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INDIVIDUAL RESPONSIVENESS TO INFORMATION IN CV SURVEYS: COMMITMENT MATTERS

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Individual Responsiveness to information in CV surveys: Commitment matters*

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Abstract

This paper inquires into the responsiveness of individuals to information in Contingent Valuation (CV) surveys by introducing a number of new innovations. Firstly, the impact of information is assessed using a sequential procedure in which individuals are successively presented with different levels of information. Secondly, two different types of information have been provided: scientific information about the good and information about the Willingness to Pay (WTP) values of the other respondents. Finally, responsiveness to information is studied by using an innovative CV survey where two groups of over 120 volunteers simultaneously provided their WTP (field experiment), and a standard telephone survey of over 240 respondents. Our results show (1) a higher level of responsiveness to scientific information than to information about the WTP values of other respondents, and (2) a higher level of responsiveness in the field experiment than in the telephone survey. We discuss our findings using the theory of commitment from social psychology and explore the extent to which commitment could be a necessary requirement in the practical application of the CV method.

Keywords: Contingent valuation, information, Commitment

JEL Classification: D6, C9

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1 Introduction

Economic theory assumes that the price of a good on a competitive market contains information about its value, and that the preferences of individuals are revealed by their decision to consume. However, for non-market goods, there is often no observable consumption behaviour and preferences are therefore unknown. In these situations, the contingent valuation (CV) method is increasingly used to elicit the preferences of respondents in order to understand the utility associated with consuming a given good, and the trade-off between consuming this good versus all others. The core concept of the CV method involves the presentation of a hypothetical market to respondents, and the elicitation of willingness to pay (WTP) under the assumptions that respondents will act in line with consumer theory and WTP will be dependent on prior knowledge, prior experience as well as new information provided in the hypothetical scenario (Mitchell and Carson, 1989, Cameron and Englin, 1997; Bergstrom et al., 1989). However, the description of an appropriate hypothetical market presents a number of difficulties: there is still no common understanding of how preferences are formed or the key factors that could lead to the alteration of preferences, and hence the type and quantity of information required in CV surveys to allow true underlying preferences to be elicited (Spash, 2002). Furthermore, it is commonly argued that individuals may not take the survey seriously enough to truthfully express their preferences because there is no personal responsibility or liability associated with their behaviour (Mitchell and Carson, 1989). In this context, one could argue that an achievement of an unbiased WTP response requires that the respondent be committed to her task - where commitment can be reasoned to provide the link between the respondent and her actions, providing the necessary impetus to do the job well.

A number of experiments have been conducted in order to aid our understanding of the impact of information in CV surveys, which have usually involved presenting different levels of information to sub-samples of respondents, and comparing WTP statistics to test for potential informational effects (Bergstrom et al 1985, Whitehead and Blomquist 1991, Hanley and Munro 1995). A notable exception is Fischer (2004) who offered the respondent the opportunity to ask for as much additional information from the interviewer as she felt she needed. Across the various studies, four types of information can be identified (Hanley and Munro 1995; Munro and Hanley 1999).

1. The first type provides information on the good itself, such as the services supplied by the good and its physical characteristics. The impact of this type of information

has been mixed - on the one hand Bergstrom et al. (1989), Bateman and Mawby (2004) and Fisher (2004) found an increase in WTP when information of this nature was provided. On the other hand Boyle et al. (1991) and Samples et al. (1986) found no significant effect on WTP. Ajzen et al (1996) focussed on the quality of the information and showed that WTP increased when better quality arguments were used to describe the good.

2. A second type of information emphasises the existence of substitutes or complements - providing information about substitutes has been shown to decrease WTP and vice versa for complements (Whitehead and Blomquist 1991).
3. A third type of information describes the potential availability of the good in the future. Results have shown that WTP is a decreasing function of supply uncertainty (Hanley and Munro 1995).
4. The fourth type provides information about current public expenditure on other goods - taking the opportunity cost of public expenditure into account had a negative impact on WTP (Kemp and Maxwell 1993).

Although the literature has shown that willingness to pay can be influenced by the level of information provided in the hypothetical scenario, particularly when non-use values are elicited (Munro and Hanley 1999), the responsiveness of different individuals to information varies. A respondent who has over-estimated an attribute of the good could revise her WTP downward when extra information is given about the "true" state of the world and *vice versa*. By implication, individual level variations in WTP could cancel each other out if only scrutinised at the aggregate level and a wide dispersion in the mean WTP between subgroups in an experiment could make it impossible to find any statistically significant effect from the provision of different kinds of information.

This paper introduces a number of new innovations to this area of research. Firstly, the impact of information is assessed using a sequential procedure in which individuals are successively presented with different levels of information. Initially, individuals state their willingness to pay based on their existing level of knowledge and experience; thereafter they have the opportunity to revise when extra information is given. The results of this process have been scrutinised at both the aggregate and the individual level.

