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# Ethics and Environmental Attitudes With Implications for Economic Valuation

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This paper tests the hypothesis that different ethical belief systems are unrelated to the attitude an individual takes towards the environment. More specifically, the neoclassical economic approach is seen to require a belief in utilitarianism while many individuals may operate on the basis of a deontological or rights-based approach to decision-making. The concern with this relationship arises from the use of the cost–benefit analysis approach to environmental policy and the specific application of the contingent valuation method. Evidence is found to support the view that environmentalists choose to operate on a rights-based approach which rejects the relative welfare arguments of economics and positively attributes compensation to future generations for environmental damages. This implies that the contingent valuation of environmental attributes will lead to values which are biased towards technocentric optimists and against the environmental movement. In terms of policy, environmental management on the basis of totalling economic values is liable to be undemocratic because of the systematic exclusion of a section of the general public.


*Keywords*: environmental ethics, cost–benefit analysis, deontology, contingent valuation, future generations.

## 1. Introduction

Decisions about 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 to the benefits of avoiding damage to future generations (e.g. Cline, 1992a,b; Ayres and Walter, 1991; Nordhaus, 1991a,b). 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

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decide whether net welfare is increased (Pareto efficient) or could potentially be increased (under the Hicks-Kaldor test).

This approach to decision-making has two requirements. First, is a fundamental philosophical position; 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 tradeoffs in relation to the quantity and/or quality of public goods. That is, individuals are assumed to follow a utilitarian philosophy. Debates in environmental ethics have raised the issue of inviolable rights and suggested serious problems for the application of economic efficiency arguments in the face of a public operating on the basis of rights or principles (Sagoff, 1988; Spash, 1993a, 1994).

The second requirement, for the cost–benefit approach to decision-making, is the need to know the extent to which people are willing-to-pay to prevent damages or willing-to-accept compensation for damages suffered. In this regard, the contingent valuation method has taken a central role. Environmental problems often involve aspects which have long-term implications and are irreversible. These include the destruction of ecosystems (e.g. flooding a valley for hydroelectricity generation), 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 an individual's valuations of far distant, future events can be analysed. In addition, the contingent valuation method provides 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 bequesting assets to future generations (for further details on the contingent valuation method see Mitchell and Carson, 1989; Hanley and Spash, 1993).

In this paper the first of these requirements is addressed while maintaining consideration of the implications for the second. The premise of this paper is that the environmental stance of individuals is liable to be correlated with specific philosophical positions. Thus, when environmental cost–benefit analysis is conducted, implicitly assuming everybody is utilitarian, the results will be biased by utilitarian justifications for non-utilitarian reasoning. For example, individuals holding a rights-based belief system would be forced to adopt a utilitarian mind-set as they answer a contingent valuation method questionnaire. These individuals will then be likely to refuse to participate in the willingness-to-pay or accept procedure. This rejection could show up in non-response, zero bids, or outliers, and the data would erroneously be regarded as respondents placing no value on the public good in the first two cases or acting irrationally in the third case.

In the next section some explanations are given as to how the prevalence of rights-based philosophies will conflict with the cost–benefit approach to environmental policy. The implications could be dramatic, for example an individual motivated primarily by non-consequentialist beliefs may deny the applicability of economic valuation methods to environmental issues. The prevalence of such individuals will then determine the political acceptability of monetary valuation as an environmental management tool. In Section 3 a method is developed to assess an individual's environmental stance and their ethical beliefs. In Section 4 the method is applied to determine whether individuals fall in to a utilitarian or rights-based philosophical set. Results from these classifications are then used to test for correlations between a belief in the right of future generations to receive compensation for environmental damages and environmental attitudes.

Problems arising from the methods of classification are discussed and suggestions are made as to how future research could improve upon the application reported here.

