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Towards a more structured selection process for attributes and levels in choice experiments: A study in a Belgian protected area

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ABSTRACT

The process of selecting attributes for inclusion in choice experiments frequently involves qualitative methods such as focus groups and interviews. In order for a choice experiment to be successful and the results to be valid, this qualitative selection process is essential. It often lacks rigour and is poorly described, particularly in environmental choice experiments. We propose a meticulous attribute and attribute-level selection process consisting of a scoring exercise and an interactive discussion. This paper provides a case study describing how attributes and attribute-levels were identified and selected for the National Park Hoge Kempen in Belgium. We carried out four focus groups and thirteen semi-structured interviews with various park stakeholders to select attributes from six categories: the four categories of ecosystem services (supporting, provisioning, regulating, cultural), infrastructure, and land use types. The top-ranked characteristics were nature conservation, natural forests, biodiversity refuge, wetlands, landscape variety, heathlands, air purification, and education. Both the scoring exercise and the interactive discussion contributed to the attributes selected for the CE. Following these, an ultimate expert consultation stage is recommended to approve both the attribute and attribute-level selection. The semi-qualitative protocol proposed in this paper can help practitioners and demonstrates how the results guide choice experiment design.

1. Introduction

Stated preference surveys have proven to be versatile valuation techniques for estimating both use and non-use values (Bennett and Blamey, 2001, Bateman et al., 2002, Rolfe and Windle, 2015). Choice experiments (CE), in particular, have been increasingly used in the ecosystem service (ES) and biodiversity domain to elicit public and stakeholder preferences for management interventions and policy changes (Birol and Koundouri, 2008). Survey respondents are presented with several choice tasks consisting of hypothetical alternatives (scenarios) framing an environmental good or service to be valued. These alternatives are composed of a number of attributes and attribute-levels. Neoclassical economists state that by trading off attribute levels and choosing the preferred alternative, respondents are assumed to maximize their utility while indirectly expressing their willingness-to-pay (McFadden, 1974). Classical and ecological economists have a more social constructivist perception of value formation, behaviour and choice (Vatn, 2009). They disagree with the utilitarian conception of values and argue that monetary valuation of public goods (*e.g.* biodiversity) fosters social inequality, focuses exclusively on individual preferences and ignores non-economic cultural values (Spash, 2002, Wilson and Howarth, 2002, Krasny et al., 2014). Moreover, there is disagreement regarding the use of monetary valuation to elicit non-material values (Chan et al., 2012).

Across research fields that apply CE, such as health care, marketing, transportation and environmental economics, the attribute generation process consists of two initial steps: (1) to identify policy alternatives and relevant attributes, and (2) to assign relevant attribute-levels. Attributes influence an individual's decision, thus ignoring relevant attributes in a CE biases findings (Lancsar and Louviere, 2006, Coast et al., 2012). Stated preference approaches should be user-useful. In an ES context for instance, it is required that practitioners respond to stakeholder needs from the start and collaborate to achieve the protection of ES and

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guarantee the flow of these ES to beneficiaries (Cowling et al., 2008). A sound attribute selection process, that entails both detailed reporting and rigorous application of qualitative methods, can reduce the complexity of choice tasks and therefore the cognitive burden associated with CE (Rolfe et al., 2004). The latter issues may arise when respondents are asked to trade-off between multifaceted and unfamiliar goods and services such as those generally involved in environmental valuation (Hoyos, 2010). The initial stages of any stated preference valuation study has to be grounded on some kind of social elicitation process in order to inform environmental or other public policy decision-making (Brouwer et al., 1999). These stages are essential if the problem of stakeholder unfamiliarity, that might occur when using stated preference valuation methods, is to be surmounted (Hein et al., 2006, Barkmann et al., 2008, Cowling et al., 2008).

Recent papers in health economics call for detailed reporting on the process of attribute generation for CE and argue that qualitative studies are best suited to derive attributes, since they reflect the perspective and experiences of the potential beneficiaries (Coast and Horrocks, 2007, Ryan et al., 2009, Coast et al., 2012, Kløjgaard et al., 2012, Hiligsmann et al., 2013, Abiiro et al., 2014, Michaels-Igbokwe et al., 2014). A list of possible attributes can be generated a priori from the literature, but this list must be upgraded through participative processes, such as focus groups, expert consultations and pilot testing. For attribute identification and attribute-levels assignment a wide variety of qualitative approaches is typically used, due to their suitability to identify attributes for CE (Bateman et al., 2002, Coast et al., 2012, Kløjgaard et al., 2012). Qualitative research methods include literature reviews, visits to the study area, exploratory surveys, expert and key informant consultations, focus groups and interviews (Bateman et al., 2002, Blamey et al., 2002, Coast et al., 2012, Abiiro et al., 2014). Brouwer et al. (1999) demonstrated that respondents in a stated-preference survey favoured participatory approaches to inform environmental decision-making process.

