

ISEE/RC'2001

Fifth International Conference of the International Society for Ecological Economics (ISEE) Russian Chapter
(Russian Society for Ecological Economics - <http://RSEE.narod.ru/>)

"Ecological Economic Management and Planning in Regional and Urban Systems"

Institute of Control Sciences, Russian Academy of Sciences, Moscow, Russia,
September 26-29, 2001

Rationality – What does Environmental Valuation say?*

By

Arild Vatn

Department of Economics and Social Sciences

Agricultural University of Norway

Tel: +47 64948606; Fax: +47 64943012; e-mail:

arild.vatn@ios.nlh.no

* Draft – not to be cited without the permission of the author.

Rationality - What does Environmental Valuation say?

Abstract

Economic valuation of the environment is disputed. One reason for this is the large number of observations that do not conform well with the standard economic vision of rational choice. Some researchers have tried to reduce this problem by adding new auxiliary hypotheses to the model. Others just dismiss the whole undertaking. This paper takes on a third route, looking at what valuation studies may contribute to improve choice theory. It focuses around two main issues: the *information problem* and the characteristics of *preference formation*. Given that information is costly, optimization is in general indeterminate. To handle this situation the individual is forced to develop choice rules. These are based on the fact that 'non-optimal' ignorance has to play a fundamental role for most choices. Co-operation may simplify this problem, reflecting that the process of knowing is very much a social one. Also, in the domain of preference formation several hypotheses are developed that may explain many 'anomalies'. These focus on the role of the status quo and the incommensurability of preferences. Furthermore, especially concerning common goods like the environment, preferences will have fundamental moral and social features. While our findings do not simplify theory, they may help us understand errors produced by illegitimate simplifications.

Key words: choice theory, rational choice, environmental valuation, philosophy of science

1. Introduction

Throughout the 1990s we have observed an extensive debate about how to make choices about the natural environment. Monetizing – especially in the form of contingent valuation (CV) estimates – has by many been understood as the way to inform rational choices in this field. It facilitates trade-off calculations in a world of scarce resources. Furthermore, it is emphasized as a democratic way to inform collective decisions (Mitchell and Carson 1989; Navrud 1992). Skeptics of CV may accept the severity of environmental problems, while they question the relevance, the validity and reliability of the obtained estimates. One important source for this critique is the amount of anomalies appearing in the valuation literature.

In the face of anomalies, one strategy has been to focus on the quality of the surveys and propose better elicitation formats (Arrow et al. 1993). Others propose methods for trimming data, restructuring the empirical model or adding auxiliary hypotheses. In all these cases respondents are still conceived as individually rational. Preferences exist and are consistent. Thus, errors have mainly been seen as '*measurement biases*' to be corrected by refining the methodology (Mitchell and Carson 1989). Certainly, many studies can be criticized for being of low quality. Still, the development of concepts like 'starting point bias,' 'position bias,' 'question order

bias,' 'yea-saying,' 'framing effects,' 'protest bids,' and 'warm glow' all have a very ad hoc character and seem to cast doubt over the behavioral assumptions underpinning the model itself.

Among some CV skeptics there has been a tendency to simply dismiss the method since results seem inconsistent with neoclassical economic theory (Diamond and Hausman 1993; Diamond and Hausman 1994; Milgrom 1993; McFadden and Leonard 1993). From the view of these authors, the problems are not that of measurement. People simply *do not have preferences* over 'non-use values'. This is a somewhat curious position. To keep a particular theory intact, observations from a whole field of inquiry have simply been dismissed as irrelevant.

My position is that one should take the inconsistencies seriously and ask what they might mean for economic theory. As Portney (1994:15) states: "the critical scrutiny directed at the contingent valuation method has led some economists to think more deeply about cognitive processes, rationality, and the nature of preferences for *all* goods, public or private. We may, in other words, come out of this debate with an improved theory of preferences and choice."

In the latter half of the 1990s we see a tendency towards some convergence not least around the issue of methodological experimentation. Certainly, we notice continuous efforts to demonstrate that what was considered anomalies in the face of the rational choice theory, still may not be so (Carson 1997a; Carson et al. 1998; Hoveenagel 1996; Smith and Osborne 1996). We do, however, also observe increased interest in procedures that focus more directly on choices as in various types of choice experiments (Bergland 2001; Desvousges et al. 1996; Garrod and Willis 1998; Hanley et al. 1998; Randall 1997). These methods still keep focus on individual trade-offs too, but avoid using rating/monetary measures directly. Finally, we observe enhanced interest in more participatory methods like focus groups, in-depth groups and citizen juries (Aldred and Jacobs 1997; Brouwer et al. 1999, Burgess et al. 1998a and b; Clark et al. 2000). These latter studies focus on deliberation, communication and a broader set of assessments than the monetary methods.

The aim of this paper is to follow up the challenges posed by Portney. I specifically want to focus on whether apparent deviations from rational choice theory really have been observed and if so, discuss potential consequences for economic theory. In my mind some of the problems encountered are specific for environmental valuation, while others seem to have bearings for economic theory more at large.

I will start my inquiry by defining the basic elements of the neoclassical economic model. The economic definition of rational choice will be examined and the restrictions it puts on the economic model will be explored. On this basis I will discuss what various observations in the valuation literature may imply for the model. I will do this in three steps considering: a) the level of the individual, b) the social level, and c) the character of the environmental good.

2. Rationality

The definition and understanding of rationality and the rational choice concept vary substantially across the literature (Elster 1984; Hausman 1992; Knudsen 1993; O'Neill 1993; Sen 1977; Sen 1997). Still, neoclassical economic theory seems to be based on a within the profession broadly accepted definition. Here rationality is understood as *substantivist* (as opposed to procedural), *individualist*, and *independent of social context*.

Hausman (1992) offers the following definition for the neoclassical position: Choices are rational if beliefs and preferences are rational and choices are made in accordance with what is preferred the most by the individual. Preferences are rational if they are *complete, transitive* and *continuous*.¹

¹ According to the formal definitions preferences are complete if for all x and y in X : $x \geq y$ or $y \geq x$. They are transitive if for all x , y and z in X where $x \geq y$ and $y \geq z$ then also $x \geq z$ holds. Finally, preferences are continuous if x is preferred over y and z is sufficiently close to y , then x is also preferred over z . Whether non-continuous preferences are 'irrational' in economic terms is an issue of some debate.

2.1 The neo-classical model

Rational choice is a core concept in neo-classical economics. Lakatos (1974), with his concept of the research program, makes a distinction between the core and the protective belt of a science. It may seem difficult to apply the Lakatosian perspective to economics, since there is no strict definition of what belongs to the core and to the protective belt. Still, rational choice and its associated perspective of methodological individualism seem to be a characteristic of all definitions among neoclassical economists.

Eggertsson (1990) specifies the core of the neoclassical model to *include rational choice, stable (given) preferences, and equilibrium*. The standard protective belt contains *full information, zero transaction costs, homogenous goods, and individual property rights/free competition*. I find this to be as far as one can possibly come in defining a representative synthesis, and I will use it as a reference point for the rest of this paper.

In the philosophy of science literature it seems to be broadly accepted that it is defense of the core that is the dominant characteristics of most research paradigms. Kuhn (1962) challenges both the logical empiricist and falsificationist positions by claiming that in periods of normal science, scientists do not confront theories with data to falsify. Instead they are trying to solve puzzles that arise in their search for making reality fit with the disciplinary matrix of the science. Lakatos (1974) focuses similarly on how sciences are structured to defend their core assumptions. When a program is developed to a level where it is appropriate to subject it to empirical tests, it is confirmation rather than falsification that is of foremost importance.

