaning of the term "rational" can be found in Alais:

> We have to have resource to the definition which seems to emerge from scientific logic, by which a man is considered to be rational when: (a) he pursues ends that are mutually coherent, and (b) he employs means that are appropriate to the ends pursued. (Allais, quoted in Godelier, 1972, p. 12).

The notion of rationality as consistency has to be further specified for the construction of a theory of rational behaviour. This theory is based on a number of axioms which can be found in microeconomic texts. In brief these axioms, as applied to the theory of the consumer, are Completeness, Transitivity, Reflexivity, Non-satiation, Continuity and Convexity. (At this point it must be mentioned that a number of theorists have attempted to dispense with some of the axioms, but instead other assumptions like maximization become much more important, Chipman, et al. 1971).

The implication of the above axioms is that the preference ordering can be represented by a continuous, convex to the origin indifference map. As a result of the non-satiation assumption, higher indifference curves are preferred to lower indifference curves. The introduction of the budget constraint in the form:

$$\sum_{i=1}^{n} p_i x_i \leq M$$

completes the picture of the rational choice.

Most authors seem to require that the axiomatic theory that we described would be understood better if they supplement it with the old concept of the utility function. Thus the common method of integrating axiomatic rational choice with utility theory is by assigning:

$$u(x) = u(x') \quad \text{iff } x = x'$$
$$u(x) > u(x') \quad \text{iff } x > x'$$

After introducing the additional assumption of the differentiability of the utility function, the problem of rational consumer choice becomes a problem of utility maximization subject to a budget constraint.

It must be noted here that the above goes against the spirit of the originators of the modern theory of choice. In particular, Pareto and Hicks attempted to construct a theory of consumer behaviour without using "psychological oriented concepts" like utility (Pareto, 1971, p. 113; Hicks, 1946, p. 18). Nowadays the identification of rational choice with utility maximization is almost universally accepted (see for instance Becker, 1976, p. 153; Hirshleifer, 1980, p. 89; Henderson and Quandt, 1980, p. 9; Campbell, 1987, p. 172).

Thus one can observe that in Neoclassical theory of consumer behaviour, the concept of rationality is eventually associated with utility maximization.

Even when the rational consumer is identified with a utility maximizing agent, most theorists treat this conception of rational behaviour as an obvious, unproblematic principle. They see it as a positive, and scientific principle, a general principle of behaviour. Moreover, it is presented as being an eternal feature of human nature, a common place experience derived from some non-historical *a priori*. Thus according to Samuelson utility maximization is a law of logic itself (Samuelson, 1976, p. 436). Clearly this conception forbids the possibility of a particular psychological basis underlying the theory, and effectively renders it unsusceptible to psychological criticism.

III. IMPLICIT PSYCHOLOGY

It can be argued that the theory of rational consumer (under certainty) as presented in microeconomic textbooks presupposes an economic agent and an environment with some implicit characteristics. One can find advanced texts which do not give indication that apart from the six axioms which were presented in the previous section, a number of important points concerning the behaviour of the consumers and their environment are also implicitly assumed. These implicit ideas are also necessary for the concept of rationality as constrained optimization (maximization). We will concentrate on the assumptions of the first kind and especially on those which essentially attach specific psychological characteristics to agents. However, before we proceed, it would be useful to mention the main implicit notions of the second category.

1. Euclidean consumption: this implies that consumption goods are infinitely divisible.
2. Stability of commodities: the characteristics of the commodities are given.
3. Income and unit prices are assumed to be fixed (in a partial equilibrium framework).

Some authors mention some of the above (see for instance Green, 1976, pp. 25-29) but a number of them do not refer to these at all (see for instance Layard and Walters, 1978; Varian, 1978). It is clear that without these implicit assumptions the conception of rational behaviour as constrained maximization of utility becomes problematic.

There are the following implicit ideas of the first category which can reveal the psychological connotations of the theory:

(a) *Archimedian Preferences*

The standard theory of the rational consumer presupposes that the preferences of the consumer are Archimedian. In formal terms Archimedian preferences imply the following. Suppose that there are two bundles of goods x and y, and that

$$(x_1, y_1) \ P \ (x_2, y_2)$$

this can be reversed by increasing x_2. This implies that there exists $x > x_2$ such that

$$(x, y_2) \ P \ (x_1, y_1)$$

In particular, a loss of some units of one bundle can always be compensated by gain of some unit of another commodity (see Borch, 1968, p. 22). This means that all preferences are considered to be reducible, that the preferences have no hierarchical structure. The implicit idea that all preferences are Archimidean goes back to the first conception of

indifference curves and continues up to the modern theories of choice (see Pareto, 1971; Hicks, 1946). The standard indifference curve which is defined either following Edgeworth, Pareto, Hicks or even Samuelson exhibits this characteristic:
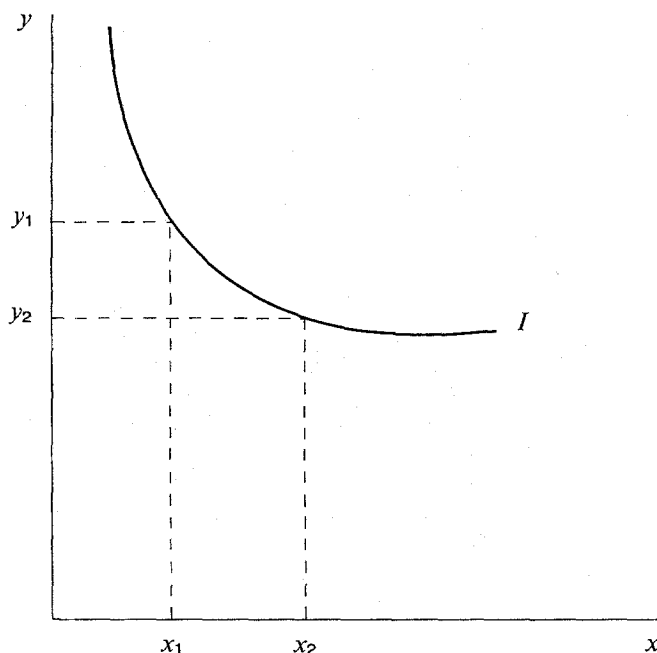