Secondly, two different types of information have been provided: scientific information about the good and information about the WTP values of the other respondents. This

has enabled us to fulfil our core objective of studying the impact of information in CV surveys, but also more generally, we have been able to assess the validity of the CV method in preference elicitation. Briefly, consumer theory assumes that individuals only refer to a private value structure when deciding to consume. However, in public settings, where the preferences of individuals have the potential to impact the welfare of the group, it has been argued that respondents could alter their preferences in order to enhance the expected utility of the population (Charness and Rabin 2002). It has not been our objective to dispute this argument - we have explicitly attempted to avoid altruistic responses by assessing WTP in a private setting where an individual's WTP cannot have an impact on public welfare. Thus, if an individual is responsive to information about the WTP values of other respondents, it could be argued that her preferences are poorly defined. Our results show a differential impact from provision of the two types of information, with a higher level of responsiveness to scientific information than to information about the WTP values of other respondents.

Finally, we have assessed whether responsiveness to information differs depending on the context in which the survey is undertaken by using an innovative CV survey (henceforward called the field experiment) where two groups of over 120 volunteers simultaneously provided their WTP for the good in question, and a standard telephone survey of over 240 respondents. Our results show that the impact of information differs depending on the data collection tool or context. In the field experiment, individuals were responsive to information about the scientific attributes of the good, but not to information about the WTP values of the other respondents. In the telephone survey, respondents were clearly less responsive to information in general and were more likely to be protest voters (i.e. stating zero WTP throughout the survey). In exploring this finding, we borrow from social psychology and the theory of commitment, where commitment has been initially defined by Kiesler (1971) as the *link which unites the individual to her actions*. In other words, a committed individual will feel herself to be the creator of her actions. However, both internal and external commitment can be influential - the former is interpreted as a personal attitude to a task whilst the latter can be influenced by the context in which a task is accomplished (Joule and Beauvois 1998). In discussing our findings, we have been more concerned with external commitment as it is clear this could be especially weak in hypothetical situations. All things being equal, by changing the circumstances in which a task is undertaken, an individual can be induced to be more or less committed. We explore the extent to which commitment could be a necessary requirement in the practical application of the CV method under the assumption that if people were committed, they would be more likely to reveal their

true WTP.

The difficulty was to find an "indicator" of the commitment of respondents to the task they were undertaking in the CV survey, that is, stating a WTP facing a hypothetical scenario. In an ideal world, we would ask individuals their WTP and then observe them undertaking a real choice of the same nature. A comparison of the real choice with the WTP response would confirm whether respondents were stating their WTP without any bias (as it is done, for instance, in Botelho and Pinto, 2002). Given however the realms of possibility of applied research, we have considered the possibility that responsiveness to information could be an indicator of commitment. Theoretically, respondents would react to information only if they hadn't already taken it into account in their initial statement of WTP. But because respondents are not usually experts on the good presented for evaluation, one would expect that information would often be new - hence leading to some reconsideration if respondents were committed to the task of truthfully expressing their WTP. We thus consider that responsiveness to information is an indicator of commitment.

The paper is organised as follows. In section 2, we present the survey design, the data collection tools and sample, the method of eliciting WTP, and the provision of information. In section 3, we present descriptive results which are further scrutinised using a bivariate probit model. The fourth section is devoted to discussion and interpretation of the results. We show the importance of studying the impact of information on WTP statistics at a disaggregated level, and the differential impact of the two types of information. Finally, the results in the two survey contexts are explored and the potential role of social psychology for future research is emphasised.

2 Methods

2.1 Survey design

The data used in this paper are derived from a CV survey designed to explore theoretical and empirical issues related to the risks of air pollution exposure. Respondents were from the Bouches-du-Rhone district, which includes Marseilles, the second largest city in France. In the survey, respondents were asked about their WTP to reduce the risk of morbidity and mortality owing to air pollution exposure. The first part of the survey required respondents to provide details of their socio-economic background, risk

attitudes, belief and knowledge of air pollution and health status. In the second part, the scenario was described and WTP was elicited.

The scenario proposed a hypothetical choice of moving between two cities, which were exactly the same (city size, housing, weather, public services etc.) with the exception of the level of air pollution and the cost of living (see appendix A for the full text of the scenario). This has numerous methodological advantages: firstly, it explicitly privatises the decision to improve air pollution so that it cannot be interpreted as having any public welfare dimensions. This decreases the possibility of strategic behaviour and caring externalities. Secondly, any biases linked to uncertainty about the existence of the good are minimized because no public action is required - respondents might be sceptical about the feasibility of air pollution reduction in Marseilles! Any remaining biases are linked to individual-level perceptions about the proposed good. This allows for a better understanding of the exact boundaries of the environmental change, and may reduce embedding effects.

A further advantage to this scenario is that it proposes a choice set that is both familiar to respondents and has more in common with the normal market environment than CV surveys examining WTP for *public policies* to improve the environment. Individualistic and economic dimensions could be argued to be dominant criteria in the choice of where to live, but even if other criteria were significant, by presenting two cities that are exactly the same with the exception of air pollution and the cost of living, the scenario explicitly clarifies the trade-off between these two elements. The payment is therefore presented as an increased monthly cost of living, which minimises protest responses that could be found if other payment vehicles (like taxes) were proposed.

