

Save the Seals? Are Causes of Threats Important?¹

Introduction

Environmental economics is concerned with the broader picture of economics and focuses on the management of natural resources in relation to economic activities. In this context, the concept of value has to be extended to include the existence value or intrinsic value attached to certain species and to natural beauty. Economists basically argue that a price has to be attached to environmental goods and services to prevent excessive threats to their existence. In general, existence values cannot be derived from market observations so other techniques have to be developed to get an idea of these values. Contingent valuation, a survey technique that determines willingness-to-pay (contingent on the description of a certain situation) became the standard approach. Many contingent valuation studies have been performed, and both design and econometric techniques improved considerably over time.



Professor Aart de Zeeuw

Department of Economics,
Tilburg University, The Netherlands
E-mail: A.J.deZeeuw@uvt.nl
CAS Fellow 2005/2006

Results of contingent valuation studies are usually interpreted through the lens of a purchase model in which utility is a function of outcomes or consequences only. This perspective has been challenged both by psychologists and economists who have recognized the importance of attributes of choices being made. For example, Kahneman and others (1993), Kahneman and Ritov (1994), DeKay and McClelland (1996) and Brown and others (2002) provide evidence that people are willing to pay (WTP) more to avoid an environmental problem if they think it is man-caused than if they think it is an outcome of nature. Kahneman and others (1993) refer to this as the ‘outrage effect’. Their empirical results suggest that intentional harm caused by humans is considered more upsetting than unintentional harm, and therefore triggers a larger WTP response to ameliorate the problem. Another reason for the higher WTP response may be that people argue that human causes are easier to control. Therefore they may attach a higher probability to the actual provision of the public good, leading to a higher stated WTP. In this article, we will stick to Kahneman’s explanation. The respondents in these studies are either museum visitors or students in a laboratory, and are thereby not really representative of the whole population. We use responses from a large representative panel of Dutch households to check the hypothesis.

Results of contingent valuation studies are usually interpreted through the lens of a purchase model in which utility is a function of outcomes or consequences only. This perspective has been challenged both by psychologists and economists who have recognized the importance of attributes of choices being made. For example, Kahneman and others (1993), Kahneman and Ritov (1994), DeKay and McClelland (1996) and Brown and others (2002) provide evidence that people are willing to pay (WTP) more to avoid an environmental problem if they think it is man-caused than if they think it is an outcome of nature. Kahneman and others (1993) refer to this as the ‘outrage effect’. Their empirical results suggest that intentional harm caused by humans is considered more upsetting than unintentional harm, and therefore triggers a larger WTP response to ameliorate the problem. Another reason for the higher WTP response may be that people argue that human causes are easier to control. Therefore they may attach a higher probability to the actual provision of the public good, leading to a higher stated WTP. In this article, we will stick to Kahneman’s explanation. The respondents in these studies are either museum visitors or students in a laboratory, and are thereby not really representative of the whole population. We use responses from a large representative panel of Dutch households to check the hypothesis.

1: This article is part of an article that was published in the *Journal of Environmental Economics and Management* (volume 49, pages 330–342, 2005) and co-authored by Erwin Bulte, Shelby Gerking and John List. I am grateful for the important comments of a reviewer.

Save the Seals? Are Causes of Threats Important?

The specific case under consideration is the conservation of a locally threatened species (seals in the Netherlands). Our main objective is to test whether WTP indeed increases when humans instead of nature (a virus) cause the harm. We distinguish between two (unintentional) types of possible human causes: (i) global warming, where society-at-large is responsible (and arguably everyone, albeit only minimally), and (ii) drilling for oil and gas where, in their pursuit of profits, industry causes the damage. It should be noted here that mitigating global warming and oil- and gas-drilling is not only beneficial for seals but has other positive effects as well, so that people may in fact be valuing a more comprehensive good. It should also be noted that people might not be valuing the species as such but the larger good of the habitat or even the ecosystem (see Veisten et al. (2004)). More research is needed to check these points or to disentangle the different possibilities. The outrage effect predicts that WTP for both human causes exceeds WTP for the natural cause. Outrage may also predict that the WTP to undo harm caused by oil- and gas-drilling firms will be higher than WTP to undo harm caused by global warming. However, a counter-effect may be at work here. Walker and others (1999) hypothesize that WTP is driven by the degree of responsibility people feel for the damages and that may be higher in the case of global warming.



Harbour seal in the Waddenzeel.

Photo: Seal Research and Rescue Center of Pieterburen (SRRC)

Data and experimental design

Data were obtained from a survey of participants in the CentERpanel (www.centerdata.nl), which consists of more than 2 000 households in the Netherlands. Panel members are selected to be representative of the Dutch population.

The analysis focused on declines in the seal population in the Waddenzeel (an estuary in the north of the Netherlands), a problem that has been widely publicized in the Netherlands for many years. The seal population reached a low point of about 300 animals in the 1970s. Currently, the number of animals has recovered to some 2 000 seals, but that number is still much lower than the 18 000 seals that lived in the Waddenzeel in the beginning of last century. The seal population is

Save the Seals? Are Causes of Threats Important?

threatened by three possible and distinct developments. First, new diseases (especially certain viruses) have taken a severe toll on the population in the past and continue to pose a serious threat. Second, climate change and the associated rise of the sea level might trigger the disappearance of the seal's breeding grounds. Third, commercial oil and gas drilling may have the same effect, not because the sea level rises, but because the land level falls. The threat from viruses represents the case in which the seal population may be harmed by natural causes for which no societal group is responsible, whereas with oil and gas drilling, actions undertaken by a comparatively small group of people for private gain contribute directly to the species' hardship. Climate change represents an intermediate situation in which virtually everyone is to some extent responsible for the problem.

