



Effects of attitudes and demography on public support for endangered species conservation



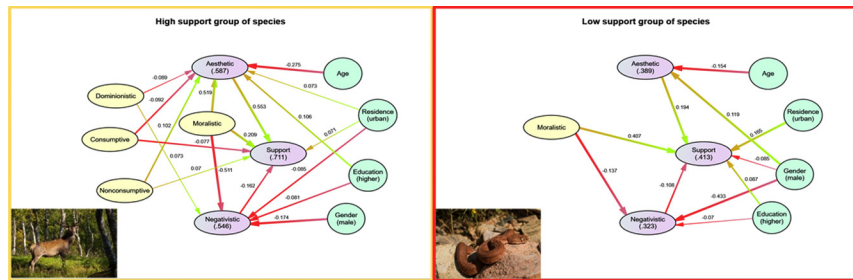
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HIGHLIGHTS

- The more attractive and safer species received higher support for conservation.
- Aesthetics, fear and moralistic attitudes better predicted species conservation.
- Aesthetics were positively and fear negatively correlated with species conservation.
- Moralistic attitudes were positively associated with species conservation.
- Female urban residents of higher education supported species conservation.

GRAPHICAL ABSTRACT



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ABSTRACT

It is critical for managers to understand how attitudes and demography affect public's preferences for species protection for designing successful conservation projects. 1080 adults in Greece were asked to rate pictures of 12 endangered species on aesthetic and negativistic attitudes, and intention to support their conservation. Factor analysis identified a group of animals for which respondents indicated high levels of support for their conservation (red deer, loggerhead sea turtle, brown bear, common pheasant, European ground squirrel, glossy ibis) and a group of animals for which respondents indicated low levels of support (black vulture, great white shark, fire-bellied toad, western barbastelle, Cretan tube web spider, Milos viper). The species that received the highest support were also rated as the most attractive and safest, excluding the fearsome brown bear. Structural models revealed that aesthetic, moralistic and negativistic attitudes were the stronger predictors of support. Aesthetic and moralistic attitudes were positively, and negativistic attitudes negatively, correlated with support for conservation in both groups. Consumptive users scored lower in aesthetics and were less supportive of protection in the high support group, while nonconsumptive users showed the opposite trend. Respondents residing in urban areas deemed animals of high support more attractive and less fearsome and were more supportive of conservation than rural residents in both groups. Females of higher education viewed animals of low support as fearsome, however they supported their conservation. Our study identified popular species that can be used as flagship species to facilitate the implementation of conservation projects. The results of this study could also be used to design a communication and outreach campaign to raise awareness about the ecosystem value of less attractive species.

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1. Introduction

Human behavior and activities have such a profound impact on Earth's atmosphere, geology and ecosystems that scientists proposed that we already live in a new geological epoch, the Anthropocene

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(Steffen et al., 2011; Waters et al., 2016). Anthropogenic pressures, notably habitat loss, overexploitation for economic gain, and climate change, are responsible for the exceptionally rapid loss of animal species over the last few centuries (Ceballos et al., 2015). In line with deforestation, scientists coined the term “Anthropocene defaunation” to denote the loss of both species and populations of wildlife, as well as local declines in abundance of individuals (Dirzo et al., 2014). Ceballos et al. (2015) estimated that the average rate of vertebrate species loss over the last century is up to 100 times higher than the pre-human background rate, indicating that a sixth mass extinction is already under way. They also stressed that avoiding a true sixth mass extinction will require rapid, greatly intensified efforts to conserve already threatened species and to alleviate pressures on their populations. The loss and decline of wildlife species and populations have been recognized by human societies. As a result, many species and populations have been, or are currently being, assessed and assigned to conservation status categories (IUCN, 2016), and also many governmental and non-governmental conservation programs have been implemented or are in progress, worldwide (Brooks et al., 2006; McClanahan and Rankin, 2016).

