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Nature conservation from a Junior High School perspective

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ABSTRACT

Nature conservation has a higher probability of being successful when it is backed by public support. This is influenced by knowledge and values, many of which may derive from school curricula, experiments and activities. We implemented a study in a Portuguese Junior High School aiming to evaluate: (1) which factors influence how people subscribe reasons for conserving nature; (2) the criteria used to identify conservation priority species; and, (3) the proposed recovery measures for priority species. A survey of 91 students in a suburban area revealed that nature conservation was regarded as being more important than tourism or industry, but less than values related to public health. Students who have close contacts with wildlife and whose parents have higher education levels exhibited positive attitudes towards nature conservation, which seems to derive from exposure to information related to nature, in their home environment. The criteria chosen to identify conservation priority species and to select appropriate conservation measures indicate that they are likely to be influenced by the media. These results emphasise that the relationship between parental education levels and access to information is an important factor in shaping urban students' attitudes towards nature conservation.

Introduction

The world is facing a global extinction crisis with many vertebrate species threatened with extinction (Baillie et al. 2004; Hambler et al. 2011). The need for global awareness relating to the importance of nature and biodiversity conservation has never been greater. Several approaches are required to achieve this goal, including politics, the media, economic assessments of ecosystem services, surveys of public attitudes, industrial support and academic research (Baillie et al. 2004).

Whatever the approach considered, conservation has a higher probability of being successful when it is aided by public support, or when arising from public needs or willingness (e.g., bear, *Ursus* spp., conservation in the USA – Jacobson & McDuff 1998; Kellert 1994; Miller 2005; Schenk et al. 2007). However, it has to be supported by knowledge (e.g., Light 2003) and values (e.g., Jepson & Canney 2003), defined as concepts or beliefs (i.e. facts as an individual perceives them) that guide selection or evaluation of behaviour and events (Dietz et al. 2005). Patry et al. (2007) defended that the model "Values and Knowledge Education" (VaKE), which combines knowledge acquisition and values in a constructivist educational perspective, is an efficient approach where values may theoretically derive from school curricula, experiments and activities. This association is based on the fact that a caring attitude (i.e. a positive or negative evaluation of a particular situation – Dietz et al. 2005), apart from the emotional involvement (i.e. attributes of feelings, beliefs and emotions towards nature – environmental sensitivity; Metzger & Mcewen 1999; Sivek 2002) is also developed by knowledge (Brewer 2006). Independent of the considered age group, knowledge (which may be defined as the expertise and skills acquired by a person through experience or education, i.e. formal knowledge – Pope 1982) is usually a common factor associated with positive attitudes towards nature conservation. For example, in Slovenia, teenagers' positive attitudes regarding Eurasian otter (*Lutra lutra*) conservation were correlated with a higher factual knowledge of the species (Torkar et al. 2010). In the National University of Singapore, biological knowledge is one of the features promoting pro-conservation attitudes among undergraduate students (Chua et al. 2008).

However, the relationship between these two factors (experience and education) and the presentation of pro-environmental behaviours is somewhat controversial. In a review paper, Kollmuss and Agyeman (2002) discussed the possible factors that affect whether people decide to take action regarding environmental issues. They presented a highly complex behavioural model,

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which divides interacting influential factors into: internal (e.g. knowledge, values, attitudes feelings, emotional involvement); and, external (e.g. economic situation, politics, social and cultural factors); with several barriers to positive influences on pro-environmental behaviour (e.g. old behaviour patterns). Although this model has suffered from some criticism (due to the attempt to reduce the environmental behaviour to a schematic "diagram with boxes and arrows" – Courtenay-Hall & Rogers 2002), this environmental behaviour model is a useful, timely and informative approach (Gough 2002), which may also be a starting point to study the behavioural process involved in displaying pro-environmental behaviours. Other authors have also stressed that pro-environmental concerns are more prone to be long lasting if anchored in significant and meaningful experiences (Maiteny 2002).

Assuming the simplification of those models, by reducing the reality to a snapshot of the complex variables and interactions involved in pro-environmental attitudes, we will consider and focus on the above mentioned factors (experience and education) as elements that will surely influence people's attitudes towards conservation.

