



# The role of social and environmental attitudes in non-market valuation An application to the Białowieża Forest



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## ABSTRACT

The purpose of this study is to investigate the impact of non-economic motivations such as altruism and environmental concerns on social preferences and hence willingness to pay (WTP) for changes in forest management strategies in the Białowieża Forest in Poland. We used data from a discrete choice experiment (CE) with attributes describing changes in the quality of the forest and recreation. The choice experiment technique makes it possible to disentangle the effect of the trait of altruism and environmental concern with regard to different attributes and their levels. Environmental attitudes were measured using the New Ecological Paradigm (NEP) scale, whereas the trait of altruism was determined using the Self-Reported Altruism (SRA) scale. The parameterization employed in the survey was a WTP space model. Results show that both altruism and environmental concerns have significant effects on the amount people are willing to pay for changes in forest management.

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## 1. Introduction

Understanding people's underlying motives to invest in environment is an important aspect of promoting ecological policy. The reasoning is that attitudes determine behavioral intentions and these can be expressed in individuals' willingness to pay (WTP) for changes in environmental quality (see, e.g., Bateman et al., 2002 or Stern, 2000). The differences in social and environmental attitudes can be useful for analyzing heterogeneity in preferences in the non-market valuation studies, including those concerning the environment. There is a growing body of literature on the influence of non-economic motives on WTP. Most of these studies focus on attitudes toward the environment.

Environmental attitudes are defined as a psychological tendency expressed by evaluating the natural environment with some degree of favor or disfavor, and are a crucial construct in the field of environmental psychology (Hawcroft and Milfont, 2010). Many different approaches to measuring these attitudes have been developed, mostly using the self-reported methods such as interviews or questionnaires. Dunlap and Jones (2003) identify three most widely applied environmental attitude measures, the validity and reliability of which have been frequently assessed in the literature. These are: the Ecology scale first developed by Maloney and Ward (1973), the Environmental Concern scale created by Weigel and Weigel (1978) and originally proposed by Dunlap and Van Liere (1978), and the New Environmental Paradigm scale (NEP) expanded and updated by Dunlap et al. (2000). All these

three scales examine expressions of concern about various environmental topics, but whereas the first two include items dealing with specific environmental topics (such as pollution, natural resources), the NEP scale concentrates on measuring the overall relationship between humans and the environment (Milfont and Duckitt, 2010).

As Hawcroft and Milfont (2010) point out, the universal nature of the NEP scale might explain why it has become the most widely used measure for exploring different environmental issues, including those concerning environmental decision-making and individuals' WTP.<sup>1</sup> The empirical works of Aldrich et al. (2007) and Choi and Fielding (2013), inter alia, report a significant role of environmental attitudes measured by the NEP scores as a predictor of the individual's WTP for endangered species protection. In their valuation study focusing on protection of peregrine falcons and shortnose sturgeons, Kotchen and Reiling (2000) show that respondents with stronger pro-environmental attitudes are less likely to provide protest responses. Gelso and Peterson (2005) also applied the NEP scale and found a correlation between environmental attitudes and use value in their study on the demand for environmental recreation. Cooper et al. (2004) argue that the influence of non-economic motives might depend on the nature of environmental goods and that such analyses should be conducted in context. To elicit value of environmental changes, the contingent valuation methodology was used in most of these studies.<sup>2</sup>

<sup>1</sup> The meta-analysis study by Hawcroft and Milfont (2010) reports on 69 studies from 36 countries where the NEP scale was utilized.

<sup>2</sup> In addition to environmental valuation studies, the NEP scale was used, inter alia, in studies that use theoretical models predicting environmental behaviors (see, e.g., Stern et al., 1995, Schultz and Zelezny, 1999 or de Groot and Steg, 2008) or in studies of risk perception (see, e.g., Slimak and Dietz, 2006 or Hall and Moran, 2006).

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Fewer environmental studies are focused on examining the role of altruism on individual's willingness to pay. Altruism can be defined as motivation to increase another person's welfare in contrast to egoism — the motivation to increase one's own welfare (Batson and Powell, 2003). For several decades, there have been discussions on whether there is any consistency in individual altruistic behavior (see, e.g., Hartshorne et al. (1929), Dlugokinski and Firestone (1974), or Rushton et al. (1981)). Recent studies by Rushton et al. (2008) and Rushton and Irwing (2011) indicate a broad-based trait of altruism in individuals, i.e., that some people are consistently more generous, helpful, and kind than others. The implication of altruism in economics is that the welfare of others enters an individual's utility function. Andreoni and Miller (2002) show that concerns for altruism can be expressed as the well-behaved preference ordering and that altruistic behavior is consistent with utility maximization.

