Ethical Design of Stated Preference Questionnaires: Results from a Split-Sample Test[1]

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ABSTRACT

Designers of stated preference studies have placed an emphasis in recent years on ensuring that questionnaires are defensible, and that all 'hypothetical' elements are removed. A potential problem with this emphasis is that it can unwittingly increase the hypothetical nature of the survey as well as necessitating the use of ethically questionable statements. An alternative approach was recommended by Morrison (forthcoming) that is ethically better and potentially less susceptible to hypothetical bias. This approach has been used in several studies, with the results indicating that designing questionnaires in an ethically neutral manner does not automatically lead to poorer quality models. In this paper we present the results of a more rigorous split sample test to test the appropriateness of using this approach. Minor evidence of strategic behaviour by a small proportion of the respondents (about 7%) was identified; however the results indicate that welfare estimates were not affected by designing questionnaires in this way.

1. Introduction

A longstanding concern amongst practitioners and users of the results of stated preference surveys is the possibility of bias resulting from the hypothetical nature of certain elements within questionnaires. This bias can take several different forms (Cummings, Brookshire and Schulze 1986). One possibility is that respondents may doubt that payment will actually occur even if a majority supported the proposal presented. If this is the case respondents may have less incentive to answer accurately, and not reveal their true willingness to pay, resulting in a strategic bias. Another possible form of hypothetical bias is that respondents may have insufficient experience with the subject to provide meaningful answers to the questions asked. This is related to the concept of

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bounded rationality (Simon 1957): that people are only able to provide accurate answers within the bounds of their understanding. The implication is that in this situation the results of a stated preference survey may not be reliable.

This concern about the possibility of hypothetical as well as other biases has lead to a series of studies designed to demonstrate the validity or otherwise of stated preference techniques, particularly the contingent valuation method. Some of these studies have examined the equality of actual and hypothetical payments for both use and non-use values. (Sinden 1988, Hanemann 1994). Other studies have focused on detecting "scope effects". That is, whether the value estimates are sensitive to changes in the good being valued (Carson, Flores, Martin and Wright 1994). The evidence from these studies are generally supportive of the validity of using stated preference techniques to estimate non-market values. However, a number of studies have found a difference between hypothetical and actual payments or the absence of significant scope effects when estimating non-use values. Some proponents of the use of stated preference techniques (eg Hanemann 1994) argue that the lack of validity identified by these studies reflects inferior questionnaire design rather than moving beyond the limits of the technique. While this point is still being resolved in the literature, it does suggest the importance of rigorously designing stated preference questionnaires.

Efforts have been made to encourage refinement of the design of stated preference questionnaires. Arguably the most influential example of this was a report prepared for the National Oceanic and Atmospheric Administration (NOAA) by a panel of economic experts. This panel, which was led by two Nobel laureates—Kenneth Arrow and Robert Solow—was tasked with evaluating the use of contingent valuation in determining non-use values. The panel recommended that various guidelines be adhered to in applications involving damage assessment. While these guidelines were originally proposed for use in damage assessment in the USA, they have flowed through to contingent valuation and choice modelling application in Australia (Bennett 1996).

These guidelines placed an emphasis on ensuring that the results of a contingent valuation application will be defensible in damage assessment. That is, the results will be useable for litigation. They include, for example, recommendations regarding framing, the elicitation format, information provision, the payment vehicle and response rates. Since the NOAA guidelines were proposed, criticisms have been made about the appropriateness of certain of these guidelines. These have included that they are excessively and unnecessarily costly to achieve (Harrison and Lesley 1996, Randall 1997), that some have no influence on value estimates (Carson et al 1994, Neil 1995) and that some recommendations are inappropriate to the non-US context (Willis 1997).

An additional criticism suggested by Morrison (forthcoming) is that an excessive emphasis on deriving estimates that would be defensible in litigation can unwittingly increase the hypothetical nature of the survey. Many respondents have the capacity to discern whether what they are told in a questionnaire is plausible. It is tempting to think that whatever is written in a questionnaire will be believed. But Australians in particular, with their 'unique cynicism', are likely to doubt the unlikely (Bennett and Carter 1993,

Blamey 1998). Empirical evidence indicates that a lack of trust regarding information that is presented in questionnaires can affect value estimates (Blamey 1998, Morrison and Bennett 2000). In addition, an emphasis on removing all hypothetical elements may necessitate the use of ethically questionable statements within questionnaires. This suggests that an alternative approach, where the goals of the survey are explicitly stated, may be more appropriate.

