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ANALYSIS

Mixing methods within stated preference environmental valuation: choice experiments and post-questionnaire qualitative analysis

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Abstract

Assessing public preferences for natural resources is a difficult task. The complexity of the research problem has encouraged practitioners to adopt qualitative approaches as exploratory and diagnostic tools within the conventionally more quantitative stated preference research. Building on best practice from previous studies, this paper reports the findings of post-questionnaire focus group analysis, investigating the adequacy of a choice experiment (CE) valuation exercise and its public acceptability. The specifics of the scenario and design choices are shown to markedly reduce problems of charity like and bid-realism/fair-share responses, observed in previous studies, and significant sensitivity to good characteristics is observed. However, a less tractable problem of valuing unfamiliar goods remains, with insights given regarding public acceptability and the usefulness of the findings to environmental decision-making.

Keywords: Choice experiments; Environmental valuation; Focus groups; Qualitative approaches

1. Introduction

The complexity of landscape and environment and the inevitable limits of cognition constrain the elicitation of preferences and attitudes from the general public regarding policy decisions. Although stated preference environmental valuation has been widely used to help formulate policy decisions (Hanley, 2001), this research has been subject to much debate as to the quality and meaning of the results produced. In response to this, it has become common practice to borrow from qualitative methodologies in order to aid survey design (Desvousges et al., 1984; Lazo et al., 1992; Chilton and Hutchinson, 1999). More recently, the role of qualitative methods has been extended to post-questionnaire exploratory

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and diagnostic tools. The results from post-questionnaire qualitative analyses have illustrated the wealth of information and understanding that can be gained, beyond that of conventional stated preference surveys (Schkade and Payne, 1994; Blamey, 1998; Brouwer et al., 1999; Powe, 2000; Clarke et al., 2000) and can lead to methodological improvements (Blamey et al., 1999a).

The contingent valuation (CV) method has provided the main focus of stated preference research, with few qualitative post-questionnaire surveys considering the alternative choice experiment (CE) method.[1] Although CEs were only extended in the early 1990s to estimate the impacts on economic welfare from changing the provision of public goods (e.g. Viscusi et al., 1991; Opaluch et al., 1993; Adamowicz et al., 1994), the flexibility of the methodology has led to an increase in its popularity (Bennett and Blamey, 2001).[2] However, although the method enables researchers to accommodate uncertainty in the specifics of the scenarios considered and to value individual components of the good, there are unresolved issues worthy of exploration using the post-questionnaire analysis. Building on best practice from previous studies, this paper reports the findings of a post-questionnaire focus group analysis which investigates the adequacy of the CE valuation exercise, respondent thought process during the valuations and public acceptability of the method. The results provide useful insights into how to improve the design of future studies and help explore further the applicability of stated preference methods.

2. Choice experiments

Adapting Fischhoff and Furby's (1988) characterisation of a transaction, in the context of environment valuation methods, the essential elements may be interpreted in terms of: the presentation of the scenario and good valued; the payment vehicle; and the transaction method. These elements are common to both CV and CE methods, with the challenge for the researcher being to design a transaction that is well defined, understood and accepted. However, the form that the transaction takes differs between CV and CE.[3] CV exercises concentrate on the valuation of a particular scenario which presents a potential quality change; environmental or otherwise. This requires researchers to concentrate on providing adequate information about the scenario for the respondent to judge a fixed quality change. The CE is more flexible, asking respondents to choose between different consumption bundles, described in terms of their attributes and the levels taken by these attributes. Fig. 1 provides an example of such an approach with three consumption bundles being presented (Alternatives A, B and C). Using this example, respondents are asked to rank the alternatives in order of preference. The results illustrate the trade-offs between the attributes, with the price included so that valuations can be estimated. While this task is more abstract than with the CV method, using CEs the attributes are valued individually with the 'part-worth' being estimated for each attribute level.

3. Post-questionnaire qualitative analysis

Given the difficulty of valuing non-market goods, the integration of qualitative methods within the process can be essential as it enables researchers to:

- gain a better understanding of how respondents discuss and conceptualise the good valued;
- gain a better awareness of respondents' thought processes during the transaction and motivations for their responses;
- test the adequacy of the valuation process used; and
- explore the public acceptability of the valuation exercise.

[1] The only post-questionnaire choice experiment studies known to the authors are the as-yet unpublished works of Blamey et al. (1997) and Morrison et al. (1997).

[2] See Farber et al. (2002) for some discussion of the wider context within which stated preferences can be used for environmental valuation.

[3] See Boxall et al. (1996), Adamowicz et al. (1998), Hanley et al. (1998), Blamey et al. (1999b) and Garrod and Willis (1999) for comparisons between CV and CE.