2.2 Data collection tools and sample

We have used three different data collection methods. The first was a sub-sample of 242 respondents from a standard telephone survey of over 1000 people who were selected according to the quota method. There were four stratification variables: gender, age, place of residence, and occupational category. In this manner, the sample was chosen to be representative of the general Bouches-du-Rhone population. It was conducted by a survey research firm during July 2000 using computer assisted telephone interviews. On initial contact, respondents were told that the survey was about quality of life. The issue of air pollution was only introduced later during the interview.

The other data collection technique was an innovative field experiment, conducted in two sessions involving 142 and 123 respondents respectively, using electronic voting to enable all respondents to answer the elicitation question simultaneously. Respondents were recruited by placing advertisements in the local newspapers, where the survey was described as being about quality of life (in keeping with the telephone survey) and that participation would be remunerated with gift vouchers. Therefore, the exact topic of the survey was not known by respondents prior to the experiment. The experiment was conducted in two sessions, and in each instance, the selection mechanism involved accepting all respondents until the voting room was full.

2.3 Elicitation of WTP and the provision of information

The experiment involved eliciting four different WTP values (see appendix A). In the first step, respondents expressed their preferences between moving to a city with half the polluted days, but with a higher cost of living. No information was provided about the benefits of decreased pollution, therefore initial WTP can be assumed to be based on the prior stock of information and experience of respondents. In the field experiment, the elicitation mechanism was based on a list of ascending closed-ended questions; respondents continued to vote until they cast a "no" vote using electronic voting. Thereafter, they reported their WTP in an open-ended question. In the telephone survey, each respondent was randomly assigned to one of three initial bid values (FRF¹ 300, 400 and 500), representing the additional monthly cost of living in the less polluted city. Thereafter, a follow-up question offered a bid of 50, 100 and 200 respectively if the individual had refused the initial offer. Alternatively, offers of 800, 1000 and 1200 were made to respondents who accepted the first bid.² This initial elicitation of WTP is referred to as **step 1**.

In the field experiment, the mean WTP of all respondents was immediately computed from the closed-ended voting results and presented to the room. Thereafter, the respondents were given the opportunity to revise their WTP in response to an open-ended question. In the telephone survey, we informed respondents about the mean WTP of individuals involved in the piloting of the instrument. As in the field experiment, respondents were given the opportunity to revise their WTP in response to an open-ended question (**step 2**).

¹FRF is equivalent to EUR 0.152 (EUR 1.00 = USD 1.20 in August 2004).

²These initial bids were based on the distribution of responses to open-ended questions in a pilot qualitative survey of 39 participants. The design is derived from Haneman and Kanninen (1999)

The next step involved presenting scientific and quantitative information on the health effects of pollution, including the pure polluting, morbidity and mortality effects. Pure polluting effects lead to brown smog in the atmosphere and an unsightly residue on buildings. Morbidity effects include irritated eyes, headaches, sore throats, coughing, flu-like symptoms, and even hospitalisation for respiratory and cardiac problems. In terms of mortality, we explained that life-expectancy could be increased by 10 years for 1 out of 100 people in the less polluted city. In the field experiment, information was simultaneously presented on individual screens and aloud to ensure that all respondents had the same information. In the telephone survey, the same scientific information was provided to the respondents and WTP was elicited with an open-ended question (**step 3**).

3 Results

3.1 Sample statistics

Respondents in the field experiment differed from the general population (see appendix B). In particular, the average age in the field experiment was 29.7 years (versus 41.2 years in the telephone survey), 60.9% were female (49.6%), 66.8% were not living with a partner (43%), the level of education was higher (47.7% had a tertiary education versus 32.2%) and the average individual income was 3903 FRF (versus 7021 FRF in the general population). Hence, the field experiment population was more likely to consist of unmarried young women with a relatively low income and a higher level of education.

Table 1 contains the mean WTP and standard deviation for each step for the two data collection methods. For the field experiment, results indicate only minimal changes in mean WTP and standard deviation between steps 1 and 2 in response to information about the WTP values of the room (316 FRF for the first session and 332 FRF for the second session³). There is however quite a marked increase in WTP between steps 2 and 3 when scientific information was introduced. In the telephone survey, there was a decrease in the mean WTP between steps 1 and 2 while the increase between step 2 and 3 was smaller than in the field experiment. Note also that the standard

³The mean WTP was computed based on respondents responses using the voting mechanism. Since these means were computed using interval responses, they differ slightly from the mean WTP obtained from the open-ended question.

deviation decreased between the first and third steps, which was not the case in the field experiment.

Insert Table 1 here

To further clarify these findings, Table 2 contains the patterns of all 9 possible WTP revisions, where revisions to WTP could be constant, up, or down for each of the two steps. Only 9 respondents (3.4%) were protest voters in the field experiment, but this was a far more important response pattern in the telephone survey - where 35 indicated zero WTP throughout the survey (14.5%). This result indicates that the data collection tool could have an important impact on the degree of protest voting. Because they are likely to be purposely unresponsive, these respondents have been excluded from Table 2 as their inclusion could distort our findings on the impact of information. For the remaining respondents, the majority did not revise their WTP when either the mean or scientific information was provided (53% in the field experiment and 58% in the telephone survey). This is particularly marked in response to the mean, where 79% in the field experiment and 74% in the telephone survey did not revise their WTP.

