

Spash, Clive L. 1998. 'Investigating individual motives for environmental action: Lexicographic preferences, beliefs and attitudes'. In J Lemons, L Westra and R Goodland (eds.), *Ecological Sustainability and Integrity: Concepts and Approaches*, pp.46-62. Dordrecht, The Netherlands: Kluwer Academic Publishers.

INVESTIGATING INDIVIDUAL MOTIVES FOR ENVIRONMENTAL ACTION: LEXICOGRAPHIC PREFERENCES, BELIEFS AND ATTITUDES

Clive L. Spash*

1. Introduction

In the debate over environmental policy there are two broad approaches: one which emphasises individual choice and the other which claims the need to over-ride the individual due to immanent disaster and the scientific complexity of environmental problems. Political dominance of the concept of free market democracy and the unattractiveness of dictatorship has placed the rhetoric of the former approach at the forefront in recent years. The result is to describe human relations with the environment in terms which require detailed description of individual consequences in material terms. This then gives science the authoritative role of defining future scenarios and linking them to current actions.

Sustainability (in whatever form it might be defined) under this democratic model is to be achieved largely by the provision of information obtained from scientific researchers and then conveyed to individual citizens. These citizens are expected to state their preferences about which current actions are deemed acceptable and so direct state intervention where necessary. The expression of preferences might be a political process (e.g., via citizens juries or referenda), or this could be market based (e.g., via cost-benefit analysis). In terms of the decision-making process the informed individual is the democratic keystone regardless of the exact institutional design through which their choices are to be expressed.

However, much current thinking on welfare is dominated by a market approach which assumes that individual behaviour is most strongly influenced by economic motives. Policy-makers have spent the last few decades designing financial incentives and explaining economically rational choices to produce changes in the way people act. Environmental policy as part of government intervention to improve welfare has become susceptible to the new emphasis on individual choice. This places the citizen in the role of active consumer choosing between state and private suppliers, or rival state services operating in an internal market. The citizen consumer is then to be informed and left to make the rational choice.

In the environmental economics literature such rationality has become evidently questionable because of the use of survey techniques (e.g., contingent valuation, contingent ranking). In the process of actually collecting original data directly from

*Department of Land Economy, University of Cambridge, 19 Silver Street, Cambridge CB3 9EP, UK.

individuals the theoretically abstract model of individual behaviour confronts an empirical reality which is hard to ignore. One result has been the need to explain apparently irrational choices by respondents and contradictory preference statements. The implication is that some aspects of behaviour which have arisen depart from the standard economic model and their explanation requires reconsidering the citizen consumer approach to environmental policy.

The extent to which information provision alone is the key to choosing sustainable production and consumption patterns depends upon the model of individual psychology with which we operate. At one extreme is the individual with a complete preference structure able to make pair-wise choices between any two given bundles of commodities (i.e., ranking options as better, worse or identical). At the opposite extreme the context of the choice at hand will form (rather than inform) the structure of the preferences and so determine the outcome of the choice. In the latter case, information provision as a method of achieving rational choice when facing complex environmental problems will play upon attitudes and beliefs rather than merely inform the preferences of the individual.

This chapter raises questions about whether we can improve the economic model and the implications of contextual preferences for any approach to environmental policy which places citizens' preferences at the centre. In the next section the way in which economists take individual preferences as a central indicator for environmental policy is explored. This is followed by a closer look at the theoretical basis for many preference based models and the potential for alternative preference orderings, and in particular lexicographic preferences.

2. Economics and Environmental Policy

Decisions over environmental policy are considered by environmental economists as being determined by the extent to which the pain of implementing the policy is exceeded by the pleasure expected to accrue from that policy. For example, the extent to which gases causing the greenhouse effect should be controlled is based upon the costs of that control today compared with the benefits of avoiding damage to future generations (e.g., Cline, 1992a, 1992b; Nordhaus 1991a, 1991b; Ayres and Walter, 1991). The continued release of greenhouse gases requires that (potential) compensation for damages is smaller than the welfare created by those releases. In this way concern for the environmental damages resulting from a given action is expressed by environmental economists within a utilitarian calculus, which necessitates the comparison of costs and benefits in order to decide whether net welfare is increased (Pareto efficient) or could potentially be increased (under the Hicks-Kaldor test).

The comparisons in welfare economics rely upon the expression of individual preferences and place the emphasis upon costs and benefits to the individual. The goal is then to create net welfare gains for society which are defined in terms of an aggregate of individual gains and losses. This diverges from the notion of creating the greatest pleasure for society and being prepared to sacrifice individual gains and losses to do so; the greater good may then be served by negating the individual from the picture. For example, if distributional concerns are raised, material gains/losses by the relatively poor

may be seen as adding more to societal happiness than the same material gains/losses by the relatively rich, regardless of any individual's own perception. Free market democracy rejects this approach and neo-classical economics reinforces this by making the individual the fundamental reference point. The only way to justify the inequitable treatment of the gains/losses between rich and poor is if the marginal utility of the rich individual were lower than that of the poor individual with respect to the material goods being considered. This may not be the case and in fact the rich person might have greater marginal utility associated with the goods than the poor person, implying a regressive transfer.

An international concern for keeping the consequences of environmental policy at the forefront is the potential for the asymmetric distribution of the costs and benefits. For example, the imposition of sustainability constraints in developing countries requires justification and potentially compensation. Preventing development projects because of their adverse impacts on environmental sustainability may disproportionately affect the economies of less developed countries, who can point out the inequality of allowing declines in environmental quality and sustainability of developed countries during their early economic industrialisation. The costs and benefits of environmental protection, and their incidence, then become a key concern for the policy maker. The economist offers to supply the required information by reference to the individual and so support the democratic process.