Attribute	**Landscape and wildlife impact on woodland, fields and environmentally sensitive agricultural land** due to reservoir construction or enlargement	**Landscape and wildlife impact on wetlands** due to changes in the level of abstraction.	**Landscape and wildlife impact on rivers and streams** due to changes in the level of abstraction	**Level of service received by households** Average likely occurrence of a hosepipe and sprinkler ban (lasting no more than 1 year) and is also an indicator of pressure and the possibility of supply interruption.	**Change in what your household pays in annual water charges** (not including wastewater / sewerage)	**RANK**
Alternative A	No change	No change	No change	1 in every 10 years	Extra £5 per year	
Alternative B	Moderate worsening	Minor worsening	No change	1 in every 10 years	No change	
Alternative C	Minor worsening	Moderate worsening	No change	1 in every 10 years	No change	

Environmental changes are shown in terms of landscape and wildlife, where the impacts are labelled either no change, minor and moderate impacts as determined by experts. As an illustration, a minor change would lead to no more than a 5% change in the number and range of species (fish, birds, other wildlife species and plants depending on the type of area) affecting no more than 50 hectares of land (1 football pitch is 0.6 hectare and 1 hectare equals 2.5 acres). A moderate change would lead to no more than 10% change in the number and range of species affecting no more than 100 hectares.

Fig. 1. Example choice card.

This section considers these issues in turn, providing a summary of the key findings noted within previous post-questionnaire qualitative studies. To aid the understanding of previous studies, Table 1 provides a summary of the key cross-study findings for four post-questionnaire surveys, giving an indication of the importance of each issue raised.[4]

3.1. Conceptualisation of the good valued

Based on ethnographic techniques, focus groups have been widely used to improve awareness of respondents' perception, understanding and categorization of environmental goods (Johnson et al., 1995). This has resulted in improved information statements (Desvousges et al., 1984; Loomis et al., 1993; Boyle et al., 1994; Willis et al., 2002), with elaborate methods having been developed to test understanding (Chilton and Hutchinson, 1999). However, problems still remain in terms of the information provided. Indeed, Table 1 shows that in all studies there were requests for more information, usually regarding the scenario considered and the cost of the schemes. Further to the information statement, in the case of CEs, a key issue is the choice of attributes and how they are described. The challenge for the researcher is to choose attributes that comprehensively describe the key elements of the scenario, while at the same time ensuring that the experiment does not impose too high a cognitive burden on respondents. This process has been documented by Blamey et al. (1997) and Morrison et al. (1997).

3.2. Comments regarding the transaction

Apart from information, Table 1 shows that the most frequent cross-study comments related to a lack of trust in the provider to use the money collected to implement the scheme considered. The key question is whether respondents considered trust when answering the CV questions. Although Powe (2000) reports that in two of the group meetings, participants unanimously agreed that when answering the valuation questions they had assumed that the money collected would indeed be spent on the scheme. A majority in another group made the same assumption. This finding was also consistent with subsequent quantitative analysis.

Although the survey design process usually leads to the choice of the most appropriate payment vehicle, respondents may still feel that it is not their responsibility to pay for the good in question. Indeed,

[4] As the individual responses reported by Schkade and Payne (1994) are independent, where possible they are provided in percentage form. Given that the other studies reported are based on group meetings, it was considered more valid to note whether the issue was discussed and, where possible, the number of groups in which it was mentioned.

Table 1
Comparison of the findings of post-questionnaire CV studies

Survey characteristics and issues	Schkade and Payne (1994)	Blamey (1998)[a]	Clarke et al. (2000)[b]	Brouwer et al. (1999)[c]	This study
Methodology	verbal protocol analysis	focus group meetings	in-depth meetings and a focus group meeting	focus group meetings	focus group meetings
Benefits	non-use	use and non-use	use and non-use	use and non-use	use and non-use
Environmental good	migratory waterfowl	freshwater marshland	freshwater marshland	freshwater marshland	3 environmental attributes
Scheme considered	covering of waste oil holding ponds	pipe to divert water from a drainage system	land management agreements	saline flood alleviation	water supply options
Elicitation method	open-ended	dichotomous choice	bidding game	dichotomous choice	choice experiment
Payment vehicle used	product prices	multiple	national taxation	national taxation	water charges
Comments regarding the transaction					
More information	discussed (% unclear)	discussed-every group	discussed	discussed-every group	discussed-three groups
Lack of trust in provider	discussed (% unclear)	discussed	discussed	discussed-four groups	discussed-one group
Denial of responsibility for payment	discussed (% unclear)	discussed-every group	not noted	discussed-every group	discussed-one group
Issues considered during the transaction					
How much could afford	discussed (39%)	discussed	discussed-every group	discussed-five groups	discussed-five groups
Fair-share/bid level realism	discussed (41%)	discussed	discussed	discussed-every group	Not discussed
Consideration of substitutes	discussed (small %)	discussed	discussed	discussed-two groups	Not discussed
Symbolic for broader good	discussed (23%)	discussed	discussed	discussed-one group	Not discussed
Charitable giving	discussed (17%)	not noted	discussed	discussed-two groups	Not discussed