Morrison (forthcoming) suggests that if the purpose of an application is the estimation of environmental costs of benefits for policy analysis, an alternative approach that places a greater emphasis on ethics and plausibility may be more appropriate. Under this approach, the existence of hypothetical elements within questionnaires is disclosed to respondents within the survey scenario. A relevant question is what effect does disclosing that certain aspects of the questionnaire are hypothetical, have on the results of the analysis? Some researchers may argue that this may increase the overall hypothetical nature of the survey. In contrast, Morrison (forthcoming) contends that if the admissions made in the questionnaire are congruent with respondents' beliefs regarding the information provided, respondents will be more likely to take the survey seriously, thereby reducing bias and variance. This has been argued elsewhere. For example, Kelman (1967, p.7) contended that deception may cause the subject to dismiss the stated purpose of the study and search for other interpretations. Alternatively, it may cause the subject to receive contradictory messages, inasmuch as there is a contradiction between the researcher's statements about the purposes of the study and the information the subject receives from the experimental conditions. Bailey (1978) suggested that this may cause different subjects to have their own definition of the meaning of the questionnaire and thus adhere to different response strategies. He suggests that 'this is somewhat analogous to survey respondents having various understandings of an ambiguous question, so that in a real sense different respondents are answering different questions while all are ostensibly answering the same question" (pp.390-391).

Several stated preference studies have been completed that have used these principles for scenario design, including Morrison and Sim (1999), Mallawarachchi, Blamey, Morrison, Johnson and Bennett (forthcoming), Straton (1999) and Morrison (2000). The evidence from these studies indicates that designing questionnaires for policy analysis does not necessarily lead to poorer quality models, and may even improve the quality of the resulting model. However, no formal split sample test has been conducted to test this assertion. The objective of this paper is to present the results of such a test.

The structure of this paper is as follows. The notion of designing stated preference studies for policy analysis applications is considered first in Section 2. The case study is then described in Section 3, followed by a description of the questionnaire in Section 4 and the survey logistics in Section 5. The results are presented in Section 6 and conclusions are offered in Section 7.

2. Options for ethical survey design

As outlined in Morrison (forthcoming), there are several ways researchers can improve the design of stated preference surveys so that they are ethically better. This includes the description of the payment scenario, the justification given for the improvements in environmental quality, and the justification given for the existence of seemingly implausible alternatives in conjoint analyses.

Description of the payment scenario

One of the critical issues when designing a questionnaire is the development of a meaningful payment vehicle and budget constraint. The NOAA panel commented that 'in willingness to pay scenarios, the payment vehicle must be presented fully and clearly, with the relevant budget constraint emphasised. The payment scenario should be convincingly described, preferably in a referendum context' (Arrow et al. 1993, p.4610). If the payment vehicle, payment scenario or budget constraint are not accepted by respondents, protests by respondents or 'yea-saying' may result. That is, respondents may simply reject the survey, or alternatively ignore the cost that they are faced with and indicate that they will pay an amount higher than their true willingness to pay.

In many situations the development of a convincing payment scenario and a plausible payment vehicle is a difficult, if not impossible, task (Morrison, Blamey and Bennett 1999). In terms of the payment scenario it is often difficult to provide a valid reason for why respondents should have to pay for environmental improvement. It is a finding of numerous focus groups that participants (at least in Australia) believed that the provision of public goods is the government's responsibility (Bennett, Blamey and Morrison 1997; Morrison, Blamey and Bennett 1997). In these studies, respondents rejected the notion that they should have to pay towards improving the quality of natural resources, because they already pay taxes to meet such needs. They do not wish to be taxed because government's fail to allocate tax revenue efficiently. This occurs despite respondents deriving utility from the environmental improvement. The problem is that they didn't believe that they were responsible for payment.

