Analysing Decision Behaviour in Contingent Valuation Studies:

A Consumer Psychological Approach

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ABSTRACT

This paper presents an empirical study based on the application of a consumer behaviour model to the context of economic valuation. Decision behaviour of respondents in a contingent valuation (CV) survey is described and classified within a framework from consumer research, comparing individual behaviour in purchasing situations to that in CV situations. The behaviour model is then adapted to the peculiarities of the interview context and used as a basis to construct validity test of the contingent valuation method. In addition, determinants of decision behaviour are identified by means of a multinomial regression analysis. In the future, these findings could help improve the quality of willingness to pay statements.

Keywords: Contingent valuation; Consumer behaviour; Decision making; Product involvement.

INTRODUCTION

In environmental economics, one fundamental idea is to internalise the so-called external costs and benefits, in order to enhance efficiency and sustainability of economic actions. For those externalities – as for instance the external benefit derived from an aesthetically pleasing landscape, or from the abundance of animals in a local forest – market prices do not exist. Environmental economists try to evaluate external benefits provided by ecological commodities, which are not traded on existing markets, by stated preference techniques, such as the contingent valuation method (CVM) (for an overview see e.g., Mitchell & Carson 1989, Hanemann 1995). In short, the key concept of those methods is to elicit the population's preferences for the commodity in question, asking a sample – either directly or indirectly – how much they are willing to pay for a well defined quantity of this ecological good, and to derive a demand curve from the aggregated willingness to pay (WTP) values. That implies the assumption that the WTP response of each individual survey participant is a statement of his or her preference.

Critics have doubted the validity of CVM results for several reasons (see Section 2). The validity of a measure is "the degree to which it measures the theoretical construct under investigation" (Mitchell & Carson 1989, p. 190; see also Schnell, Hill & Esser 1999, p. 150). In this case, the relevant construct is the *individual preference for a particular good* (see e.g., Blamey, Common & Quiggin 1995; Gregory, Lichtenstein & Slovic 1993; Mitchell & Carson 1989, p. 211). The study presented in this paper also challenges the validity of stated WTP, particularly theoretical validity, and thus examines whether WTP statements are consistent with theoretical expectations (Mitchell & Carson 1989, p. 206).

Markets established in a CV are assumed to be analogous to real markets. Consumer psychology shows that consumers in real markets do not necessarily decide rationally, i. e., cognitively controlled. If respondents in a CV study indeed behaved like consumers, they would be likely to apply similar strategies to those of consumers in real markets. However, since preferences are cognitions, cognitive control is an essential precondition for preference-based decisions (see e.g., Ben-Akiva et al. 1999). WTP bids stated without cognitive control might indicate responses to the interview situation, the interviewer, or any other stimulus, but would not reflect individual

preferences for the environmental good in question. They therefore would not be valid measurements of the individual benefit derived from the good as supposed by CV researchers.

The survey presented here takes the analogy of real and hypothetical markets as its starting point and in an innovative approach focussing on individual decision processes applies a decision behaviour model from consumer psychology to the valuation context. This approach deploys welfare and environmental economic propositions to validate the CVM. The psychological theories and concepts consulted act as an instrument, as an aid to compare respondents' decision making to the criteria provided by economic theory. These criteria include (i) the assumption that individuals make choices based on their preferences and restrictions and (ii) that hypothetical markets are analogous to actual markets. Reference criteria are thus immanent to economic theory.

The paper starts with a brief overview of the basic ideas of contingent valuation and its market analogy, and of consumer decisions. From a synthesis of these two approaches, hypotheses and matching survey methods are derived. Finally, the main results of the study are presented and discussed.

MEASURING PREFERENCES FOR ECOLOGICAL GOODS – THE CONTINGENT VALUATION METHOD

For environmental economics with its roots in neoclassical theory, individuals decide as homines oeconomici, basing their actions on rational choices. The concept of rationality can be quite broad if we define it as maximising individual utility by scrutinising relevant options, preferences and restrictions (see e.g., Sen 1982 p. 99; Braun 1999; Kirchgässner 2001 p. 7). This definition implies a certain degree of cognitive control in all choices which are claimed to be rational, and, at the same time, that the individual does in fact hold preferences concerning an amenity which are relatively stable over time (see e.g., Payne, Bettman & Schkade 1999, p. 246; San

Miguel, Ryan & Scott 2002)[1]. These foundations, applied to human economic behaviour since the times of classical economics, are now transferred to respondents' behaviour in valuation surveys. In what is claimed to be a market analogy, respondents are asked to evaluate non-market goods. In other words, lacking a real market from which to deduce preferences by the analysis of prices, researchers make up a hypothetical market for the commodities in question, elicit WTP values and then interpret these values as stated preferences. In these situations, respondents are treated as consumers who, depending on the format of the WTP question, express a positive or negative purchase intention for a commodity with a given price, or to name the maximum price they would pay for the good. These decisions, no matter if in the context of real market or interview situations, are assumed to be rational, preference-based choices.