FIGURE 1

The curve shows that every good can be compensated. The loss of y can be compensated by increasing x. The above implies that there is an implicit psychological assumption that all goods are considered comparable by the individual. Archimedian preferences facilitate the conception of rational agents as optimizers because everything is reduced into a single dimension. Different wants or needs with varying importance are reduced to a common denominator: utility. Thus the theory of rational consumer presupposes that all wants are reducible.

In order to illustrate the psychological basis of the above conception of preferences, we will mention a specific example where preferences are not reducible (non-Archimedian). More specifically, a good example of such preferences is the lexicographic ordering. Formally, the lexicographic ordering in a simple case of two goods, can be presented as follows:

$(x_1, y_1) \ P \ (x_2, y_2)$ if either

(1) $x_1 > x_2$

or

(2) $x_1 = x_2$ and $y_1 > y_2$

Clearly, lexicographic preferences imply that agents are characterized by the principle of the hierarchy of wants, or in other words that preferences are irreducible. This kind of preferences are quite relevant in consumer choices especially when the habitual nature of a great number of choices is taken into account. In addition common rules like "safety first" are lexicographic in nature. One can construct a complete model of consumer choice based on such preferences. A specific example of such a model has been presented by Georgescu-Roegen. In this model there are primary and secondary criteria. Once the primary criteria are satisfied, the secondary criteria become relevant (see Georgescu-Roegen, 1966, pp. 193-201). It can be maintained that Maslow's psychological theory of the hierarchical structure of needs, provides support to the lexicographic model (see Maslow, 1954). However, in spite of the realistic appeal of this model Neoclassical theorists have basically ignored it in a rather arbitrary way: "Although lexicographic orderings represent a perfectly reasonable system of choice, it is convenient to rule them out" (Deaton and Muellbauer, 1980, p. 27).

Lexicographic orderings can also be used as an argument against the transitivity of preferences, which, as was observed above, is one of the basic axioms of the theory of the rational consumer. A simple example will clarify this. A consumer who wants to purchase a car has two criteria. The first one is price and the second one is reliability. The first criteria is dominant and the second operates next. The decision rule is the following: the second criteria operates only when the difference in price is less than 1000 (this can be interpreted as a threshold level). Prices and reliability are the following:

Type of car	Price	Reliability
A	4000	Low
B	4800	Medium
C	5600	High

If types A, B, C correspond to x, x', x'' then the rule would give:

$$x' \, P \, x$$
$$x'' P \, x'$$
$$x \, P \, x''$$

This contradicts the axiom of transitivity (see also Fishburn, 1974, pp. 1446-1454).

(b) *Egoistic Preferences*

Although many Neoclassical theorists would support the view that the theory of rational consumer does not presuppose egoistic preferences, it is clear that they are implicitly assumed in most cases. (It can be argued that many informed non-economists see consumer theory models as selfish, though technically this is not necessarily so.) According to many authors, the utility function of a given individual depends on what he or she consumes and nothing else. The standard approach to this is the following. The utility of individual i is written as:

$$U_i \, (x_1, x_2, \ldots x_n)$$

The utility of the individual is not affected by the consumption of goods of other individuals. As S. Winter has put it:

However, the fact remains that the assumptions actually employed in construct-
ing economic theories almost always correspond to the stereotype: For example

the satisfaction of the individual depends on what he consumes and nothing else. (Winter, 1969, p. 9).

This viewpoint is also held by a number of other theorists (see for instance, Amacher, Tollison and Willet, 1976; Schall, 1972; Hirshleifer, 1977; Nicolaides, 1988). Thus the standard implicit assumption in the presentation of the theory of rational consumer is the following (where i, and j individuals):

$$\frac{\partial U_i}{\partial x_j} = 0$$

In addition, if one looks at advanced microeconomic textbooks, one will observe that the only case when the utility of the consumer is affected by other factors is when externalities are discussed. Even so, non-selfish preferences are rarely analysed (see for instance, Varian, 1978).

One is supposed to take into account non-selfish preference or utility functions if it is assumed that the welfare of the individual depends on the welfare of others. Generally, in the simple case of two individuals (i, j) and one good (x), the utility function is:

$$U_i(x_i, x_j)$$

with the possibilities:

(1) $\dfrac{\partial U_i}{\partial x_j} > 0$ (Altruism)

(2) $\dfrac{\partial U_i}{\partial x_j} < 0$ (Malevolence)

The above are clearly non-selfish possibilities. More specifically following Collard (1978) one can formulate the altruistic possibility in the following manner: A commodity related approach to the problem can be written as:

$$U_i(x_i, x_j)$$

where $\dfrac{\partial x_i}{\partial x_j} > 0$

A utility related approach can take the following form:

$$U_i[u_i(x_i), u_j(x_j)]$$

where $\dfrac{\partial U_i}{\partial u_j} > 0$

As we shall see in a subsequent section, the adoption of the above in the theory of rational consumer, will significantly alter a number of well established theoretical points. For instance, altruistic preferences will be shown to imply that indifference curves are closed when:

$$\frac{\partial U_i}{\partial x_i} < \frac{\partial U_i}{\partial x_j}$$

The possibility of altruism and especially the parent-to offspring altruism which is very strong, has been noted by a number of theorists, but it still occupies a very minor part of the theory (see Hirshleifer, 1977, pp. 17-23).