Insert Table 2 here

For those who changed their initial WTP, 9.47% revised downward in response to the mean in the field experiment. These respondents had an initial WTP which was FF 171 (53%) higher than the mean, and reduced their WTP by FF 135 on average. A further 8% revised their WTP upward in response to the mean. Their initial WTP was FF 156 (48%) lower than the mean, and their revision increased their initial bid by FF 66 on average. In the telephone survey very few respondents revised their WTP upward in response to information about the mean, but 8.68% revised downward. These respondents had an initial WTP that was on average FF 684 (159%) higher than the mean, and in their revision they reduced their WTP by approximately FF 566.

The provision of scientific information had a larger impact on the likelihood of revising WTP in both the field experiment and the telephone survey, where 23% revised upward in the former, and 13% revised upward in the latter. Very few respondents revised their WTP downward in response to scientific information.

Although the majority of the respondents maintained their initial WTP throughout the survey, the impact of scientific information was still important in terms of leading

to an upward revision in WTP. The large downward revision by respondents in the telephone survey in response to the mean is likely to be a reaction to the large difference between their WTP and the mean (159% higher).

3.2 Econometrics

This section further scrutinises the probability to revise initial WTP in response to the mean or scientific information with a standard bivariate probit model and a variety of explanatory variables (Greene, 2000). The model has two different equations: one for each potential revision (i.e. in response to scientific information or to information about the mean), with the error terms in each equation correlated to one another (disturbance correlation parameter). While we have been able to consider the probability to revise in response to each category of information, the small sample sizes do not allow the direction of the revision to be considered in the model.

Explanatory variables included socio-economic variables (age, gender, level of education) along with variables on knowledge, past experience, and perceptions of air pollution both physically and in terms of perceived health effects. In the equation relating to scientific information, a dummy variable indicated whether the data collection tool was the telephone survey or not, whereas in the equation relating to revisions in response to the mean, we have introduced a number of different versions of a variable allowing the probability of a revision to increase in response to the size of the difference between the mean WTP and the initial WTP: (1) the difference between initial WTP and mean WTP with different parameters estimated for the field experiment or telephone survey; (2) the absolute value of the difference; and (3) the difference between mean and initial WTP with different parameters for the field or telephone survey and for positive or negative differences.⁴

Insert Table 3 here

In the first equation (revisions in response to the mean) only two variables were significant: knowledge of the more well-known air pollution indicator specific to the Bouches-du-Rhone region (AIRMARAIX) and version (1) of the variable modelling the probability of revision based on the difference between initial WTP and the mean, which

⁴Estimations were computed using Limdep 8.0.

was only significant in the telephone survey and had a positive coefficient. The intuitive explanation for this is that those respondents with a WTP higher than the mean would be more inclined to be willing to "pay less" than respondents who would have to "pay more" to be in line with the mean. Given however that those respondents who revised downwards had exceeded the mean by 159%, this is not particularly surprising!

In the second equation (revisions in response to scientific information) two variables were significant: perception of air quality in Marseilles by the respondent and the telephone survey dummy. Both of them had a negative effect on the probability to revise. According to the first variable, a perception that the air quality in Marseilles is relatively good implies a smaller probability to increase WTP to move to a less polluted city (most revisions in response to scientific information were upward). The second variable indicates that respondents in the telephone survey were significantly less inclined to revise WTP than in the field experiment. This confirms the findings in Table 2.

The disturbance correlation parameter was significant ($p < 0.0001$) and positive indicating that the two revision processes were interrelated. The parameter coefficient was positive indicating that a revision in response to the mean was positively correlated with a revision in response to scientific information, and vice versa. In other words, this parameter indicates that respondents are consistent with their earlier behaviour.

4 Discussion and conclusion

Our presentation of aggregated and disaggregated WTP statistics in Tables 1 and 2 has illustrated the importance of examining the impact of information at a disaggregated level. For instance, responsiveness to the mean in the field experiment was not readily apparent from Table 1, because revisions were both upward and downward. The aggregated mean from the telephone survey gave a better picture of revisions in response to the mean because respondents mainly stayed constant, or revised downward.

Although many respondents maintained their initial WTP throughout the survey, respondents who were sensitive to information were differentially sensitive depending on the type of information - clearly scientific information about the health effects of pollution had a more important impact than information about the WTP values of other respondents. This is a positive result for the CV method because it indicates that respondents had relatively well-defined preferences - they were not influenced by the

WTP "opinion" of others (see Chanel et al, 2004). This does not dispute the findings of Charness and Rabin (2002) who have shown that individuals have socially-defined preferences when making decisions in public settings - we would agree that altruism could have an impact on preferences. However, we have specifically avoided eliciting preferences that could include elements of altruism and other strategic behaviour by privatising the decision to improve air quality. Therefore, if respondents react to mean WTP, it is more likely that this is because their preferences are imperfectly formed than because of altruistic motivations.⁵

Our finding of a largely upward revision in WTP in response to scientific information is in keeping with the positive information effect of Munro and Hanley (1999), who have shown theoretically that respondents will revise their WTP upward if new information increases the subjective probability that the possible effects of air pollution are greater than previously anticipated, using an expected utility framework. Information provision is positive if all individuals revise their WTP upward when new information is provided (with at least one strict inequality). Our results allow us to verify such a proposition, indicating that respondents undervalued the effects of air pollution.