One of the valuation techniques which work on this principle is the CVM with its main application field in environmental economics. Ever since its invention in the late 1940s by Ciriacy-Wantrup, methodical aspects as well as doubts about the underlying concepts have been discussed intensely. Only a few studies, however, deal with convergent validity of the CVM (e.g., Ryan & San Miguel 2000; see also Mitchell & Carson 1989; for a criterion validity test see Loomis et al. 1997). Most researchers challenge theoretical validity and, much more frequently, reliability, i. e., the extent to which variance of stated WTP is due to the underlying preferences and not to random sources mainly address the effects of setting and scenario manipulations carried out on the basis of empirical economic approaches (Mitchell & Carson 1989 p. 211). These studies (e.g., Satterfield et al. 2000; Hoevenagel & v. d. Linden 1993; Harrison & Lesley 1996; Bennett, Morrison & Blamey 1998; Berrens et al.2000). A few studies consequently use social psychological theories as a background for analysis (e.g., Aakkula 1999; Ajzen et al. 1996), but focus rather on effects of information than on validity.

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[1]The assumption of relatively stable preferences undoubtedly is an essential precondition to measuring of preferences: If preferences were not considered outlasting, an assessment of preferences would not make sense, since measurements would not be reliable at all. However, the assumption that individual preferences do exist for most objects has been questioned by several authors (e.g., Gregory, Lichtenstein & Slovic 1993; Gregory & Slovic 1997; Bettman, Luce & Payne 1998; Payne, Bettman & Schkade 1999). Based on this debate, it now seems a more realistic concept that individuals construct preferences rather than retrieving them when asked to evaluate a good they are not familiar with (e.g., Payne, Bettman & Schkade 1999). Still, constructed preferences have to be relatively persistent over time to provide a basis for a reliable and feasible valuation of non-market goods (Hanemann 1994).

CONSUMER DECISIONS: A TYPOLOGY OF DECISION BEHAVIOUR

Consumer behaviour research, in contrast to environmental economics, does not exclusively rely on the rational choice paradigm. As many of its basic ideas are of a social psychological origin, rational choice is one of the fundamental concepts, but no dogma. Therefore, decisions that would not fit into the definition of rationality are still considered part of the field of investigation, and factors such as emotions, routine and involvement and their influences on decision making are regular subjects for analysis.

To compare decision behaviour in purchasing and CV contexts, a classification model of consumer decisions is applied in this study, which, in its main features, is widely accepted in consumer psychology (see for example Howard 1994; Antonides & van Raaij 1998), and is used here in a version elaborated by Weinberg (1981, Weinberg 1994, Kroeber-Riel & Weinberg 1996). This model postulates four different types of decision making described by three constituent processes, such as (1) cognitive control, (2) emotional involvement and (3) reactive, spontaneous behavioural responses. Depending on the relative weight given to these three processes, different decision types are used to decide whether a good will be purchased and if so, what it should be. In the following, these strategies are briefly outlined (see Table 1).

Weinberg distinguishes between two types of cognitively controlled decisions: the extensive and the limited strategy. These differ both with regard to the emotional involvement of the individual and the amount of new information collected during decision making. *Extensive* decisions are characterised by relatively strong emotional involvement and a strong demand for additional information. Consumers decide extensively when the choice of an appropriate product appears important to them and when they are not used to purchasing such an item. In such cases, they invest time and money making a sound decision based on their newly acquired knowledge and their subjective valuation.

Limited decisions, in contrast, require less new information, as the consumer has typically gained some prior experience concerning the purchase of this good and is able to decide on the basis of existing data. Since the good in limited decision cases is normally not that emotionally appealing, involvement tends to be low.

Cognitive control and elaboration, however, are not constituent attributes of the *impulsive* and the habitualised decision behaviour types. The former is based on spontaneous reactions to a stimulus under relatively high involvement: Information is not thoroughly elaborated, and, as the stimulus is not necessarily related to the good and its characteristics, the decision in many cases does not reflect the consumer's preferences for the good itself. *Habitualised* decisions are routine choices requiring neither cognitive efforts nor emotional involvement, e.g., purchasing everyday food. Table 1 gives an overview of constitutive processes for the different types of consumer decisions described above.