## 2. Deontology and environmentalism

Modern environmental policy is discussed largely in terms of calculating the usefulness to humans of preserving specific goods and services provided by environmental systems. However, there is an apparent undercurrent of beliefs amongst environmental policy-makers which argues against such an accounting approach (Craig *et al.*, 1993). That is, environmental concern is often expressed by rejection of directly anthropocentric and economic calculations. A clear example of such a division of environmental attitudes towards policy-making can be identified amongst North American conservationists, both past and present. This conservation movement split between the utilitarian conservationists following the likes of Gifford Pinochet, with an emphasis on multiple land use policy (e.g. the U.S. Forest Service), and the preservationists under John Muir, who pushed for National Parks, wanting land removed from materials extraction (Righter, 1982). The preservationists today exist in organisations such as the Wilderness Society and regard nature as more than the sum of its material parts i.e. a psycho-spiritual, as well as material, resource (Callicot, 1993). The preservationist perspective with its emphasis on non-human intrinsic values is the one modern economists seem to have neglected.

While making decisions on a utilitarian basis may seem eminently sensible to most economists the approach is rejected by those holding a principles-based, rights-based or deontological approach to life. The etymological origins of deontology lie with the ancient Greeks: dei meaning "it is binding" or "it behoves", and ontology the science or study of being. In this context decisions are made on the basis of whether the act itself is right or wrong regardless of the consequences, e.g. thou shall not kill. This contrasts with teleology which is the branch of knowledge dealing with ends or purposes (telos meaning end) and from which utilitarianism grows. Although, as noted below, teleology can be broadly defined to include the consequences for non-humans, if they are regarded as having moral standing, modern economics normally takes a narrower anthropocentric position.

The expression of a deontological environmental position is revealed by a belief in the inherent, inviolable value of the environment (e.g. Naess, 1986). Legislation protecting human health as an absolute requirement with no regard to the costs is similarly deontological in outlook, e.g. the primary requirements for air quality standards in the United States under the Clean Air Act. By contrast environmental policy is discussed in instrumental, consequentialist terms which tend to emphasise individual self-interest. Debates such as biodiversity preservation concentrate upon the usefulness of species, e.g. their potential as products or drug suppliers. Those concerned for the welfare of animals often attribute to them various rights and reject consequentialist evaluations. Thus, cost–benefit analysis of a tropical rainforest on the basis of fir products is seen as being as repulsive as the notion of calculating the value of a city on the basis of the leather products human skin could supply. Humans typically regard themselves as having intrinsic value which is recognised by rights such as the United Nations Charter on Human Rights. A deontological philosophy applied to environmental policy might recognise similar rights for animals, plants and ecosystems.

This idea of deontological environmentalism contrasts with the value structures found in neoclassical economics. The use of the contingent valuation method has

encouraged some extension of the debate over environmental values from the narrow concept of current personal consumptive uses normally found in economic studies. The category of non-use values (only assessable by contingent valuation) is employed to describe non-consumptive and future values. Thus, for example, contingent valuation infers option, bequest and existence values for environmental goods and services from individuals willingness to pay for environmental improvements. However, this is far from the position being described here as deontological. In fact, some prominent environmental economists regard a belief in the existence of non-human intrinsic value as both radical and new (Turner and Pearce, 1990, p. 31). Jeremy Bentham writing in 1789 held a more liberal viewpoint which recognised the extension of utilitarianism to animals and so can be argued to have recognised intrinsic value in non-humans (Nash, 1989, p. 23).

One central aspect of deontology leads neoclassical economists to reject the notion. That is the denial of the rationality attributed to making tradeoffs, 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, deontological individuals, by definition, treat certain aspects of the environment differently from the manner suggested by this theoretical framework of microeconomics. 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 tradeoffs which degrade what is regarded as an environmental commodity in the neoclassical 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 neoclassical economists as representing lexicographic preferences (Freeman, 1986). Under a lexicographic preference the utility functions are undefinable for an individual since the axiom of continuity is violated, and indifference curves collapse to single points denying the principle of gross substitution. Lexicographic preferences are conveniently regarded as unrealistic and unlikely to occur in economics (Malinvaud, 1972, p. 20).