(c) *Parametric Agents*

The concept of rational agent, as always engaging in constrained optimization, is meaningful only if agents are parametrically rational. Parametric agents treat their environment and the behaviour of other agents as constant. Clearly this conception has important implications for behaviour. As Elster states:

> Parametric rationality usually leads to a unique and well defined prescription for behaviour, given the initial assumptions and expectations.
>
> (Elster, 1979, p. 117)

In a framework of parametric agents optimization is possible and easily attainable. One can note here that this assumption can be seen as irrational itself because it is based on a very unrealistic and naive belief about agents and about their environment. Moreover, this assumption is further undermined when one thinks from a collective point of view. This is because it will generate unintended and perverse consequences of the kind explored by Marx and Keynes (see Elster, 1979, p. 18 and Buchanan, 1975, pp. 71-78).

The extreme importance of the concept for the theory of rational consumer becomes much more obvious when the idea of non-parametric agent is introduced. Contrary to the parametric actor, the non-parametric actor conceives the environment as made up by other agents who also have non-parametric behaviour. Moreover all participating agents are aware of this fact. Thus, in this kind of framework, the very idea of constrained optimization might be non-existent: "In strategic interaction there may be no uniquely defined mode of behaviour which is singled out as the rational choice." (Elster, 1979, p. 117).

A number of theorists have attempted to tackle the case of non-parametric agents in economics by using a game theory framework. Although this approach seems to be much more relevant than the standard one, and has helped to throw light on the issues, it still has important problems. In particular, in a such framework, the usual standard assumptions about rationality hold (actually the assumptions are stronger) and also the agents are assumed to have perfect reasoning capacities. Also additional assumptions are made like the independence assumption which again attach psychological characteristics to agents (see Shubik, 1982). Still as Simon points out "the definition of rational conduct is ambiguous in all cases save the zero-sum two person game" (Simon, 1959, p. 266).

The realistic possibility of non-parametric actors can be connected with Simon's well-known discussions of the problematic character of the concept of rationality as conceived by Neoclassical theorists. In an environment of non-parametric actors, bounded rationality may be much more relevant than complete rationality. Simon's satisficing seems to be more effective in dealing with non-parametric agents because it does not require all the additional assumptions of game theory and also because it takes into account the limited computational abilities of the agents.

IV. Utility Maximization as the Consumer's Sole Goal

The previous implicit ideas about the economic agent that we saw can be connected with the concept of utility maximization. Utility maximization is thought to be the basic mechanism characterizing choice behaviour, or the sole objective of the economic agent. Although there is no universal agreement about the meaning of utility, most theorists seem to conceive it as a positive subjective sensation (pleasure or satisfaction). A number of

theorists are very explicit in identifying utility with pleasure or satisfaction. G. Becker for instance, identifies "Bentham's pleasure function with a utility function" (Becker, 1976, p. 137). Henderson and Quandt also explicitly treat utility and satisfaction as equivalent (Henderson, and Quandt, 1980, p. 9). Ferguson and Gould follow the same line (Ferguson and Gould, 1975, p. 12). The same attitude can be observed in more recent developments in the theory of choice under uncertainty. In particular, in their attempt to account for some inconsistencies in the standard theory of choice under uncertainty, some economists have developed the theory of regret. In the process of the discussion, the concept of expected utility is treated as equivalent to the Benthamite pleasure (see Loomes and Sugden, 1982, p. 807).

Some theorists assign a neutral dimension to the term, implying that it serves a mere semantic function. Thus they sometimes use the terms of preference or value function. However, this claim has been attacked by others as invalid since the conception of the word utility as a positive sensation is necessary even in the context of axiomatic theories of consumer behaviour. Georgescu-Roegen for instance, has pointed out that the axioms of choice theories which do not use the concept of utility or satisfaction have neither a rational explanation nor an experimental justification (Georgescu-Roegen, 1966, p. 193). The same approach is followed by theorists like S. Wong, W. Kroeber-Riel, and B. Loasby (see Wong, 1978, pp. 59, 73; Kroeber-Riel, 1971, pp. 340-344; Loasby, 1976, p. 23).

Moreover, one can understand better the dependence on the idea of utility maximization as the sole goal of rational consumer if one considers the possibility of an alternative approach. If the goal of utility maximization is replaced by habit formation, then the consumer can still be rational (in the neoclassical sense of consistency) without aiming at utility maximization. More specifically, as Arrow points out: for a given price-income change, choose the bundle that satisfies the budget constraint and that requires the least change from the previous consumption bundle (see Arrow, 1987, p. 202). This approach is different from utility maximization and this can be seen by the fact that if prices and income return to their initial levels after several alterations, the final bundle purchased will not be the same as the initial (Arrow, 1987, p. 202). (It should be pointed out here that apart from Arrow, other economists have emphasized the importance of habitual behaviour (see for instance Veblen, 1949).