Among those who provide evidence that altruistic motives may be relevant to the individual's decisions on WTP for environmental policy actions are Ito et al. (2012) and Vázquez Rodríguez and Leon (2004). Using a choice experiment technique, Vázquez Rodríguez and Leon (2004) show that altruism is significant for environmental policies to reduce the health impact of a power plant and to improve income level of pollution affected population. Altruistic values in this case were elicited from a population not affected by power plant externalities. Ito et al. (2012) provide an insight that although altruism does not directly increase the willingness to pay for CO<sub>2</sub> mitigation, it can indirectly increase individuals' cooperative behavior. Cooper et al. (2004) find that altruism is not a significant covariate of WTP for lake water quality improvement. In the last two papers mentioned, the scales containing statements that probed different aspects of the Schwartz model (1977) for altruistic behavior were applied. According to this model, altruistic behavior arises from personal norms if two criteria, i.e. individual's awareness of consequences and ascription of responsibility, are met.<sup>3</sup>

The overall objective of the present study is to examine the impact, if any, of environmental attitudes and an individual trait of altruism on social preferences and consequently on willingness to pay (WTP) for changes in forest management strategies in the Białowieża Forest in Poland. We used data from a discrete choice experiment (CE) with attributes describing changes in the quality of the forest and recreation. In the current study, environmental attitudes were measured using the NEP scale (Dunlap and Van Liere, 1978; Dunlap et al., 2000), where the basic environmental belief system is assessed based on the strength of an individual's ecocentric system of beliefs (e.g. that humans are considered to be just one component of nature) as opposed to an anthropocentric system of beliefs (where human beings are conceived as superior and independent from all the other organisms on Earth). The predictive, known-group, content, and construct validity of the NEP scale has been confirmed by numerous studies (see, e.g., Ebreo et al., 1999; Kempton et al., 1995; Stern et al., 1995 or Widegren, 1998).

Patterns in individual differences in altruistic behavior were estimated using a questionnaire concerning the frequency of engagement in different altruistic behaviors developed by Rushton et al. (1981). This self-administered measure of altruism is characterized by psychometric stability, internal consistency, and discrimination validity checked against samples from North America and Europe (see, e.g., Rushton et al., 1981, Rushton, et al., 1986). Outside the Western cultures, Chinese and Indian versions of the Self-Reported Altruism (SRA) scale were developed (see Kee-Lee, 1996, and Khanna et al., 1993). In both cases, the adapted SRA-scales bore high equivalence to the original scale and confirmed their concurrent validity and reliability in terms of internal consistency. Because the SRA test is relatively quickly administered and scored, it could be applied in a wide range of research. The SRA scale was used, inter alia, in surveys on reasons for cooperation and defection

<sup>3</sup> In both of these studies i.e. Ito et al. (2012) and Cooper et al. (2004) the altruism scale was found to be of weak internal reliability.

in real-world social dilemmas (Attari et al., 2014), the influence of testosterone on prosocial behaviors (Harris et al., 1996), the relationship between altruism and antisocial behavior (Krueger et al., 2001), and the inheritance of altruism (Rushton et al., 1986).

The choice experiment technique makes it possible to disentangle the effect of social and environmental attitudes with regard to different attribute levels. The parameterization employed in the survey was a WTP space model (Train and Weeks, 2005). The advantage of this approach is that the WTP distribution is specified by the researcher directly instead of being derived from the estimated distribution of coefficients as in models in preference space. The WTP space model also allows us to take taste and scale heterogeneity into account.

To our knowledge, this study is the first to examine the role of social and environmental attitudes on individuals' willingness to pay for changes in forest management. Additionally, this is probably the first attempt to examine both social and environmental attitudes using CE methodology, and the first to analyze attitudes as motives of environmentally related WTP in Central European countries.

The article is structured as follows: Section 2 describes the area examined for the case study, the Białowieża Forest in Poland. The modeling approach is outlined in Section 3. Section 4 reports the design of the experiment, the sampling procedure, and the survey administration. Section 5 presents the results of the econometric analysis of responses and Section 6 concludes.

## 2. The Białowieża Forest

The analysis is conducted in the context of the Białowieża Forest in Poland, an ancient woodland straddling the border between Belarus and Poland. It is one of the last and largest remaining parts of the immense primeval forest that once spread across the European Plain. The Białowieża Forest covers a total area of 150,000 ha, with 62,500 ha in Poland and 87,500 ha in Belarus. The Białowieża Forest is the most recognized and ecologically valuable forest in Poland. Despite some visible signs of human activity, it is still commonly considered to be a natural lowland forest. It is valued in particular for its natural dynamics as well as its richness of species, and its ecological structures and functions.

The Białowieża National Park was established in 1921 and was the first national park in Poland. The National Park with natural reserves outside its borders covers 35% of the Białowieża Forest. These parts of the forest have remained virtually unaffected by human activity for hundreds of years. This is because this forest originally belonged to the kings of Poland and then the tsars of Russia who used it as a hunting ground, and the removal of wood was prohibited.

A significant part of the Białowieża Forest has since been subjected to commercial use. Currently, 50% of its territory consists of a typical commercial forest where management is focused on sustainable timber production. The last part of the Białowieża Forest (about 15%) is a second-growth forest. During and shortly after World War I, this part of the forest was exploited. The area was then logged and has not been reforested. Today the forest is a product of natural regeneration. The oldest trees in this part are around 80–90 years old. Although the second-growth forest is not as unique as the forest of the National Park and the preserved areas outside the park, it is particularly valuable because it is possible to observe how forests evolve in places devoid of human interference. The trees, bushes, and other plants growing there came about naturally and adapted to the local conditions without human intervention. Even though no logging currently takes place there, Polish law allows this part of the forest to be used for commercial purposes.

The Białowieża Forest is a popular destination for Polish and foreign visitors alike. For several years, particularly in summer and autumn, there has been an increase in visitors to the forest, numbering over 100,000 annually. On Polish public holidays in May and August, the forest is visited by 10,000 people each day. In the future, without any

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