While the denial of continuity and violation of gross substitution are relegated to obscure footnotes and expected to be of little relevance, 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. In this regard some evidence exists to suggest that 25% of individuals may express lexicographic preferences for wildlife (Stevens *et al.*, 1991) and animals, plants and ecosystems (Spash and Hanley, 1995). 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 five million signatures gathered by members of the Cousteau Society to petition the United Nations to recognise rights for 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 non-instrumental environmental values. However, there appears to have been no formal attempt to analyse the philosophical underpinnings of a non-compensatory stance or, more specifically, whether environmentalists are likely to be deontologists as opposed to utilitarians. The analysis which follows is an initial attempt to help rectify this situation by testing for the presence of deontological belief systems amongst environmentalists.

## 3. Method

In order to probe the relationship between the environmental stance of an individual and their ethical beliefs a method of categorising each is required. This means a

classifying definition of attitudes towards the environment must be designed and an assessment made of where individuals are to be placed within this. A similar process is also necessary for the ethical beliefs of individuals and in particular here their ethical beliefs related to environmentally sensitive issues. Once having gained the information on an individual, in terms of their environmental attitude and ethics, the data can be analysed for correlations between the two.

### 3.1. ASSESSING ENVIRONMENTAL ATTITUDES

The potential for environmentalism to influence willingness-to-pay bids has been recognised by some economists. Thus, contingent valuation studies often include questions about the number of environmental organisations to which respondents belong, and perhaps may also ask which ones. These data can be used as a crude measure of environmentalism in bid curve analysis to identify correlations with willingness-to-pay e.g. Hanley and Craig (1991) use a zero/one dummy variable on membership of conservation organisations in a bid curve. However, the society membership variable is a poor reflection of environmental attitudes and a wide range of individual beliefs and levels of activism can exist among the membership of any given environmental organisation. About 10% of the U.S. public report belonging to an environmental organisation but only around 1% are active (Milbraith, 1984, p. 73). While the inclusion of a variable on society membership indicates some concern for the influence of environmentalism there has been no discussion in the economics literature as to what is expected from this measure, and no hypotheses have been tested.

Attitudes towards the environment are normally characterised as two extremes, e.g. see O'Riordan (1989) and references therein. On the one side are the technocentric optimists and on the other are the ecocentric pessimists. Merely classing people as belonging to one camp or the other would be little better for current purposes than the societal membership procedure. In order to create a measure of the spectrum of attitudes which occur in moving from one extreme to the other a series of key questions might be used. Following Milbraith (1984) a ranking can be created of any given sample in terms of environmental concern by getting responses to three statements:

(i) I perceive the condition of the world environment as a:
Small problem/Large Problem.
(ii) Technical development and scientific change can solve society's environmental problems and no basic change in habits is required:
Disagree/Agree.
(iii) There are limits to growth beyond which our industrial society cannot expand:
Disagree/Agree.

The answers can be used to split a given sample into two groups from the first question, these two can then be split into four groups via the second question, and eight groups via the third question. Figure 1 shows the resulting ranking of groups, with the level of environmental concern moving from 1, basically unconcerned and trusting in technology with no limits to growth, to 8 which Milbraith has defined as the environmental vanguard.