The above preoccupation of the theory of rational consumer with utility maximization as the sole aim of the consumer, has also been identified by H. Simon and S. Winter (Simon, 1987, p. 38 and Winter, 1969, p. 5). Simon, for instance gives a real world example where consumer choice has nothing to do with utility maximization. In particular, he states that flood insurance is bought by persons who have had such experiences. Cost-benefit considerations do not influence the decision-maker. Simon emphasizes that utility maximization is neither a necessary nor a sufficient condition for deducing who will buy insurance; rather the process that puts the item on the decision agenda is the important thing (Simon, 1987, pp. 31-32). In addition, empirical studies have shown that the behaviour of individuals when it comes to insurance against rare disasters is completely different than the one predicted by the standard utility maximization theory (see Kunreuther *et al*, 1978). Kunreuther found that the main characteristic of those individuals that bought insurance was acquaintance with others who took out insurance. (This reinforces the point made previously by Simon). Futhermore, Arrow provides additional examples of intertemporal markets (*i.e.* the grain futures market) which show systematic deviations from the standard utility maximization model (see Arrow, 1982).

V. A Psychological Interpretation

The implicit assumptions of Archimedian preferences and egoistic preferences combined with the idea of utility maximization as the sole aim of the consumer, can indicate an underlying psychological theory of the consumer. More analytically, as was seen, the basic point of Archimedian preferences is that all wants are reducible because of the existence of a common denominator, utility. If utility is taken to mean (as indeed a considerable number of theorists conceive it) satisfaction, then the first traces of an underlying psychological theory appear. This theory can be identified as quantitative hedonism. The starting point of this theory is that individuals maximize satisfaction and that all pleasures or satisfactions are reducible and comparable. The main representatives of this approach were Aristippus and Bentham. Bentham especially is very explicit in reducing all pleasures to a common one. His quantitative hedonism is clear when he states:

> Quantity of pleasure being equal, push-pin is as good as poetry.
> (Bentham in Bronfenbrenner, 1977, p. 95)

One can contrast the quantitative hedonism of Bentham with the qualitative hedonism of Mill. In his "Utilitarianism" he states:

> It is quite compatible with the principle of utility to recognise the fact, that some kinds of pleasure are more desirable and more valuable than others. It would be absurd that while, in estimating all other things, quality is considered as well as quantity, the estimation of pleasures should be supposed to depend on quantity alone.
> (Mill, (1863), 1979, p. 258)

In addition to the above, egoistic preferences complete the picture of the underlying presence of specific psychological characteristics. Psychological egoism states that individuals are always seeking their own greatest good (see Frankena, 1963, pp. 16-21). This viewpoint has a long history in Western thought but it became very influential with the work of Hobbes. It seems that somehow the Hobbesian idea that "except they be restrained by some coercive power, every man will distrust and dread each other" has dominated economics (Hobbes, 1839, p. xv). The Hobbesian approach to human nature has been adopted explicitly in recent models and this is another indication of the influence of psychological egoism in economics. For instance, S. Bowles and O. Williamson have used Hobbesian concepts like "malfeasance" and "opportunism" as a key in the understanding of the production process in a competitive economy. In particular it has been suggested that malfeasance (or opportunism) is a universal human proclivity which provides the conceptual basis for an economic analysis of the capitalist firm (Bowles, 1985 and Williamson, 1980). For instance, the analysis of firm's labour productivity is explicitly connected with the workers' self-interest or shirking (see Bowles, 1985).

If psychological egoism is combined with quantitative hedonism then the resulting picture is that egoistic quantitative hedonism is the underlying psychological schema of the theory of the rational consumer. In this framework one can add that the preoccupation with parametric agents implies a belief that behaviour is mechanistic. More analytically, egoistic hedonism is considered to be a mechanistic theory of human motivation. Agents are moved only by considerations of their own pleasure and pain and nothing else. Again it is not difficult to see that mechanistic behaviour is easily compatible with such a framework.

This can be reinforced by an examination of the origins of the modern theory of

rational agent. In particular, in the marginalist works one can find indicative statements which show the preoccupation with the framework that we discussed (see also Drakopoulos, 1990). Thus, Jevons thinks of Political Economy as "the mechanics of utility and self interest" and attempted to "treat Economy as a Calculus of Pleasure and Pain" (Jevons, 1871, p. vii). This picture can also be found in the work of C. Helvetius who exercised a strong influence of Bentham and through him on Jevons and Edgeworth. Helvetius states:

> [The rational individual should] fly from pain, and pursue pleasure. It is to this constant flight and pursuit that is given the name of self-love.
>
> (Helvetius, 1777, p. 413).

The idea that a rational individual always seeks his or her own greatest pleasure can be also found in the work of Walras and Edgeworth (see also Jevons, 1871, p. 38; Walras, 1965, p. 125, Jaffe, 1977, p. 305; Edgeworth, 1881, p. 6).

VI. EVIDENCE FROM PSYCHOLOGICAL THEORY

Given our interpretation and provided that one is not willing to follow Friedman's thesis, the next step is to see if modern psychological theory supports the underlying conception of economic agents as quantitative egoistic hedonists. In particular, quantitative hedonism as a psychological approach is considered to be a reductionist theory (see Boden, 1972, p. 100). Although these types of theories were popular in the previous century, since the first decades of this century a large number of psychologists have been very critical of reductionist theories. One can mention many examples of psychologists who attacked reductionist theories and especially hedonism. W. McDougall, J. Cosling and R. Peters are representative examples (see McDougall, 1936, Gosling, 1969, and Peters, 1958). The common point of these theorists is that hedonism is a very crude and inadequate theory of motivation. In particular, McDougall thought that pleasure and pain are incidental consequences of the human activities and not the objective of these activities (McDougall, 1936, p. 457).