Changes in the protective belt are certainly legitimate and often very important to fit the concrete situation better. Varying the assumptions about information is standard in most neo-classical applications. It has also become increasingly approved to include positive transaction costs. These specific kinds of changes in the protective belt certainly make the model more

realistic. The price is, as we shall soon see, to render it inconsistent.

It is standard to define a modification of a model *inconsistent* if it does not conform to the logic given by its other elements – here structured as elements of the core or protective belt. Another important concept is *ad hocness*. According to Chalmers (1982), modifications – be it of the core or protective belt – are in general *ad hoc* as long as they produce no new testable consequences. As I will argue later, the explanations given for various anomalies in CV studies can to a large degree, be characterized by either *ad hocness* or inconsistencies or by both.

2.2 Three interrelated concepts: rationality, preferences and full information

The neoclassical version of rational choice is demanding. Furthermore, the model implies several interdependencies. The most important ones link rational choice to the standard protective belt. More specifically, rational preferences – as defined by Hausman – seem to depend on full information. This must be the case for the individual, as she must also know all states of the world to determine the relative values. Otherwise, preferences cannot be considered complete.

Certainly, most economists accept choices under imperfect information to be rational, if the best option is chosen given available knowledge. There is, however a problem with this position. To define an optimum in a precise way, information has to be complete/transaction costs have to be zero. If it is costly to carry out the choice process – e.g., to gather and handle information – optimization becomes indeterminate. When maximizing, the actor will always have to decide whether resources should be used on conducting choices or on gathering more information as a basis for choice. This self-reference problem was acknowledged already by Morgenstern (1935). It cannot be solved by other means than an arbitrary act or standardized interruption rule, since it is the cost of information that creates the problem. Following Knudsen (1993), there exists an inextricable problem as soon as the cost of optimizing becomes part of the opti-

mization calculus itself. We enter into an infinite regress. Thus, diverting from the assumptions about full information/zero transaction costs is inconsistent with the core, or more precisely: The *utility maximization* algorithm when shifted to *expected utility* becomes indefinable.

Choices can be directly observed, while motives cannot. Testing the rationality assumption has thus become demanding. The behaviorist bend of the economist profession has directed analysis away from the study of stated towards the method of revealed preferences utilizing data over observed choices. The problem with this alternative is its strong demands on other parts of the model. To be able to test the assumptions underlying the definition of rational choice, not only full information, but also stable preferences must be assumed. Learning is not a logical part of the model – i.e., optimal learning could in principle have been – but cannot be defined. Thus observing information costs should in itself falsify the model.

From this it follows that there are only two positions that can be taken concerning the substantivist rational choice model and real world choices. It can be considered a *best approximation*, when understanding and predicting behavior. One has to admit that ‘best approximation’ has to be taken much on faith. Alternatively, one can take the position that the anomalies observed make a search for other models both interesting and necessary. Actually, the CV literature is an important source in such a search, while one must acknowledge that this area of inquiry also brings our analysis into domains that go beyond what is relevant for choices in the standard market place. Given the perspectives outlined above, the underlying focus will be on the *information problem* and the characteristics of *preference formation*.

3. The individual

The structure of the neoclassical model of rational choice directs the interest towards the individual. Compared with the analytical stringency of the economic model that also underpins

environmental valuation studies, the ad hoc character of various concepts developed in the literature to characterize real behavior is somewhat astonishing.

Concerning consistency of preferences, several CV studies show that responses are not independent of the technical characteristics of the elicitation procedure. According to one type of problems, the level of proposed payment in both serial and dichotomous bidding games influences the estimates (Boyle et al. 1997; Herriges and Shogren 1996; Holmes and Cramer 1995; Kealy and Turner 1993; McFadden and Leonard 1993; O’Conor et al. 1999). The so-called ‘starting-point bias’ or ‘anchoring effect’ thus deviates from the model of rational choice. According to a second type of potential bias – the so-called ‘sequencing bias’ or ‘ordering effect’ – the value of a good depends on which number it has in a sequence of goods presented for valuation (Carson et al. 1998; Hanemann 1994). A third issue is the observed discrepancy between willingness to pay (WTP) and willingness to accept compensation (WTA) measures (Gregory 1986; Hanemann 1991; Kahneman and Knetsch 1991; Knetsch 2000). Finally, the question of ‘protest bids’ and lexicographic preferences (Spash and Hanley 1995; Spash 2000) is of significant interest when we consider how observations conform to the rationality model.

3.1 'The starting point bias'

The starting-point bias (SPB) is observed in connection with closed bids. The arguments for using such bids are two fold: First, they reduce the possibility for the bidder to act strategically². Second, the referendum type format is thought to be more familiar than an open-ended question since it mimics the type of decisions we make in ordinary markets (Arrow et al. 1993).³

² Whether this kind of eliciting method is so-called incentive compatible is still an open issue (see Cummings and Harrison 1992)

³ Which at the outset is an admittance of deviations from the rational choice model.

If we knew our preferences and they were complete and continuous, the levels offered to us in a closed bidding game should not influence WTP estimates. McFadden and Leonard (1993) give the following comments in a study where they use the so-called double referendum format: “Summarizing, we find that the distribution of stated WTP depends strongly on the elicitation format.... Thus, the ‘starting-point bias’ that led CV researchers to abandon repetitive bidding games is already a damaging effect in second response, and the double referendum elicitation format is internally inconsistent” (p. 191). Holmes and Kramer (1995) even find SPB to occur in single referendum (dichotomous-choice) formats, a conclusion supported also by Meade (1993).

Two explanations on these observations are presented in the literature, both of an ad hoc nature. One is the existence of so-called ‘yea-saying’ (Mitchell and Carson 1989; O’Conor et al. 1999). The other relates to the possibility that respondents consider the bid they are confronted with to carry information about the value of the good. Mitchell and Carson (1989) emphasize that “confronted with a dollar figure in a situation where he is uncertain about an amenity’s value, the respondent may regard the proposed amount as conveying an approximate value of the amenity’s true value and anchor his WTP amount on the proposed amount” (p. 240).

While ‘yea-saying’ in my mind directs the concern mainly towards the social dimension – i.e., the interplay between individuals when forming or defining value (see later) – the latter explanation makes us focus on the completeness of preferences, respondents ability to handle information and compare value across different categories of goods. One interpretation is that prices are used as information about the quality of the good. Boyle et al. (1997) propose that “bids may carry *unintended* cues to survey respondents regarding the *quality* of the item being valued” (p. 1496, my emphasis). They also refer to various marketing studies indicating that consumers use price as shorthand for quality. Thus, information costs may make it rational for the respondent to use the bid as an ‘anchoring point’ – i.e., as cheap information in a complex world. Certainly the complexity and maybe unfamiliarity people have of environmental goods

may make this effect especially important within the field we are looking at here.

The idea can, however, be taken one step further: Even preferences may be formed – at least partly – as an effect of price information. Through (continuous) consumption we do not only learn about the quality of various goods. We may also learn to value a good in accordance with the prices we are used to observe. We get supportive indications of this from the assertion that prices may vary substantially between countries and cultures. When traveling, people may even be offended when experiencing prices that are unfamiliar to them. Over time, however, one may get ‘used to’ the new price level and adapt to it.⁴ SPB should be expected in particular when valuing goods where we have no other price information to which we can relate our bids.