As mentioned in the introduction, a current concern is then to apply the political vogue for free market democracy to environmental policy. This in turn leads to the emphasis upon markets and market values as a legitimate expression of welfare gains and losses. In short, if decisions about environmental protection are to be made on the basis of individual gains and losses, then some means of placing an economic value on the benefits of actions which increase protection is necessary. Unfortunately, for those advocating the operational abilities of free markets, this is complicated by the non-market nature of many of these benefits. Non-market goods and services, which by definition have no explicit price, must be given a pseudo-market price or shadow price. In order to achieve this the relationship of the environmental good or service can be related to market goods or, more controversially, a hypothetical or contingent market can be created to achieve monetary valuation (i.e., using the contingent valuation method).

A major concern is the use of the cost-benefit analysis approach to environmental policy and the specific application of the contingent valuation method. Environmental problems often involve aspects which have long term implications and are irreversible. These included the destruction of ecosystems, loss of species, and the creation of pollutants which damage ecosystems functions or cause genetic mutations. The contingent valuation method forms the only basis upon which the nature and causes of individual's monetary valuations of far distant, future events can be analysed. In addition, the contingent valuation method promises to provide information on non-user benefits such as the value placed on knowing a species exists, the value of maintaining options to consume in the future and the value of bequeathing assets to future generations.

Sagoff (1988) has argued against the use of contingent valuation of the environment, and defended the view that the individual can be split into a citizen and a consumer so that political and economic decisions are separated. However, the point at which the free market operates and the political realm ends is unclear. Sagoff's primary concern is to see government policy based upon market failure and efficiency arguments

removed, although he accepts paternalistic regulation on other utilitarian grounds. His stance has much in common with that of free market libertarians (e.g., the Chicago school) because he places the market beyond the realm of government insofar as the efficiency problems, at the centre of much intervention policy, are deemed inappropriate public policy concerns. As he states (p.16):

‘...libertarians take rights, especially property rights, very seriously. Like me, they reject the use of the efficiency criterion as a justification or as a pretext for governmental intervention in markets.’

Contingent valuation, as the creation of hypothetical markets, is seen as a movement into the political realm of the citizen and ‘crazy’ because this is ‘not the sort of decision or choice for which a market or cost-benefit analysis is at all relevant’ (*Ibid.* p.113). Yet, the operation of markets is a dynamic that changes over time so that those markets accepted today may be seen as unacceptable tomorrow, and those of yesterday are often unacceptable today. That is the political and economic realms interact so as to make them unified. The ability of humans to create private property rights and free markets where there were previously common property resources governed by community values, and similarly to reverse that process, allows a choice between institutions. Thus, using current institutional arrangements as the defining category between economic and political decisions does nothing to clarify the boundary. For example, the endangered tiger could be bought and sold in the open market rather than merely asking people their hypothetical willingness to pay for Tiger preservation. The local communities might benefit and tiger numbers improve. The existence of actual as opposed to hypothetical markets is the wrong focus and the concern should be for the ethical concerns which challenge different institutional arrangements.

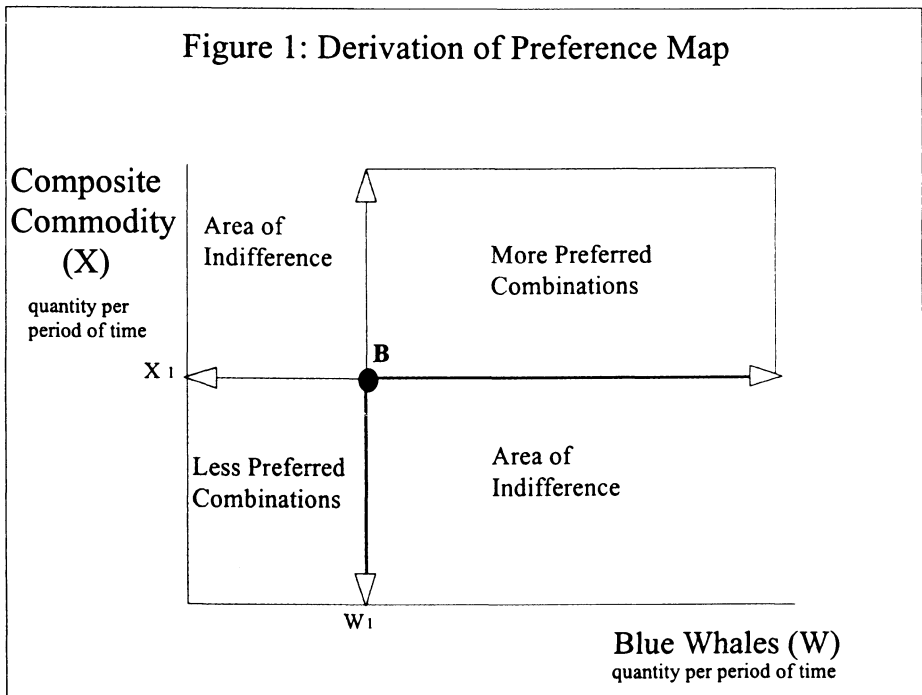
Further complexity is added to the simple dichotomy of consumer and citizen because these categories are non-separable. Buying or boycotting a simple market commodity such as oranges can be a political act when they are produced by a repressive regime known to be violating human rights (as formerly under apartheid in South Africa).