Researchers have attempted to deal with this problem in several different ways. One approach used by a number of researchers is to attempt to convince respondents that the government does not have sufficient money available to pay for the project. While this approach may convince respondents of their responsibility regarding payment, it may be ethically questionable as it involves the use of deception. It is not necessarily the case that the government does not have enough money, nor is it the case that if respondents were willing to pay the money that the project would go ahead. Moreover, it is possible that respondents will realise that these statements are not true, and will discount this information.

An alternative, ethically better, explanation is to tell respondents that, while the project could be funded from existing government revenue, eventually these types of projects lead to increases in taxes. Respondents could then be asked to assume for this project

that there is an increase in taxes. This approach was used by Straton (1999) and Morrison (2000).

Justifying how environmental changes are achieved

Ethically problematic statements are found in other parts of stated preference questionnaires. Another area of potential difficulty for researchers is in explaining how a change in environmental quality will be achieved. Sometimes this is relatively straightforward. For example, the costs associated with improving the quality of remnant vegetation can be explained by fencing costs and compensation to farmers for unused lands. In other cases it is more difficult. How does one explain to respondents how all of the harmful effects of passive smoking could be eliminated? Or how does one explain to respondents about how all of the weeds within a national park could be removed when there is no currently available technology that could do this? Researchers could be tempted, for defensibility, to deceive respondents and tell them that a way is available. Alternatively, the uncertainty about the existence of technology could be admitted and respondents asked to assume that it could be developed. This approach was used in the context of passive smoking by Morrison and Sim (1998).

Justifying the existence of implausible alternatives

Other ethical issues are faced when designing conjoint applications. An important issue is how to explain to respondents why they are asked to evaluate alternatives that may seem to be unusual or even implausible. These unusual alternatives result from their creation using orthogonal experimental designs. Because of the emphasis on defensibility, most stated preference studies have attempted to provide a rationale for these somewhat implausible alternatives. They have tried to explain why these seemingly improbable alternatives are nonetheless possible. An alternative approach advocated in this paper is to be explicit about why alternatives in conjoint studies seem implausible. Rather than telling respondents that the alternatives are real, they are told that they are hypothetical. Respondents can also be informed about why they are choosing these alternatives: to communicate to decision makers what aspects of environmental quality are important to them. This approach was used by both Mallawaraachchi et al (forthcoming) and Morrison (2000). The results of a split sample test of using this approach are presented in subsequent sections.

3. Case Study

The Sunshine Coast is one of the fastest growing regions in Australia. Over the last ten years the population has almost doubled. Similar growth is expected over the next decade. The total urban area in the Sunshine Coast in 1999 was about 11,000 hectares. With current population growth and planning policies, the total urban area is expected to increase to 19,000 hectares in 2010.

The Sunshine Coast also contains 9000 hectares of sugar cane that supply Moreton Mill. However, the viability of the mill is uncertain, as cultivation of 10,000 hectares is required to ensure viability. Since 1980 about 700 hectares of sugar cane has been converted to other land uses. New areas have however been developed for sugar cane production.

Within the Sunshine Coast region there are also areas of rare or unique vegetation. This includes areas of wallum (tea-tree and paperback woodland) and rainforest. The area is currently about 28,000 hectares, about one-third of the original area. The area of rare or unique vegetation has been decreasing by about 500 hectares a year over the past 10 years. Under current rates of development, the area would decrease to about 15,000 hectares by 2010.

Thus there are three competing land use priorities in the Sunshine Coast region. Local government can implement policies to encourage or discourage the expansion of all of these land uses. Choice modelling was used to estimate the community's preferences for changes in the areas of each of these land uses.

4. Questionnaire Description

The questionnaire was developed using the results from four focus groups undertaken in Nambour and Mudjimba. The focus groups were used to determine the attributes that should be included in the choice sets, and to refine a draft questionnaire.

The questionnaire was contained in a 20 page booklet and was titled 'Land Use Options for the Sunshine Coast A Community Survey'. Accompanying the questionnaire was a brochure that provided detailed information about the three main land uses in the Sunshine Coast region. In the questionnaire, respondents were told that there were three main ways of using land on the Sunshine Coast (urban areas, sugar production, and for rare or unique vegetation). Respondents were then asked several Likert scale questions to determine their attitudes towards these land uses.