We find supportive arguments of such mechanisms also in the more general literature. Hollis and Nell (1975:119) support the position taken here as they emphasize that “the formation of preferences often seems to be a function of economic variables like price, income and output.” Hodgson (1998) looks at prices as social conventions. Elster (1983) argues that there is a relationship between attainable output and preferences. According to the rational choice model the above kind of interrelationships should not exist. They impose devastating circularities. Still, at the face of high information costs and uncertainties about own preferences, such behavior cannot be termed irrational.

In a study made by Schkade and Payne (1993) verbal protocols were used to get insights about how people reached conclusions over their value bids. Their study shows that people tend to look at what they have spent on somewhat similar goods. They further show that the cost of producing a good also seems to influence what we are willing to pay, possibly also since it guards against the feeling of being cheated. Clark et al. (2000) document that some respondents explicitly want to anchor their bids to the costs. Schkade and Payne (1993) observe in their

⁴ Prices of cars and gasoline are very different in countries like Norway and the US. The patterns of car use are different too, but much less so than the price and income elasticities of each country should imply. Maybe

study that 41 % of the respondents searched for the *appropriate* or necessary bid assuming that everybody paid their part. Since the environmental good is a common one, it makes sense to expect a fair distribution of costs to be important.

3.2 'The sequencing effect'

Turning to the sequencing effects (SE), the problem shifts somewhat. While in the case of SPB all agree that such observations are counter to the standard rationality assumptions, some level of SE should be expected given the model. Hoehn and Randall (1989), Hoehn (1991), and Carson et al. (1998) are among those developing various aspects of this. Their findings imply that if the goods are Hicksian substitutes, the WTP for an increase in one of the public goods should decrease the farther out in a sequence it is valued. The opposite is true if they are complements. Only in the case of independence, the sequence should not matter. How large the SE could be, is not easy to determine. Carson et al. (1998) acknowledge that some observed differences in values under different context are too large to be plausible.

Let us look at an example. Halvorsen (1996) presents results from a study where people were asked to value the human health and environmental effects of reduced air pollution. In a sequential valuation with the health effect focused first, the mean WTP values were 1133 NOK for the health effect and 6 NOK for the environmental. If both goods were valued simultaneously and the respondents were asked to split their bid on the two elements afterwards, the results were 278 and 862 NOK for the two effects respectively. As we see, not only did the ordering change, the alteration of mean WTP for the environmental impact was indeed substantial.⁵

Even though it may be that e.g., environmental and health effects are substitutes to some degree,

(..fortsatt)

behavior is relative to 'status quo' price levels? This is an issue we will return to.

⁵ Halvorsen (ibid.) concludes that while a sequencing effect is observed, this is still not counter to the rationality hypothesis. The fact that the summed values from the two formats are almost equal is used to support the rationality hypothesis.

one may certainly ask if results like the ones above are plausible. Still, my agenda here is with the theoretical stringency of the way effects of substitution and complementarity is handled in the literature. After having clarified the errors made by just adding up valuation estimates within a CBA framework, Hoehn and Randall (1989) conclude: “The structure of a valid benefit cost measure limits alternatives to either a one-shot, holistic valuation or a sequenced approach”⁶ Their argument is convincing – given their understanding of the good and the way the implicitly conceives the information process.

Concerning the character of the good, more will be said in section 5. Here I will just focus on the information problems involved. Basically, there is no reason to believe that all participants in a valuation study have the same idea about what constitutes a ‘whole good’ in the sense of Hoehn and Randall. There is no reason to believe that the individuals involved perceive the good in such a way that one set of demarcations secures that there is no substitution effects or complementarities across the border towards other goods left at least for some individuals. The logical consequence of this is that all potential changes in the sphere of public goods should be valued at the same time. This raises issues that are impossible to handle consistently in practical situations. The problem is technically that of balancing the need of information to be delivered with that of securing the internal consistency of the policy packages to be valued. One could construct a two-step procedure where the first step concerns the definition or demarcation of the good and the second the elicited values. This would at least increase consistency, but may still not pay for the extra costs?

We are back to the problem of Morgenstern. In concrete valuation studies – whether a one- or two-step procedure is used – important information will be lacking. In such a setting

⁶ By ‘sequenced approach’ is meant a stepwise procedure where the value of each element which the whole environmental good consists of, is estimated given that the elements already valued in the sequence take on the status they will have as element of the final good. This will – following the assumptions underlying the analysis – give the same aggregate value as a holistic valuation. The elicited value of each element will vary though,

the only reasonable thing to do for the individual may be to use some sort of ‘mental accounts’,⁷ for each class of goods and from there on solve the problems of choice just as they appear – i.e. sequentially. This may result in exactly the type of observations made by Halvorsen. Whether this is a rational basis for collective environmental choices is quite another issue.

3.3 The WTA – WTP discrepancy

While the previous two themes concern the way people tackle the information problem, I will now move to assumptions underlying the type of preferences people have. The observed large differences between WTP and WTA measures have raised some doubt concerning the structure of these. As is well known, the income effect should result in some difference between the two. The effect is, however, under normal conditions expected to be rather modest (Willig 1976). After reviewing the literature, Gregory (1986) concludes that this is not in accordance with empirical findings. WTA estimates tend to be at least three times as large as those concerning WTP. Later surveys (Kahneman and Knetsch 1991; Knetsch 2000) conclude similarly.

Hanemann (1991) is critical to the idea that economic theory implies WTA normally to be fairly equal to WTP. There is not only an income effect working. Also substitution effects may be of importance. Actually he shows that if market goods in the choice set are, collectively, rather imperfect substitutes for the public good under consideration, and the income elasticity is somewhat limited, the substitution effect could be many times as great as the income effect.

Certainly, this may explain some observations, even though it is almost impossible to test this within the field of the environment since one needs separate data on substitution elasticities. As Knetsch (2000) however shows, the deviation seems to be a persistent

(..fortsatt)

according to the sequence utilized.

phenomenon also when valuing ordinary market goods – i.e., in situations where substitution is undoubtedly very easy.⁸ This may imply that not only do people anchor bids to the proposals they are confronted with, as in the case of SPB. They seem also to anchor values or bids to the status quo situation they find themselves in. Costs and gains are not traded off according to a once and for all continuous ordering. Instead, the hypothesis flowing from this type of work seems to be that preferences are ordered relative to the status quo as individually perceived. Tversky and Kahneman (1986) have termed the high resistance against losses from this position for ‘loss aversion’. The importance of position and relative gains has been observed also in other parts of the literature. One example is Duesenberry (1949) who argues for the so-called relative income hypothesis. It is relative rather than absolute income that determines consumption patterns.

3.4 'Protest bids'

In cases where substitutability between market goods and environmental goods are perceived to be low or non-existing, another type of preference 'problem' may occur. That is, people may not reveal continuous, but lexicographic preferences. This may appear in the form of a refusal to pay even though respondents show even highly positive attitudes towards the good. Some studies indicate that people protest because they do not support the payment vehicle. This does not challenge the standard rationality assumption. Other studies show that zero bids may result from lexicographic preferences (Spash and Hanley 1995; Spash 2000; Stevens et al. 1991).

The argument is that at least some people have ethical views concerning the environment that obstruct trade-offs with market goods. According to this hypothesis, the different goods

(..fortsatt)

⁷ The idea of ‘mental accounts’ is developed by Deaton and Muellbauer (1980), and deviates clearly from standard rationality assumptions.