Buying organically grown oranges can be a statement about health, the environment and sustainable lifestyles. Buying anything has production and distributional consequences and will have a variety of impacts upon the environment. Even the simplest commodity, such as a plastic yo-yo, has environmental impacts, being non-biodegradable and made from fossil fuels. Thus, while Sagoff has identified ethical concerns as an important aspect of being human, which is neglected by neo-classical economics, the reasons why markets should be allowed to operate freely in one realm and be excluded from another remain unclear. The problem is that Sagoff believes in a division of economic and ethical questions while the two merge. Rather than remove the ethical and political from the study of economics (which has been the aim of neo-classical economics) these aspects need to be reintroduced. Thus, the following sections introduce ethical considerations and show, as Sagoff has argued, that they have important implications. However, economic preferences are shown to take a variety of forms, some of which diverge strongly from the standard economic model of preference utilitarianism.

3. Lexicographic Preferences

Monetary valuation of the environment requires the definition of commodities in a way fundamentally identical to marketed goods and services. That is, when an environmental improvement occurs an individual must give up some consumption of other commodities to maintain a constant utility level. This gives an individual's willingness to pay amount, which can then be summed across all affected individuals to obtain an aggregate willingness to pay figure. Similarly, the minimum quantity of other commodities demanded to accept a reduction in environmental quality is the willingness to accept compensation. In this case, expenditure on other goods must be increased to compensate for the reduction in environmental quality, so maintaining the individuals initial level of welfare. Whether the other commodities are regarded in terms of a single numeraire (money) or remain as a diverse set of goods and services is inconsequential.

Figure 1 shows the preferences described in commodity or goods space. For simplicity only two goods are shown, namely X a composite good representing all the goods consumed except one which is shown on the horizontal axis. For illustrative purposes this other 'good' is Blue Whales (W), an endangered animal species. An individual is assumed to start with a given endowment of the two goods. This can be viewed as a bundle of commodities such as point B in Figure 1 where the individual has quantity X_1 of the composite good and W_1 Blue Whales. If we try to move the individual from point B they are assumed to be able to compare the bundle at point B with any new bundle offered to them. Thus, for normal goods, the individual is assumed to prefer more



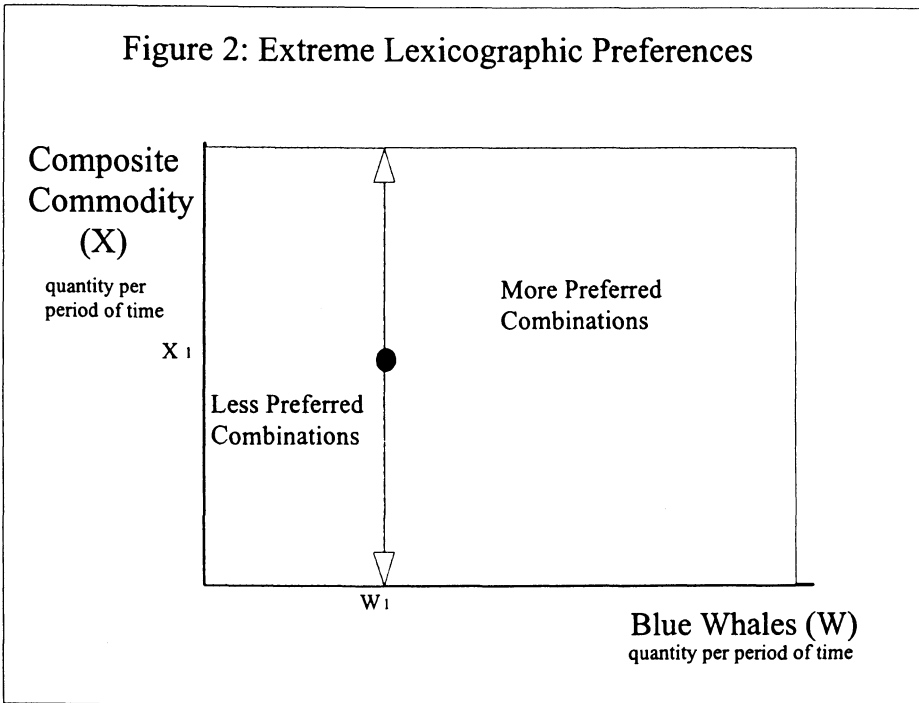
of both goods so that any bundle in the quadrant to the north-east of B would increase their welfare and be more preferred to B. Similarly, bundles which hold one good constant and increase the other are more preferred, i.e. the arrow lines pointing north and east. Conversely, reductions of either good (where they are both normal) will make the individual worse-off and so all bundles containing less of both goods are less preferred, that is, the quadrant to the south-west of B. In addition, the arrow lines pointing west and south are less preferred as they hold one good constant but reduce the quantity of the other.

This leaves the unshaded quadrants in Figure 1 which show bundles combining less of one good but more of the other. These are the areas in which economist are most interested because they imply the willingness to make trade-offs of one commodity for another. For example, if we reduce the amount of the composite commodity, in order to maintain an individual's welfare constant, an increase in the number of Blue Whales is required as compensation; a movement to the south-east quadrant. If, on the other hand, we reduce the number of Blue Whales an increase in other goods will be required to maintain their welfare constant; a movement to the north-west from B. By varying the reductions and finding the compensation required a number of points can be identified which show bundles the individual regards as giving the same welfare as B. These are points of indifference because the individual is unconcerned whether they remain at B or move to one of these other bundles which give the same welfare. Once all these points are defined in relation to B an indifference curve can be drawn connecting the points. All the bundles below this curve will be less preferred and those above it more preferred. The essential message of the indifference curve is that individuals are able to swap one bundle for another and can do so for a set of bundles without affecting their welfare level.