In addition, more recent research in psychology has cast serious doubt over the basic idea of utility (or value) maximization which is a fundamental part of the theory of the rational consumer and also a basic characteristic of psychological hedonism. In particular, psychologists compare maximization (optimization) with alternative choice behaviours like matching (or sometimes melioration). We will briefly state the two theories following Hernstein and Heyman (1979), Mazur (1981), Prelec (1982) and especially Baum (1981). Both theories' starting point is that organisms interact with the environment and produce responses (b_i). Two sorts of variables depend on each b_i: those beneficial to the organism denoted as r_i (reward or reinforcement), and those costly or harmful to the organism denoted as q_i. If one assumes that the organism is optimizing then this translates into maximizing of reinforcement or when cost is significant, of net gain. Optimizing consists in equating all partial derivatives of net gain with respect to b.

$$\frac{\partial(r_1 - q_1)}{\partial b_1} = \frac{\partial(r_2 - q_2)}{\partial b_2} = \ldots = \frac{\partial(r_n - q_n)}{\partial b_n}$$

Essentially, if one assumes that the subjects optimize then the crucial variables are the marginal changes. Psychologists explicitly identify optimization with the maximization of satisfaction (see Baum, 1981).

On the contrary if it is assumed that the organism is following matching behaviour then the frequency of the responses matches the reward or net gain. Usually the matching equation is identified specifically as follows:

$$\frac{r_1 - q_1}{b_1} = \frac{r_2 - q_2}{b_2} = \ldots = \frac{r_n - q_n}{b_n}$$

Contrary to maximization equation, the matching equation states that the proportion of responses devoted to one alternative will match (equal) the proportion of reinforcements or net gain provided by that alternative (see also Prelec, 1982, pp. 190-195; Mazur, 1981, p. 823). Clearly choice behaviour is affected by a process that produces a matching of behavioural outputs to reinforcement inputs. This is radically different from a process of reinforcement or net gain maximization. In other words maximization implies that subjects are maximally happy across the n activities and matching implies that subjects are equally happy in each of their n activities (see Prelec, 1982, p. 222).

Experimental work conducted by the above authors and also by Heyman and Duncan (1979) and Vaugham (1981) points to the idea that organisms exhibit matching rather than maximizing behaviour. The implications of these experiments are crucial because they undermine the idea of utility maximization as the universal characteristic of rational behaviour. Moreover, this can be connected with alternative formulations of rationality like "satisficing". More specifically, Simon's satisficing theory is closely related to the concept of "event matching" as Simon himself states (Simon, 1959, p. 260).

In addition, a number of specialists have been very critical of the idea that actors are motivated by egoistic considerations only. As a starting point, evolutionary anthropology and human ethology support the view that both selfishness and altruism have a natural root. Moreover, they see both as equally important factors in all human societies (see Masters, 1978, pp. 70, 72; Wispe, 1978, p. 2). Apart from that, recent sociological investigations of modern societies have recognized the commonplace of altruistic behaviour (see for instance, Titmuss, 1971).

Again more recent studies in psychology and biology have demonstrated the important role of altruism in behaviour. In particular, in a 1978 paper R. Alexander and G. Borgin distinguished between two kinds of altruism: directed and undirected. The first category favours individuals with the same trait and the second one is directed to any interactant (Alexander and Borgin, 1978, p. 460). Findings by the previous authors and also by Hamilton, 1975, point to the extreme importance of altruism for explaining a great number of behavioural characteristics and especially sociality (sociality is seen as growing from acts of undirected altruism). Operating in a biological framework, Trivers views altruistic behaviour as an evolutionary response to complex situations like the one described by the Prisoner's Dilemma (Trivers, 1971). He also goes as far as to suggest the crucial role of altruism for the evolution of cognitive powers (even brain size) of man (see Trivers, 1971, p. 54).

Apart from the above, a number of contemporary psychologists seem to support general theories of motivation which can be characterized as anti-reductionist and anti-hedonistic. More specifically, A. Maslow's and R. D. Laing's works exhibit a strong anti-reductionist bias (see Maslow, 1954; Laing, 1960). Maslow's theory of the hierarchy of needs can be seen as providing support of non-Archimedian preferences and also of altruistic agents.

VII. Implications

Having the above points in mind, one might wonder what are the implications of not having this particular underlying psychological framework which characterizes the standard theory of the rational consumer. Since the purpose of this paper is not an extensive investigation of this topic, we will attempt to give indications for possible future research directions.

The adoption of non-Archimedian preferences would have significant implications. To start with, the assumption of the existence of the utility function is questionable in this framework (see Deaton and Muellbauer, 1980, p. 27). However, if one assumes the existence of lexicographic utility the resulting demand functions will be significantly altered. Assuming that there are psychological thresholds or saturation levels, kinks will become commonplace. This would imply that consumer choice is much less sensitive to price changes than the prediction of the standard theory (see also Kornai, 1971). An empirical investigation of this might invole simulation of demand functions in order first to see the existence of kinks and then to examine if their existence is due to non-Archimedian preferences. One can argue that non-Archimedian preferences might be able to assist in the explanation of the structure of some problems faced by Third World countries like famine. The structure of wants in these cases might be strictly hierarchical (see Desai, 1988).