However, the overwhelming WTP pattern was one of unresponsiveness to new information irrespective of its nature. This pattern can be explained with reference to the concept of escalating commitment from social psychology which may particularly arises when there is uncertainty about future costs and benefits of an investment or a task and which has been verified in many experiments (Staw, 1976, 1996). A classic example is an experiment involving two groups of businessmen (Staw, 1981). The first group is given information and based on this, a decision is taken. In the next stage, the same group is given new information that overwhelmingly indicates that the first decision was wrong. Despite this, the vast majority choose to maintain their initial decision. The second group is given the first set of information and is informed of the first decision that was taken. After being given the second set of information they are asked to make a decision. For this group, the overwhelming majority choose to revise the first decision. The key insight is that under certain conditions, people are more likely to adhere to their original choice than to the reasoning that lead them to make the choice (Beauvois and Joule, 1998). More recently, Camerer and Weber (1999) examine the escalation of commitment from an economic perspective and find that escalation of commitment cannot

⁵Of course, as the decision implies that the respondent's entire household would have to move to another town, our scenario does not avoid altruism towards household members. However, it could be argued that the WTP of other respondents would not be an indicator of the preferences of household members.

be dismissed, despite attempts to find more rational explanations for the behaviour.

Similarly, in our setting, almost no explanatory variables associated with knowledge, past experience and beliefs of air pollution were significant in explaining the variation in WTP (with the exception of believing that the air quality in Marseilles is good which was negatively related to initial WTP). In other words - the WTP values that we encountered after steps 2 and 3 could be more related to a commitment to the original WTP decision than to the knowledge, past experience and beliefs that we would assume to be instrumental in the formulation of that initial decision. It is possible that the sequential procedure of eliciting WTP adopted in this survey produced similar conditions to those encountered in social psychology experiments although this cannot be validated in the absence of a control group. A potential shortcoming of our survey design is that escalation of commitment could dampen any "true" underlying effect of the provision of information.

So far, the discussion has focused on the varying impact of scientific information versus information about the mean as well as potential reasons for unresponsiveness to information. However, a further finding of differential responsiveness generally depending on the data collection *context* provides us with an opportunity to scrutinize how these conditions impact the formulation of WTP and to derive important practical implications for the CV methodology.

In both data collection contexts, the survey was initially described as being about quality of life. Nevertheless, in the field experiment, there were fewer protest voters as well as a higher probability to revise in response to scientific information. The most obvious explanation for this is that respondents in the field experiment were remunerated with gift vouchers. In experimental economics, this is a standard technique used to induce truthful responses in experiments (Smith, 76, 82). The quality of information could also be argued to be better in the field experiment: it was announced over a loud speaker and simultaneously presented on screens at the front of the room. This is similar to the effect shown by Ajzen et al (1996).

A further explanation from social psychology known as the "foot in the door technique" could also be of relevance (Freedman and Fraser, 1966). A typical example (Harris, 1972) is an actor asking a stranger for a small amount of money. It was shown that if the actor first asked for the time before asking for money, the chance of success was greatly increased. More radically, housewives who initially agreed to put a small flyer advertising their commitment to road safety in their window (almost 100% agreed)

were 4.5 times more likely to agree to put a large banner on road safety in their garden (Freedman and Fraser, 1966). Many experiments in social psychology have confirmed this effect. Thus, if a foot in the door is initially established, the likelihood of compliance to a task is greatly increased even if the cost of the task is relatively high. In this manner, we could argue that respondents in the field experiment were relatively more committed to their task than those in the telephone survey: by taking a decision to participate and travelling to the survey venue, a pre-commitment device similar to that described above had been established. A foot in the door together with a monetary incentive could enhance the level of commitment to a task more than payment alone given that the latter was guaranteed irrespective of the outcome. This argument is in line with Camerer and Hogart (1999) who argue, after reviewing a number of economic experiments, that financial incentives interact with other variables and so a narrow-minded focus on these incentives alone is misguided. Therefore, we argue that respondents were committed to the survey because they had undertaken an initial decision to be respondents and had travelled to the survey venue, whereas this was not the case in the telephone survey. Of course, there is no way to test whether the respondents were not more committed through self-selection - the type of person who would respond to our advertisement could be different from the average.