A problem arises if, for example, an individual believes that aspects of the environment have to be protected without regard to the cost in terms of other commodities. That individual will refuse all money/commodity trade-offs which decrease what is regarded as an environmental commodity in the neo-classical framework. In theory, willingness to pay to prevent the loss would be all the available commodities the individual could command (i.e., their income) and willingness to accept compensation would be infinite. The respondent believes that aspect of the environment in question should remain at or above its current level in terms of either quantity or quality.

In Figure 2, increasing both goods is more preferred and reducing both goods less preferred, as before. Also, as before, holding Blue Whale numbers constant and varying X makes the individual better-off for an increase and worse-off for a decrease in X. However, contrary to Figure 1, no increase in X can now compensate the individual for a reduction in Blue Whales (their willingness to accept compensation for a decrease in Blue Whales is infinite). In addition, removing all X can be more than compensated by even the smallest increase in Blue Whale numbers. Thus, the only point which gives equal utility to B is B itself, whilst any reduction in Blue Whale numbers below W_1 will give less utility irrespective of the increase in X. As a result all points representing alternative bundles of X and W are either better than B or worse than B, none give equal welfare.

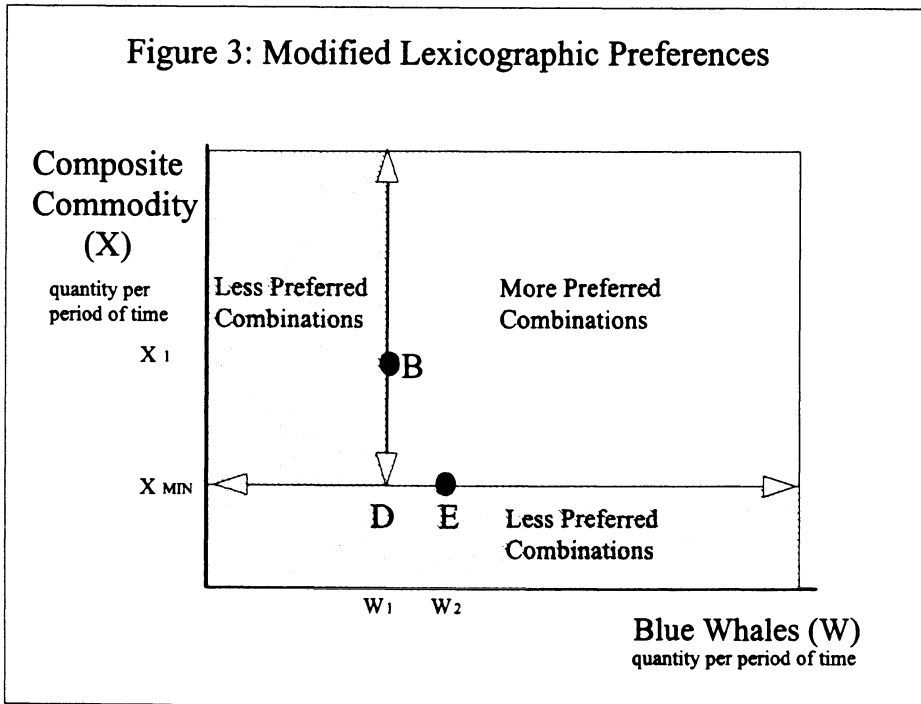
Such preferences mean that utility functions including environmental aspects which are to be protected at all costs are undefined for an individual (since the axiom of continuity is violated), and that indifference curves collapse to single points (denying the



principle of gross substitution). These preferences are termed lexicographic by neo-classical economics because they give absolute priority to one commodity over all others and therefore imply a strict ordering, as in a lexicon. The position described is, however, best regarded as extreme because its implications for the individual are total sacrifice for the environmental aspect to be protected (e.g., Blue Whales). Economists have tended to regard the denial of continuity and violation of gross substitution as of little relevance because lexicographic preferences are unrealistic and unlikely to occur (Malinvaud 1972 p. 20).

The extreme lexicographic position does indeed seem likely to be uncommon because of this overriding ranking of a good above even the individual's own life. Freeman (1986) gives the example of freedom expressed on car license plates in the State of New Hampshire by the slogan 'Live Free or Die'. He questions that all individuals would be prepared to deny themselves any quantity of material goods in exchange for a loss of freedom let alone die to prevent the loss. While this raises a question over the corruption of individual choice by bribery, the extreme lexicographic position in the case of the environment is brought into question. Thus, a modified form of the proposition can be offered as more likely.

The modified lexicographic position might be drawn up in terms of first attaining a minimum level of X prior to being prepared to defend the environment. This minimum X could be the level of consumption to ensure the survival of an individual prior to giving Blue Whales absolute protection. This analysis is presented in Figure 3. An individual starting at bundle B would be WTP the same amount $(X_1 - X_{min})$ for any increase in the



Blue Whale population, where X_{min} is the lowest amount of X which ensures human survival. While this partially moderates the extreme lexicographic position a further moderation would be to adopt a minimum standard of living. In this case X_{min} would represent the minimum amount of commodities which define a basic living standard. Following Pigou (1952: 759) this minimum might include, but not be restricted to: a defined quantity and quality of housing, medical care, education, food, leisure, sanitation and safety at work. Sen (1987), appealing back to notions of Adam Smith, goes further and defines functionings (the various living conditions we can achieve) and capabilities (our ability to achieve them) as essential parts of living standard rather than commodities. Such a living standard might be relatively materialistic in societies where being a functional member of society is defined in such terms e.g., requiring ownership of a car and a television. As Sen (1988: 17) states: 'The same capability of being able to appear in public without shame has variable demands on commodities and wealth, depending on the nature of the society in which one lives.' In this formulation the concept of lexicographic preferences becomes more readily acceptable but the definition for empirical purposes becomes far more difficult because X_{min} is expected to differ amongst social groupings.