⁸ Knetsch (ibid.) refers among others to a study he has undertaken regarding ordinary mugs.

belong to separate classes making the preference structure discontinuous. Respondents may view choices in the realm of the environment as ‘citizen’ issues as opposed to ‘consumer’ issues. They may also attribute rights to other species, restricting trade-off possibilities.

According to Spash (2000) lexicographic preferences may be bounded – i.e., they may operate within certain limits. This implies that needs are structured hierarchically, but they may be traded if minimum standards are available. Actually we can distinguish four possible categories of preferences (cf. Lockwood as referred in Spash (2000)): A strong lexicographic ordering; a modified lexicographic ordering operating within thresholds; weak comparability where choices are made between goods without attributing a common value to them; and commensurability as in standard rational choice theory.

Three out of these four classes are plural implying discontinuities. Still, I find it difficult to a priori claim that any of these orderings are not rational. Certainly, accepting such orderings complicates analysis and goes against standard consumer theory. They can, however, be as consistent as a single value ordering – i.e., both transitive and complete. It is in a way curious that while among philosophers it is those claiming value commensurability that needs to explain themselves (Chang 1997), the matter is totally opposite within economics.

Spash (2000) documents that among people, which in his survey have responded in a rights based/lexicographic way, there are some that still offer a bid. Such a behavior seems inconsistent. In some cases people may just be outside the bounds they draw for the specific good. Another possible explanation is that since the setting is monetary valuation, some feel compelled to conform to the rules of the institutional setting they find themselves moved or forced into. This implies that the broader social context influences responses.

4. The social

The methodological individualist perspective of economics may explain why the concept of context in valuation studies is exclusively used to describe the setting of the study itself – i.e., which other goods are explicitly involved or mentioned etc. It does not cover the broader context of the individual within which she is formed and undertake choices. The problem from a CV standpoint is to secure that the context of the (hypothetical) market as perceived by the respondent equals the one intended by the researcher. Thus, the concept of ‘context mis-specification bias’ is introduced, covering elements like ‘payment vehicle bias’ and ‘information bias’. The problem with this attitude is that it may misconstrue what is going on in the interview situation. It may miss important insights concerning the background against which the individual gives her response. Looking at the relationships between the individual and the society, I will again start by focusing at the information problem and continue with the issue of preference formation.

4.1 'Information bias' or the social aspect of knowledge

A CV study is a specific type of communication. The problem for the researcher – as perceived is to make up her mind as to what is ‘neutral’ or ‘enough’ information. The respondent on the other hand, faces the problem of understanding what is presented when trying to capture the logic of the choice situation. Given the complexity of most choices, the respondent most probably will look into her repertoire of tested responses – i.e., responses that have been learnt either by own experience or on the basis of social conventions.

Each individual will have a limited frame of reference concerning direct experience. The information problem faced in most cases may be very hard to cope with. Humans have, however, the ability to transfer information between each other and this way increase knowledge

far beyond the capacity of each. Knowing is a social process (Norgaard 1994). Some of this collective experience may take the form socially tested rules of behavior – i.e., institutions (Hodgson 1988; Screpanti 1995). In modern society instituted expert knowledge specifically plays an important role (Norgaard, 1994).

Screpanti (1995) emphasizes diffusion as important concerning adaptation to new behavioral rules. In my mind this argument can be expanded to knowledge itself. New solutions will be developed where old ones do not serve the observed needs well. To the degree these solutions are considered suitable by many, they have the potential of being spread. Others will not. This way they become socially tested, and we observe this as historically dependent layers of common knowledge and rules of performance. Certainly, in situations with great change or involvement in constantly widening subject areas – as is typical for the modern world – there will be a growing deficit here. A discrepancy will develop between the problems people are faced with and their repertoire of socially tested knowledge/sets of standardized behavior. It is no wonder that people in such situations may tend to use prices as short hand information (see section 3.1). They may reasonably assume that the market has done the testing of what is the quality of the good as implicit in the price. Certainly, problems appear if everybody assumes that everybody else make that test for them.

The idea that the interviewer delivers neutral information becomes a very difficult position given such an understanding. A social relationship will always be involved. The person interviewed must react both to the setting, to the type of information and not least to the way responses are supposed to be given. To ask for a price is certainly not the only way that people can convey their preferences or their arguments. From this perspective CV is a specific type of value articulating institution, with rules concerning both what counts as relevant responses and which form these responses are allowed to take. We should thus also expect that the individual have preferences also concerning how their values best could be expressed.

4.2 Deliberating over preferences

As already emphasized, most CV studies seem to presume that people have well defined preferences over different states of the world. Over the years, especially when confronted with evidence from psychological research, this view has come under some pressure and has facilitated a move towards a more *constructivist* perception. As Slovic et al. (1990) formulates it, people have well defined values only for familiar goods. Obtaining values for less familiar ones demands some kind of inferential process.

The constructivist perspective may not be a great challenge to the neoclassical core position. Hanemann (1994) emphasizes: “The real issue is not whether preferences are a construct but whether they are a *stable* construct” (p. 28). This just implies that the individual learns about herself.⁹ It becomes a problem for the model if preferences are also socially contingent.

This takes us to the perspective of social constructivism, which transcends the individualist perspective of both psychology and economics. It is developed within an institutionalist brand of social theory (Berger and Luckman 1967). Here, the focus is on the social construction both of society, culture and man. The argument is much in line with the position of Srepani. The main point is that we perceive and understand on the basis of socially produced concepts, which represents certain culturally defined worldviews. This relationship influences not only the production of knowledge and the dynamics of cognition. From this perspective, preferences reflect both characteristics of the individual and the society within which the individual is raised. Preferences become endogenous to the system in which the individual acts (Bowles 1998; Hodgson 1998; Vatn and Bromley 1994). People are living in webs of cultural significance as part of their linguistic communities (Foulkes 1975). This kind of perspective delivers important and very different hypotheses considering several observations surviving in the contingent valuation

⁹ Certainly, it may also be a problem for the consistency of the model if learning about ones own preferences

literature. I will pose my arguments in relation to the concept of ‘yea-saying.’

‘Yea-saying’ is certainly an ad hoc explanation for some observed deviations from the rational choice theory. It is defined as “the tendency of some respondents to agree with an interviewer’s request regardless of *their true views*” (Mitchell and Carson 1989, pp. 240-241, my emphasis). The concept seems to have been used both in marketing and psychological research before it entered the CV literature. Again some true, individual value is presupposed. It is, however, twisted through the elicitation process. If one instead shifts focus, and looks upon preferences as conforming to a social norm, as expressing a social belonging etc., the interpretation of what is going on would be rather different. ‘Yea-saying’ would not be understood as twisting a given, true value. It would rather be conceived as part of the preference development itself and conform to the idea that there is a communicative process going on, here between the interviewer and the one interviewed. Certainly, the interview situation is not what would be thought of as a normal communicative process. Still, there are strong enough similarities to expect respondents to be influenced if social mechanisms have any effect at all.

From the view presented here, the need is not foremost to measure values, but to facilitate communicative processes from which people could develop their understanding and define the values to which they then would adhere.¹⁰ Constructing preferences seems to be a much more continuous and socially profound process than organizing oneself in an interview process. As an example, the perspective advanced here would favor various types of group studies as an alternative or maybe supplement to more individually based studies as basis for defining appropriate social choices. The kind of work undertaken by Burgess et al. (1988a, 1988b, 1995) illustrates the dynamics of group processes and the role of dialogue in formulating what may in
(..fortsatt)
involves costs. Then we are back to the problem of self-references as discussed in section 2.3.