Classifications like the Weinberg model provide helpful explanations for consumer decisions in the market place. But what does that mean for the CVM? In a CV study, researchers suppose, that the participants do decide extensively, therefore elaborating the given and the existing information, valuing the propositions carefully and under high involvement. This assumption is essential to ensure validity of WTP answers: Respondents' decisions have to be rational, and, as the valuation task is probably new to them, they have to be well informed on the topic to be able to decide rationally (see also Hanley 1995 p. 43). However, consumer psychology shows that purchase intentions can be formed without cognitive control as well – habitualised or impulsive – or without being emotionally concerned about the decision – following the limited strategy. If in a CV non-market goods are evaluated in a market analogous situation, and respondents accept this setting, they are supposed to behave like consumers in market contexts. Consequently, it seems likely that not all participants process the given information and use it to valuate the commodity as thoroughly as intended by the researcher. It seems possible, if not probable, that some respondents in CV do not decide rationally, but rather in a habitualised way or impulsively, reacting to key words, i. e., cues, without cognitively processing the information. Information given in the scenario thus could lead to a stated WTP without even touching the corresponding preference. As a consequence, these WTP statements would not be based on preferences for the good in question. In these cases, CVM measurements would indeed not be valid.

Obviously, the application of consumer decision models to the CV concept leads to several questions concerning construct validity of the technique, as for instance:

I. Which decision strategies do respondents apply in a CV survey? Do they use the strategies described for regular purchase decisions on markets?

II. Is the choice of a decision type influenced by the interviewer, the study design and setting, or certain cues in the scenario?

III. What percentage of respondents do not formulate their WTP answers under cognitive control? Is this percentage too high to allow a valid measurement of preferences on an aggregated level (theoretical validity)?

STUDY DESIGN – METHODS

Hypotheses

These questions lead to two main hypotheses:

$H1_o$ The majority[2] of WTP statements are not an outcome of decision processes as described by Weinberg.

$H1_A$ The majority of WTP statements are an outcome of decision processes as described by Weinberg.

$H2_o$ The majority of WTP statements are not an outcome of cognitively controlled decision processes.

$H2_A$ The majority of WTP statements are an outcome of cognitively controlled decision processes.

Study Design: The Contingent Valuation

To test these hypotheses, a two-part study was designed. The first module consisted of a face-to-face CV with an open-ended WTP question. The commodity to be evaluated was 100 km of hedgerows which were to be planted and cultivated in an agricultural landscape in a county in central Germany. The payment vehicle was in the form of a single payment for the next 10 years. The CV study was part of a county-

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[2]So far, validity tests of the CVM lacked clear stipulations of threshold values. Validity has not been determined in absolute terms (see examples mentioned in Section 2). The 50 % benchmarks used here are not meant as thresholds of validity, but as landmarks to provide orientation in a first attempt to quantify the proportion of market analogous and cognitively controlled decision making in CV surveys. In a second step relative changes in these proportions may be assessed (see also Section 6).

wide pilot scheme attempting to establish markets for ecological services and goods by means of result-oriented payments to farmers, according to the regional demand (Gerowitt, Isselstein & Marggraf, forth.). The scheme was outlined in a scenario and photographs of two qualitatively different hedgerows were shown to the respondents. Respondents had to evaluate both.

Apart from the information provided through the standardised scenario text, participants were offered the opportunity to collect as much additional information from the interviewer as they pleased (see e.g., Carson 1998): After listening to the scenario, respondents were told that they could ask as many questions as they liked if they felt they needed additional information about hedges or the payment scheme. Interviewers gave standardised answers to all questions, which, nevertheless, did not affect the normal interview atmosphere. Finally, participants were asked to state their general willingness to contribute to this program and then to express their WTP for 100 km of each of the two hedgerow types in their county.

In an experimental approach, a smaller sample had to evaluate the same goods after having heard an alternative scenario. This alternative scenario had the same wording as the control group's scenario text, but in addition included several cues like "subsidies for agriculture" and "a new tax" (see Appendix).

Study Design: Decision Behaviour

In the second module decision behaviour was studied using a mixed technique. To measure the time participants spent on their decisions regarding whether to make the hypothetical purchase and how much to pay for the good, and to be able to quantify any additional information needed, interviews were recorded using an mp3-format. The recorder started automatically as soon as the WTP question was posed and an offer to provide more information was made. The recording was stopped after respondents had stated their bids or after they had given their reasons for not being willing to contribute to the programme, respectively.

After having completed the CV, each respondent answered a questionnaire which was designed to examine their emotional involvement in the topic, their knowledge about it, their attitude towards financing the proposed undertaking, their environmental awareness (using a scale by Schahn 1999), as well as to ascertain socioeconomic and

other variables. Interviewers also observed respondents and rated the latters' emotional involvement in the subject and the perceived time pressure in the interview situation on a –3 to +3-scale. Study design for both parts was tested on a pilot survey sample (n=41) and was consequently improved upon.