[a] See also Blamey et al. (1999a).
[b] See also Burgess et al. (1998, 2000).
[c] See also Powe (2000) for a more detailed analysis.

for example, Blamey (1998), in a project considering the protection of Australian swamps, found a denial of responsibility from those living outside the state within which the wetlands valued were located. Comments were made that each state should deal with its own problems. Others saw the wetlands considered as a national issue. Similarly, in each every focus group described by Powe (2000), concern was expressed that, rather than protecting the environment, the potential flood alleviation scheme described would be defending land for farming or commercial holiday purposes, with suggestions that these beneficiaries should pay. Denial of responsibility for payment was also noted by Schkade and Payne (1994), where it is reported that 12% of respondents stated 'oil companies should pay'. These issues were not noted by Clarke et al. (2000).

3.3. Understanding the respondents' thought processes

An understanding of the respondents' thought processes during the transaction and their motivations for the responses made can identify potential pitfalls in design choices. Cognitive survey design, verbal protocol analysis and retrospective methods have been

used by authors such as Schkade and Payne (1994) and Lazo et al. (1992). Qualitative responses can be elicited through questions, for example: 'How did you come up with your monetary amount in the previous question?'. The thought processes of respondents are perhaps best reflected within an individual interview situation, where responses are not influenced by the comments of others, and where participants can reflect on their behaviour post-questionnaire (Blamey, 1998; Brouwer et al., 1999; Clarke et al., 2000).

Table 1 suggests that the most common issues considered during CV transactions were: how much the respondents could pay and what their fair-share of the total amount should be. Both issues are relevant to CV and CEs, with the first consistent with theoretical expectations and the second not. Although Bohara et al. (1998) have empirically demonstrated a statistically significant 'fair-share' effect for the open-ended version of the CV method,[5] the results of Blamey (1998) and Powe (2000) suggest that, in the case of the dichotomous choice[6] approach, there may also be a problem that some respondents do not feel that the bid amounts used are realistic. These findings are consistent with those of Stevens et al. (1994). If this problem was to be observed with CEs, it would reduce the validity of the valuation estimates made.

Although consideration of substitutes is a very important theoretical expectation for CV, Table 1 shows cause for concern as it suggests insufficient consideration was given by respondents to this issue. For CEs, relevant substitutes are assumed to be implicitly included within the attributes used, and Blamey et al. (1999b) suggest that this makes respondents less likely to 'dump' their money on the first cause that is described to them. However, although CEs enable a broader range of policy changes to be considered, respondents must be able to make trade-offs between the attributes considered, i.e. preferences are consistent with the work of Lancaster (1966, 1971) on consumer theory such that individuals derive utility from the characteristics of goods rather than the goods per se. Any technical inability to trade-off attributes or characteristics will restrict the margins at which environmental goods can be valued using the CE approach. Although the authors are unaware of studies where this has been tested using CEs, Lewan and Söderqvist (2002) have considered the ability of respondents to rank ecosystem services. Using this ranking approach they found a number of informants were unable to provide a full ranking, emphasising that the importance of nature is a whole, rather than as a provider of specific ecosystem services. Furthermore, some participants in that study were uncertain as to which preferences (private, family, employers or society) they should use as the basis of the ranking exercise. These issues may also be relevant within CEs.

Table 1 reports that, although some respondents were aware of substitutes, there may be a tendency to see a positive response as a contribution towards solving environmental problems more generally than the specific good considered. This is an important issue, as respondents using this strategy may provide valuations that are insensitive to the specific characteristics of the goods considered, reducing their policy relevance. The issue of sensitivity to the characteristics of the good is also relevant to CEs, where it is important that the attributes are meaningful to the respondents, so that they are able to choose between different attribute levels.

Table 1 also shows that comments about charitable giving were reported in most of the studies. Such responses are difficult to explain and may contain expressive and instrumental value, where the former may demonstrate the respondents' particular self-image and the later the following of a social norm such as fairness (Sugden, 1999). This is true for both CV and CE methods.

Further to these general issues, a better understanding of the respondents' thought processes and motivations might also be used to consider issues specific to the elicitation method used. For example, Powe (2000) reported participant objections to the use of the double-bounded dichotomous choice approach.

[5] The open-ended approach to CV is perhaps the most straightforward, as it merely asks the respondent for the maximum amount they would pay or minimum compensation they would accept in respect to the change in provision described.