Next there was an introduction to the choice sets. This is where the differences between the two versions of the questionnaire are found. The ethical version and the standard version of this part of the questionnaire are presented below. There are three main differences between the two versions. Respondents to the ethical alternative were told first that the options to be evaluated were hypothetical and secondly that the purpose of asking the questions was to identify the outcomes that people think are most important. Thirdly, because of this explanation, respondents to the ethical alternative were not given an explanation about why some alternatives were "a little odd".

Ethical version:

Land Use Options for the Sunshine Coast

We would now like to find out your views about some options for the use of land on the Sunshine Coast. To do this, we have prepared a number of hypothetical options for you to evaluate. By evaluating these options, we will be able to identify the outcomes you think are most important, and the options that best suit people like yourself.

You will need to read the enclosed brochure before evaluating these options. The brochure describes the features of the options we would like you to consider in this section.

The options have been specifically designed so that you have a broad range of options to consider.

Standard version:

Land Use Options for the Sunshine Coast

We would now like to find out your views about some options for the use of land on the Sunshine Coast. To do this, we have prepared a number of options for you to consider.

You will need to read the enclosed brochure before evaluating these options. The brochure describes the features of the options we would like you to consider in this section.

The options have been specifically designed so that you have a broad range of options to consider.

Some options may seem a little odd, but bear in mind that there are a number of ways of determining land uses.

Respondents were then presented with four single alternatives where they rated their preferences. The purpose of collecting this data was to "warm up" respondents for the choice sets that came next, and to provide an additional data set to validate the choice modelling data. The attributes used in the ratings and choice questions, and their levels are shown in Table 1:

Table 1: Attributes and levels used in the choice and ratings questions

Urban area in 2010	Area of sugar cane in 2010	Area of rare or unique vegetation in 2010	Change in land rates
19,000 ha	5000 ha	15,000 ha	No change
12,000 ha	10,000 ha	17,000 ha	$50
15,000 ha	15,000 ha	20,000 ha	$100
18,000 ha	20,000 ha	23,000 ha	$200
22,000 ha		26,000 ha	

One of the attributes used was land rates. This attribute was included so that it would be possible to estimate respondents' willingness to pay for changes in land uses. In the brochure, respondents were told that land rates could increase if extra money were needed to purchase areas of unique vegetation or to compensate farmers for not clearing; or because policies leading to urban expansion may require extra funding for infrastructure.

Respondents were asked to answer six choice modelling questions, an example of which is below.

Question 8: Suppose the following three options were the only ones available, which **ONE** would you choose?

Option A: Continue existing policies

Urban Area in 2010	Area of sugar cane in 2010	Area of rare or unique vegetation in 2010	Change in land rates
19,000 hectares	5000 hectares	15,000 hectares	No change

Option B: New option

Urban Area in 2010	Area of sugar cane in 2010	Area of rare or unique vegetation in 2010	Change in land rates
22,000 hectares	5000 hectares	26,000 hectares	$200 increase

Option C: New option

Urban Area in 2010	Area of sugar cane in 2010	Area of rare or unique vegetation in 2010	Change in land rates
12,000 hectares	5000 hectares	17,000 hectares	$50 increase

I would choose *tick one box only*

- ☐ Option A: Continue existing policies
- ☐ Option B
- ☐ Option C
- ☐ Not sure

After answering the choice sets, respondents were asked several attitudinal debrief questions, and various sociodemographic classification questions.

5. Survey logistics

Each version of the questionnaire was sent to 825 potential respondents on the Sunshine Coast during October-December 1999. A mail survey was used – an initial questionnaire plus two reminders. A 40.7% response rate was achieved (625 valid responses, 56 undeliverables). The sociodemographic characteristics of the respondents in each split

are shown in Table 2. The respondents to both versions have similar sociodemographic characteristics.