A change in the ordering of the questions would affect this scale in the intermediate categories; e.g. 3 becomes 2 and 6 changes with 7, when the limits to growth comes before the technical fix. An ordinal ranking independent of such changes could be based upon the number of positive responses, e.g. two answers favouring environmentalism and

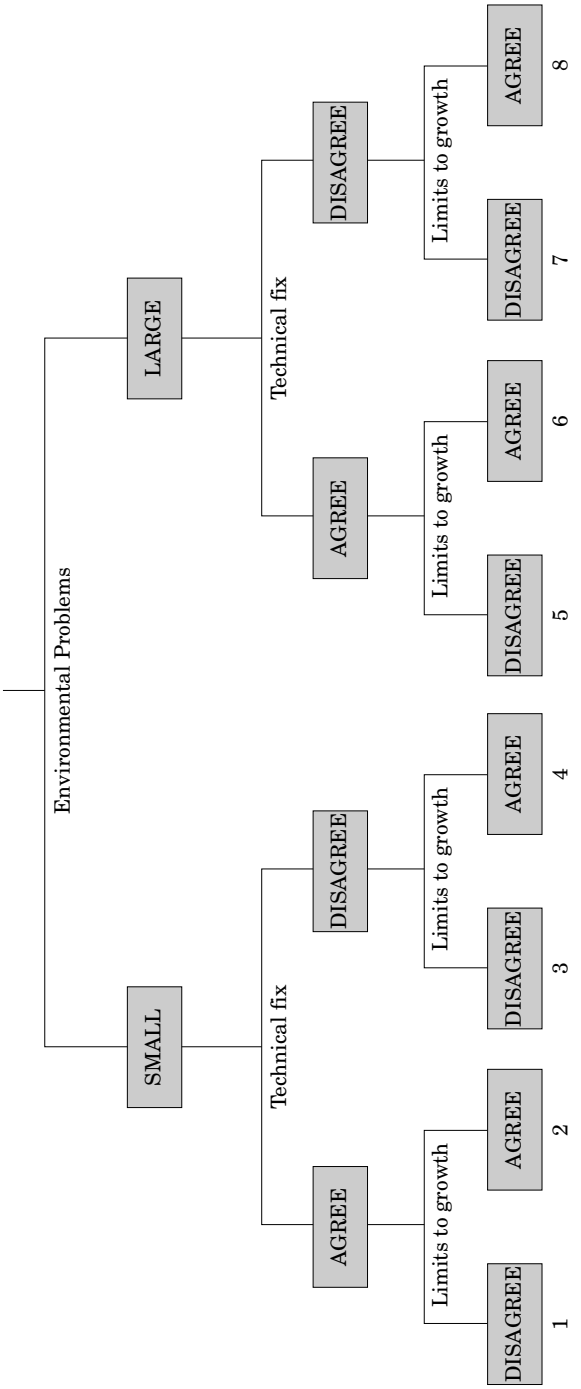


Figure 1. Categories of environmental concern.

one against regardless of the actual question. This would give four categories; namely, 1, 2+3+5, 4+6+7, and 8. This assumes there is no qualitative difference between the questions, i.e. believing environmental problems to be small is the same as believing in no limits to growth or technology as the solution to such problems. Milbraith (1984, p. 44) found the ranking from 1 to 8, as shown in Figure 1, gave a linear progression of environmentalism from left to right.

### 3.2. PROBING THE IMPORTANCE OF ETHICAL BELIEFS

A central concern in defining ethical beliefs is to provide the context in which judgements are being made and the relevance of that context to other issues. Separating out the ways in which ethics affect environmental attitudes requires defining ethical categories (e.g. utilitarian and deontological) and giving this division a basis in terms of an ethical problem. Two approaches for doing so are discussed 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 (i.e. some will argue against the crudeness of the deontological/utilitarian split). The contention here is that the positive attribution of absolute rights by individuals is the most important ethical belief for the environmentalist and the most serious concern for the application of economics to environmental 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 (e.g. Regan, 1983). Given the difficulty of trying to define deontological vs. 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 one of the following options 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 choose 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 possibly 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 choose (i) when comparing the rights of the undistinguished person vs. future cancer sufferers. Next, consider how utilitarians may be classified as deontologists

under the lifeboat approach. In this case utilitarians would choose 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 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 respondent's 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 seems to raise more problems than are solved in 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 may 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 analyse the influence of environmentalism.