If the assumption of selfish agents is dropped the possibility of altruism arises. In this framework, indifference curves might become closed. More specifically, there are three possible cases:

$$(1) \quad \frac{\partial U_i}{\partial x_i} > \frac{\partial U_i}{\partial x_j}$$

$$(2) \quad \frac{\partial U_i}{\partial x_i} = \frac{\partial U_i}{\partial x_j}$$

$$(3) \quad \frac{\partial U_i}{\partial x_i} < \frac{\partial U_i}{\partial x_j}$$

In the third case a section of the individual's indifference curve has a positive slope which means that the preferred set becomes closed (for a discussion of closed indifference curves see Walsh, 1970 and Morgenstern, 1972). Closed indifference curves have important implications for the standard theory of exchange. First of all one must prove that equilibrium exists. This problem can be overcome by assuming that closed preference sets are convex (see McKenzie, 1955 and Collard, 1978). In the case of two goods and two individuals analysed in the standard Edgeworth box, closed indifference curves will give a shorter contract curve with sections which represent charity (see Danielson, 1975).

The idea of altruistic behaviour can be combined with non-Archimedian preferences. This approach might be especially fruitful in the analysis of charitable donations and as a basis for family economics. In particular the idea of non-Archimedian altruists might be much more relevant approach to the decision-making of parents towards their offspring than the standard utility maximizing model used in family economics.

A possible formulation of the above might be the following. We assume that we have two individuals i and j and one good x. The individual is an extreme altruist and has a lexicographic ordering. As we have seen in the previous pages, the extreme altruist can be

represented as follows (we use the conventional notation to represent his lexicographic utility, although the individual has no utility function in the conventional sense; for a discussion of lexicographic utility see Fishburn 1974, pp. 1456-1459 and Chipman, 1960, pp. 193-224).

$$U_i (x_i, x_j)$$

$$\frac{\partial U_i}{\partial x_i} > 0, \quad \frac{\partial U_i}{\partial x_j} > 0 \text{ and}$$

$$\frac{\partial U_i}{\partial x_j} > \frac{\partial U_i}{\partial x_i}$$

The extreme altruism of the individual can imply that there are lexicographic preferences which can be represented as

$$(x_j, x_i) \ P \ (x_j', x_i')$$

when   (1) $x_j > x_j'$

                 (2) $x_j = x_j'$ and $x_i > x_i'$

The above describe a lexicographic altruist (for instance x can be food and j and i can be child and mother respectively).

If one considers our previous discussion about matching, threshold levels and strategic behaviour, then one can argue that the cybernetic theory comes into the picture. More specifically, cybernetics describe a decision process which basically deals with inherent uncertainty (non-parametric agents) by means of highly focused attention and response. As Steinbrunner states: "The Decision-maker . . . does not engage in alternative outcome calculations or in updated probability assessments" (Steinbrunner, 1974, p. 86). (The alternative outcome calculations are the core of optimizing behaviour). Cybernetic theorists adopt a completely different approach from the standard optimization theory. To start with they need not make assumptions about consistency or regularity of behaviour. The critical values of a few key variables are important for the decision making process. The example of servomechanism (a simple cybernetic idea) is indicative. The thermostat which is an application of servomechanism is quiescent within a reasonably narrow range of temperatures, and the range is set to desirable values. If it records temperatures below the desired range, it closes a connection which activates a heating system and vice versa (Steinbrunner, 1974, p. 51). Other examples of cybernetic behaviour include the wide range of mechanical phenomena like that of the Watt governor and also a great number of biological phenomena like that of the ant army (see Ashby, 1952).

One can argue that the idea of threshold levels and response-reinforcement type of behaviour are closely related to the above. Thus a possible way of dealing with these concepts in an uncertainty framework is by drawing from cybernetics. Indeed this approach can incorporate our discussion of recent psychological experimental evidence and also the problem of non-parametric agents. Although it is clear that there is scope for future research, one can mention that some attempts to apply cybernetics to economic problems have been explored by March, Simon, Cyert and Beer (Beer, 1959; Cyert and March, 1963; March and Simon, 1968). Clearly, cybernetics can be seen as a possible alternative to the standard optimizing theory or the utility maximizing approach in particular.

VIII. Conclusion

The starting point of this paper was the implicit psychology of the theory of rational consumer. In our discussion we were able to identify three psychological connections which are not generally recognized by theorists: (1) preferences are Archimedian, (2) agents are basically egoistic and (3) agents are usually assumed to be parametric. Moreover, it was emphasized that many theorists are preoccupied with utility maximization as the sole aim of the consumer. This was combined with the common view of the concept of utility as a positive subjective sensation (satisfaction). Our interpretation of the implicit ideas reinforced by the preoccupation with utility maximization suggested that there was an underlying psychological framework. This framework can be characterized as a mechanistic theory of motivation namely quantitative egoistic hedonism.

An examination of the current psychological theories and recent psychological and biological experimental findings indicated that the above framework is not considered acceptable. Rather the evidence suggested that matching, and not maximizing, is the dominant behaviour and also emphasized the role of altruism. The next step was to examine the possible implications of adopting the above in consumer theory so as to make this more compatible with the recent developments. Thus, we discussed the effect of adopting altruistic agents with non-Archimedian preferences. Finally, it was suggested that the ideas of matching, threshold levels and non-parametric agents might be better dealt with in a cybernetic framework than in the standard utility maximizing one. It has to be emphasized again however, that the purpose of the paper was not to construct a new theory of rational consumer but rather to point out the psychological underpinnings of the existing theory, and to offer an interpretation. The last section dealing with the implications of incorporating recent ideas from other disciplines served mainly as an additional illustration of the implicit psychological framework of the standard theory. It might also be taken as a basis for future research directions.