¹⁰ The ideas developed here are influenced by the work of Habermas on communicative rationality (see Habermas 1984).

the end be a proper action to take in the case of environmental issues.

This kind of studies has recently given rise to some combined analyses. Brouwer et al. (1999), and Clark et al. (2000) have combined a CV study with a focus group and an in-depth group study respectively. Brouwer et al. conclude that a combination of the two methods is most appropriate. In their case the respondents were rather happy with accepting the validity of their CV estimates, while a majority also favored a more participatory process. In the Clark et al. study the focus was more directly on how people went about constructing their WTP figures. These authors conclude “When deconstructed by the respondents themselves, their WTP figures proved to have little substance and they unequivocally rejected CV as an acceptable means of representing their values.... valuing nature in monetary terms was incommensurable with deeply held cultural values” (p. 60). Clark et al. refer to a study of Vадnjal and O’Connor (1994) reaching similar results. Also the above-mentioned study of Schkade and Payne (1994) has parallel conclusions, while the results cannot be compared directly since the latter did not utilize a discursive procedure.

Both the Brouwer et al. (1999) and Clark et al. (2000) studies thus support more deliberative and group based methods. I find this to represent good progress concerning the rationalities that seems to be involved. Still, we observe very strong differences between the two studies concerning the respondents valuing of the CV method. It is impossible to draw any definite conclusions about the reasons for this. The different formats both concerning the CV study and deliberative processes involved may have had an effect. Clark et al. (2000) also emphasize that the type of good involved was simpler to respond to in monetary terms in the Brouwer study (flood alleviation scheme vs. nature conservation). One should also be aware of the differences in experience of the two research teams and the effect of this on their engagement in conducting the various types of analyses. At least this hypothesis is in line with the perspective on rationality emphasized in this paper.

5. The good

While most choices have some social and ethical dimensions, choices in the realm of the environment are pervaded with such characteristics. They may involve issues concerning the rights of other species (Holland 1997). Moreover, nature is a common good. Self-organized, interrelated processes dominate. Hence the choice of one actor influences the possibilities for others (Vatn 2000). Finally, this also implies that the good is difficult to define and delimit.¹¹

While the ethical issues concern the level of preferences, the latter again moves us back to the realm of information problems. Let me this time start in the preference domain.

5.1 Preferences and the character of the good

In the valuation literature we observe ethically oriented concepts like ‘non-use values,’ ‘existence value’ and ‘warm glow.’ They have all created extensive debates. I would like to focus on two issues: Are altruistic motives rational, and what do the interrelationships involved between humans mean for a rational preference formation?

5.1.1 Are altruistic motives rational?

Within the neoclassical tradition, two competing positions can be found concerning the standing of altruistic motives. Some, like Romp (1997), term preferences not based on individual interests irrational. Parallel to this position we have the idea that economic value should only cover a person’s selfish motives. In the CV debate, Milgrom (1993) formulates this explicitly. He claims that for the CV-approach to be even theoretically valid within a cost-benefit framework “it would be necessary for people’s individual existence values to

¹¹ This is not an issue with relevance only for environmental goods. Also in the market place, relational conditions may be of great significance causing the same kind of problem as observed here (see as an example Groenewegen 1997).

reflect only their own personal economic motives and not altruistic motives, or sense of duty, or moral obligation” (p. 431). Otherwise double counting will occur.

Most CV practitioners take a different stand. Hanemann (1994) is a well-articulated representative. With references to Arrow and Becker, he claims that any element the consumer finds appropriate may enter the utility function. This also goes for moral commitments and altruistic motives. He demonstrates that double counting only appears for a specific and not very convincing formulation of the utility function. Further, as long as there is reciprocity – i.e., that others also care and thus pay – the double counting problem vanishes by itself.

We should observe that the difference between Milgrom and Hanemann is only one of degree. The possibility that we may have moral obligations that make us act in a way that reduces own utility find no place in any of these positions. Only ‘selfish altruism’, as opposed to ‘selfless altruism’ (Crowards 1997), acquires place in the standard economist apprehension of rationality. Thus, the concept of ‘warm glow’ – understood as selfish altruism – may easily fit within the standard core of economics.

I find it almost offensive that preferences not based on individual satisfaction have to be termed irrational. This most profoundly illustrates the problem economic theory has with handling value interrelations – i.e., issues concerning our choices as they in this case by necessity have to affect also other humans. I believe this cannot be solved within the framework of methodological individualism. If behavioral revelation is the only accepted way to inform about motives, it may certainly be hard to empirically distinguish between ‘selfish’ and ‘selfless’ acts. This does not imply, however, that the distinction is unimportant.

5.1.2 Interrelated goods and interconnected preferences

Through nature's interdependencies, what one person does influences the possibilities for others. In such a situation it seems rational for any person to ask others to take ones own interests into

account – i.e., to engage in a discourse over what are legitimate preferences.

The farthest neoclassical theorists have come into this area is to introduce repetitive games – i.e., that each player may observe the cooperative will of others – before determining own actions. This is a form of ‘reciprocal altruism’ (Crowards 1997), which is a different class from ‘selfish altruism’ since in the latter case it is the act of giving that in itself produces utility.

This is in my mind still too narrow. To be able to develop the common good, we must deliberate over what it should contain. This way, influencing each other’s preferences through moral discourse must be both legitimate and rational. In such a situation the one would like to reason with the other about what are reasonable or defensible preferences, both because we influence the situation for each other including those of the generations to come. This perspective directs the attention towards the group or the forum, not the market. In my mind this insight is the strongest argument for using group processes when evaluating environmental (common) goods. It is the soundness of the argument, not the purchasing power that should count.

O’Neill (1998) emphasizes that the most profound element of the neo-classical revolution in economics was to remove any question about what is a good or right way of living. Due to the interdependencies involved in life, it is curious to individualize these issues. Moral commitments belong to another class of action than commodity transactions. They can hardly be transformed into monetary representations without at least causing confusion for the one being asked to express her values. More specifically, the logic of norm following has very little to do with optimization at the margin. Certainly, many of the protest bids observed in CV studies or problems that people report in verbal protocols seems to have originated from exactly this underlying contradiction.

5.2 'Part-whole bias,' 'total value,' and the demand for information

Concepts like the 'embedding effect' or 'part-whole bias' have flourished in the environmental valuation literature over the last 15 years (see among others: Kahneman 1986; Kahneman and Knetsch 1992; Hanemann 1994; Boyle et al. 1994. Smith and Osborne 1996; Carson 1997b). The debate has almost entirely been on the issue of how much higher the willingness to pay for protecting let's say five lakes as compared to one lake should be to count the answers as economically sensible.

The literature on these issues is far from conclusive. Hanemann (1994) and Carson (1997b), emphasize that studies showing embedding effects are badly conducted or that the observations are not counter to what should be expected from economic theory. Substitution rates between different environmental goods or the marginal value of different levels of the same good may be such that observations fit the standard core assumptions.¹² Authors like Kahneman and Knetsch (1992), on the other hand, argue that the embedding effect is a result of the purchase of moral satisfaction. It is the 'warm glow' of giving.