In the current context I have chosen to concentrate on the rights of future generations. This relates to ongoing research concerning the enhanced greenhouse effect where intergenerational rights are directly related to concerns for compensation (Spash, 1994). So that they can focus attention on intertemporal (between generations) resource allocation and distribution of welfare, economists commonly assume that consumption is split equally among the members of any one generation (Solow, 1974; Page, 1977, p. 153). The assumption avoids intratemporal (within a generation) distribution and aggregation issues. The result is to treat generations as if they were individuals (for aggregation assumptions see Maler, 1974), and can involve assuming each generation is composed of homogeneous individuals so they can be represented as a single agent (Norgaard and Howarth, 1991). Thus, even though economists work with a utilitarianism that is supposedly individualistic (that is, all interests and benefits are those of single individuals) such assumptions effectively aggregate whole generations into single agents having utilities. This approach is followed below.

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 can 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.

Alternative formulations are of course possible and one reviewer suggested the following: "Do we have a responsibility to ensure that future generations are able to live in a world where environmental quality and biological diversity are at least equal to current levels if the cost to us is a significant reduction in own material standards of living (i.e. 10%)?". This type of question is concerned with equity rather than, as here, compensation for harm inflicted, and therefore it neglects to differentiate the two types of inter-generational transfers (see Spash, 1994). In addition, this question would give two categories unrelated to consequentialist or rights-based philosophies (both could logically answer yes) and would be unable to separate out those categorised here as inviolable rights holders.

Under the definition described here 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. Now in terms of the positive attribution of inviolable rights only deontologists wanting to compensate future generations are relevant and all other ethical groups can be regarded as denying that right.

Spash (1993a,b) has argued that the important stance in terms of environmental ethics is the acceptance of inviolable rights to compensation. An inviolable right is one which is held as absolute; regardless of compensation paid to ameliorate its infringement. Rather than considering ethical groupings as passive categories, the environmentalist would then be regarded as positively opting to reject the relative welfare arguments of economics and positively recognising rights. Thus, the utilitarians and individuals refusing the future the right to compensation can be regarded as being in the same ethical category of rejecting the existence of inviolable rights.

## 4. Results

The compensatory questions above were employed as part of a contingent valuation study on the enhanced greenhouse effect (Spash, 1993b). Three samples were taken: one from students and staff at the University of Stirling, one from economics students at the University of Wyoming, and the third from the general public in Glasgow. The

TABLE 1. Levels of environmental concern

| | Category of concern | | | | | | | | Total N |
|---|---|---|---|---|---|---|---|---|---|
| | 1 (%) | 2 (%) | 3 (%) | 4 (%) | 5 (%) | 6 (%) | 7 (%) | 8 (%) | |
| Glasgow | 2 | 8 | 0 | 4 | 7 | 14 | 24 | 41 | 96 |
| Stirling | 2 | 0 | 0 | 0 | 2 | 2 | 10 | 83 | 89 |
| Wyoming | 1 | 5 | 1 | 2 | 4 | 2 | 20 | 64 | 84 |
| Total (%) | 2 | 4 | 0 | 2 | 4 | 6 | 18 | 62 | |
| Total N | 5 | 12 | 1 | 6 | 12 | 17 | 49 | 167 | 269 |

N.B. Percentages may not add to 100 due to rounding errors.

TABLE 2. U.K. and U.S. Levels of environmental concern, 1982.

| | Category of concern | | | | | | | | Total N |
|---|---|---|---|---|---|---|---|---|---|
| | 1 (%) | 2 (%) | 3 (%) | 4 (%) | 5 (%) | 6 (%) | 7 (%) | 8 (%) | |
| U.S. Public | 17 | 9 | 14 | 26 | 4 | 6 | 5 | 19 | 695 |
| U.K. Public | 9 | 14 | 19 | 25 | 2 | 3 | 5 | 24 | 439 |

Source: Milbraith, L. W. (1984) Environmentalists: Vanguard for a New Society New York: State University Press. pp. 16, 46, 48.