Table 2: Sociodemographic characteristics of the survey samples

	Ethical version	**Standard version**
Age	53.5 years	52.4 years
Sex	48% female	56% female
Education*	4.5	4.5
Income	$42,148	$38,738
Member of an organisation associated with environmental conservation	6.6%	6.8%
Associated with sugar industry	3.4%	4.4%

* 1-never went to school, 6-tertiary degree

6. Results

The data collected were analysed using multinomial logit models after tests indicated that there was no evidence of significant IIA violations (Hausman and McFadden 1984)[2]. The model was structured so that the sociodemographic and attitudinal variables were interacted with the choice set attributes rather than the alternative specific constants (see Morrison, Bennett and Blamey 1999). Likelihood ratio tests and examination of explanatory power indicated that this was the most appropriate model specification.

The variables included in the models, and their expected signs, are presented in Table 3. Several variables are worthy of a special mention, as they represent components of value that are often noted in the resource economics literature. The variable "sugaesth" indicates whether there is amenity value attached to viewing sugar cane areas; if yes this variable should have a negative sign. The variable "vegexis" indicates the extent to which there is existence value attached to the preservation of areas of rare or unique vegetation, compared to use values.

[2] This test involves a comparison of the coefficients of a full MNL model with a restricted model from which one alternative has been removed. If the IIA property holds—so that the probability of choosing one alternative over a second alternative is independent of the attributes of a third alternative—then consistent parameter estimates should be found in the full and restricted models.

Table 3: Variable descriptions and expected signs

Variables	Description	Expected sign
Urban	Urban area in 2010	–
Urbchar	Interaction between Urban and Likert scale for "A slower rate of urban development is needed to maintain the character of the region" (1-strongly agree)	+
Urbprob	Interaction between Urban and Likert scale for "Urban development results in social and environmental problems" (1-strongly agree)	+
Urbhd	Interaction between Urban and Likert scale for "Local governments should encourage high density residential developments" (1-strongly agree)	+
Sugar	Area of sugar cane in 2010	?*
Sugind	Interaction between Sugar and association with the sugar industry	+
Sugviab	Interaction between Sugar and Likert scale for "It is important to retain the viability of the Moreton Sugar Mill in Nambour" (1-strongly agree)	–
Sugaesth	Interaction between Sugar and Likert scale for "Cane fields are pleasing to look at" (1-strongly agree)	–
Veg	Area of rare or unique vegetation in 2010	+
Vegexis	Interaction between Veg and Likert scale for "Rare or unique vegetation should be preserved even if most people will never visit those areas" (1-strongly agree)	–
Vegenvgp	Interaction between Veg and membership of an environmental group	+
Rates	Increase in land rates	–
Rateinc	Interaction between Rates and income	+
Rateincdum	Interaction between Rates and a dummy variable set to one when respondents did not report their income	?
Rateage	Interaction between Rates and age	–
ASC	Alternative specific constant	?

* indeterminate

The statistical models are presented in Table 4. Four models are presented, with models 1 and 3 estimated using the ethical design data set. Models 1 and 2 are slightly different from models 3 and 4, with the difference being whether the variable "Vegenvgp" is included.

Table 4: Modelling Results

Variables	Model 1	Model 2	Model 3	Model 4
Urban	-0.267*** (-5.580)	-0.194*** (-4.107)	-0.266*** (-5.525)	-0.194*** (-4.086)
Urbchar	0.778E-1*** (6.195)	0.493E-1*** (3.658)	0.793E-1*** (6.239)	0.500E-1*** (3.700)
Urbprob	0.418E-1*** (3.470)	0.488E-1*** (4.018)	0.423E-1*** (3.493)	0.481E-1*** (3.958)
Urbhd	-0.834E-2 (-0.922)	-0.834E-2* (-1.803)	-0.984E-2 (-1.084)	-0.161E-1* (-1.814)
Sugar	0.103*** (6.744)	0.114*** (6.935)	0.106*** (6.885)	0.114*** (6.897)
Sugind	0.694E-1** (2.177)	0.124E-1 (0.526)	0.639E-1** (2.073)	0.140E-1 (0.597)
Sugviab	-0.320E-1*** (-5.659)	-0.345E-1*** (-5.530)	-0.323E-1*** (-5.637)	-0.349E-1*** (-5.587)
Sugaesth	-0.184E-1*** (-3.237)	-0.184E-1*** (-3.237)	-0.194E-1*** (-3.388)	-0.180E-1*** (-2.715)
Veg	0.231*** (12.184)	0.242*** (11.873)	0.209*** (10.761)	0.252*** (11.925)
Vegexis	-0.766E-1*** (-9.968)	-0.842E-1*** (-9.585)	-0.702E-1*** (-9.050)	-0.873E-1*** (-9.718)
Vegenvgp			0.173*** (4.257)	-0.581E-1* (-1.894)
Rates	-0.824E-2*** (-6.601)	-0.994E-2*** (-8.533)	-0.835E-2*** (-6.769)	-0.996E-2*** (-8.533)
Rateinc	0.317E-7* (1.845)	0.883E-7*** (5.094)	0.349E-7** (2.016)	0.896E-7*** (5.157)
Rateincdum	-0.642E-2*** (-3.100)	0.123E-2 (0.615)	-0.578E-2*** (-2.807)	0.128E-2 (0.640)
Rateage	0.414E-4*** (2.891)	0.602E-5 (0.525)	0.390E-4*** (2.843)	0.544E-5 (0.472)
ASC	0.292E-1 (0.251)	0.427E-1 (0.339)	0.378E-1 (0.324)	0.447E-1 (0.355)
Summary statistics				
Log likelihood	-1483.061	-1428.818	-1471.696	-1427.076
Rho-squared (adj)	0.139	0.151	0.146	0.152
N	1576	1540	1576	1540