There are two potential avenues for future research. Firstly, in order to validate our arguments, it would be necessary to conduct two field experiments - one with a monetary incentive and one without and to compare the level of commitment as proxied by responsiveness to scientific information and the number of protest voters. Secondly, to improve the overall design of CV surveys, we could test the results of a two-stage telephone survey. In the first stage, respondents would be asked to respond to a very brief survey (in keeping with the costless nature of the initial commitment device in social psychology). Thereafter, they could be contacted again and asked to respond to a standard CV survey. The results of this survey could be compared to a control group that was only contacted for the standard survey. If the first group was found to be more responsive to information and/or less likely to protest vote, this could be a crucial finding for empirical research. Currently, face-to-face interviews are considered to be a better data collection technique than telephone surveys - but this poses quite large financial costs on research. If the foot in the door can enhance the commitment of respondents in telephone surveys, this would be a far more viable approach from a financial point of view. Of course, this technique could also be used to enhance commitment in face-to-face interviews.

More generally, an important issue in CV surveys is the need to link individuals to their own actions so that they will state their true preferences, which is particularly important owing to the hypothetical nature of the scenarios. This has been identified as one of the main shortcomings of the CV method in the literature, contrary to indirect valuation methods which study real behaviour and where the issue of people revealing their true preferences is therefore less relevant. If our arguments are correct, the social psychology of commitment has important insights. Many of these techniques and ideas are implicitly used in CV surveys; the benefit of theory is to provide clarity to what is already being done.⁶

A final consideration should be highlighted. The various techniques for enhancing commitment in CV surveys borrowed from social psychology have ethical implications in that they attempt to "manipulate" individuals to respond "freely" in a manner that is in keeping with the a priori expectations of economic theory. Although the desire to enhance the commitment of respondents to the survey process seems intuitively correct (in order to minimise the various biases that can be found through a lack of commitment such as unresponsiveness to information or escalation of commitment as found in the telephone survey) these types of normative manipulations require careful consideration since their appropriateness would be highly dependent on the particular situation.

⁶The psychology of commitment has previously been used in Luchini (2000) to add insight to the differing WTP of respondents depending on the hypothetical payment vehicle - for instance, respondents were argued to be more committed to a survey describing a user fee to enter a national park (free decision) than they were to a local tax to cover the costs of the park (enforced decision)

References

- Ajzen, I., T. Brown, and L. Rosenthal (1996). Information bias in contingent valuation: Effects of personal relevance, quality of information, and motivational orientation. *Journal of Environmental Economics and Management*, **30**, 43–57.
- Bateman, I.J. and J. Mawby (2004). First impressions count: interviewer appearance and information effects in stated preference studies. *Ecological Economics*, **49**, 47–55.
- Bergstrom, J.C., B.L. Dillman, and J.R. Stoll (1985). Public environmental amenity benefits of private land: The case of prime agricultural land. *Southern Journal of Agricultural Economics*, **17**, 139–149.
- Bergstrom, J., J. Stoll, and A. Randall (1989). Information effects in contingent markets. *American Journal of Agricultural Economics*, **00**, 685–691.
- Botelho, P. and C. Ligia (2002). Hypothetical, real, and predicted real willingness to pay in open-ended surveys: Experimental results. *Applied Economics Letters*, **9**, 993–996.
- Boyle, K., S. Reiling, and M. Philips (1991). Species substitution and question sequencing in contingent valuation surveys. *Leisure science*, **12**, 103–118.
- Camerer, C. and R. Hogarth (1999). The effects of financial incentives in experiments: A review and capital-labor-production framework. *Journal of Risk and Uncertainty*, **19**, 7–42.
- Camerer, C. and R. Weber (1999). The econometrics and behavioral economics of escalation of commitment: A re-examination of Staw and Hoang’s NBA data. *Journal of Economic Behavior and Organization*, **39**, 59–82.
- Cameron, T.A. and J. Englin (1997). Respondent experience and contingent valuation of environmental goods. *Journal of Environmental Economics and Management*, **33**, 296–313.
- Chanel, O., S. Cleary, and S. Luchini (2004). Does public opinion influence willingness-to-pay? Evidence from the field. Working Paper GREQAM **2004-08**, Marseilles, France.
- Charness, G. and M. Rabin (2002). Understanding social preferences with simple tests. *Quarterly Journal of Economics*, **117**, 817–869.
- Fischer, A. (2004). Decision behaviour and information processing as determinants for stated willingness to pay? - An interdisciplinary approach towards explaining stated preferences in contingent valuation surveys. Communication AERE, Budapest, June.