Stirling sample was via postal reply, the Wyoming sample was conducted in class, while the Glasgow survey consisted of in-house interviews conducted by a market research company (Scotsearch).

The approach to classifying environmentalism based upon Milbraith's definitions was adopted employing the three questions given above. The resulting categories created following this ranking are directly comparable with Milbraith's. In the statistical analysis which follows small sample size in categories 1, 2 and 3 required that they be combined, as were categories 4 and 5. This gave five groups with greater definition at the environmental end of the spectrum.

The resulting frequencies for each of the three regional samples are given in Table 1. All three samples show a distribution favouring environmental concern. This could be taken to imply that surveys on environmental problems, such as the contingent valuation of environmental attributes, will select environmentalists from among the general population and so be biased. The extent to which this conclusion can be generalised depends upon the expected distribution of environmental concern within a given population. This can be approximated for the U.K. and the U.S. by comparing Table 1 with Milbraith's results given in Table 2. This suggests that all three samples are unrepresentative. However, due to the increase in environmental awareness, over the years since Milbraith's sample was taken, the difference between the results of Table 2 and Table 1 might be partially explained. Alternative explanations are that the samples here have an above normal education level or socially desirable responses are obscuring the results. In the first case the Glasgow sample should vary from the two University samples by showing a higher percentage of respondents on the left side of the scale.

As can be seen in Table 1 there is no clear divergence. The increased prevalence of socially desirable responses is difficult to assess, in the absence of additional data, but seems less likely to occur given the circuitous route of asking three questions without respondents knowing their combined purpose. Furthermore, only the first question has an obviously socially correct answer. If individuals had been asked to classify themselves straight on to the scale from 1 to 8 social correctness might have been more problematic. Future applications could use direct questioning to provide a comparison with the ranking used here, or a psychological social-desirability scale could be employed.

Amongst the three samples, the Stirling respondents show a strong bias towards the environmental vanguard. As this sample was collected by a postal survey this suggests self selection. This is as might be expected, and is one reason why concern should be shown over the potential operation of ethical beliefs in the context of the contingent valuation method; postal surveys, being less expensive than in-house interviews, are liable to be more common. The existence of such self selection alone suggests the non-random nature of the postal technique. As no data were collected via telephone no conclusions can be drawn concerning telephone interviews, although self selection is still a strong possibility. The extent to which personal interviews or captive audiences can overcome this problem is suggested by the other two samples. However, individuals can still show their dissatisfaction with their predicament via spoilt surveys, "irrational" answers and zero bids.

The set of questions on intergenerational compensation were used to define ethical categories. As discussed in the previous section the group of individuals positively attributing inviolable rights to compensation is the most important for current purposes. That is, these individuals were hypothesised to be highly represented amongst environmental activists.

A set of frequency tables can be constructed showing the ethical belief as defined by the compensation questions and level of environmental concern. The non-parametric contingency coefficient is used to test for the association between the two. In order to use this chi-squared test there should be no more than 20% of the expected frequencies smaller than 5 and no cells with an expected frequency less than 1. As can be ascertained from Table 1 this is not the case given the complete range of categories of attitudes towards environmentalism in the data set. Thus, in order to increase the expected frequencies, following Siegel (1956), adjacent categories are combined. The low frequencies also mean the chi-squared test can only be carried out with confidence for the total sample. Although, the test was run for subsamples and the result reported below was unchanged. The categories combined were the first three $(1+2+3)$ and the next two $(4+5)$, giving five levels of environmental concern (establishment, middle, conservationist, environmentalist, and vanguard). This is justified on the grounds that the question on the size of environmental problems is the defining category.