In environmental CE, attributes may represent land use types (Hoyos, 2010, Shoyama et al., 2013), ES (Barkmann et al., 2008), biodiversity features such as plant and animal species (Cerda et al., 2013), tourism facilities and activities (Chaminuka et al., 2012), and geographical attributes such as location and size (Rolfe et al., 2000). Environmental CE studies that have applied focus groups and or interviews to select attributes generally combine them with methods such as expert consultation, discussions, and literature research. However, where these two qualitative methods are applied for attribute generation, very often little or no description is provided, thus leaving room for doubt whether these are indeed all relevant and encompassing (Coast et al., 2012, Abiiro et al., 2014, Armatas et al., 2014). Environmental CE studies which do not perform qualitative work assume that selecting attributes based on previous work, literature review or “discussions” suffices (Li et al., 2004, Rajmis et al., 2009, Liu and Wirtz, 2010). Information about the amount of time taken to select attributes and the type of stakeholders are frequently lacking. In the environmental economics domain, we are only aware of Armatas et al. (2014) who documented a detailed attribute selection process. They applied the Q-methodology, a non-monetary preference elicitation technique that can highlight ES that are suitable for valuation and salient to a wide range of stakeholders (Kløjgaard et al., 2012, Armatas et al., 2014).

This paper responds to and builds on the aforementioned health and ecological economics studies. We contribute to the need for more rigorous attribute selection processes in the environmental economics domain. Here, we propose an attribute selection process that is based on the most frequently used qualitative methods, *i.e.* focus groups (FGs) and semi-structured personal interviews (INTs). The participation of park stakeholders is necessary to select attributes that are relevant to them (demand-relevant) and that they would like to see change. This study provides an easy-to-use and transferable approach, considered as semi-qualitative, to support the selection of attributes for environmental CE. Our final CE will aim to understand preferences of and trade-offs made by visitors for the characteristics (*i.e.* future CE attributes) of the National Park Hoge Kempen in Belgium.

The remainder of this paper is organized as follows. In Section 2, we describe our case study, the National Park Hoge Kempen in Belgium. In Section 3, we outline the rationale for the research methods chosen, and propose a framework for the identification and selection of CE attributes and attribute-levels. Then, we thoroughly outline our approach in five successive stages, including the methodology (Section 4: stage 1 to 3) and the results (Section 5: stage 4 and 5). In Section 6, we discuss the results and the protocol's shortcomings, while Section 7 holds the conclusion and provides general recommendations.

2. Case study: the national park Hoge Kempen

The study focuses on the National Park Hoge Kempen (NPHK), located in the Province of Limburg in the East of Belgium (Fig. 1). The NPHK (inaugurated in 2006) is surrounded by six municipalities with a total of about 163,500 inhabitants, equivalent to a population density of 450/km^2 (average density in Flanders 539/km^2). This first and only Belgian national park covers an area of approximately 6000 ha with a rich variety of habitats, including heathlands. This cultural North-West-European landscape, rich in biodiversity, has experienced a drastic surface reduction in the past decades due to urbanisation and tree planting for the coal mining industry.

Like the majority of protected areas worldwide, the NPHK relies largely on governmental budget for ES and biodiversity conservation, habitat restoration and visitor management. In the European Union, financing the costs to achieve these objectives is a highly debated political issue. Further empirical information is necessary to demonstrate public preferences for different management options of protected areas (Hoyos et al., 2012). Although hypothetical, a stated preference survey is considered to elicit the socio-economic benefits-or Total Economic Value (TEV)-of the park, and assist in the further development of conservation

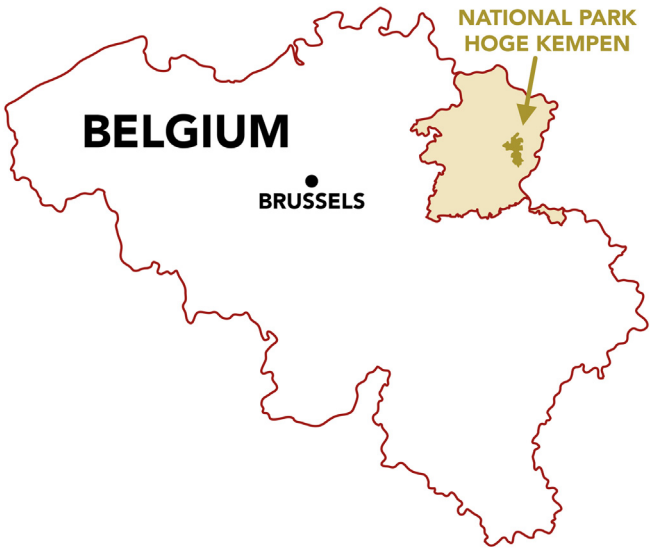

Fig. 1. Situation of the NPHK (*Source:* elizon maps).