- Freedman, J. and S. Fraser (1966). Compliance without pressure: The foot-in-the-door technique. *Journal of Personality and Social Psychology*, **4**, 195–202.
- Greene, W. (2000). *Econometric Analysis* (Fourth ed.). Prentice-Hall.
- Haneman, W.M. and B. Kanninen (1999). The statistical analysis of discrete-response cv data. In I.J. Bateman and K.G. Willis (Eds.), *Valuing Environmental Preferences: Theory and Practice of the Contingent Valuation Method in the US, EU, and Developing Countries*. Oxford University Press.
- Hanley, N. D. and A. Munro (1995). The effects of information in contingent markets for environmental goods: A survey and some new evidence. Papers 848, Queen's at Kingston - Institute for Economic Research.
- Harris, M. (1972). The effects of performing one altruistic act on the likelihood another. *Journal of Social Psychology*, **88**, 65–73.
- Joule, R-V. and J-L. Beauvois (1998). *La soumission librement consentie*. Paris: Presses Universitaires de France.
- Kemp, M.A. and C. Maxwell (1993). Budget context for CV estimates. In J.A. Hausman (Ed.), *Contingent Valuation: a critical assessment*, pp. 217–265. North-Holland.
- Kiesler, C.A. (1971). *The Psychology of Commitment. Experiments linking behavior to belief*. New York: Academic Press.
- Luchini, S. (2000). *Preferences Elicitation in Non-Market Environments: Application to Environmental Assets*. Ph. D. thesis, Université de la Méditerranée, GREQAM, Marseille.
- Mitchell, R.C. and T. Carson, R. (1989). *Using Surveys to Value Public Goods : The contingent Valuation Method*. Washington D.C.: Resources for the Future.
- Munro, A. and N.D. Hanley (1999). Information, uncertainty, and contingent valuation. In I.J. Bateman and K.G. Willis (Eds.), *Valuing Environmental Preferences: Theory and Practice of the Contingent Valuation Method in the US, EU, and Developing Countries*, pp. 258–279. Oxford University Press.
- Samples, K., J. Dixon, and M. Gower (1986). Information disclosure and endangered species valuation. *Land Economics*, **62**, 306–312.
- Smith, V. (1976). Experimental economics: Induced value theory. *American Economic Review*, **66**, 274–279.
- Smith, V. (1982). Microeconomic systems as an experimental science. *American Economic Review*, **72**, 923–955.
- Spash, C. (2002). Informing and forming preferences in environmental valuation: Coral reef biodiversity. *Journal of Economic Psychology*, **23**, 665–687.

- Staw, B.M. (1976). Knee-deep in the big muddy: A study of escalating commitment to a chosen course of action. *Organizational Behavior and Human Performance*, **16**, 27–44.
- Staw, B.M. (1981). The escalation of commitment to a course of action. *Academy of Management Science*, **6**, 577–587.
- Staw, B.M. (1996). The escalation of commitment: An update and appraisal. In Z. Shapira (Ed.), *Organizational Decision Making*. Cambridge, England: Cambridge University Press.
- Whitehead, J. and G. Blomquist (1991). Measuring contingent values for wetlands: Effects of information about related environmental goods. *Water Resources Research*, **27**, 2523–2531.

Tables

	Field experiment				Telephone survey	
	Session 1		Session 2		Mean WTP	Standard deviation
	Mean WTP	Standard deviation	Mean WTP	Standard deviation		
Step 1	273.5	288.9	307.0	314.7	539.8	629.4
Step 2	274.6	285.9	295.4	295.5	493.7	560.6
Step 3	307.6	324.9	356.3	320.9	514.9	550.6

Table 1: Mean and Standard Deviation for each evaluation step

Step 1 → 2	Step 2→ 3	Sessions 1 & 2	Telephone survey	Sessions 1 & 2	Telephone survey
		Frequencies (n=264) (n=242)		Percent	
Up	Up	8	2	3.03%	0.83%
	Constant	12	4	4.55%	1.65%
	Down	1	0	0.38%	0.00%
Constant	Up	61	31	23.11%	12.81%
	Constant	139	140	52.65%	57.85%
	Down	9	9	3.41%	3.72%
Down	Up	11	9	4.17%	3.72%
	Constant	8	11	3.03%	4.55%
	Down	6	1	2.27%	0.41%
Zero WTP for all 3 questions		9	35	3.41%	14.46%

Table 2: WTP patterns

Variables	First revision	Second revision
	equation (Step 1 → 2)	equation (Step 2 → 3)
	Parameter (p-value)	Parameter (p-value)
Constant	-1.2425*** (.0020)	-.3245 (.2731)
Gender (female)	.09882 (.5802)	-.0220 (.8726)
Age	-.00693 (.3196)	-.0025 (.5941)
Secondary education level	-.02757 (.9043)	.0253 (.8881)
Tertiary education level	-.08513 (.6418)	-.1054 (.4968)
Respondent declares having a good knowledge of air pollution	-.00026 (.7684)	.0541 (.7073)
Respondent knows AIRMARAIX air pollution indicator	.39608* (.0800)	.0840 (.6393)
Respondent knows ATMO air pollution indicator	.09137 (.6721)	-.0813 (.6315)
Respondent perceives that the air quality in Marseille is good	-.04157 (.8043)	-.2827** (.0363)
Respondent perceives that the air quality is good where she lives	-.06681 (.6795)	.1864 (.1844)
Respondent indicates that her health is important	.29340 (.1015)	.0758 (.5963)
Respondent occasionally or regularly perceives the effects of air pollution on her health	.12887 (.5515)	.1431 (.4124)
Respondent regularly gathers information on air quality	.19544 (.2663)	-.0113 (.9411)
Difference between initial WTP and Mean WTP in the Field Experiment	.00005 (.8991)	-
Difference between initial WTP and Mean WTP in the telephone survey	.00030** (.0449)	-
Telephone survey dummy	-	-.3846 (.0169)
Disturbance correlation		.3736 <.0001
Number of observations		451
Log likelihood function		-445.0332

Table 3: Bivariate probit model

A Hypothetical scenario and elicitation questions of WTP

A translation of the questions and the scenario presented to respondents and relevant to the study is reproduced below. Sentences in italics are for the reader and were not read to respondents.