RESULTS

Cluster Analysis

The study was conducted on a representative sample with respect to sex, age, income, and municipalities of residence. The sample (n=299) was taken at random. Respondents had to be inhabitants of the project region, i. e., potential users of the good, as WTP was asked exclusively with regard to hedges in that county.[3]

61.2 % of the sample stated a positive WTP, and 53.5 % of the participants asked for additional information. To quantify the qualitative information captured on the mp3-recordings, the number of queries for additional information after a respondent had heard the valuation scenario, the decision time, and several strictly defined evidences of spontaneous behavioural responses were extracted as numerical variables (see also Table 2). Indicators of reactive processes with regard to impulsive behaviour were, for instance, verbal expressions of strong, spontaneous reactions to details in the valuation scenario. Indicators of reactive processes with respect to habitualised behaviour were, e.g., explicit, verbal interpretations of the contribution as a routine charitable donation not related to the purchase of a particular good. These indicators then were transformed into "dummy" variables.

In many cases, different types of decision behaviour (see Section 3) could have even been identified at sight. To classify decision behaviour according to the Weinberg model (1994, see Table 1), a k-means cluster process was applied to both the pilot and study sample. As indicators, the number of queries, the decision time and the dummy variables on reactive processes (see above) were entered into the cluster analysis plus the involvement as rated by the interviewer, the frequency of the individual's activities in agricultural landscape as a measure of experience, and the preference for these activities as a measure of involvement (see Table 2). The two latter were calculated adding item values from a seven item scale, respectively. Since

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[3]SPSS for Windows, version 11.0 was used for data analysis.

this kind of classification had apparently not been carried out before – neither with regard to purchase intentions in real markets, nor even less with regard to decisions in hypothetical markets – the indicator variables mentioned above were considered to be indispensable in a differential diagnosis of the Weinberg types of decision behaviour. They are operational definitions of the three constituent processes (see Table 1). For each variable, quantitative rules for classification were deduced from theoretical concepts of Kroeber-Riel & Weinberg (1996).

An exploratory k-means cluster analysis was then run without fixed cluster centres. This analysis disclosed a very strong tendency – already evident in the relatively small pilot survey sample – towards a division of the group of limited decisions into two distinctive classes: (a) includes cases with a relatively high emotional involvement to the subject and a lot of experience, and (b) cases with a low involvement and less experience (see Table 1). Neither the first nor the second group corresponds totally to what Weinberg postulated (Kroeber-Riel & Weinberg 1996). Both categories are limited in the literal sense, i. e., based on a confined amount of additional information. As mentioned above (see Section 3), however, typical limited decisions are based on a certain amount of experience with the commodity in question, but, at the same time, they lack a high level of emotional involvement, since the purchase of the good is not that important nor is it a new issue for the consumer. Yet, the results of this survey show that in CV there are respondents who are both involved and experienced, as well as respondents who display neither of these attributes. As a consequence, a fifth category of decision behaviour was added to the Weinberg model: the *limited-plus* type of decision in which respondents with some degree of experience showed involvement. This is to be differentiated from the *limited-minus* type which includes cases with low involvement and less experience (see Table 1).

In a subsequent step, cluster centres for all relevant variables were determined, according to the theoretical model and, at the same time, with regard to the empirical evidence from the pilot and the main survey. Although variable values and cluster centres were processed after a z-transformation to eliminate any effects of scale and different standard deviations, the following table displays absolute values (see Table 2) in an attempt to depict classifications more clearly.

Final cluster centres as shown in Table 2 are the result of seven iterations and are insensitive to minor changes in starting point values. They were checked with respect to their theoretical consistency. The 'dummy' variables encoding spontaneous behavioural responses as indicators of habitualised and impulsive decision behaviour proved to be dominant over other items; however, classification coincides almost perfectly with theoretical assumptions. Box plot figures indicate that there was virtually no case which exceeded thresholds of variable values, defined for each variable and decision behaviour type, respectively. Those cases with relatively high distances from the cluster centres were examined to find the reasons for the deviation; however, as none of these lacked compliance with the theoretical model, no 'outlier' had to be removed from the classification. Hypothesis $H1_A$ is corroborated, $H1_0$ rejected: The vast majority of WTP statements are an outcome of decision processes as described by Weinberg. It should be noted, though, that to better match the conditions of decision making in survey contexts, the Weinberg typology was modified. Thus, the corroboration of $H1_A$ is restricted to the literal sense of limited decisions only (see above, see Section 6).

Table 3 shows the results of the k-means cluster classification.