[6] Using the dichotomous choice approach, the respondent can choose between the 'with' policy situation at a given price or bid level (BL) and the 'without' at zero price. The yes/no responses to the BLs are modeled within a discrete choice framework from which welfare measures can be estimated (see Hanemann and Kanninen, 1999).

In the case of CEs, recent quantitative research by Foster and Mourato (2000, 2002) has questioned the use of the contingent ranking (CR) method,[7] a form of CE, observing a substantial proportion of respondents not providing 'coherent responses to contingent ranking problems' (Foster and Mourato, 2002, p. 326). If the suggestions of Hausman and Ruud (1987) and Ben-Akiva et al. (1991) are true that individuals pay more attention to identifying their first choice than to ranking the remaining alternatives, this may provide an explanation for these findings.

3.4. Testing the adequacy of the valuation process used

The problem of scenario presentation can perhaps be alleviated using focus groups, which allow participants to discuss, deliberate and ask for clarification. The introduction of new information and deliberation within group meetings may better enable participants to express their preferences. Indeed, the majority of focus group participants reported by Brouwer et al. (1999) stated that the group discussion had improved their understanding of the questionnaire and made them feel more capable of making a decision about the good being valued. Although not consistently tested, Brouwer et al. (1999) found that the majority of participants did not want to change their responses.[8] Testing for a change in opinion at the end of the group meeting may provide an important indication as to the adequacy of the interview situation used. It was suggested by Fischhoff (1997) that with 'unfamiliar topics and heterogeneous audiences, no one wording may be interpreted similarly (and appropriately) by all respondents' (p. 201), with Strack and Schwarz (1992) suggesting conversation is required in order to ensure understanding of meaning within standardised question formats and avoid 'response effects' where respondents look for cues in the information presented and the questions asked. Indeed, Macmillan et al. (2002) have demonstrated that the use of group-based approaches within value formation can produce favourable results.

3.5. Exploring the public acceptability of the valuation exercise

Qualitative methods provide an opportunity to ask questions that would be difficult within the confines of a structured questionnaire. The result of such questioning can give insights into the public acceptability of the actual payment, the provision of the environmental improvement and the decision making process. Given the controversial nature of environmental valuation this additional information can indicate the policy relevance of the information provided. Within the studies by Brouwer et al. (1999) and Clarke et al. (2000), the public acceptability of the valuation process was considered. Clarke et al. (2000) reports that the participants 'unequivocally rejected CV as an acceptable way of representing their values, or views, to decision makers' (p. 60). In contrast, Brouwer et al. (1999) found a majority in five of seven groups to consider the overall approach to be 'acceptable and suggesting that the answers were meaningful and accurate enough to inform actual decision making' (p. 336).

4. Case study examining service/environment trade-offs

Using the framework outlined above, the case study presented in this paper investigates the adequacy of the CE valuation exercise, respondents' thought processes during the valuations, and the public acceptability of the method for a water supply scenario. As part of their planning process, Southern Water, a water company operating in the South of England, have forecast future demand and compared this to the available supply for water under different scenarios (e.g. average or peak demand). Many alternatives are available for reducing future supply

[7] CEs can be performed using two or more alternatives. If more than two alternatives are considered then this data can be modelled using the respondents' preferred option, from the choices given or using the full ranked data. Using the preferred option approach does not utilise all of the information provided by the ranking experiment, and the ranked data model developed by Beggs et al. (1981) can be adopted to utilise this additional information. The ranked model is the more restrictive of the two assuming the same underlying distribution governs both ranking decisions, rather than merely the first.

[8] Further evidence presented by Macmillan et al. (2002) found a follow-up meeting a week later induced 37% of participants to change their mind regarding the valuations given.

deficits, including river and ground water abstractions, reservoir construction/usage, intra- and inter-basin transfers, reduced abstraction or demand (e.g. through leakage reduction and demand management) (McMahon and Postle, 2000). As any choices made will have implications for customers, either through changes in service standards, price of water and environmental quality, there is a need for consultation in terms of their preferences for these issues and their willingness to pay for any given level of supply through water charges.