« You are going to be the main actor in our scenario. You will have to take the best decision for yourself and your household.

Let's imagine that you and your household have to move. You can choose between two towns which are exactly equivalent in terms of inhabitants, work conditions, schools, climate, public services, cultural life, transport, housing, surroundings, etc. There is only one difference between them: the level of atmospheric pollution. The first town - let's call it POL - is as polluted as Marseilles. And the second town - let's call it LESSPOL - is half as polluted as Marseilles.

The problem is that the cost of living is higher in LESSPOL (the less polluted town): housing, local taxes, public transport, etc. are more expensive. This means that if you choose to move to LESSPOL, you will have to pay more to have the same standard of living as in POL.

We would like to know how much you would be able to pay per month for you and your household to move to LESSPOL (the less polluted town) rather than to POL (the town as polluted as Marseilles). Do not forget that this money will be drawn from your household's budget! You will therefore have less money at the end of the month. »

QUESTION 1:

How much would you be willing to pay for you and your household to move to LESSPOL (the less polluted town) rather than living in POL (the town as polluted as Marseilles)?:

The respondents in Regional Council answered with electronic material, "Yes", "No" or "Do not know", to each of the following values that were announced orally and presented on a screen:

10, 50 100, 200, 400, 700, 1000, 1500 and more, French Francs per month, 120, 600, 1200, 2400, 4800, 8400, 12000, 18000 and more (per year)

Respondents that were interviewed by phone were asked the following bid:

X French Francs per month ?

If yes, would you be willing to pay Y French Francs per month? If no, would you be willing to pay Z French Francs per month ?

with (X, Y, Z) respectively (300, 800, 50), (400, 1000, 100) and (500, 1200, 200).

QUESTION 2 (STEP 1):

How much would you be willing to pay per month to live in the less polluted town ?

..... French Francs per month.

The respondents in Regional Council were told the following: The amount that all people present in this room are willing to pay on average is 316 French Francs per month (session 1) / 332 Francs per month (session 2).

Respondents that were interviewed over the phone were told the following:

A pilot study indicates that people were willing to pay on average 430 French Francs per month

QUESTION 3:

Knowing that, do you want to change the value you gave ? YES / NO

QUESTION 4 (STEP 2):

If Yes, how much would you be willing to pay per month to live in the less polluted town ?

..... French Francs per month.

In fact, only a few people actually know the impact of air pollution. There are three different types of effects: the pure polluting effects, the irritant effects, and the fatal effects.

The pure polluting effects cause a cloud of brown dust. This makes the buildings dirty which have to be more frequently cleaned and which smell bad.

The irritant effects cause additional diseases: irritated eyes, headache, sore throat, coughing fit, flu symptoms, and even hospitalisation for respiratory and cardiac problems.

Fatal effects shorten life. If you are exposed over several years to a high level of air pollution, you will be less healthy, and you will die earlier. If you take 100 people living in LESSPOL, ONE will die before 80 because of her/his bad health due to air pollution. This person will have lost around 10 years of life. If these 100 people live in POL, TWO of them will die. We can therefore say that 1 person per 100 can live 10 years more by living in LESSPOL rather than in POL.

QUESTION 5 (STEP 3):

What is the maximum amount you would be willing to pay for you and your household to move to LESSPOL (less polluted town) rather than living in POL (town as polluted as Marseilles)?

..... French Francs per month.

B Sample characteristics

Variable (standard deviation)	Telephone survey (n=242)	Sessions 1 & 2 (n=256)
Gender (female)	.4959 (.5010)	.6094 (.4919)
Age	41.2273 (18.3195)	29.6836 (11.1526)
Secondary education level	.2025 (.4027)	.2578 (.4351)
Tertiary education level	.3223 (.4683)	.4766 (.5008)
Respondent declares having a good knowledge of air pollution	.3306 (.4714)	.3125 (.4617)
Respondent knows AIRMARAIX air pollution measure network	.0579 (.2821)	.2196 (.4063)
Respondent knows the public index of air pollution level ATMO	.0868 (.2087)	.2549 (.4357)
Respondent perceives that the air quality in Marseille is good	.4339 (.4966)	.4023 (.4902)
Respondent perceives that the air quality is good where she lives	.6860 (.4651)	.3438 (.4729)
Respondent indicates that her health is important	.7438 (.4374)	.5820 (.4966)
Respondent occasionally or regularly perceives the effects of air pollution on her health	.3368 (.4731)	.4453 (.4976)
Respondent regularly gathers information on air quality	.2603 (.4397)	.1797 (.3795)
Difference between initial WTP and Mean WTP in the Field Experiment	-37.12 (290.96)	-
Difference between initial WTP and Mean WTP in the telephone survey	-	109.79 (629.43)
Respondent's income (FRF)	7020.78 (5413.58)	3902.80 (3729.61)
Respondent lives alone	.5702 (.4961)	.3320 (.4729)