On the whole, most people made their decisions cognitively controlled, as 88.3 % of the sample made decisions using either the extensive or one of the limited strategies. Limited-minus behaviour was considered a cognitively controlled decision type since

I. individuals who were classified as deciding the limited-minus type did not show any evidence of dominant reactive components in the decision process, and

II. as any other respondent, limited-minus deciders received information provided through the valuation scenario. In contrast to the individuals who made a routine or an impulsive decision, these respondents gave no indication of *not* having processed the given information.

Only 15.7 % chose the extensive strategy, even though one would expect it to be used by the ideal participant in a CV according to the environmental economic framework. The limited-plus cluster was the most voluminous.

A comparison of sub-samples revealed further details. As described in Section 4.2, the experimental group was given a valuation scenario which contained particular cue words such as "subsidies for farmers" and "a new tax", whereas respondents in the control sub-sample listened to a scenario text which lacked these words.

In the experimental group, proportions of both limited-minus and impulsive behaviour were much higher than in the control group. In the experimental sub-sample, the limited-minus cluster was actually the most voluminous and held 40 % of the cases. The proportion of habitualised behaviour was slightly higher in the control group than in the experimental group. Cross-tabulations showed that these differences were significant ($p=0.016$; $\varphi=0.201$).

Hypothesis $H2_A$ is corroborated, $H2_0$ rejected: The majority of WTP statements in both sub-samples were an outcome of cognitively controlled decision processes. However, results suggest a strong impact of the scenario version on the decision behaviour (see below). Are there other factors that explain the choice of a decision behaviour strategy? The following paragraph suggests some answers.

Determinants of Decision Behaviour: A Multinomial Logistic Regression

What makes people in CV surveys decide the way they do? Searching for determinants involved in the choice of a decision behaviour type can help explain, for instance, why an individual who is both highly involved and experienced chooses the extensive instead of the limited-plus strategy: Besides, an examination of determinant parameters makes for a consistency check of the cluster analysis. Hypotheses with respect to the determinant parameters of decision behaviour referred to:

I. knowledge on the valuation subject measured in the questionnaire as (a) botanical knowledge on plant species in hedges, and (b) as the perceived individual knowledge on hedgerows in agricultural landscape (see Kroeber-Riel & Weinberg 1996, see also Antonides & van Raaij 1998 p. 273, Brucks 1985).

II. parameters related to the individual perception of the decision task such as perceived pressure of time (e.g., Bettman, Luce & Payne 1998, p. 200),

perceived complexity of the purchase decision and perceived financial risk (see Kroeber-Riel & Weinberg 1996), and experience with giving donations.

III. particular cues such as "a new tax" that provoke spontaneous behavioural responses (see 5.1, 4.2, see also Antonides and van Raaij 1998 p. 213).

IV. the attitude toward the act of contributing to the programme (e.g., Ajzen 1988), determined with an item scale based on the Ajzen & Fishbein concept which asked for the respondents' beliefs and evaluations regarding hedges in agricultural landscapes, and giving money for the programme described in the scenario.

V. age and level of education (see Kroeber-Riel & Weinberg 1996).

The attitude index was to test influences of these variables, a multinomial logistic regression was calculated. Eight variables which proved to be significant ($p<0.05$) (see Table 4) with respect to the differentiation of two behaviour types at a time, were entered into the final version of the model. The experience with donations in general had a minor impact, but unlike other factors that showed no effect at all, as for example environmental awareness, it was not eliminated from the equation, since it seemed to be an important argument to differentiate the two types of limited decisions ($p=0.052$). The regression model had an explanatory power of 0.362 (Nagelkerke's pseudo r-squared).

In Table 4, magnitude and significance of the variables are summarised. The first columns show specifications for the whole model, the following six columns refer to contrasts in decision strategies and quantify parameter estimates for three exemplary calculations. Some observations concerning theoretically meaningful contrasts are resumed in the following paragraphs (in Table 4 marked in italics), and will be discussed afterwards.

Apparently, the two knowledge parameters were important predictors, differentiating between the limited and the extensive classes of decision behaviour: the more botanical knowledge a person possessed, the more likely he or she was to decide extensively and not by one of the "limited" ways. On the other hand, the more an individual believed to know about hedges in agricultural landscapes, the less likely he

or she was to belong to the "extensive" cluster (p=0.025, see Table 4), or the limited-minus (p=0.001) or the habitualised class (p=0.039), but belonged rather to the limited-plus class of decisions.

Respondents who considered the WTP-question ("Are you willing to contribute financially to the planting and cultivation of 100 km of hedgerows in Northeim county?" etc.) difficult to answer ("perceived complexity") were more likely to be part of the extensive cluster than of the limited ones (p<0.05). This observation corresponds to the theoretical expectations (see Kroeber-Riel & Weinberg 1996).