5. Study design and participant characteristics

Based on the results of four exploratory focus groups across two projects considering water supply issues (Willis et al., 2002; Powe et al., 2002) and a further four focus groups discussing environmental issues with water supply customers (Powe et al., 2004), a choice experiment was developed, with attributes reflecting water charges, service levels (using the likelihood of hosepipe bans as a proxy), and environmental change.[9] Table 2 shows the attributes used and their attribute levels, while Fig. 1 shows a sample of a card used in the choice experiment. The base level was the situation in which a target of one hosepipe ban in 10 years was consistently reached across the Southern Water area at an extra cost to customers of £5 per year. Environmental changes are shown in terms of landscape and wildlife, where the impacts are labelled either 'no change', 'minor' or 'moderate' as defined by experts. Thus, a 'minor' change would lead to no more than a 5% change in the number and range of species (fish, birds, other wildlife species and plants depending on the type of area) affecting no more than 50 ha of land. A 'moderate' change would result in no more than a 10% change in the number and range of species affecting no more than 100 ha. Any more significant changes were not included in the choices as these would not be tolerated by the regulator. Water charges were used as the payment vehicle and the exercise related to the environment and services within the whole of the Southern Water supply region, thus ensuring consistency between the population of interest and the payment vehicle. The changes in the amounts were as far as possible linked to the range of costs involved. These design choices were made to help reduce some of the problems noted in Section 3.

Table 2
Final attributes and levels used within the choice experiments

Attribute	Attribute levels
Level of service received by households. Average likely occurrence of a hosepipe and sprinkler ban (lasting no more than 1 year) and is also an indicator of pressure and the possibility of supply interruption	1 every 10 years [BASE] 1 every 2 years 1 every 5 years 1 every 50 years
Landscape and wildlife impact on woodland, fields and environmentally sensitive agricultural land due to reservoir construction or enlargement	No change [BASE] Minor decrease Moderate decrease Moderate improvement
Landscape and wildlife impact on wetlands due to changes in the level of abstraction.	No change [BASE] Minor worsening Moderate worsening Moderate improvement
Landscape and wildlife impact on rivers and streams due to changes in the level of abstraction	No change [BASE] Minor worsening Moderate worsening Moderate improvement
Change in what your household pays in annual water charges (not including wastewater/sewerage)	No change [BASE] £10 less per year £10 more per year £20 more per year

All effects apply to the whole of the Southern Water supply area.

Six post-questionnaire focus groups were held in October and November 2002. Participants were recruited using a market research firm, with a £25 incentive being offered to reduce sample selection bias. This incentive was provided at the start of the meetings in order to avoid compliance bias. The meetings lasted between 1.5 and 2 h and were led by an experienced facilitator. A representative from Southern Water attended most groups.

The topics for discussion were carefully predetermined to reflect issues of interest and concerns regarding the questionnaire. These were sequenced within a protocol, which consists of dialogue and a series of open-ended questions. Participants were first asked to complete the questionnaire. This was

[9] We acknowledge, however, that no formal pilot was conducted prior to the post-questionnaire focus groups presented within the case study.

observed to take approximately 20 min. The subsequent session covered the following headings:

- introduction and preamble;
- experience as water supply customers;
- water supply issues;
- the questionnaire and respondents' approach to answering the questions.

At the end of the meetings, participants were given the opportunity to revisit the questionnaire and make any changes they felt necessary using a different coloured pen. As the focus group meetings allowed the participants to deliberate and ask further questions regarding the issues, this tested the adequacy of the questionnaire responses.

The qualitative data was analysed in the following stages.

- Debriefings after the meetings in order that first impressions could be considered.
- The taped discussions were transcribed.
- Themes were identified, noted and then the transcripts sorted on a word processor.

A total of 49 participants were involved in the focus groups, with Table 3 providing a summary of the focus group participant characteristics. The groups were coded as G1–G6 and were located as follows in the South East of England: G1 in Crawley; G2 in Horsham; G3 and G4 in Chatham; G5 in Winchester; and G6 in Southampton. The participants were coded by group and given a letter, for example, G1A refers to participant A in Group 1. As Table 3 shows, the participants reflect a mix of gender, age, income and environmental interests. All participants had either sole or joint responsibility for paying their water bill and did not have anyone in their immediate family employed in market research, public relations or the water supply industry.