The survey began with a brief introduction, in which attention was directed to the declining seal population. Then, panellists were presented with a description of one of the three types of threats along with a plausible mitigation measure. These scripts are shown below.

1. *Virus*: A number of factors continue to threaten the seal population.

One important threat is a new virus that undermines the species' resistance to various diseases. The origins of the virus are unknown, but it is regarded as a 'natural enemy' of the seal population. The spreading of the virus is a natural process, independent of human actions. It is possible that, without any preventive actions, the seal population in the Waddenzee will fall by some 50 per cent. An effective preventive measure would be a vaccination program.

2. *Climate change*: A number of factors continue to threaten the seal population. One important threat is climate change, mainly caused by our burning of fossil fuels. An important risk of climate change and the associated rise of the sea level is that breeding grounds will be submerged for longer periods. This will have an adverse impact on the ability of female seals to deliver and feed young seals. It is possible that, without any preventive actions, the seal population in the Waddenzee will decline by some 50 per cent. An effective preventive measure would be to elevate the existing sand banks.

3. *Oil and gas drilling*: A number of factors continue to threaten the seal population. As regards drilling for gas by oil and gas companies in the Waddenzee, one important risk of gas exploitation is that the land level will fall so that breeding grounds will be submerged for longer periods. This will negatively impact the ability of female seals to deliver and feed young seals. Barring any preventative actions, it is possible that the seal population in the Waddenzee will decline by some 50 per cent. One effective preventive measure would be to elevate the existing sand banks.

Panellists were asked to value conservation measures to protect seals from further harm. In each case, panellists were asked one discrete choice valuation question where they were to respond yes or no to a specific amount of money. Information (income, education, age, gender, family size, province of residence) about panellists was not collected in the survey because it was already available.

Results

The dichotomous choice responses obtained can be modelled parametrically by specifying the linear WTP function as follows:

Save the Seals? Are Causes of Threats Important?

$$Y = \beta_0 + \beta_1 DRILL + \beta_2 CLIMATE + \zeta\gamma + u.$$

WTP to protect seals (Y) is expressed in terms of treatment effects ($DRILLING$, $CLIMATE$), a vector of controls for panellist characteristics (ζ), and an additive stochastic preference term (u). In this equation, the β_j and the elements of γ are coefficients to be estimated and u is assumed to have a normal distribution. The constant, β_0 , is interpreted as WTP to avoid the virus threat.

Does the source or cause of an environmental problem affect WTP or, in other words, does the outrage effect exist? As typically applied, standard utility theory holds that utility depends solely on outcomes, and that the cause is unimportant. If people value only outcomes and do not care about the cause, then the equation is $\beta_1 = \beta_2 = 0$. This joint hypothesis is rejected at the 5 per cent level using a likelihood ratio test. Also, t-tests reject the individual null hypotheses that $\beta_1 = 0$ and $\beta_2 = 0$ at the 5 per cent significance level. Thus, the oil and gas drilling and the climate change treatments differ from the virus treatment: people are willing to pay more to avoid man-caused environmental harm than if the harm is caused by an act of nature. These results broadly support the existence of an outrage effect and are consistent with earlier work using museum visitors and undergraduates as subjects.

The results do not reject the null hypothesis that $\beta_1 = \beta_2$ at the 5 per cent level. Thus, WTP is not significantly different at conventional levels when the harm is caused by a specific group of people (oil and gas firms), compared with when it is caused by society as a whole (climate change from greenhouse gas emissions). An explanation for our result could be that the two effects cancel out. On the one hand, people may consider harm caused to increase a corporation's profits to be more 'unfair' than harm caused by society-at-large, triggering more 'outrage' and a larger contribution to offset the damages. On the other hand, people may also be driven by moral responsibility for their own actions, which is stronger in the case of global warming. More research is needed here.

References

- Brown, T.C., D. Nannini, R.B. Gorter, P.A. Bell, and G.L. Peterson, "Judged seriousness of environmental losses: reliability and cause of loss", *Ecological Economics* 42, 479–491, 2002.
- DeKay, M.L., and G.H. McClelland, "Probability and utility components of endangered species preservation programs", *Journal of Experimental Psychology: Applications* 2, 60–83, 1996.
- Kahneman, D., I. Ritov, K.E. Jacowitz, and P. Grant, "Stated willingness to pay for public goods: a psychological perspective", *Psychological Science* 4, 310–315, 1993.
- Kahneman, D., and I. Ritov, "Determinants of stated willingness to pay for public goods: a study in the headline method", *Journal of Risk and Uncertainty* 9, 5–38, 1994.
- Veisten, K., H.F. Hoen, S. Navrud, and J. Strand, "Scope insensitivity in contingent valuation of complex environmental amenities", *Journal of Environmental Management* 73 (4), 317–331, 2004.
- Walker, M.E., O.F. Morera, J. Vining, and B. Orland, "Disparate WTA-WTP disparities: the influence of human versus natural causes", *Journal of Behavioral Decision Making* 12, 219–232, 1999.