As already mentioned above (see 5.1.), the scenario version (see 4.2.) was a strong determinant for impulsive behaviour (odd ratio: 5.227, p=0.023), but also for limited-minus compared to limited-plus behaviour (odd ratio: 2.781, p=0.034).

The education level, transformed into dummy variables, had strong influences as well (see Table 4): generally, higher education levels seemed to have a positive influence on the probability to choose a limited-plus or extensive rather than a limited-minus way of deciding (not shown in Table 4). Impacts of age, though significant, were relatively small.

Comparing the parameter estimates for each contrasting pair of clusters, the choice of habitualised instead of limited-minus behaviour was almost only predicted by age and level of education. The choice between habitualised and limited-plus behaviour was explained by education level and the perceived knowledge, with the habitualised group believing themselves less adept at the topic. Impulsive behaviour, on the other hand, was mainly determined by the scenario version. The extensive and the two limited classes were differentiated by a mixture of variables, such as perceived and botanical knowledge, the perceived complexity of the WTP-question, and minor effects of other variables. The overall high influence of the knowledge parameters was consistent with theoretical expectations (see Kroeber-Riel & Weinberg 1996) and underlines the relevance of the classification.

DISCUSSION

One of the main intentions of this study was to apply consumer psychological behaviour models to the context of economic valuation to check the validity of the CVM. To this end, respondents' decision behaviour in CV was classified according to the Weinberg model of consumer behaviour (see Sections 3 and 5.1). Results from a cluster analysis were twofold. On the one hand, the application of the Weinberg model on decision behaviour in CV seems sensible, for there were very few outliers, if any. On the other hand, categorising the actual decision behaviour (see 5.1) reveals that the cluster of limited decisions can be divided into decisions under relatively high involvement by individuals with some experience in the valuated commodity ("limited-plus") and decisions under low involvement made by less experienced individuals ("limited-minus", see Table 1). In other words, an adaptation of the Weinberg model to the valuation context appears possible.

The proposed modification does not alter the model core, which includes a differentiation between decisions with and without cognitive control. This modification obviously makes a great deal of sense in the context of communication theories: What does a respondent, who is not very involved in the topic and does not know much about it, think he or she is supposed to do if an interviewer asks him or her – more or less politely – to answer a few questions on a regional valuation subject? An individual, at that moment in this position, will presumably try to answer those questions in a "decent" way, following common conversational rules and trying to make sense of the questions asked (see e.g. Schwarz 1995; Tourangeau et al. 2000). On the other hand, he or she will not invest too much time and effort because of the lack of involvement. A strategy appropriate in a case like that is not included in the Weinberg model. But evidently, less experienced individuals with low involvement who do not feel like deciding either the typical limited manner or in one of the other ways described by consumer psychology, do exist in real interview situations. Under these circumstances, the limited-minus decision type is subjectively quite a reasonable strategy.

Do the transfer of the Weinberg model to the economic valuation context and the differentiation of two kinds of limited decisions affect the theoretical validity of the CVM at all? The majority of respondents in this survey did answer the WTP questions cognitively controlled, i. e., according to the expectations of neoclassical economics

(see Section 2). Thus, these decisions fulfil an essential precondition of rational choice. The respective percentage amounted to 90 % in the control group, whereas in the experimental group 80 % of the decisions were found to be cognitively controlled. This figure is considerably higher than the 70 % of participants answering consistently resulting from the Ryan & San Miguel study (2000). This can be due to the setting of Ryan & San Miguel which focused on inconsistency and made identification of inconsistent answers more easy. The survey results presented here have to be considered a first attempt to identify cognitively controlled decision making; there might have been 'impulsive' or 'habitualised' cases left undetected.

Even the less interested participants, classified to the limited-minus group, took their preferences for the commodity in question into consideration while deciding whether or not to accept a payment (see 5.3). But, on the other hand, there is reason to suspect that the high percentage of adequate decision behaviour regarding common conversational rules in this survey had been fostered by the regionality of the evaluated amenity. Further research could reveal if there are any contingencies between the involvement provoked by the valuated commodity, and the ratio of cognitively controlled, impulsive and habitualised behaviour, and the non-response rate, respectively.

More attempts to check the validity of the CVM in the survey presented in this paper will be undertaken in the future. A comparison of preference measurements by an attitude index and stated WTP, verbal and monetary expressions of preferences, and an analysis of rates of respondents who expressed difficulties with the valuation question should shed more light on decision behaviour in CV studies.