Here it is the proponents of CV studies that tend to dismiss 'evidence,' while the opponents actually resort to ad hoc modifications. Diamond et al. (1993) seize the 'warm glow' argument and claim: "WTP survey answers are not consistent with underlying preferences" (p. 60). Referring to the fact that people are not totally insensitive to the scale or scope of the good, they then add: "Of course, the absence of perfect embedding does not imply that the survey answers are consistent with economic preferences... We do not expect to find perfect embedding over a wide range of number of wilderness areas to be preserved, because we expect the 'warm glow' to vary somewhat with the size of the 'cause'" (p. 60).

In this analysis 'warm glow' takes on the role of protecting the core assumption about

¹² Note that the arguments are parallel to those of Hoehn and Randall (1989) concerning the sequencing effect.

economic rationality. Diamond et al. support the Milgrom (1993) position that altruistic behavior should not count as relevant for economic (CBA) analysis. The hypothesis is, however, ad hoc since it produces no new testable consequences. Moreover the chosen solution is not without costs. Diamond et al. have to accept that there are important areas with economic consequences to which economic theory, as they conceive it, cannot have a meaningful say.

An alternative explanation to the low increase in bids to more comprehensive goods is based on the idea that respondents have more sophisticated views of the good than the economic researcher assumes. Schulze et al. (1994) argue that in the case of species protection, the respondents may not only think of the specific species. They may also include the ecosystem to which it belongs. "Butterfly species in the Amazon are becoming extinct because of the loss of habitat. The only way to save one species is to save all of them by saving the forest as well" (p. 16). Again it is not possible to draw conclusions about the validity of the reasoning, at least on the basis of existing surveys. The proposal is, however, interesting. We are actually back to the argumentation raised in the section about the sequencing effect and the demarcation of the good.

The environmental good is basically a system of complex interrelationships developed over billions of years. The various life-supporting systems are generated through long enduring trial and error processes. The different species and the bio-geo-chemical processes they are a part of have in fact formed each other during this development (Ayres 1993; Graves and Reavy 1996). The information problem when evaluating such systems features is vast, and cannot be fundamentally solved. Two observations are important: The problem is of different magnitude dependent on the type of good to be valued. WTP for a fishing experience is informationally spoken a much easier task than WTP for preserving a species or an area. Further, dialogue will again be important to help respondents converge towards the same definition of the good at stake.

(..fortsatt)

Actually the issues of sequencing effect and embedding are two sides of the same coin given standard interpretations.

The environment is not only a ‘whole,’ it is also a ‘non-produced’ good. Willingness to pay measures are, as an example, bound by the budget constraint. This constraint in turn is in total defined by the size of the economy. The problem is that there is no relationship between this size and the values that natural processes create for humans. Thus WTP estimates – at least – are a victim of the *fallacy of composition* error. What may be logically undertaken for each and every piece alone becomes erroneous if conducted for many or all pieces together.¹³ Certainly, one may argue that the idea of CV or other types of marginal assessments is not to value the sum of ecosystem services.¹⁴ On the other hand, since environmental goods are linked, can marginal analyses offer anything at all? The question becomes at best how many ‘items’ can be valued before the internal logic breaks down, which item to choose first etc.

6. Conclusion

In the environmental valuation literature a number of deviations from standard assumptions in economic theory are observed; some are just due to badly constructed or conducted surveys; others may after deeper thought still be consistent with the model. A large number do, however, challenge one or more assumptions. This paper points especially at problems related to presumptions about information and information handling, and the characteristics of preferences and preference formation. Generally, it emphasizes errors that appear because of lacking in-

¹³ Although my reasoning here to some extent is in line with that of Hoehn and Randall (1989) – i.e., that simple summation may be inconsistent – I thus oppose their claim that summing estimates for various environmental goods will always produce too high value estimates for the environment in total. They emphasize that while each single change is (almost) independent of its income effect, the sum of all goods will not be thus unrelated. This I support, and it holds for both WTP and WTA measures. My argument is that the value of the environment cannot be limited by the size of the economy. Another way of saying the same is to acknowledge that – given economic valuation is acceptable at all – WTA is normally the consistent type of value estimate in the case of the physical environment. It will normally be the loss of naturally produced functions or goods that are at stake. Thus aggregate CBA estimates may well be too low, while they may not be consistent if based on the summation of independent studies.

¹⁴ It is rather "puzzling" that a leading ecological economist is responsible for a study that was actually intending to do this - i.e. Costanza et al. (1997). Maybe we here observe how demanding it is to combine insights

sights into the role of the social spheres in shaping both information and preferences.

Information problems render the whole idea of optimization indefinable. While many authors have observed this puzzle, it seems not to have been taken properly care of in mainstream neo-classical economic theory. Specifically, this problem shows up in a long list of anomalies in valuation studies. I believe a better understanding concerning how information problems are handled, is found through expanding the analysis from the individual to the social level. I will thus emphasize the following hypotheses as basis for developing improved insights:

Generally:

- Through the co-operative production of knowledge and choice rules, the social sphere plays a crucial role in supporting individuals in understanding choice issues and handling individually insurmountable information problems.
- Faced with choices involving great informational needs, the individual utilizes choice rules defined for situations with similar characteristics.

Specifically:

- The perceived quality of a good is influenced by the valuation of others – e.g., price bids may be taken to convey information about the quality of a good; respondents are looking for clues in the material presented concerning what might be a reasonable value; respondents may anchor bids on costs.

Concerning preferences and preference formation I find that the valuation literature gives support to several hypotheses. I would like to emphasize the following:

- Preference orderings are neither complete nor continuous. They are organized in classes between which trade-offs are blocked or heavily restricted.
- Preferences are ordered relative to the status quo as experienced by the individual.

(..fortsatt)

from different disciplines without applying some of them inconsistently.

- Preferences are the result of learning – both about what is attainable and what is socially reasonable or permissible.
- Aspects of fairness – e.g., considerations concerning fair distribution of costs – have an autonomous influence bids.
- Due to the common good characteristics of important goods, what one person prefers influences the opportunity set of others. This act as a motivation for individuals to take part in deliberation over which preferences are legitimate to hold.

Given this understanding, it is no wonder that a theory based on a purely individualistic and context independent perspective happens to be faced with anomalies. This does in my mind not imply that the individual isn't a prime object of economic research. What is lacking is an understanding of how individuals relate to each other and how social processes help the individual to act reasonably – should I dear say rationally.

References

- Aldred, J. and M. Jacobs, 1997. *Citizens and Wetlands*. Report of the Ely Citizen's Jury. Mimeo. Centre for the Study of Environmental Change. Lancaster University
- Arrow, K., R. Solow, P.R. Portney, E.E. Leamer, R. Radner and H. Schuman, 1993. *Report of the NOAA Panel on Contingent Valuation*. Mimeo.
- Ayres, R.U., 1993. Cowboys, cornucopians and long-run sustainability. *Ecological Economics*, 8(3):189-207.
- Becker, G.S., 1993. Nobel Lecture: The Economic Way of Looking at Behavior. *Journal of Political Economy*, 101(3):385-409.
- Berger, P. and T. Luckman, 1967. *The Social Construction of Reality. A treatise in the Sociology of Knowledge*. New York: Penguin Books.
- Bergland, O., 2001. Attribute-Based Stated Preference Methods. Nota di lavoro. Fondazione Eni Enrico Mattei, Milano.
- Bowles, S., 1998. Endogenous Preferences: The Cultural Consequences of Markets and Other Economic Institutions. *Journal of Economic Literature*, XXXVI (March):75-111.
- Boyle, K.J., W.H. Desvousges, F. R. Johnson, R.W. Dunford and S.P. Hudson, 1994. An Investigation of Part-Whole Biases in Contingent-Valuation Studies. *Journal of Environmental Economics and Management*, 27:64-83.
- Boyle, K.J., F.R. Johnson and D.W. McCollum, 1997. Anchoring and Adjustment in Single-Bounded Contingent-Valuation Questions. *American Journal of Agricultural Economics*, 79(5):1495-1500.
- Brouwer, R., N. Powe, R.K. Turner, I.J. Bateman and I.H. Langford, 1999. Public Attitudes to Contingent Valuation and Public Consultation. *Environmental Values* 8:325-347.