Table 3
Focus group participant characteristics

	Sex	Age group	Gross household income (£)	Group membership
G1A	M	46–55	10,000–19,999	NT
G1B	F	46–55	20,000–29,999	NT, AC
G1C	F	26–35	30,000–39,999	OG
G1D	M	26–35	20,000–29,999	None
G1E	M	36–45	20,000–29,999	AC
G1F	M	46–55	30,000–39,999	WWF
G1G	F	46–55	20,000–29,999	WG, EH
G1H	F	36–45	20,000–29,999	None
G2A	F	36–45	20,000–29,999	None
G2B	M	46–55	20,000–29,999	None
G2C	F	26–35	10,000–19,999	GP, NT
G2D	M	26–35	20,000–29,999	NT
G2E	F	36–45	30,000–39,999	None
G2F	F	56–65	20,000–29,999	None
G2G	M	36–45	20,000–29,999	AC, OG
G2H	M	46–55	30,000–39,999	NT
G3A	M	36–45	40,000–59,999	NT, WWF, EH
G3B	M	46–55	20,000–29,999	NT, RSPB, EH
G3C	M	26–35	30,000–39,999	NT, EH, AC
G3D	M	26–35	20,000–29,999	None
G3E	F	16–25	10,000–19,999	None
G3F	M	36–45	40,000–59,999	NT, EH
G3G	F	46–55	10,000–19,000	NT
G4A	M	26–35	10,000–19,999	None
G4B	M	36–45	10,000–19,999	RSPB, WG, AC
G4C	M	26–35	10,000–19,999	WWF
G4D	F	56–65	5000–9999	None
G4E	F	46–55	20,000–29,999	None
G4F	F	36–45	20,000–29,999	GP, FoE, NT, EH
G4G	F	56–65	20,000–29,999	None
G4H	F	36–45	10,000–19,999	None
G4I	F	36–45	5000–9999	None
G5A	F	36–45	20,000–29,999	None
G5B	F	36–45	5000–9999	None
G5C	F	36–45	40,000–59,999	NT, RSPB
G5D	F	36–45	20,000–29,999	None
G5E	M	36–45	20,000–29,999	None
G5F	M	36–45	30,000–29,999	AC
G5G	M	46–55	20,000–29,999	RSPB, AC
G5H	M	26–35	30,000–39,999	None
G5I	M	26–35	30,000–39,999	None
G6A	M	46–55	Over 60,000	EH, LWT
G6B	M	36–45	40,000–59,999	None
G6C	F	46–55	30,000–39,999	GP, FoE
G6D	F	26–35	10,000–19,999	OG
G6E	F	26–35	30,000–39,999	FoE, NT, RSPB, OG
G6F	F	36–45	20,000–29,999	WG
G6G	M	46–55	30,000–39,999	None
G6H	M	46–55	Over 60,000	NT, RSPB, WG

Notes to Table 3:
Environment Groups: GP: Green Peace; WWF: World Wide Fund for Nature; FoE: Friends of the Earth; NT: National Trust; RSPB: Royal Society of the Protection of Birds; EH: English Heritage; AC: Angling Club; WG: walking group; LWT: local wildlife trust; OG: Other wildlife/environmental group.

The evaluation of the valuation exercise is provided within the next two sections, separated into general issues and choice experiment specific issues.

6. General issues

The column on the right-hand side of Table 1 has been completed for this study and the issues raised are discussed in Sections 6.1 and 6.2. The sensitivity of responses to deliberation is then considered in Section 6.3.

6.1. Comments regarding the transaction

Most participants found the choice task difficult, with a lot of information to take in and understand (comments from G1G, G1F, G2H, G2H, G3A, G4C, G4E, G6E, G6C, G6C). Although some difficulty is expected from a correctly formulated choice experiment, it was also stated within three groups that there was not enough information to choose between the environmental attributes (G2A, G2B, G4F and G5D).

Although only in G3 was this discussed post-questionnaire, within G2–G6 participants were asked within the questionnaire 'if your water charges were raised by Southern Water in order to finance the improvements stated, would you trust them to implement these schemes in practice'. The modal answer to this question was 'yes' (15 participants (46%)), but 10 participants (24%) said 'no' and further 10 participants (30%) said they did not know. The most important issue, however, in terms of the validity of the valuation exercise is whether they assumed the money would be used for the schemes when answering the questions. A further question was included asking this and 25 participants (76%) stated that they had made this assumption with a further 7 (21%) stating they had not. It was difficult to interpret the meaning of the seven participants' responses, but it is assumed that a lack of trust would be likely to lead to the participants understating their willingness to pay.

The results appear not to be affected by denial of responsibility for payment as this was only mentioned by one participant (G4B). The link between who pays and policy outcomes are very strong within this study—in other studies there may be a more obvious alternative payer.

6.2. Issues considered during the transaction

Immediately following the choice questions, respondents were asked to select an alternative, from a list provided, that best explained the reasoning behind their choices. Reflecting the comments made within the groups, the most popular option chosen by 24 of the participants (49%) was 'I wanted a more secure water supply but did not want to damage the environment'. The only other popular options were 'I wanted to protect the environment' [12 participants (25%)] and 'I wanted to protect the environment regardless of the cost' [six participants (12%)]. Although the latter option might suggest an unrealistic level of protection, comments from these participants suggested they were also considering their ability to pay.

Many participants made comments relating to the affordability of the bid amounts (G1C, G1F, G1G, G3A, G3B, G3G, G4D, G4F, G4H, G4G, G5A, G5H, G5G, G6H), with some saying that they would not notice the payment, and relating the amounts to the cost per month and the price of everyday items such as cigarettes.