Table 3 shows the outcome when the separation of belief systems is subjected to the chi-squared test. A strong correlation is found between belief in the inviolable right to compensation and environmental concern. The chi-squared of 12·18 is significant at the 2% level (4 degrees of freedom) giving a strong rejection of the null hypothesis that there is no difference between those holding an ethical belief in inviolable rights and those denying such rights in terms of the level of environmental concern.

## 5. Conclusions

The prevalence of deontological belief systems, where environmental problems are concerned, affects the extent to which tradeoffs are accepted as opposed to respect for

TABLE 3. Correlation of inviolable right to compensation and environmental concern

| | Category of Environmental Concern | | | | |
|---|---|---|---|---|---|
| | Establishment 1,2,3 | Middle 4,5 | Conservation 6 | Enviro. 7 | Vanguard 8 |
| No Inviolable Right | 17 | 15 | 12 | 30 | 103 |
| Observed | | | | | |
| Expected | 11·54 | 11·54 | 11·54 | 33·99 | 108·38 |
| Chi-squared | (2·579) | (1·035) | (0·018) | (0·468) | (0·267) |
| Inviolable Right | 1 | 3 | 6 | 23 | 66 |
| Observed | | | | | |
| Expected | 6·46 | 6·46 | 6·46 | 19·01 | 60·62 |
| Chi-squared | (4·611) | (1·850) | (0·032) | (0·837) | (0·478) |
| Total N | 18 | 18 | 18 | 53 | 169 |

Total chi-squared 12·176 with 4 degrees of freedom.

inviolable rights. The recognition of rights-based beliefs as particularly relevant to environmental issues implies that "environmentalists" are more likely to hold rights based beliefs. In a random sample representing a given population, a previously unrecognised type of self selection bias could operate within a contingent valuation survey; that is a deontological bias exists (Spash, 1993b). Thus, environmentally concerned individuals are more likely to answer surveys relating to environmental goods and services. Yet these are the exact individuals whom we expect to exhibit deontological beliefs and so reject the utilitarian basis of contingent valuation. This paper has attempted to test the hypothesis that there is no difference between utilitarians and deontologists in terms of their levels of environmental concern.

The general approach of assuming a consistent philosophical belief system, as suggested by the philosopher's lifeboat question, seems flawed. The commonly used lifeboat question itself gives answers which are difficult to interpret in light of decision making under uncertainty. Thus, I have suggested taking a case study approach where the moral aspects of an environmental issue are identified and the extent to which individuals hold extreme (from the neoclassical economic viewpoint) rights-based views can then be tested. There are an array of potential rights-based issues which could influence the acceptability of tradeoffs to individuals so that the case specific approach seems the only way forward. In addition, this approach offers the potential for links to be built with the results of contingent valuation studies.

While the results reported here are a first step, the implications of environmentalists being likely to believe in a rights-based system and positively choosing to separate from other ethical groups are potentially far reaching. The contingent valuation technique can be viewed as biased in favour of establishment followers. Mail surveys are likely to be biased in terms of the number of responses by environmentalists who, in turn are liable to be deontologists. A strong correlation between those attributing inviolable rights to future generation and environmentalists was found. The simple test conducted here should be improved upon and repeated for other environmental commodities which are commonly valued using the contingent valuation method. Of course, in order to generalise the results reported here the applicability to alternative rights would have to be proven e.g. the rights of animals, trees, ecosystems and so on.

Contingent valuation has been controversially used in the assessment of environmental damages, e.g. the Exxon Valdez oil spill and Kakadu National Park uranium mining. The potential of the method to capture a wide range of values (e.g. from current use to the existence of species) has been seen as a major advantage. However, the method also shows respondents rejecting monetary valuation in a systematic way, which implies a previously unrecognised bias against the group believing in inviolable rights and termed here deontologists. A danger then exists in an institutional mechanism which systematically disenfranchises a sub-section of society. The technique also raises the importance of their existence for environmental valuation and more generally public policy formation.

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