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Environmental attitude, motivations and values for marine biodiversity protection

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ABSTRACT

This study explores people's environmental attitudes and motives for putting economic values to marine biodiversity protection. Primary data were collected from a sample of 359 residents in two important Greek ports: Thessaloniki and Volos. Respondents' environmental attitude was measured with the New Ecological Paradigm (NEP) scale. Economic values were derived from contingent valuation survey. Use of appropriate methods revealed three factors of environmental attitudes: man dominate to nature, anti-anthropocentrism and limits to growth. Significant relationships are found between NEP scale factors, socio-economic characteristics and individuals' opinions about biodiversity utility. Pro-environmental behavior is associated with higher NEP scores. A logistic regression setup the relation between people's willingness to pay (WTP) for marine biodiversity protection with their socio-economic characteristics and PCA results. Significant relationships are found between environmental attitudes, non-use motivations, WTP and ethical motives for species protection. Mean individuals' WTP for marine biodiversity protection was calculated approximately equal to €29.

1. Introduction

Last decades many studies have extensively focused on the fields of sociology and psychology to explain the changes in people's behavior toward the natural environment. According to Marquart-Pyatt (2007), social research is interested in the environmental concern of the general public because it is crucial for supporting environmental policies. A new discipline called conservation psychology (Clayton and Myers, 2009; Saunders and Myers, 2003) and ecopsychology psychology (Doherty, 2011) gives emphasis to understanding and troubleshooting issues related to people's decisions about environmental conservation.

For many researchers, the knowledge of people's attitude will help to predict their behavior. Clayton and Myers (2009) claim that environmental attitude is based on moral and social values and is a combination of people's beliefs, affective responses and behavioral intentions toward the environmental problems. According to psychology attitudes cannot be directly observed but must be supposed from people's responses (Himmelfarb, 1993; Heberlein, 1981). So the challenge is to construct a reliable and appropriate tool for environmental attitudes. More than 700 measures have been designed for this reason (Dunlap and Jones, 2002). New Ecological Paradigm (NEP scale) is one of the most popular and have its validity and reliability assessed.

On the other hand, the relationship between attitudes and behavior as a predictor of specific environmentally based actions and participation decisions for environmental protection is based on the "theory of reasoned action" by Ajzen and Fishbein (1980). As a result, various studies have concentrated specifically on the correlation between environmental attitudes and environmentally related behaviors. Specifically, there are studies that investigate the relation between environmental attitudes and political participation, conservation behaviors or willingness to modify behavior (Mohai, 1992; Luzar et al., 1995; Guagnano et al., 1995; Weaver, 1996; Walsh and McGuire, 1992). There are also studies measuring environmentally related willingness to pay (WTP) in connection to individuals environmental attitudes (Widegren, 1998; Stern et al., 1993; Halkos and Matsiori, 2012,2014). The attempt to include environmental attitudes in CVM studies begins from the

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questions about the membership to environmental organizations (Hanley and Graig, 1991; Brown et al., 1996) with many objections about its ability to reflect people's real environmental behavior. Clayton and Myers (2009) claim that environmental attitude is based on moral and social values and is a combination of people's beliefs, affective responses and behavioral intentions toward the environmental problems. According to psychology attitudes cannot be directly observed but must be supposed from people's responses (Himmelfarb, 1993; Heberlein, 1981). So the challenge is to construct a reliable and appropriate tool for environmental attitudes. More than 700 measures have been designed for this reason (Dunlap and Jones, 2002). New Ecological Paradigm (NEP scale) is one of the most popular and have its validity and reliability assessed.

Our paper reports findings from a primary research investigating people's environmental concern. More specifically it provides unified evidence of public understanding, attitudes and behaviors and in addition, it measures the effect of socioeconomic characteristics to levels of environmental concern. Public knowledge and concern about marine biodiversity are related to people's willingness to pay for biodiversity conservation. In this way, we also explore the sensitivity of WTP to changes in environmental attitudes.

More specifically the objectives are:

- To confirm the factors describing environmental concern
- To find the relation between people's environmental concern and socioeconomic characteristics
- To recognize the changes in people's beliefs, attitudes, and values in connection to their opinions and knowledge about marine biodiversity
- To investigate how environmental concern influences people's willingness to pay for marine biodiversity protection.

