Did people "buy" what was "sold"? A qualitative evaluation of a contingent valuation survey information set for gains in life expectancy

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ABSTRACT

A number of stated preferences studies have estimated a monetary value for the gains in life expectancy resulting from pollution control, using a Value of a Life Year (VOLY) approach. However, life expectancy gains are a complex concept and no attempt has been made, to date, to investigate peoples' understanding of what it is they are being asked to value. Past practice has been to focus on the outcome of a policy i.e. a gain to the average person of X months', providing no details on how the individual receives, or experiences this gain, a potentially important attribute to value. This paper sets up and reports the results from a structured debriefing exercise to qualitatively investigate an alternative approach which explicitly emphasises how this gain is delivered (on-going reductions in the risk of death). We find that, for the majority of respondents, the approach is effective in communicating the on-going nature of the gain and reduces or eliminates the use of the (incorrect) heuristic that it is an 'add-on' at the end of life, in poor health. Further refinements are required, however, to communicate the cumulative nature of these risk reductions and the lack of impact on quality of life. The lesson for stated preference studies in general is that structured debriefings can be very useful, highlighting such issues as the persistence of ill-defined attributes and the difficulties that respondents may encounter setting aside their preferences over attributes of the good that should not be included in the valuation.

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1. Introduction

The monetary value of health benefits or costs to individuals from different environmental regulations has been increasingly requested by government departments in the European Union countries and the USA for use in cost-benefit analyses of these programmes. Desaigues et al. (2011) note that all valuation studies before 1996 calculate the economic cost of mortality as a number of premature deaths due to pollution multiplied by the value of prevented fatalities (also called 'Value of Statistical Life' (VSL)). This practice is supported by the fact that the underlying theoretical framework for the valuation of a one-period risk reduction (Jones-Lee, 1976) is fully specified and well established. However, life expectancy gains from pollution control arise from multi-period i.e. on-going risk reductions over a lifetime, for which a valuation model or framework (termed the Value of a Life Year, or VOLY) has not been established in the formal sense.[1] These risk reductions to individuals within the affected population generate the population-based estimate of life expectancy, which expresses how many more months/years an average individual of a particular age can expect to live. So, for example, a 40 year old male in the UK has a life expectancy of 38 years (although some will die before they reach 78 while others will live longer).

[1] Approaches such as those in Mason et al. (2009) establish a procedure to calculate a VOLY indirectly from a VSL, which is not the same concept.

Coupled with this, a general concern exists about the availability of sound estimates and the degree to which reliable methods have been developed for the empirical estimation of a VSL (and, by extension a VOLY). These concerns are for example reflected in the US Environmental Protection Agency-Science Advisory Board current advisory (US EPA-SAB, 2007) which recommends weighting mortality risks sourced in the literature by their reliability in any meta-analysis of such studies for policy values and calls for more empirical evidence on the relationship between the VSL and the VOLY. This is despite the fact that a number of advantages of using the VOLY over the VSL approach have been highlighted in several studies (see e.g. Brunekreef et al. (2007), Hammitt (2007) and Desaigues et al. (2011)). Recognising both the problems with and desirability of a direct VOLY estimate for air pollution reduction, The European Union commissioned a study[2] which had, as a major aim, to address some key methodological issues associated with the VOLY.

This paper reports on one of the key challenges addressed within, namely that of information provision and, specifically, its impact on respondent interpretation and understanding of the benefits i.e. life expectancy gains being valued. Whilst there has been some attention to this issue in the environmental literature, the issue of respondent unfamiliarity with the good has been largely unaddressed in the mortality valuation literature, most likely because the VSL approach focuses on outcomes of instant (albeit premature) death which is arguably relatively well understood, often from causes with which the respondents are familiar e.g. road accidents.[3] Confirmation of respondent understanding can be thought of as an additional validity test, complementing more familiar ones that are usually applied to quantitative survey data, such as scope sensitivity (Carson and Mitchell, 1993), the effect of subjective, as opposed to objective, probabilities on values (Whitehead, 2005) and the effect of demographic and other independent variables in regression analysis of WTP (Wang and Zhang, 2008).