- Burgess, J., M. Limb, C.M. Harrison, 1988a. Exploring environmental values through the medium of small groups: 1. Theory and Practice. *Environment and Planning A*, 20:309-326.
- Burgess, J., M. Limb, C.M. Harrison, 1988b. Exploring environmental values through the medium of small groups: 2. Illustration of a group at work. *Environment and Planning A*, 20:457-476.
- Burgess, J., J. Clark and C. Harrison, 1995. *Valuing Nature: What lies behind Responses to Contingent Valuation Surveys?* Paper, Dept. of Geography, Univ. College London.
- Carson, R.T 1997a. Contingent Valuation: Theoretical Advances and Empirical Tests since the NOAA Panel. *American Journal of Agricultural Economics*, 79(5):1501-1507.
- Carson, R.T., 1997b. Contingent Valuation Surveys and Tests of Insensitivity to Scope. In Kopp, R.J., W.W. Pommerhene and N. Schwarz (eds.): *Determining the Value of Non-marketed Goods. Economic, Psychological, and Policy Relevant Aspects of Contingent Valuation Methods*. Boston/Dordrecht/London: Kluwer Academic Publishers, pp. 127-164.
- Carson, R.T., N.E. Flores and W.M. Hanemann, 1998. Sequencing and Valuing Public Goods. *Journal of Environmental Economics and Management*, 36:314-323.
- Chalmers, A.F., 1982. *What is this thing called science*. Buckingham: Open Univ. Press. 2. ed.
- Chang, R., 1997. *Incommensurability, Incomparability, and Practical Reason*. Cambridge/Massachusetts: Harvard Univ. Press.
- Clark, J., J. Burgess and C.M. Harrison, 2000. "I struggled with this money business": respondents' perspectives on contingent valuation. *Ecological Economics*, 33:45-62.
- Costanza, R., R. d'Arge, R. de Groot, S. Faber, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R.V. O'Neill, R.G. Raskin, P. Sutton and M. van den Belt, 1997. The value of the world's ecosystem services and natural capital. *Nature*, 387:253-260.
- Crowards, T., 1997. Nonuse Values and the Environment: Economic and Ethical Motivations. *Environmental Values*, 6:143-167.
- Cummings, R. G. and G. W. Harrison, 1992. *Identifying and Measuring Nonuse Values for Natural and Environmental Resources: A Critical Review of the State of the Art*. Dept. of Economics, Univ. of New Mexico, (mimeo).
- Deaton, A. and J. Muellbauer, 1980. *Economics and Consumer Behavior*. Cambridge: Cambridge University Press.
- Desvousges, W., F.R. Johnson, S. Hudson, A. Gable and M. Ruby, 1996. *Using Conjoint Analysis and Health-State Classifications to Estimate the Value of Health Effects of Air Pollution*. Report for Environment Canada, Triangle Research Institute.
- Diamond, P.A. and J.H. Hausman, 1994. Contingent Valuation: Is Some Number Better than No Number? *Journal of Economic Perspectives*, 8(4):45-64.
- Diamond, P.A. and J.H. Hausman, 1993. Contingent Valuation-Based Estimates of Nonuse Value: An Overview and Outlook. In J.A. Hausman (ed.): *Contingent Valuation. A Critical Assessment*. Amsterdam: North Holland, pp 3-38.
- Diamond, P.A., J.H. Hausman, G.K. Leonard and M.A. Denning, 1993. Does Contingent Valuation Measure Preferences? Experimental Evidence. In J.A. Hausman (ed.): *Contingent Valuation. A Critical Assessment*. Amsterdam: North Holland, pp 41-85.
- Duesenberry, J.S., 1949. *Income, Saving and the Theory of Consumer Behavior*. Cambridge: Mass., Harvard Univ. Press.
- Eggertsson, T., 1990. *Economic behavior and institutions*. Cambridge: Cambridge Survey of Economic Literature.
- Elster, J., 1983. *Sour Grapes: Studies in the Subversion of Rationality*. Cambridge: Cambridge Univ. Press.
- Elster J., 1984. *Ulysses and the Sirens: Studies in Rationality and Irrationality*. Cambridge: Cambridge Univ. Press.

- Foulkes 1975. *Group-Analytic Psychotherapy*. London: Gordon and Breach.
- Garrod, G. and K. Willis, 1998. Using Contingent Ranking to Estimate the Loss of Amenity Value for Inland Waterways from Public Utility Service Structures. *Environmental and Resource Economics*, 12:241-247.
- Graves, J and D. Reavy. 1996. *Global Environmental Change*. London: Longman.
- Gregory, R., 1986. Interpreting Measures of Economic Loss: Evidence from Contingent Valuation and Experimental Studies. *Journal of Environmental Economics and Management*, 13:225-237.
- Groenewegen, J., 1997. Institutions of Capitalism: American, European and Japanese Systems Compared. *Journal of Economic Issues*, XXXI(2):333-347.
- Habermas, J., 1984. *The Theory of Communicative Action*. Boston: Beacon Press.
- Halvorsen, B., 1996. Ordering Effects in Contingent Valuation Surveys. *Environmental and Resource Economics*, 8:485-499.
- Hanemann, W.M., 1991. Willingness to Pay and Willingness To Accept: How Much Can They Differ? *The American Economic Review*, 81(3):635-647.
- Hanemann, W.M. 1994. Valuing the Environment through Contingent Valuation. *Journal of Economic Perspectives*, 8(4):19-43.
- Hanley, N.D, D. MacMillan, R.E. Wright, C. Bullock, I. Simpson, D. Parsisson and B. Crabtree, 1998. Contingent Valuation versus Choice Experiments: Estimating the Benefits of Environmentally Sensitive Areas in Scotland. *Journal of Agricultural Economics*, 49 (1): 1-15.
- Hausman, D.M., 1992. *The inexact and separate science of economics*. Cambridge: Cambridge Univ. Press.
- Herriges, J.A. and J.F. Shogren, 1996. Starting Point Bias in Dichotomous Choice Valuation with Follow-Up Questioning. *Journal of Environmental Economics and Management*, 30:112-131.
- Hodgson, G.M., 1988. *Economics and Institutions*. Cambridge: Polity Press.
- Hodgson. G.M., 1998. The Approach of Institutional Economics. *Journal of Economic Literature*, XXXVI (March):166-192.
- Hoehn, J.P., 1991. Valuing the Multidimensional Impacts of Environmental Policy: Theory and Methods. *American Journal of Agricultural Economics*, 73(2):289-299.
- Hoehn, J.P. and A. Randall, 1989. Too Many Proposals Pass the Benefit Cost Test. *The American Economic Review*, 79(3):544-551.
- Holland, A., 1997. Substitutability, or why strong sustainability is weak and absurdly strong sustainability is not absurd. In Foster, J. (ed). *Valuing Nature? Economics, Ethics and Environment*. London: Routledge, pp. 119-134.
- Holmes T.P. and R.A. Kramer, 1995. An Independent Sample Test of Yea-Saying and Starting Point Bias in Dichotomous-Choice Contingent Valuation. *Journal of Environmental Economics and Management*, 29:121-132.
- Hollis, M. and E. Nell, 1975. *Rational Economic Man. A Philosophical Critique of Neo-Classical Economics*. Cambridge: Cambridge Univ. Press.
- Hoevenagel, R., 1996. The Validity of the Contingent Valuation Method: Perfect and Regular Embedding. *Environmental and Resource Economics*, 7:57-78.
- Kahneman, D., 1986. Valuing Environmental Goods. An Assessment of the Contingent Valuation Method: The Review Panel Assessment. In Cummings, R.G. and D.S. Brookshire (eds.): *Valuing Environmental Goods: An Assessment of the Contingent Valuation Method*. New Jersey: Rowman & Allanheld, pp. 185-194.
- Kahneman D. and J. L. Knetsch, 1992. "Valuing Public Goods: The Purchase of Moral Satisfaction." *Journal of Environmental Economics and Management*, 22:57-70.
- Kealy, M.J. and R.W. Turner, 1993. A test of the equality of closed-ended and open-ended