Besides the validity aspect, results from this survey can contribute to the improvement of the CVM by analysing impacts of interview setting on decision behaviour (see 4.1). Generally, not all of the determinants postulated by Weinberg (e.g., Kroeber-Riel & Weinberg 1998) had an effect on decision behaviour as shown by a multinomial logistic regression analysis (see 5.2). Consistent with theory, variables such as background knowledge proved to have a significant impact, but risk perception, for instance, did not.

To draw conclusions for the CV technique, individual, non-manipulable parameters such as environmental awareness and knowledge should be distinguished from setting variables which are subject to manipulation by the researcher and/or the interviewer. Significant parameters of the latter category are, following the regression analysis, the perceived complexity and the presence or absence of provoking cues (see 4.2) in the valuation scenario. As expected, certain expressions, e.g. "subsidies for farmers" in the given context can induce impulsive answers, but also behaviour of the limited-minus class (see 5.3) which can be considered closer to "the edge" of desirable responding behaviour in CV. The variance in the proportions of decision types due to the wording of the valuation scenario emphasises that the percentage of valid decisions is highly susceptible to minor manipulations in the survey design.

In contrast, higher perceived complexity can enhance a higher demand for more information and extensive decision behaviour, on the one hand. From the economist's point of view, this can be favorable, as the statement of preferences can be judged more valid, the more thoroughly the given information is elaborated (see Section 3). On the other hand, respondents are likely to feel overstrained by valuation tasks which are perceived as too complex, and then to interrupt the interview.

Classifying decision behaviour according to the proposed model could help detect changes in the percentage of potentially rational versus non-rational decisions due to scenario and setting manipulations. Impacts of these manipulations could be assessed by means of medium-sized pre-test samples that receive different treatments, e.g., scenario versions. Results of cluster analysis could then indicate the treatment which yields the maximum number of valid answers and reduces non-response rates. As a consequence, this approach could help design more valid CV studies.

CONCLUSION

To test validity of the CVM, the decision behaviour of respondents in a CV study was classified according to a consumer psychological behaviour model. The limited and the extensive decision types postulated by this model are characterised by cognitive control, whereas the habitualised and the impulsive strategy lack cognitive control. Results from a cluster analysis show that 80-90 % of the survey sample (n=299) chose one of the cognitively controlled decision strategies. These decisions are likely to reflect individual preferences for the good, albeit there is no certainty about that. This is

a quite favourable result with regard to the theoretical validity of the CVM. However, the percentage of potentially valid decisions decreased substantially due to minor manipulations of the scenario wording.

In addition, results of a multinomial regression analysis indicate determinant factors of decision behaviour. Knowledge about these effects could be applied to improve the validity of the CVM.

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Table 1: Characteristics of Decision Behaviour Types (based on Kroeber-Riel and Weinberg 1996; *italics: modifications based on survey results***)**

Decision behaviour types	Cognitive elaboration of information	Emotional involvement	Reactive, spontaneous behavioural responses	Compliance with rational choice concept
Extensive	high	high	low	yes
Limited	relatively high	relatively low	low	yes
Limited-plus	*high*	*high*	*low*	*yes*
Limited-minus	*relatively low*	*low*	*low*	*yes*
Impulsive	low	high	high	no
Habitualised	low	low	high	no

Table 2: Final Cluster Centres of Indicator Variables with Respect to Decision Behaviour Types

Constituent processes	Indicator variable		Types of decision behaviour in contingent valuation surveys - cluster centres of indicator variables -				
			Extensive	Limited-plus	Limited-minus	Impulsive	Habitualised
Cognitive	**Number of questions**	Starting point	4.5	1	1	0	0
		Final centre	3.7	0.7	0.8	0.4	0.85
	Decision time (min)	Starting point	8	1.15	1.15	1.15	1.15
		Final centre	4.2	1.78	1.63	2.5	1.38
	Experience scale **Range: 0-20**	Starting point	3	15	3	7	7
		Final centre	10.5	13.5	8	9.5	8.7
Emotional	**Involvement as rated by interviewer** **Range: -3 - +3**	Starting point	2	1.2	-1.2	0.2	-1.2
		Final centre	0.8	0.9	-0.5	1.1	-0.5
	Involvement scale **Actual range: -14 - +10**	Starting point	4.8	4.8	-5	-2	-5
		Final centre	2.5	4.7	-0.5	0.2	1
Reactive	**Dummy: Indicators of habitualised behaviour**	Starting point	0	0	0	0	1
		Final centre					
	Dummy: Indicators of impulsive behaviour	Starting point	0	0	0	1	0
		Final centre					