Environmental substitutes were not discussed within the meetings, however, this is perhaps to be expected as three different types of environmental goods were considered (see also Section 7.2). The issues of charitable giving, fair-share and bid realism were not raised in any of the groups and when specifically questioned regarding the latter, it was unanimously agreed that the amounts were assumed to reflect the costs. These findings suggested that the design choices made had had the desired effect. Some participants discussed the general principle of environmental protection (G1C, G2G), however, as will be shown in the next section, sensitivity to the characteristics of the environmental attributes was observed within the responses.

6.3. Sensitivity of responses to deliberation

In order to explore the sensitivity of the valuation responses to deliberation, at the end of the group meetings participants were asked to reconsider their responses, particularly to the choice cards, and to make any changes with a different coloured pen. Most of the participants were observed to spend some time on this exercise, even though the cards had been discussed at

length within the meeting. Twenty-four participants (49%) made at least one change to the questionnaire, which were fairly evenly spread throughout the questionnaire. Five participants (10%) changed their valuation responses with a total of six cards (3%) being changed. This suggests that the valuation responses themselves were fairly robust to deliberation.

7. Choice experiment specific issues

7.1. Choosing between attributes

7.1.1. Service

The most common reaction to the service attribute was that, in the context of the other attributes used, it has a lower priority than the environment and water charges (G1C, G1D, G1E, G1F, G3F, G4G, G5D, G5C, G6B, G6D, G6E). Indeed, with the exception of G5 a difference of opinion was not expressed (G5B, G5D, G5E, G5H).

7.1.2. Environment

The choice cards were the same for all participants and were chosen so that preferences between environmental attributes could be considered. Two of the cards enabled a direct comparison to be made between the environmental attributes. In the case of Card 3, which is presented in Table 1, a service level of 1 in 10 years and no change was held constant across Alternatives B and C ensuring the participants made a choice between the moderate worsening of landscape and wildlife for both non-wetland and wetland areas. Twenty participants (65%) ranked[10] a moderate worsening for woodlands, fields and environmentally sensitive agricultural land higher than for wetlands. This was found not to be significantly different from a proportion of 0.5 at the 5% level of significance (p-value=0.12).[11] In the fourth and final card, the service level of one hosepipe ban in 5 years and an extra £10 per year were held constant across Alternatives B and C. The difference respondents' face between these alternatives is choosing whether a moderate improvement should occur in wetlands or rivers and streams. In response to Card 4, 31 participants (66%) ranked a moderate improvement for rivers and streams higher than for wetlands: this was significant at the 5% level (p-value=0.03), suggesting a preference for rivers and streams over wetlands.

Although, within economic theory, Hanemann (1994) suggests the reasons for these choices are not important, if participants base their responses on inaccurate information they may not be valid. Respondents' comments suggested the following motivations: making use of uneconomic farmland (G4B, G4G), that a reservoir would be a positive thing (G3B, G4F and G6F), scarcity of wetlands (G6C), a preference for fishing (G1D, G4B, G2G), recreational preference for rivers (G2C, G3E, G5B, G5I), thinking rivers to be more natural (G3G), assuming wetlands were saltwater and not as much effected by abstraction (G4G) and because wetlands were considered to be less likely to be able to recover (G4F). Others found it hard to articulate their reasons (G1G and G3E). Most of the responses are based on preferences and/or experiences and are difficult to question, and help to interpret the meaning of the choices made. In the case of G4G, G6C and G4F responses were based on their personal assessment of a technical issue, which may or may not be correct but to obtain such responses is not the intention of the valuation exercise.

Some participants found Card 3 easier than 4 (G5A, G5B and G5I), perhaps because they involved no environmental degradation or due to them having more personal experience of rivers. However, some participants still found it difficult to choose between the two attributes where they did not want to damage either (G3B, G3A) and had an insufficient understanding of the consequences of the choice (G2A, G2B, G4F, G5A, G5D, G5E). Indeed, participant G5E refused to decide between the environmental issues and put them both as second choice. These participants believed they were being asked to make a technical assessment of what was the most appropriate choice to make. Indeed, comments suggesting such were made by G5A and G2B.

[10] Only participants in groups 3–6 answered this question as in groups 1 and 2 a card testing if participants could trade-off charges for the environment was used. As all but one participant was found to be willing to pay an extra £10 for the environmental improvement stated, testing the trade-off between environmental attributes was considered more worthwhile for subsequent meetings.

[11] Note that as only 33 participants were asked this question this test lacks power.

7.2. Validity of the ranking exercise

In each group, participants were asked if they found it easiest to choose their first choice from the card. However, it was not always that simple because sometimes participants found it easiest to choose their least preferred option first. For example, in G1 the following comments were made: 'I chose the one I liked least first and then the one I wanted the most' (G1A) 'that is how I went about it' (G1C). Other participants had different strategies, for example, 'I read them all through and I decided which order to put them in' (G2E) 'that is how I did it, I just read everything and put one two three' (G2G). The most common strategy appeared to be choosing the most preferred choice first. Contrary to the suggestions of Hausman and Ruud (1987) and Ben-Akiva et al. (1991), in the context of this experiment, with the exception of G2G, participants appeared to put more effort into their second choice because it was more difficult (G1A, G3A, G6H, G6G and universal agreement in G4 and G5).