In general, contrary to the belief of many theorists, the theory of rational consumer is not neutral but it pre-supposes a specific psychological framework. The most important consequence of this is that it can provide justification for testing the empirical validity of the existing theory and also for a dialogue between economics and other related disciplines.

References

Alexander, R. and Borgin, G. (1978), "Group Selection, Altruism, and the Levels of Organization of Life", *Annual Review of Ecology and Systematics*, vol. 9.

Amacher, R. *et al.* (1976), *The Economic Approach to Public Policy* (Ithaca: Cornell University Press).

Arrow, K. (1982), "Risk Perception in Psychology and Economics", *Economic Inquiry*, vol. 20.

Arrow, K. (1987), "Rationality of Self and Others in an Economic System", in R. Hogarth and M. Reder (eds), *Rational Choice* (Chicago: The University Press).

Ashby, R. (1952), *A Design for a Brain* (New York: John Willey and Sons).

Baum, W. (1981), "Optimization and the Matching Law as Accounts of Instrumental Behaviour", *Journal of Experimental Analysis of Behaviour*, vol. 36.

Becker, G. (1976), *The Economic Approach to Human Behaviour* (Chicago: Chicago University Press).

Beer, S. (1959), *Cybernetics and Management* (New York: John Willey and Sons).

Boden, M. (1972), *Purposive Explanation in Psychology* (Cambridge Mass: Hanover University Press).

Boland, L. (1981), "On the Futility of Criticizing the Neoclassical Maximization Hypothesis", *American Economic Review*, vol. 71.

Borch, K. (1968), *The Economics of Uncertainty* (Princeton: Princeton University Press).

Bowles, S. (1985), "The Production Process in a Competitive Economy: Walrasian, Neo-Hobbesian, and Marxian Models", *American Economic Review*, vol 74.

Bronfenbrenner, M. (1977), "Poetry, Pushpin, and Utility", *Economic Inquiry*, vol. xv.

Buchanan, J. (1975), "The Samaritan's Dilemma" in E. Phelps (ed), *Altruism, Morality and Economic Theory* (New York: Russel Sage Foundation).

Campbell, D. (1987), "Rationality and Utility from the Standpoint of Evolutionary Biology", in R. Hogarth and M. Reder, (eds), *Rational Choice* (Chicago: The University of Chicago Press).

Chipman, J.S. (1960), "The Foundations of Utility", *Econometrica*, vol. 28.

Chipman, J. *et al.* (1971), *Preferences, Utility and Demand* (New York: Harcourt Brace Jovanovich).

Collard, D. (1978), *Altruism and Economy* (Oxford: Martin Robertson).

Cosling, J. (1969), *Pleasure and Desire: the Case for Hedonism Reviewed* (Oxford: Clarendon Press).

Cyert, R. and March, J. (1963), *A Behavioural Theory of the Firm* (New Jersey: Prentice-Hall).

Danielson, A.L. (1975), "Interdependent Utilities, Charity and Pareto-Optimality", *Quarterly Journal of Economics*.

Deaton, A. and Muellbauer, J. (1980), *Economics and Consumer Behaviour* (Cambridge: Cambridge University Press).

Desai, M. (1988), "Economic Aspects of Famine", in G.B. Harrison, *Famines* (Oxford: Oxford University Press).

Drakopoulos, S. (1990), "Two Levels of Hedonistic Influence on Microeconomic Theory", *Scottish Journal of Political Economy*, vol. 37.

Earl, P. (1983), *The Economic Imagination* (Brighton: Wheatsheaf Books).

Edgeworth, F. (1881), *Mathematical Psychics* (London: Kegan Paul).

Elster, J. (1979), *Ulysses and the Sirens: Studies in Rationality and Irrationality* (Cambridge: Cambridge University Press).

Ferguson, C.E. and Gould, J.P. (1975), *Microeconomic Theory* (Homewood, Illinois: Richard Irwin).

Fishburn, P. (1974), "Lexicographic Orders, Utilities and Decision Rules: A Survey", *Management Science*, vol. 20.

Frankena, W. (1963), *Ethics* (New Jersey: Prentice Hall).

Friedman, M. (1953), *Essays in Positive Economics* (Chicago: University of Chicago Press).

Georgescu-Roegen, N. (1966), *Analytical Economics* (Cambridge, Mass: Harvard University Press).

Green, J. (1976), *Consumer Theory* (London: MacMillan).

Godelier, M. (1972), *Rationality and Irrationality in Economics* (London: NLB).

Hamilton, W. (1975), "Innate Social Aptitudes of Man: An Approach from Evolutionary Genetics", in R. Fox (ed.), *Biosocial Anthropology* (New York: John Wiley and Sons).

Heiner, R. (1983), "The Origin of Predictable Behaviour", *American Economic Review*, vol. 73.

Helvetius, C. (1977), *On Man, His Intellectual Faculties, and His Education* (translated by Hooper, London).

Henderson, J. and Quandt, R. (1980), *Microeconomic Theory: A Mathematical Approach* (New York: McGraw-Hill).

Hernstein, R. and Heyman, G. (1979), "Is Matching Compatible with Maximization in Concurrent Variable Interval, Variable Ratio?" *Journal of the Experimental Analysis of Behaviour*, vol. 31.

Heyman, G. and Duncan, L. (1979), "Operant Matching is not a Logical Consequence of Maximizing Reinforcement Rate", *Animal Learning and Behaviour*, vol. 7.

Hicks, J. (1946), *Value and Capital* (Oxford: Clarendon Press).