We identified the potential for *ex post* debriefing as a tool by which to explore this issue. Whilst common practice in CVM studies it is most often used to establish the validity or otherwise of WTP estimates and to understand why respondents acted as they did. Often, it is fairly informal in nature. By structuring this exercise more formally and making it more in-depth, we aimed to provide insights into respondents' interpretation and assimilation of the *information* with respect to the "good", what they perceive it to be and hence what it is they have valued. Note here an important subtlety − the aim of the debriefing study is to establish what is valued by the stated preference survey and not to 'test' whether each individual respondent fully understood, particularly in a technical sense, the information provided, arguably an unreasonable expectation. Put another way, it is the survey (or rather the information set) that is 'on trial' and not the respondents. It would seem that a necessary condition for such an information set is that it places respondents in a position whereby they are "buying" what the survey is "selling". Therefore, a precursor for an assessment of the "success" or reliability of the resulting valuation exercise is that respondents can be judged to have at least a sound intuitive understanding of the goods main characteristics and how changes in its level of provision might affect their wellbeing.

If Payne et al.'s (1999) constructivist interpretation of contingent valuation is accepted, then the issue of respondent understanding of the information set is of crucial importance. They argue that a central role of any elicitation procedure is to aid the respondent in arriving at 'well-constructed' preferences and that respondents must give thorough consideration to the most critical information and not be unduly influenced by irrelevant information or features such as survey design characteristics or framing. Three approaches were available to us in respect of the type of information to provide. The first, which certainly avoids information overload, is to describe the good in very general terms, mirroring past practice. Here, *no* details are provided as to how the change comes about, instead it focusses solely on the outcome for the *average* person exemplified by the following: *"The chance for a man/woman of your age to become at least 75 years old is x per cent. On average, a 75-year old lives for another 10 years. Assume that if you survive to the age of 75 years you are given the possibility to undergo a medical treatment. The treatment is expected to increase your expected remaining length of life to 11 years. Would you choose to buy this treatment if it costs y and has to be paid for this year?"* (Johannesson and Johansson, 1996, 1997)[4] *"By reducing the general level of air pollution that causes wear and tear and faster ageing, everybody could live longer. That would mean that you (and everyone else in your household) could expect to live about X months longer in your (their) normal[5] state of health"* (Chilton et al., 2004)

Whilst arguably reducing the cognitive burden on respondents, the cost to the validity of the resulting willingness to pay (WTP) estimates of the value of a life year (VOLY) is unknown, but anecdotal evidence from our own previous experience and that of colleagues suggests that many respondents adopt the heuristic that it is a simple 'add-on' at the end of life, most usually in poor health and value this accordingly, as opposed to what is actually delivered (changes in the risk of death over time).

A second approach (described in Section 2) would be to describe it in very precise, technical terms, perhaps based explicitly around Eq. (2) in Section 2. This would seem infeasible.

A third approach, and the one adopted, is, as noted, to provide fairly detailed information[6] to respondents.

The motivation for the study reported in this paper is the results from two previous UK VOLY studies[7] (Desaigues et al., 2007, 2011; Chilton et al. 2011). In both studies, carried out on a convenience sample of members of the public in Newcastle upon Tyne, sample size was identical (152) and demographic characteristics very similar. The only major difference between those studies was the nature and provision of the information set presented. Both information sets employed the same pictorial/graphical depictions of life expectancy changes (see Section 2), but the second study (Chilton et al. 2011) had a longer value construction phase, with

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[2] Project no: 502687 'New Energy Externalities Developments for Sustainability' [NEEDS].

[3] Of course, a number of VSL studies have taken care to establish the degree of respondent understanding of what is meant by a change in the risk of death (e.g. Krupnick et al. 2002; Cameron and De Shazo, 2013). Unfortunately, using a quantitative approach to explain the change in a VOLY framework would necessitate showing to respondents the difference between the original (policy-off) and new (policy-on) risks *distributions*. This approach was not adopted for perhaps obvious reasons and meant, therefore, that we could not draw on insights from this literature in our own inquiry.

[4] As far as we are aware, the 1996 survey was the first to ask explicitly about the valuation of a life expectancy gain.

[5] Respondents had previously discussed what "normal" state of health mean for them in different stages of their lives.

[6] This had been checked for major cognition and comprehension problems (as opposed to the type of 'understanding' assessed in the debriefing study) during the *survey development phase* which utilised a combination of focus groups and individual verbal protocols. This procedure, in line with other studies, is not directly set up to assess the type of 'understanding' investigated in the subsequent debriefing study, reported in this paper.

[7] These two surveys can be requested from us from the contact author for this paper, should they wish to compare the two information sets.