- contingent valuation. *American Journal of Agricultural Economics*, 75:221-231.
- Knetsch, J., 2000. Environmental valuation and standard theory: behavioural findings, context dependence and implications. In Tietenberg, T. and H. Folmer (eds.): *The International Yearbook of Environment and Resource Economics 2000/2001: A Survey of Current Issues*. Cheltenham: Edward Elgar.
- Knudsen, C. 1993. Equilibrium, Perfect Rationality and the Problem of Self-Reference in Economics. In Mäki, U., B. Gustafsson & C. Knudsen (eds.): *Rationality, Institutions and "Economic Methodology"*. London: Routledge. pp. 133-170
- Kuhn, T.S., 1962. *The Structure of Scientific Revolutions*. Chicago: Univ. of Chicago Press.
- Lakatos, I., 1974. Falsification and the Methodology of Scientific Research Programmes. In Lakatos, I. and A. Musgrave (eds.): *Criticism and the Growth of Knowledge*. Cambridge: Cambridge Univ. Press, pp. 91-196.
- McFadden, D. and G.K. Leonard, 1993. Issues in the Contingent Valuation of Environmental Goods: Methodologies for Data Collection and Analysis. In J.A. Hausman (ed.): *Contingent Valuation. A Critical Assessment*, pp 165-208. Amsterdam: North Holland.
- Meade, W.J., 1993. Review and Analysis of State-of-the-Art Contingent Valuation Studies. In J.A. Hausman (ed.): *Contingent Valuation. A Critical Assessment*. Amsterdam: North Holland, pp 305-332.
- Milgrom, P. 1993. Is Sympathy an Economic Value? Philosophy, Economics, and the Contingent Valuation Method. In J.A. Hausman (ed.): *Contingent Valuation. A Critical Assessment*. Amsterdam: North Holland, pp 417-435.
- Mitchell, R.C. and R.T. Carson, 1989. *Using Surveys to Value Public Goods: The Contingent Valuation Method*. Washington D.C., Resources for the Future.
- Morgenstern, O., 1935 (1976). Vollkommene voraussicht und wirtschaftliches gleichgewicht. *Zeitschrift für Nationalökonomie*, 6. In English: Perfect foresight and economic equilibrium. Published in Schotter, A. (ed.): *Selected Economic Writings of Oscar Morgenstern*, New York: New York Univ. Press, pp. 169-183.
- Navrud, S. (ed.), 1992. *Pricing the European Environment*. Oslo: Scand. Univ. Press.
- Norgaard, R.B, 1994. *Development Betrayed. The end of progress and a coevolutionary revisioning of the future*. London and New York: Routledge
- O'Connor, R.M., M. Johannesson and P-O Johansson, 1999. Stated Preferences, Real Behavior and Anchoring: Some Empirical Evidence. *Environmental and Resource Economics*, 13:235-348.
- O'Neill, J., 1993. *Ecology, Policy and Politics. Human Well-Being and the Natural World*. London: Routledge.
- O'Neill, J., 1998. *The Market. Ethics, Knowledge and Politics*. London: Routledge.
- Ostrom, E., 1990. *Governing the Commons. The Evolution of Institutions for Collective Action*. Cambridge: Cambridge Univ. Press.
- Portney, P.R., 1994. The Contingent Valuation Debate: Why Economists Should Care. *Journal of Economic Perspectives*, 8(4):3-17.
- Randall, A., 1997. The NOAA Panel Report: A New Beginning or the End of an Era? *American Journal of Agricultural Economics*, 79(5):1489-1494.
- Romp, G., 1997. *Game Theory. Introduction and Applications*. Oxford: Oxford Univ. Press.
- Schkade, D.A and J.W.Payne, 1993. Where Do the Numbers Come From? How People Respond to Contingent Valuation Questions. In J.A. Hausman (ed.): *Contingent Valuation. A Critical Assessment*. Amsterdam: North Holland, pp 271-293.
- Schulze, W., G. McClelland and J. Lazo, 1994. *Methodological issues in using contingent valuation to measure non-use values*. Paper EPA/DOE workshop, Herndon, USA.
- Screpanti, E., 1995. Relative Rationality, Institutions and Precautionary Behaviour. In Groene-

- wegen, J., C. Pitelis and S.E. Sjöstrand (eds.): *On Economic Institutions - Theory and Applications*. Cheltenham: Edward Elgar, pp. 63-84.
- Sen, A., 1977. Rational Fools: A Critique of the Behavioral Foundations of Economic Theory. *Philosophy and Public Affairs*, 6:317-344.
- Sen, A., 1997. Maximization and the Act of Choice. *Econometrica*, 65(4):745-779.
- Slovic, P., D. Griffin and A. Tversky, 1990. Compatibility effects in judgement and choice. In R.M. Hogart (ed.): *Insights in decision making: A tribute to Hillel J. Einhorn*. Chicago: Univ. of Chicago Press.
- Smith, V.K. and L.L. Osborne, 1996. Do Contingent Valuation Estimates Pass a "Scope" Test? A Meta-analysis. *Journal of Environmental Economics and Management*, 31:287-301.
- Spash, C.L., 2000. Multiple Value Expression in Contingent Valuation: Economics and Ethics. *Environmental Science Technology*, 34:1433-1438.
- Spash, C.L. and N. Hanley, 1995. Preferences, information and biodiversity preservation. *Ecological Economics*, 12:191-208.
- Stevens T.H., J. Echeverria, R.J. Glass, T. Hager and T.A. Moore, 1991. Measuring the Existence Value of Wildlife: What do CVM Estimates Really Show. *Land Economics*, 67:390-400.
- Tversky, A. and D. Kahneman, 1986. Rational Choice and the Framing of Decisions. In R. M. Hogarth and M. W. Reder (eds.): *Rational Choice. The Contrast between Economics and Psychology*. Chicago: Univ. of Chicago Press, pp. 67-94.
- Vandjal and M. O'Connor, 1994. What is the Value of Rangitoto Island? *Environmental Values*, 3:369-380.
- Vatn, A., 2000. The Environment as a Commodity. *Environmental Values*, 9:493-509.
- Vatn, A. and D. Bromley, 1994. Choices without Prices without Apologies. *Journal of Environmental Economics and Management*, 26:129-148.
- Willig, R.D., 1976. Consumer surplus without apology. *The American Economic Review*, 66(4):589-97.