Hirshleifer, J. (1977), "Economics from a Biological Viewpoint", *Journal of Law and Economics*, vol. 20.

Hirshleifer, J. (1980), *Price Theory and Applications* (Engelwood Cliffs: Prentice-Hall).

Jaffe, W. (1977), "The Walras-Poincare Correspondence on the Cardinal Measurability of Utility", *The Canadian Journal of Economics*, vol. 5.

Jevons, S. (1871), *The Theory of Political Economy* (London: MacMillan).

Katona, G. (1953), "Rational Behaviour and Economic Behaviour", *Psychological Review*, vol. 60.

Kornai, J. (1971), *Anti-Equilibrium* (Amsterdam: North Holland).

Kunreuther, H. *et al.* (1978), *Disaster Insurance Protection* (New York: Willey).

Kroeber-Riel, W. (1971), "Constructs and Empirical Basis on Theories of Economic Behaviour", *Theory and Decision*, vol. 1.

Laing, R.D. (1960), *The Divided Self: A Study of Sanity and Madness* (London: Routledge).

Layard, P. and Walters, A.A. (1978), *Microeconomic Theory* (New York: McGraw-Hill).

Leibenstein, H. (1976), *Beyond Economic Man* (Cambridge MA: Harvard University Press).

Loasby, B. (1976), *Choice, Complexity and Ignorance* (Cambridge: Cambridge University Press).

Loomes, G. and Sugden, R. (1982), "Regret Theory: An Alternative Theory of Rational Choice under Uncertainty", *Economic Journal*, vol. 92.

March, J. (1978), "Bounded Rationality, Ambiguity and the Engineering of Choice", *Bell Journal of Economics*, vol. 9.

March, J. and Simon, H. (1963), *Organizations* (New York: John Willey and Sons).

Maslow, A. (1954), *Motivation and Personality* (New York: Harper and Row).

Masters, R. (1978), "Of Marmons and Men: Animal Behaviour and Human Altruism" in *Wispe*.

Mazur, J. (1981), "Optimization Theory Fails to Predict Performance of Pigeons in a Two-Response Situation", *Science*, vol. 214.

McDougall, W. (1936), *An Introduction to Social Psychology* 23rd edition (London: Methuen).

McKenzie, J. (1955), "Competitive Equilibrium with Dependent Consumer Preferences" in H. Antoziemicz (ed) *Proceedings of the Second Symposium in Linear Programming*, Washington National Bureau of Standards.

Mill, J.S. (1979), in M. Warnock (ed), *Utilitarianism* (Glasgow: Collins).

Morgenstern, O. (1972), "Thirteen Critical Points in Contemporary Economic Theory: An Interpretation", *Journal of Economic Literature*, vol. 10.

Nicolaides, P. (1988), "Limits to the Expansion of Neoclassical Economics", *Cambridge Journal of Economics*, vol. 12.

Pareto, V. (1971), *Manual of Political Economy* (translated by A. Schwier, London: Macmillan).

Peters, R.S. (1958), *The Concept of Motivation* (London: Routledge and Kegan Paul).

Prelec, D. (1982), "Matching, Maximizing and the Hyperbolic Reinforcement Function", *Psychological Review*, vol. 89.

Robbins, L. (1932), *An Essay in the Nature and Significance of Economic Science* (London: Macmillan).

Samuelson, P. (1947), *Foundations of Economic Analysis* (Cambridge, Mass: Harvard University Press).

Samuelson, P. (1976), *Economics* (New York: McGraw-Hill).

Schall, L.D. (1972), Interdependent Utilities and Pareto Optimality", *Quarterly Journal of Economics*, vol. 86.

Shackle, G.L.S. (1972), *Epistemics and Economics* (Cambridge: Cambridge University Press).

Shubik, M. (1982), *Game Theory in the Social Sciences* (Cambridge, Mass: MIT Press).

Simon, H. (1959), "Theories of Decision — Making in Economics and Behavioural Sciences", *American Economic Review* vol. 49.

Simon, H. (1987), "Rationality in Psychology and Economics", in R. Hogarth and M. Reder (eds), *Rational Choice* (Chicago: The University Press).

Steinbruner, J. (1974), *The Cybernetic Theory of Decision* (Princeton: University Press).

Titmuss, R. (1971), *The Gift Relationship: from Human Blood to Social Policy* (London: George Allen and Unwin).

Trivers, R. (1971), "The Evolution of Reciprocal Altruism", *Quarterly Review of Biology*, vol. 46.

Varian, H. (1978), *Microeconomic Analysis* (New York: Norton).

Vaughan, W. (1981), "Melioration, Matching, and Maximization", *Journal of the Experimental Analysis of Behaviour*, vol. 36.

Walras, L. (1965), *Elements of Pure Economics* (translated by W. Jaffe, London: George Allen and Unwin).

Walsh, V.C. (1970), *Introduction to Contemporary Microeconomics* (New York: McGraw-Hill).

Williamson, O. (1980), "The Organization of Work", *Journal of Economic Behaviour and Organization*, vol. I.

Winter, S. (1969), "Concepts of Rationality in Behavioural Theory", Institute of Public Policy Studies Discussion Paper, University of Michigan.

Wispe, L. (1978), "Biological and Social Bases of Altruism and Sympathy" in L. Wispe (ed), *Altruism, Sympathy, and Helping* (New York: Academic Press).

Wong, S. (1978), *The Foundations of Paul Samuelson's Revealed Preference Theory* (London: Routledge and Kegan Paul).