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The effects of presentation formats in choice experiments

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In most choice experiment studies in environmental economics, the attributes of non-traded environmental goods are communicated to respondents in the form of a table consisting of verbal descriptions. The table normally consists of attributes, their detailed descriptions, and levels. Thereafter, respondents are presented with a series of choice sets, which are often in the form of written text. It is assumed at this stage that the respondents can form their preferences in response to the information provided to them in choice sets pertaining to the environmental good in question. We argue that in addition to the information presented to respondents, the presentation format in which the information is conveyed to respondents may also influence how preferences are formed. Presentation format pertains to the way the attribute alternatives are presented, that is, whether attributes and levels are presented as written text, visuals or text-and-visuals. This aspect is taken for granted in the environmental economics literature. Evidence on the influence of presentation format on how preferences are formed has been observed in the literature of fields such as housing, urban planning, and consumer studies.

This study attempts to investigate whether the text, visuals or text-and-visuals presentation formats matter for discrete choice experiments in environmental and resource economics. The objective of the study is to test whether presenting attribute levels in these three presentation styles generates significantly different results with respect to attribute interpretation, relative importance, probability of adopting water conservation technologies, and willingness to pay estimates. To achieve this, households completed a choice experiment questionnaire that contained three versions of the same six choice tasks with three alternatives (status quo, alternatives 1 and 2), in which the attribute levels were presented in text, visuals or text-and-visuals. The status quo was undefined, as only the households knew their current situation.

Five attributes relating to the decision of households to adopt water-saving technologies were included. The study is designed to contribute to the limited but growing literature pertaining to whether presentation formats matter in choice experiments.

Experimental data was collected from 894 heads of households in the Gauteng Province of South Africa, during the period November 2017 to February 2018. A split-sample survey was adopted, in which the first sub-sample was presented with a text experiment and data was collected from 232 respondents. The second sub-sample was presented with the same information, but using visual representations, and 257 complete responses were collected. The third sub-sample was presented with a questionnaire that combined both text and visual representations, and 405 complete responses were collected. Subsequently, the mixed logit (MXL) model was used as an estimation tool. We estimate three utility functions, each for text, visuals, and text-and-visuals experiments. This is done using unconstrained MXL models where the five attributes of the study are modelled as normally distributed random parameters while alternative specific constants are modelled as fixed parameters. Results are obtained using the Halton sequence for simulation, based on 1000

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draws. Further, we report on the marginal willingness to pay (MWTP) estimates for each of the three experiments.

The study reports four main findings. Firstly, we found that while only two attributes emerged as important in the text experiment, four attributes were important in the visuals experiment and three were important in the text-and-visuals experiment. This result is consistent with those of similar studies in the literature, which also find visual experiments to have more statistically significant coefficients than text experiments. Secondly, a comparison of attribute parameters across all three experiments showed some differences in the signs of each parameter, with only two attributes having the same sign across all three experiments. Thirdly, we observed that the text-and-visuals experiment reported fewer attribute parameters with dispersion around the sample population than the text and the visuals experiments. Only two parameters in the text-and-visuals experiment had statistically significant standard deviations. This indicates that the estimates reported in the text-and-visuals experiment correctly reflect respondents' choices, except for two attributes. Finally, MWTP estimates showed that households were willing to pay for more attributes in the visuals experiment than in the other two experiments. In the visuals experiment, respondents were willing to pay for three attributes, whereas they were only willing to pay for one in the text experiment and one in the text-and-visuals experiment.

Based on these results, we join other studies in the literature in arguing that visually-presented attributes tend to take on more importance than attributes presented through text. However, we advise caution when presenting experiments as visuals, since other less important aspects such as colour and form may distort preferences. On the other hand, the text-and-visuals experiment showed some consistency with both the text and the visuals experiments in terms of the sign and significance of parameters. By combining both text and visuals, the experiment was able to clarify attributes to respondents, thereby yielding more robust stated preference data and empirical estimates. Overall, we argue that the format of presenting information matters in choice experiments conducted in environmental economics.

The main limitation of our study was that each of the three instruments used to collect information was presented to different respondents with similar socio-economic characteristics. We did not ask each respondent to answer all three experiments because that would have resulted in learning, fatigue and boredom. However, if these could be controlled, results from studies where all three questionnaires are answered by the same respondents would be interesting. Therefore, we recommend that future studies should test this by presenting all three experiments to the same respondents. Additionally, more research is required on the effects of the use of various presentation styles in environmental economics, so that guidelines can be established on how to develop valid presentation formats for attribute levels in the choice tasks found in choice experiments. It is important to appreciate that the effect of the presentation format may depend on the context under consideration. Sometimes images can influence people's decisions more in one field than the other. Therefore, more research on this subject is warranted in the context of environmental economics.