t-statistics are in brackets

***significant at the 1% level, **significant at the 5% level, *significant at the 10% level

Models 1 and 2

The results from models 1 and 2 are considered first. At first glance it appears that the model estimated using the "standard" data set is marginally more robust, as it has a slightly greater explanatory power. A likelihood ratio test, however, showed that the models are not different (test statistic X^2=22.036, critical value (15 df, α=0.05) = 25.00).

Implicit prices and Hicksian prices were also compared (see Tables 5 and 6)[3]. While the willingness to pay for the ethical data is larger in magnitude, it is statistically no different. Similarly no differences were detected between estimates of Hicksian surplus (at the 5% significance level).

Table 5: Implicit prices estimated using Models 1 and 2

Implicit Price	Ethical	Non-ethical	P-value
Sugar area	-$0.73	-$0.05	0.32
Urban area	-$10.58	-$5.97	0.16
Rare or unique vegetation	$15.34	$11.45	0.12

Table 6: Hicksian surplus using Models 1 and 2

Implicit Price	Ethical	Non-ethical	P-value
Change 1: *Urban 12,000 ha* *Sugar 10,000 ha* *Veg 17,000 ha*	$152.36	$105.60	0.15
Change 2 *Urban 15,000 ha* *Sugar 15,000 ha* *Veg 20,000 ha*	$162.99	$121.81	0.09
Change 3 *Urban 17,000 ha* *Sugar 20,000 ha* *Veg 23,000 ha*	$127.61	$103.67	0.11