8. Public acceptability of the valuation exercise

Within the questionnaire, participants were asked almost immediately following the choice cards 'do you feel that your responses to the last questions are sufficiently accurate to guide policy decisions on water supply?'. Following the completion of the questionnaires, 30 participants (61%) responded 'yes' and only 4 (8%) 'no'. However, following the discussion, participants G2B, G2C and G4F switched from 'yes' to 'no' such that 27 participants (55%) responded 'yes' and only 7 (14%) as 'no'. Although, a majority of participants still viewed their responses to be accurate enough, with the remaining 15 participants (31%) unsure there is a need for concern. When asked how participants would react if they were to find out that Southern Water had increased their water charges in order to fund environmental improvements, the reaction of most participants was cautious, showing concern that the bill would increase by only the order of magnitude stated in the questionnaire (G1G, G4H, G6C, G5H, G5A), and that they would like to know/see what has been done with the money (G1D, G1C, G2D, G4G, G5C, G6F, G6B). Although some negative comments were made about water companies (G2H, G4B, G4F, G5A, G6B), subject to the two caveats, participants were generally happy with the proposition.

9. Discussion and conclusions

This paper has reported the findings of post-questionnaire focus group analysis, investigating the adequacy of a choice experiment valuation exercise and it's public acceptability. The relevance and importance of the findings has been enhanced by a cross-study comparison with previous post-questionnaire contingent valuation studies. The results provide useful insights into how to improve the design of future studies and the applicability of the methods.

The choice experiment compared favourably to previous post-questionnaire surveys, where introducing consistency between the population of interest and the payment vehicle and linking the bid amounts to the actual range of costs reduced problems of fair-share/bid-level realism observed in previous studies. The realism of the response-policy link helped also to reduce the problems of charity like responses. Indeed, there was no mention of fair-share, bid-level realism or charity in any of the group meetings.

Participants found the trade-off between environmental quality, service and cost relevant and most responses reflected a balance between these issues. Some participants stated that they could choose between environmental attributes and a statistically significant difference in preference was observed. However, participants generally found such choices more difficult than merely trading-off between the environment, service and water charges. Indeed, some thought they had inadequate knowledge and experience in order to make valid responses. In terms of the ranking exercise, the evidence suggested both the first and second choices were given due consideration. Indeed, contrary to the suggestions of Hausman and Ruud (1987) and Ben-Akiva et al. (1991), in the context of this experiment, participants appear to have put more effort into their second choice because it was more difficult. This issue clearly needs further research, as even though participants put more effort into their second choice, the cognitive effort required

may still be too great for participants to give meaningful responses.

Choices were found to be insensitive to deliberation, where, following the group meetings, only 3% of the choices were altered. This was despite most of the participants being observed to spend time re-evaluating their questionnaire responses and 49% making at least one change to the questionnaire. Whether, as observed by Macmillan et al. (2002), these responses were sensitive to time was not tested.

Including the changes made at the end of the group meetings, the majority of the participants thought the responses to the valuation questions were accurate enough to guide policy decisions on water supply, though a substantial number chose the 'don't know' option. Following the discussion of environmental attributes, three participants switched from 'yes' to 'no', suggesting that the meeting had slightly reduced some participants' certainty about their willingness to pay. Asking how participants would react if they were to find out that water charges had increased in order to fund environmental improvements, produced a cautious but favourable response. As long as the bill increase was of the order of magnitude on the cards and customers were kept informed regarding environmental improvements, then participants were happy further supporting the validity of the choice experiment responses.

In terms of the specific study, the use of post-questionnaire qualitative analysis has endorsed the approach but suggests that more consideration is required regarding the presentation of information (including the use of visual or other communication aids), including an explanation of the role of respondents within the decision making process, and the selection of the range of environmental attributes considered. Regarding the design of future studies, it has been demonstrated that careful choices regarding the transaction being portrayed and the study population can significantly reduce problems of fair-share/bid-level realism and charitable giving. Despite the potential for such methodological improvements, there is still insufficient evidence to determine the extent to which exercises such as this provide sufficiently robust and accurate information on public preferences to guide policy. Although the majority of participants were happy that their responses accurately reflected their preferences, some found making trade-offs between environmental attributes difficult. Even with improved design, there are clearly limits to the cognitive ability of participants, especially when valuing unfamiliar goods. This study was at the boundary of such limits.

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