Table 3: Number of Cases Per Decision Behaviour Type

Decision behaviour type	Total sample (n=299)		Control group (n=249)		Experimental group (n=50)	
	n cases	proportion (%)	n cases	proportion (%)	n cases	proportion (%)
Extensive	47	15.7	41	16.5	6	12.0
Limited plus	122	40.8	108	43.4	14	28.0
Limited minus	95	31.8	75	30.1	20	40.0
Impulsive	20	6.7	12	4.8	8	16.0
Habitualised	15	5.0	13	5.2	2	4.0

Table 4: Multinomial Regression Model Specifications. Dependent Variable: Affiliation to a Decision Behaviour Cluster. *Italics: values addressed in the text*

Variable	Chi-squared	Significance	Odd ratio extensive vs. lim+	Significance extensive vs. lim+	Odd ratio impulsive vs. lim+	Significance impulsive vs. lim+	Odd ratio extensive vs. lim-	Significance extensive vs. lim-
Experience : donations	4.854	.303	0.808	.334	1.113	.740	1.138	.569
Botanical knowledge	7.902	.095	*1.718*	*.037*	1.098	.796	*2.074*	*.008*
Perceived knowledge	14.540	.006	*0.652*	*.025*	0.835	.485	1.061	.768
Perceived complexity	7.862	.097	*0.662*	*.017*	1.202	.553	*0.665*	*.025*
Attitude index	10.197	.037	1.014	.253	0.967	.028	1.028	.024
Scenario version	8.537	.074	1.116	.856	*5.227*	*.023*	0.401	.128
Age	8.618	.071	1.030	.048	1.033	.098	1.032	.040
Education level	24.462	.080						
Σ	101.91	.000						

APPENDIX

A. FISCHER (2004) ANALYSING DECISION BEHAVIOUR IN CONTINGENT VALUATION
STUDIES:
A CONSUMER PSYCHOLOGICAL APPROACH

Valuation scenario of the questionnaire

"Contingent valuation of hedgerows in agricultural landscapes**"**

(Please note that this is a translated paper-and-pencil version of the questionnaire. The original questionnaire applied in the survey was in German and part of a Lotus Notes database, i.e. in an electronic format. Words printed in italics were not shown or read to the respondents.)

VALUATION SCENARIO

In a region shaped by agriculture like Northeim county, farm hedges are a major element which fulfil important functions for agriculture, e.g., as a windbreak. Hedges and groves provide habitats for a wide variety of animals and plants. Moreover, many people consider hedgerows in the countryside as scenic. Thus, hedges play an important role in landscape.

At the same time, farmers avoid planting this kind of woods in order to manage plots more easily. How can the planting of hedges be encouraged?

Agriculture does not only produce food, but also has an influence on the natural balance and the scenery. Farmers who operate their farm creating and maintaining a landscape as beautiful and healthy as possible should get remunerated for their services. (Additional formulation in experimental group: ...by payments similar to the actual subsidies).
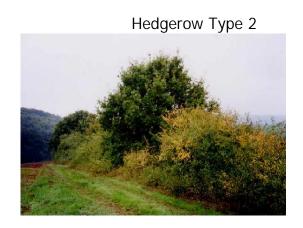
There is a fund paying remuneration to farmers if they plant hedgerows in Northeim county and cultivate them for a period of 10 years. To provide finance for this payment scheme every resident of the county contributes with a single payment to this fund. (Alternative wording in experimental group: A supplement tax is planned to pay remuneration to farmers if they plant hedgerows in Northeim county and cultivate them for a period of 10 years. To provide finance for this payment scheme every resident of the county contributes by paying this one-time supplement tax.)

How much would you be willing to pay to make the planting and cultivation of 100 km of hedges in Northeim county possible?

There are two types of hedges (show pictures).

Hedgerow Type 1

Hedgerow Type 2

Before you answer this question: Would you like to know more about this payment scheme for hedge planting in this county?
(audio-recorder on. standardised answers to participants' queries)
Do you have any further questions? (If not:)

In principle, would you be willing to pay if this money was used to plant 100 km of hedges in Northeim county and maintain them for the next 10 years?

Yes m   No m

(If yes:)

How much are you willing to pay for 100 km of this hedgerow? (open-ended question, show picture hedgerow Type 1) Please name any amount you are willing to contribute. There are no default values.
How much are you willing to pay for 100 km of this hedgerow? (open-ended question, show picture hedgerow Type 2)
(If no:)

If you are not willing to contribute, please name the main reason for your refusal.

(Please check.)

m I think it is not the task of the regional population to provide financing for hedges.
m I think there is no need for any more hedgerows in this county.
m I believe farmers should plant hedges voluntarily and should not receive remunerations for that.
m I am not sure if the money actually will be spent on this purpose.
m I do not have any spare money.
m I am donating money for other conservation purposes already (please specify).
m Other reasons (please specify).

(audio-recorder stop)