In rural areas there is a high sense of responsibility and moral obligation to conserve nature, due to people's familiarity with the wilderness experience (Berenguer et al. 2005), whereas teenagers in urban or suburban areas have little or no contact with wilderness or wildlife. In the latter group the commitment towards conservation is more dependent on the formal knowledge transmitted in schools. The rural population's role in nature conservation has been well established through the maintenance of traditional land-use practices (Pinto-Correia 2000; Plieninger et al. 2006), by participating in the planning processes and implementing activities that might promote conservation (e.g. tourism) (Törn et al. 2007). Alternatively, in industrialised or newly industrialised countries (e.g. western Europe or China) the importance of urban residents in nature conservation issues derives from the fact that they usually have higher levels of education (e.g. Eastwood & Lipton 2000; Paúl et al. 2003), income (e.g. Paúl et al. 2003; Sicular et al. 2007), have increased exposure to the mass media and knowledge of environmental degradation (e.g. Liu & Leiserowitz 2009), and therefore may have a higher intervention power. Moreover, urban inhabitants usually consider nature for leisure and contemplation and not for survival (Berenguer et al. 2005), therefore may be more prone to conserve it since it does not imply restrictions in their way of life (e.g. Bandara & Tisdell 2003). Based on these assumptions, an *a priori* assessment of urban and suburban student's knowledge and attitudes is valuable in helping to improve nature conservation teaching approaches. This is especially important in southern Mediterranean Europe (especially Portugal) where the population shows lower levels of education (Baró 2010), that might constrain nature conservation strategies. This characteristic of the Portuguese population, together with an almost absence of data regarding what might be influencing how students value nature (e.g. experience, education) led us to conduct the present study.

We implemented a study aiming to evaluate the knowledge and attitudes of a suburban junior high school population towards nature conservation in Portugal. This was carried out prior to formal education relating to this topic. Our specific questions were: (1) which values strongly influence how students subscribe to different reasons for conserving biodiversity (cultural heritage, social values, tourism, health care, ecosystem services, science, intrinsic value and industry); (2) what criteria do students use to identify priority species for conservation; and, (3) what are the proposed recovery measures for these priority species.

To study these questions we assumed two main environmental attitude patterns: the anthropocentric attitude (valuing nature because of material or physical benefits it can provide for humans), associated with Instrumental Values (i.e. means to human ends – Dietz et al. 2005), and the ecocentric (valuing nature for its own sake) attitudes, which derives from Intrinsic values (independent of the values that humans assign to them – Dietz et al. 2005) (Thompson & Barton 1994).

In this line of reasoning, Caro et al. (2003) considered that the reasons for conserving biological diversity can derive from different values, that might induce the attitudes identified by Thompson and Barton (1994): anthropocentric [cultural heritage, tourism, health care, ecosystem services (processes by which natural ecosystems sustain human life – Lindenmayer & Burgman 2005), science, industry and social values] or ecocentric [Intrinsic values ("ethical positions that place value on species and communities, independent of people, i.e., the valuation of nature *per se*" – Lindenmayer & Burgman 2005)].

Furthermore, assuming a pro-nature conservation attitude, the decision of what to conserve may also be based on two opposite value types: Intrinsic (e.g., endemic species) or Instrumental (e.g. edible species) (Dietz et al. 2005). The evaluation of the dominant values associated with this decision is a fundamental issue needed to guide the baseline strategy implicit to all conservation plans. To be successful this strategy requires public support – environmental and conservation awareness (e.g. Padua 1994), and needs to match the manager defined recovery measures focused on priority species to those considered by the general public.

Methods

Study area and population

This study was conducted in a Junior and High School located in Agualva, a suburban area of Lisbon (Portugal, south western Europe). Students reside in a region defined by a 3 km radius from the school. This area is characterised mainly by a middle-class population, but low socio-economic neighbourhoods still exist in the area. Within the student population, we randomly selected 91 students (54% of males) from 15 classes of the 7th and 8th grades (12–15 years old) in the first trimester of the school year of 2008–2009 (21% of the 7th and 8th grade student populations). Fifty-nine percent ($N = 54$) of the students were included from seven classes of the 7th grade, and the remaining from eight classes of the 8th grade. The random selection allowed inclusion of students from different socio-economic, cultural and intellectual backgrounds. This selection was taken among students that willingly accepted to participate in the study and whose parents had previously given authorisation to allow their students to participate in every extracurricular school activity developed by the school. These grades were selected because nature conservation issues are only discussed in schools as a part of the *curricula* after the 2nd trimester of the 8th grade. This allowed us to test students' values and knowledge prior to the influence of the school curriculum.

Questionnaire development

Each of the 91 selected students was asked to anonymously fill out a questionnaire which focused on nature conservation issues. It was subdivided into three sections (see Appendix I for details):

1) The relative importance of eight different values (cultural heritage, tourism, health care, ecosystem services, science, industry, intrinsic and social values) compared to Nature Conservation. To assure that students were not answering at random, two questions evaluating each of the mentioned values were presented to the students. These questions were adapted from Caro et al. (2003) study and derived from the reasons why nature