Models 3 and 4

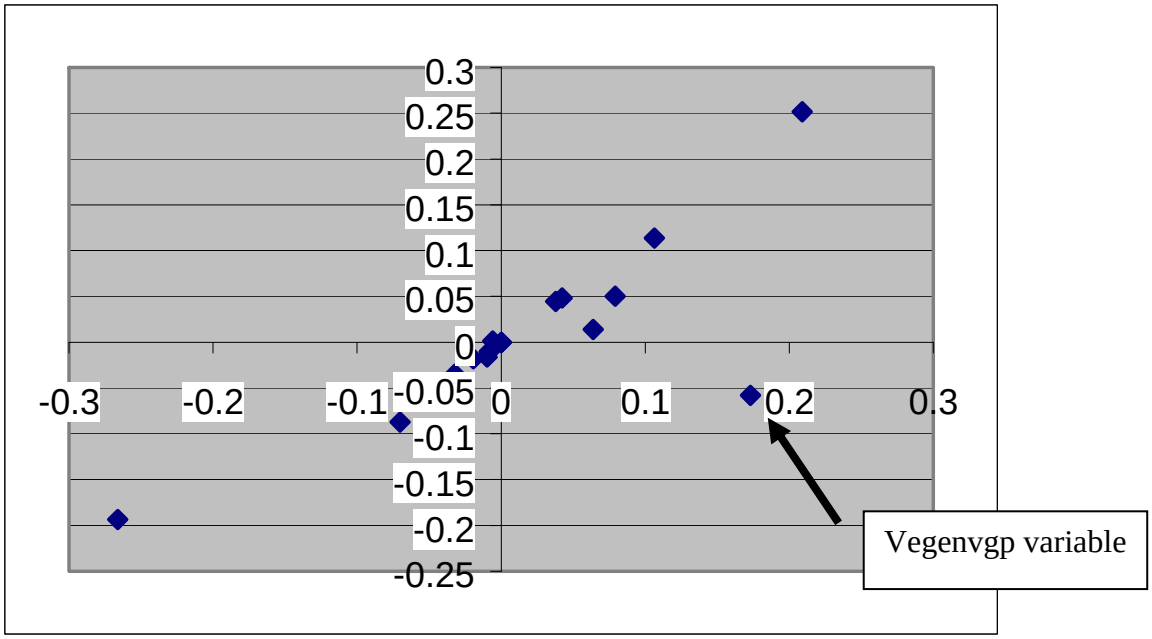
As mentioned above, the next two models are identical to the previous two except that there is an extra explanatory variable "vegenvgp" which represents the interaction between the vegetation variable and membership of an environmental group. It could be expected that certain interest groups may behave more strategically when told that a question is hypothetical. There is some evidence of this in model 3. The variable Vegenvgp is significant and positively signed, indicating that membership of an environmental group does effect the importance placed on the vegetation attribute. Likelihood ratio tests indicated that this variable should be included in model 3, but not model 4. A likelihood ratio test was also used to determine if the models are different, and the null hypothesis of no difference between the models was rejected (test statistic X^2=46.56 (rescaled = 43.26), critical value (15 df, α=0.05) = 26.30). Thus it appears

[3] Probability values were estimated using the approach recommended by Poe et al (1994).

there is evidence that the ethical design of stated preference questionnaires can induce certain interest groups to act strategically.

A graphical examination of the proportionality between the parameter vectors for models 3 and 4 indicates that the difference between the models is primarily due to the Vegenvgp variable (see Figure 1).

Figure 1: The proportionality of the parameter vectors for Models 1 and 2



However, while differences between models have been detected, it does not necessarily follow that this will translate into value differences (eg Loomis 1992). Examination of implicit prices and Hicksian surplus (see Tables 7 and 8) indicates that values have not been affected by strategic behaviour (denoted by the low probabilities). This reflects that only a relatively small proportion of the sample that belong to an environmental group (<7%) are acting strategically.

Table 7: Implicit prices estimated using Models 3 and 4

Implicit Price	Ethical	Non-ethical	P-value
Sugar area	-$0.72	-$0.07	0.32
Urban area	-$10.21	-$5.93	0.19
Rare or unique vegetation	$15.58	$11.36	0.11

Table 8: Hicksian surplus using Models 3 and 4

Implicit Price	Ethical	Non-ethical	P-value
Change 1: *Urban 12,000 ha* *Sugar 10,000 ha* *Veg 17,000 ha*	$105.78	$70.97	0.16
Change 2 *Urban 15,000 ha* *Sugar 15,000 ha* *Veg 20,000 ha*	$118.27	$86.89	0.08
Change 3 *Urban 17,000 ha* *Sugar 20,000 ha* *Veg 23,000 ha*	$140.98	$108.75	0.07

7. Conclusions

The potential for hypothetical bias has led to researchers emphasising defensibility when designing questionnaires. In some cases, this has resulted in the use of deceptive or misleading statements that can be considered to be ethically questionable. However, because of the potential for increasing implausibility, the question arises whether deception is necessary.

This paper has tested the effect of modifications to one aspect of a choice modelling questionnaire – the rationale provided for the existence of implausible alternatives. The evidence indicates that ethical design leads to a small amount of strategic behaviour by a single interest group, but that this was not sufficient to affect value estimates. The implication is that unless strategic behaviour is expected on a large scale, which empirical evidence suggests is unlikely in the general population surveys (see Morrison, Blamey, Bennett and Louviere 1996), the use of this modification to choice modelling questionnaires is not likely to be problematic, and from an ethical perspective should be preferred.

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