One aspect of lexicographic preferences which is worth emphasising is the implication for policy irreversibility. If increases in Blue Whale numbers are considered the strict nature of lexicographic preferences is apparent. In Figure 3 the individual is assumed to start at point B with $W=W_1$ and $X=X_1$. An increase in W to W_2 means the individual will be willing to give up X to have this increase in W , so long as this would

not push X below X_{\min} . The combination at point E with (X_2, W_2) would give greater utility than the combination at point A with (X_1, W_1) . However, once the move to E has been made there would be no way to go back to A without reducing utility. In this way W_2 now becomes the new reference point at or above which Blue Whales must be maintained. In addition, X will always be given up for W but not visa versa.

4. Empirical Investigation of Preferences

The dominant economic theory of decision-making requires a fundamental philosophical assumption; namely that individuals believe the net utility from the consequences of an action determines whether that action is right or wrong. Cost-benefit analysis and its tools, such as the contingent valuation method, assume that individuals are able and willing to consider trade-offs in relation to the quantity and/or quality of public goods. Debates in environmental ethics have raised the issue of individuals refusing to make these judgements and so raised serious problems for the application of economic efficiency arguments (Sagoff 1988; Spash 1993a, 1994). One aspect of refusal can be a basis of belief in inviolable rights so that actions are intrinsically of value or deontological.

Neo-classical economists reject the notion of deontology because there is an assumed rationality attributed to the ability to make trade-offs, whatever the commodity, as long as enough compensation is offered in return. This can be summarised by the old colloquialism that everybody has their price. However, some individuals may treat certain aspects of the environment differently from the manner suggested by this theoretical framework. If an individual believes that aspects of the environment, such as wildlife, have an absolute right to be protected, then that individual will refuse all money trade-offs which degrade what is regarded as an environmental commodity in the neo-classical framework (for a wider discussion of non-compensatory decision rules see Earl 1986).

Denial of the "everybody has their price" position may be regarded by neo-classical economists as representing lexicographic preferences. However, lexicographic preferences, as we have stated above, are generally regarded by economists as anomalies or obscure theoretical cases. Yet the prevalence of the deontological position seems likely to be high amongst environmentalists who claim absolute rights to life for humans and other animals, future generations, trees or ecosystems. Evidence for the support of deontological philosophies can also be drawn from the membership of and support for animal rights groups. Other evidence is the 5 million signatures gathered by members of the Cousteau Society to petition the United Nations to recognise the rights of future generations (Cousteau Society 1994). In addition, Craig et al. (1993) have interviewed environmental policy makers and found supporting, conversational evidence for a belief in intrinsic values. In contingent valuation some evidence exists to suggest individuals may express lexicographic preferences for wildlife (Stevens et al. 1991) and animals, plants and ecosystems (Spash and Hanley 1995).

Stevens et al. collected data on individual preferences and found that around 25% of their sample revealed lexicographic preferences for wildlife preservation in the USA. The species studied were bald eagle, wild turkey, coyote and salmon. They state that 70% of their sample gave responses inconsistent with either neo-classical or lexicographic

preferences because of statements denying monetary valuation was the correct determinant while making willingness to pay bids. However, 80% of the remainder had lexicographic preferences as determined by disagreeing with the statement:

1. Wildlife preservation and money are both important to me; but decisions have to be made and more money could make up for the loss I would feel if there were less wildlife.

and simultaneously agreeing with one of the following two statements:

Either,

2. As long as I have enough money to live on, wildlife preservation is more important to me than having more money.

Or,

3. No matter how much money I have, having more money will always be more important to me than wildlife preservation.

Thus, the refusal to trade is clear for those answering 1 and 2, and appears consistent with the modified lexicographic position. However, those answering 1 and 3 reject monetary compensation for wildlife but rank money above wildlife, which is inconsistent rather than lexicographic. In addition, the trade-off between money and wildlife is poor because money can be regarded as inclusive of utilitarian aspects of wildlife. The exact number of lexicographic individuals is uncertain from the data reported in the paper.

Later Stevens et al. (1993) gave three possible interpretations of their results. First was an interpretation basically outlining the same argument as Sagoff (but credited as the Bergson-Tinter-Samuelson framework) that there are citizen values and consumer values. Second is a natural rights viewpoint equated with Kantian ethics and animal existence rights. Third is ambivalence theory where protest bids are found to occur when the values at stake are felt to be hard to compare. Ambivalence theory predicts that choices can be made when extremes are offered such as a large gain in wildlife for a small payment or a large loss of wildlife for a small gain, but are unable to decide over intermediate trade-offs. Stevens et al. show some evidence for ambivalence for bids between \$50 and \$75, but identifying ambivalence still leaves its cause unexplained.

Spash and Hanley (1995) also attempt to identify lexicographic preferences and found 23.2% of the sample in this category. In this study a rights based motivation was explicitly explored. Respondents were asked their willingness to pay into a trust fund set up to protect an area of ancient woodland in Scotland. Such ancient woodland is a rapidly-disappearing regional ecosystem, which is the principle habitat of rare birds (e.g., the Caipercaille and Crested Tit) and rare mammals (e.g., the Scottish Wildcat and Pine Marten).