For this reason, we use the New Ecological Paradigm (NEP) scale, one of the most widely used scales for measuring environmental concern of groups of people. The scale focuses on people's beliefs about our ability to upset nature, the existence of limits to growth and humanity's right to rule over the rest of nature (Dunlap et al., 2000a). Using a primary research involving marine biodiversity conservation, the task is to extend the knowledge of how attitudinal reflections may contribute to CV methodologies. This information may help the design of effective environmental policies by understanding people's opinion relative to marine biodiversity.

The structure of the paper is the following. Section 2 provides the background information of the existing relative literature while Section 3 discusses the materials of the primary research like the study area and the survey design. Section 4 presents the empirical results obtained from the statistical and econometric methods used in measuring and modeling environmental concern. The last section concludes the paper discussing the policy implications of the derived empirical results.

2. Background

The original NEP scale was published by Dunlap et al. (1978) and consisted of three dimensions: the balance of nature, anthropocentrism, and limits to growth. With the years in an attempt to obtain better its psychometric ability, it was later corrected with new items with a 5-point Likert response scale (Hawcroft and Milfont, 2010). According to Dunlap et al. (2000b), the new NEP scale consists of fifteen items and has five sub-scales; namely limits to growth, anti-anthropocentrism, the fragility of nature's balance, rejection of exemptionalism and the possibility of an eco-crisis.

The NEP scale has been used widely for different groups of people (like farmers, students, ethnic minorities etc) with valid ability to distinguish between members of environmental groups and members of the public (Widegren, 1998). According to the empirical results of various studies, NEP scale measures pro-environmental beliefs in relation to behavioral intentions, and real pro-environmental behaviors (Rauwald and Moore, 2002; Casey and Scott, 2006).

Stern et al. (1995a) insist that NEP scale results are associated with beliefs, norms, intentions, and behaviors towards the natural environment. On the other hand, NEP scale had been used to predict environmental activism, environmentally significant behaviors, people's real environmental behavior, awareness for environmental problems (e.g. global warming, participation in the green electricity program, waste-reduction, landscape preferences, household location choices etc) and emotional connectedness to nature (Stern, 2000; Chung and Poon, 2001; Clark et al., 2003; Poortinga et al. 2004; Peterson et al., 2008).

According to Homer and Kahle (1988), an environmental value leads to environmental attitude and this, in turn, leads to environmental behavior. The correlation between pro-environmental values and high NEP scores (Dunlap et al., 2000a) is evident in previous studies (Stern et al., 1995b; Rauwald and Moore, 2002; Hunter and Rinner, 2004; Berenguer et al., 2005; Casey and Scott, 2006; Kaltenborn et al., 2008; Luo and Deng, 2008).

Other studies have shown that socioeconomic characteristics (as gender, age, ethnicity, income, education level, family incomes, occupation, religion etc), personality, individuality (sensitivity, leisure time activities etc), parents, friends or living area influences (parents' educational backgrounds and their life paradigms, friends value systems, development level of the country etc), sociodemographic, cultural, attitudinal and behavioral variables are related to nature effect on persons' environmental value systems, culture (Mohai and Bryant, 1998; Kim, 1999; Dunlap et al., 2000b; Zinn and Graefe, 2007; Taskin, 2009; Wilhelm-Rechmann et al., 2014).

According to Lopez and Cuervo-Arango (2008) NEP scale has significant relation with behavioral intentions. In addition, environmental orientation and environmental knowledge are often used to explain people's pro-environmental behaviors (Sherburn and Devlin, 2004). In general, many studies have shown that environmental concern does not necessarily rely on people's knowledge about ecological processes, their influence on these processes, or the implications of human-induced environmental change (Williams et al., 2015; Bord et al., 2000; Henry, 2000; Jacobson and Marynowski, 1997).

The knowledge of wildlife and biodiversity issues differs along several socio - demographic dimensions. For instance, gender and type of preferred recreation activities are related with the degree of individuals' knowledge for biodiversity (Kellert, 1985; Kellert and Berry, 1987; Mankin et al., 1999). The link between environmental concern and environmental knowledge was also proved in previous studies with the help of the NEP scale (Hunter and Rinner, 2004).

In Greece, there are few studies in this area although the marine biodiversity plays an important role in the economy, social, cultural etc. All previous studies were focused on economic valuation of marine biodiversity (Langford et al., 1998; Langford et al., 2001; Kaval et al., 2009; Halkos and Jones, 2012).

3. Materials and methods

Our study is based on two representative samples of 359 randomly selected people living in Thessaloniki and Volos.[1] Face-to-face interviews were accomplished on-site. The questionnaire con-

[1] The main goal of the present study is to associate persons' environmental attitude with their opinion about biodiversity protection. So we need a sample con-