Zero bids were analysed in light of the response to a list of possible motives. These motives were then related to the beliefs of respondents concerning their ethical view on rights, i.e. whether animals, plants or ecosystems have the right to be protected regardless of the cost to society. Sub-samples were defined according to whether respondents were asked about animal, plant or ecosystem rights. Each respondent appears in one sub-sample only. The results are summarised in Table 1.

Table 1. Rights and the Cost of Protection

	Animal rights	Ecosystem rights	Biotic rights	<u>N</u>
Sample Size	64	67	67	198
WTP > 0	43	48	42	133
Zero Bidders by Reason				
Can't afford	7	2	9	18
Protect by law	6	17	8	31
BD unimportant	0	0	0	0
BD unimportant here	1	0	0	1
Other	7	0	8	15
Zero Bidders Protesting	13	17	16	46
Rights irrespective of cost	49	50	49	148

After Spash and Hanley (1995)

In the animal rights sub-sample only one person stated a zero bid because they placed no value on preserving the forests' biodiversity (BD). All respondents said that animals had the right to be protected. Of these 49 said that this should be done irrespective of the costs which included 35 who were willing to pay a positive amount (14 zero bids). The correlation coefficient between a belief in absolute rights and WTP was -0.104.

In the ecosystem rights sample there were no zero bids given for reasons of zero value. All but one respondent thought ecosystems had the right to be protected, with 50 of these persons believing that this protection should be extended regardless of the cost. Of these strong rights respondents, 34 were willing to pay some positive amount for BD protection, whilst 16 refused to state a WTP figure. The correlation between WTP and absolute rights was +0.022.

In the biotic rights sample there were 42 positive bids and no zero bids on grounds of no value. All respondents said that plants/trees had the right to be protected. Of the 49 claiming protection should be given irrespective of the costs 33 gave a positive willingness to pay bid (16 zero bids). The correlation coefficient between a belief in absolute rights and WTP was +0.181.

Two main groups of individuals refusing to trade-off income against biodiversity protection are revealed by this study:

- Group 1: Respondents who stated that animals/ecosystems/plants should be protected irrespective of the costs and who refused to give a WTP amount. (46 respondents or 23.2% of the sample.)
- Group 2: As with 1, but where individuals have a positive WTP. (148 respondents or 74.7% of the sample)

Interestingly, 67% of those in group 1 believe that 'biodiversity should be protected by law, and we shouldn't have to pay money to protect it'. Those who said that rights should

be upheld regardless of the cost (a belief in absolute rights), were often found to be willing to pay a positive amount, i.e., in spite of their implied infinite valuation. These respondents believe decreases in biodiversity should be prevented but are willing to pay relatively small amounts, in terms of their disposable income, to offset a threatened reduction. Several explanations might be offered and include: inconsistent preferences, absence of an alternative institutional arrangement to allow the individuals to vote for a scheme which prevents any deterioration in biodiversity, a modified lexicographic position. In this latter case, lexicographic theory predicts their willingness to pay should be their entire income. Alternatively, under the modified lexicographic theory these individuals may be at their minimum living standard.

5. Further Exploration of Rights

The area of natural rights and deontology in particular has been explored further by Spash (1993b, 1997). A central concern in defining ethical beliefs is to identify the positions adopted by individuals which are most relevant to the issue at hand. The aim is therefore to identify a method for separating out the way in which ethics affect environmental issues. For example, in order to find out if there is any difference between utilitarians and deontologists in terms of their levels of environmental concern requires separating out deontologists from utilitarians. Two methods for doing so are suggested here: (i) a lifeboat ethic and (ii) the right to compensation. In addition, we need to have some grounds for believing that an ethical categorisation is relevant. The contention here is that the positive attribution of absolute rights by individuals is the most important ethical belief for environmentalist and the most serious concern for policy.

In the philosophical literature a lifeboat ethics question has been suggested in order to test a respondent's attitude towards the right-to-life. Given the difficulty of trying to define deontological versus utilitarian systems an appeal to philosophers who have spent so long on such questions seems a sensible start. As Pojman (1988 p.157) states: "In order to get to the heart of these types of theories, let us begin with a frequently used example." A question attempting this approach might then run along the following lines:

Two people are stranded in a lifeboat; one is a scientist and the other undistinguished. The scientist has in his or her mind the cure for cancer. If the scientist survives many people would as a result be cured. There is only enough food and water for one of these individuals to reach safety for certain. Which of the following would you choose?

- (i) Give the food and water to the scientist ensuring this individual's survival.
- (ii) Split the food and water equally and hope against the odds for a miracle.

Those who believe in the right-to-life should give equal amounts of food to the two individuals facing death in the lifeboat, while utilitarians should favour trying to save one individual in preference to the other if they can increase social welfare, i.e., saving the scientist with the cure for cancer in their head.

However, there are reasons why deontologists might be classified as utilitarians, as well as reasons why utilitarians may be mistaken for deontologists. In the former case

deontologists would chose to preserve the life of the scientist and let the undistinguished person die. First regard the scenarios in terms of risk preference. Answer (i) would be chosen by a person believing in the right to life because they prefer one certain live person to two possible dead ones. Second, the rights of future cancer sufferers are implicitly being discussed. Respondents could be operating on the basis of a hierarchy of principles and chose (i) when comparing the rights of the undistinguished person versus future cancer sufferers. Next consider how utilitarians may be classified as deontologists under the lifeboat approach. In this case utilitarians would chose to split the life preserving resources and so risk both lives rather than ensure the scientist's survival. First, the undistinguished person might be regarded as a more vividly present, specific individual as opposed to the unspecified number of future cancer sufferers. Thus, choosing an option which allows some possibility of both surviving, even if small, would be preferred. This might be regarded as heavily discounting the future. Second, the respondent is left to form their own view on the probabilities attached to different outcomes. There are three potential outcomes: (a) the scientist survives, (b) undistinguished survives, (c) they both survive. The latter two options are allowed for under answer (ii). Therefore the outcome chosen will be dependent upon the respondents risk perception. This then leads to a third point concerning what Kahneman and Tversky (1979 pp.268-269) call the reflection effect. Risk aversion when facing gains is accompanied by risk seeking when the prospect is a loss. Individuals therefore take large risks because they perceive the prospect as less unfavourable. Thus, a small chance of both surviving is preferred.

An attempt to clarify what is happening in the lifeboat question might be made by attaching specific probabilities to the outcomes. However, this then leads to trying to separate out beliefs from attitudes towards risk, or explain the compatibility of choices concerning risk with beliefs. As Tversky and Kahneman (1982 p.20) state: "Unfortunately, there can be no simple formal procedure for assessing the compatibility of a set of probability judgements with the judge's total system of beliefs." The lifeboat question seem to raise more problems than are solved in terms of our search for a method of classifying fundamental philosophical positions.

An alternative approach to defining ethical beliefs is to use a question directly related to the environmental attribute under analysis, e.g., in a contingent valuation survey. Where the environmental attribute has obvious rights-based issues associated with it the types of bias due to deontology, of which this paper is concerned, are likely to be most relevant. These rights issues can then be used to identify deontologists from utilitarians. For example, attempts to value biodiversity or wildlife will raise issues of animal rights. As a result some individuals will refuse to bid on species preservation because this is outside their system of thinking. Questions probing the belief in animal rights can then be used to analyze the influence of environmentalism.

For example, concentrating on the rights of future generations is a relevant aspect of the enhanced greenhouse effect and concerns for compensation (Spash 1994). The intergenerational right to compensation will determine the extent to which the potential damages due to global warming are taken seriously and so affect what if any action is taken to control greenhouse gas emissions. A specific set of questions might then be developed as follows:

- (a) Do you think the current generation should in general compensate future generations for damages it inflicts upon them, given that compensation is feasible? YES/NO
- (b) If your answer to (a) was YES would you change your answer if you knew for certain the future would be better-off in terms of welfare than the present? YES/NO
- (c) If your answer to (a) was NO would you change your answer if you knew for certain the future would be worse-off in terms of welfare than the present? YES/NO.

Under this definition four categories of belief in compensation are obtained; namely no right to compensation, rights to compensation, compensation if poor, no compensation if rich. The belief in compensation relative to welfare levels is utilitarian in that the compensation is dependent upon the outcome (the consequentialist principle) and welfare is the measure of right and wrong (the utility principle). A third group rejects compensation regardless of the consequences and gives future generations no right to compensation. The fourth group is of greatest concern here because they recognise that future generations have a right to compensation regardless of the relative welfare arguments at the heart of economics.

A potential bias in contingent valuation due to a deontologist or rights believer refusing to play the game is presented here. The approach taken is to split the sample on the basis of ethical belief and also look at the responses in terms of the willingness-to-pay questions. The data are taken from a survey asking for willingness to pay to prevent five events occurring in the year 2100 due to the enhanced greenhouse effect. Three payment mechanisms were given providing fifteen willingness to pay responses. Thus, fifteen different correlation tables can be constructed to test for the importance of ethical beliefs. Six groups of willingness to pay are set up; namely zero bids, 0-£5, £5-£10, £10-£100, >£100, and no response. A non-respondent is an individual who answers the ethical and environmental questions but leaves the willingness-to-pay questions blank.

Taking the split of belief systems as utilitarian, the right to compensation and no right to compensation gives strong correlation results. Only one result is insignificant at the 5% level. Even at the 1% level thirteen of the correlations remain significant. The strongest results specific to willingness-to-pay are found in the non-response and in the 0-£5 categories. Both are consistent across events and payment mechanisms, and have high chisquared results. Under non-response a greater than expected number of rights-based individuals is found. In the 0-£5 category there are fewer rights-based individuals implying a tendency to bid high. While this trend in bidding high is also evidenced in the other categories the results are weaker and inconsistent across the fifteen tables. A lack of data seems to be hampering the results here, especially in the >£100 category. In general the rights affirming individuals were hypothesised to be over represented in the zero, non-response and high bid categories. This hypothesis holds for the non-response categories and is supported for the high bid categories but fails to show in the zero bids. In fact, there are fewer than expected numbers of individuals in this category. The no rights group were hypothesised to refuse to bid or bid zero, and this hypothesis is strongly supported. There is also a tendency in the no rights group towards under-representation in the positive bid ranges, especially strong for the 0-£5 category and consistent in the £10-£100 category. The results for the sea level rise case with the R&D payment mechanism are shown in Table 2.

Table 2. Ethics and Willingness-to-Pay: Sea Level Rise

	Willingness-to-Pay (household, £ per annum)					
	0	0-5	5-10	10-100	>100	No Response
<u>Rights</u>						
Observed	24	17	15	23	6	17
Expected	30.13	20.69	14.16	21.42	5.44	10.16
Chisquared	(1.246)	(0.658)	(0.050)	(0.117)	(0.057)	(4.598)
<u>No Rights</u>						
Observed	24	6	14	13	5	8
Expected	20.68	14.20	9.72	14.70	3.74	6.98
Chisquared	(0.534)	(4.735)	(1.890)	(0.196)	(0.427)	(0.151)
<u>Utilitarian</u>						
Observed	35	34	10	23	4	3
Expected	32.20	22.11	15.13	22.89	5.82	10.86
Chisquared	(0.244)	(6.394)	(1.738)	(0.001)	(0.568)	(5.690)
Total <u>N</u>	83	57	39	59	15	28

Note. Total Chisquared 29.294 with 10 degrees of freedom.

6. Conclusions

The importance of what motivates individuals has been neglected with the dominance of a narrow self-interested model of the individual in economics. In methodological terms, models have been acceptable as long as behaviour can be regarded as conforming to prediction. However, the model has become the distorting lens through which observations are channelled, so that 'unacceptable' observations are filtered by the very process of being observed. For example, failing to make trade-offs of one commodity for another can violate basic economic assumptions which are stated in terms of how a rational individual operates. If you are offered increasing sums of money to sell your car at some point you will sell your car. If we substitute your grandmother for the car the proposition seems less credible. A less dramatic and more intermediate emotional substitution might be an animal which is your pet. The point is that a range of refusals to trade can be perfectly reasonable although apparently economically irrational under the dominant economic model.

Under the movement towards free market democracy cost-benefit analysis has taken on new importance with regard to environmental policy. The tool of contingent valuation has been particularly powerful in this regard, and most notably in the United States. This tool at the same time has begun to provide empirical evidence for the importance of ethics in economics. In this chapter some of this evidence has been discussed. In particular the way in which rights based ethics are a current challenge to economics and can only be explained by lexicographic preferences has been explored. The importance of accepting the existence of alternative value systems lies in the

implications for environmental policy and more fundamentally the future for economics. If, as suggested here, human motivation to environmental action includes intrinsic value in acts then a policy based upon the exclusion of that value will alienate at least a subsection of the population. This then is the current danger in pursuing the current economic model of human behaviour as encapsulated in microeconomic theory. Those who refuse to play the game in terms of monetary valuation in hypothetical markets are also active in operating with a world view which lies beyond current economic analysis.

7. References

- Ayres, R.U. and J. Walter. 1991. The Greenhouse Effect: Damages, Costs and Abatement. *Environmental and Resource Economics* 1(3): 237-270.
- Cline, W.R. 1992a. Global Warming: The Economic Stakes. Institute for International Economics, Washington, DC.
- Cline, W.R. 1992b. The Economics of Global Warming. Institute for International Economics, Washington, DC.
- Cousteau Society. 1994. Rights of Future Generations. *Calypso Log* 20(5/6): 30.
- Craig P.P., H. Glasser, and W. Kempton. 1993. Ethics and Values in Environmental Policy: The Said and the UNCED. *Environmental Values* 2(2): 137-158.
- Earl, P. 1986. Non-compensatory Choices in Retrospect and Prospect. In *Lifestyle Economics: Consumer Behaviour in a Turbulent World*, P. Earl, ed. Wheatsheaf Books Ltd., Brighton, pp. 232-253.
- Freeman, A.M. 1986. The Ethical Basis of the Economic View of the Environment. In *People, Penguin and Plastic Trees: Basic Issues in Environmental Ethics*, D. van der Veer and C. Pierce, eds. Wadsworth Publishing Co., Belmont, CA, pp. 218-227.
- Malinvaud, E. 1972. *Lectures on Microeconomic Theory*. North-Holland, Amsterdam.
- Nordhaus, W. 1991a. To Slow or Not to Slow: The Economics of the Greenhouse Effect. *Economic Journal* 101(6): 920-937.
- Nordhaus, W. 1991b. A Sketch of the Economics of the Greenhouse Effect. *American Economic Review* 81(2): 146-150.
- Pigou A.C. (1952) [1920] *The Economics of Welfare*. Macmillan, London.
- Pojman, L.P. 1988. *Ethical Theory: Classical and Contemporary Readings*. Wadsworth Publishing Co., Belmont, CA.
- Sagoff, M. 1988. *The Economy of the Earth*. Cambridge University Press, Cambridge.
- Sen, A. 1988. *The Standard of Living*. Cambridge University Press, Cambridge.
- Spash, C.L. 1997. Ethics and Environmental Attitudes: With Implications for Economic Valuation. *Journal of Environmental Management* 49: forthcoming.
- Spash, C.L. 1994. Double CO₂ and Beyond. *Ecological Economics* 10(1): 27-36.
- Spash, C.L. 1993a. Economics, Ethics and Long-term Environmental Damages. *Environmental Ethics* 15(2): 117-132.
- Spash, C.L., 1993b. Estimating the Importance of Inviolable Rights: The Case of Long-term Damages and Future Generations. Unpublished report to the Scottish Economic Society, 76pp.

- Spash, C.L. and N. Hanley. 1995. Preferences, Information and Biodiversity Preservation. *Ecological Economics* 12(3): 191-208.
- Stevens, T., Echevarria, J., Glass, R., Hager, T., and More, T. 1991. Measuring the Existence Value of Wildlife: What Do CVM Estimates Really Show. *Land Economics* 67(4): 390-400.
- Stevens, T., More, T., and Glass, R. 1993. Measuring the Existence Value of Wildlife: Reply. *Land Economics* 69(3): 309-312.