Human behavior can be organized into a cognitive hierarchy consisting of values, value orientations (i.e., patterns of basic beliefs), attitudes/norms, behavioral intentions, and behaviors (Fulton et al., 1996; Homer and Kahle, 1988; Rokeach, 1973). These cognitions build upon one another in what has been described as an inverted pyramid, with values forming the foundation. The theory of planned behavior (Ajzen, 1988) suggests that behavioral intentions are the most proximal predictors of behavior, which in turn are anteceded by attitudes (which reflect the individual's positive or negative appraisal of a behavioral option), a subjective or social norm (the social pressure from reference group members to enact the behavior), and perceived behavioral control (the perceived ease or difficulty of performing the behavior). Ajzen (1991) noted that the stronger the intention to engage in a behavior, the more likely should be its performance. Furthermore, most studies have indicated that an individual's intention to perform a behavior should be strengthened by a more positive attitude and subjective norm and greater perceived behavioral control (Ajzen, 1991; Liebe et al., 2011; López-Mosquera et al., 2014). Kellert (1980, 1996) categorized human attitudes toward wildlife into nine basic categories. Human dimensions research has shown that attitudes toward wildlife can predict public preferences for different species and wildlife management and conservation methods (Gunnthorsdottir, 2001; Huddy and Gunnthorsdottir, 2000; Jacobs et al., 2014; Kellert, 1989, 1996; Knight, 2008; de Pinho et al., 2014). Given the fact that human activity is the primary source of species decline and extinction, the success of wildlife conservation programs largely depends on public support (Teel and Manfredi, 2010; Zinn et al., 1998). Therefore, it is critical that wildlife managers and policy makers understand the public's intention to support endangered species and the possible influence of attitudes, and incorporate such knowledge into conservation actions and policies.

1.1. Aesthetic and negativistic attitudes

The human thought processes can be divided into two intertwined systems, the analytic system and the experiential system (Epstein, 1994). The analytic system includes cognitive thought processes, while the experiential system is based on affect and emotion. Affect is the specific quality of goodness or badness experienced as a feeling state and demarcating a positive or negative quality of a stimulus, while cognition refers to the mental process of knowing, including aspects such as awareness, perception, reasoning, and judgment (Slovic et al., 2002). Contrary to earlier theories that considered affect to be postcognitive, Zajonc (1980) argued for the primacy of affect, citing that “we can like something or be afraid of it before we know precisely what it is and perhaps even *without* knowing what it is”. From an evolutionary perspective, the primacy of affect is consistent with the human

need to respond quickly in life or death situations. Jacobs et al. (2012) noted that cognitive variables, studied under the cognitive hierarchy model, can explain approximately half of the variability in behavioral intentions and reported behaviors. Affect and emotions have not been studied as much as cognitive variables and researchers proposed that their inclusion in predictive models will enhance the understanding of human–wildlife interactions (Jacobs et al., 2012; Slagle et al., 2012).

Wilson (1984) defined biophilia as “the innate tendency to focus on life and lifelike processes”, meaning that we gain the most satisfaction from processes that mimic the nature of life on many levels. Wilson (1993) further stated that biophilia is a complex set of learned behaviors and processes based on our innately emotional affiliation to other living organisms. These learnings are split into biophilia, which are positive learnings and “approach” behaviors, and biophobia, which are negative learnings with “avoid” behaviors (Ulrich, 1993).

These findings make very relevant the examination of the role of attitudes such as aesthetic and negativistic in shaping public support for the conservation of endangered species. Kellert (1996) defined aesthetic attitude as the physical appeal and beauty of wildlife, and negativistic as the fear, aversion and alienation from wildlife. Previous studies have found that the public supports the protection of aesthetically pleasing species more than of non-aesthetically pleasing ones (e.g. Gunnthorsdottir, 2001; Kellert, 1996; Knight, 2008; de Pinho et al., 2014). Negativistic attitudes (evoked fear) have been also considered as an important concept related to perceptions of wildlife, with people being more negative toward fearsome than safe species (Bjerke et al., 2001; Kellert, 1996).

In general, aesthetic and negativistic attitudes ranked lower than other factors in predicting support for species conservation in earlier studies (Brackney and McAndrew, 2001; Czech et al., 1998; Kellert, 1996). Kellert (1996) argued that this could have happened because these attitudes are extremely difficult to measure through social survey methods and pointed out that the used measures of attitudes have been inadequate. In an effort to remedy this, later studies have used pictures of animals to study aesthetic and negativistic attitudes and how they relate to support for species protection (Gunnthorsdottir, 2001; Knight, 2008; Tisdell et al., 2005, 2006). More specifically, survey participants were shown pictures of the species in question and asked to rate them on the grounds of affective and other attitudes and support. This methodology is particularly relevant to the study of aesthetics and fear since, as Zajonc (1980) put it, “all sorts of judgments are faster and more efficient for pictures than for words, and this may be so just because pictures are able to evoke an affective reaction more directly and faster than words”.

1.2. Other attitudes and demography

Moralistic, dominionistic, and naturalistic attitudes have also been found to affect public perceptions of wildlife. Moralistic attitudes refer to beliefs in the spiritual reverence and ethical concern for wildlife, whereas dominionistic attitudes, being essentially the opposite, refer to beliefs that humans have mastery, physical control and dominance of wildlife (Kellert, 1996). Prior research has found that those with moralistic attitudes are more positive toward nature and wildlife and more supportive of species protection than those with dominionistic attitudes (Knight, 2008; Wilson, 1997).

Naturalistic attitudes refer to the direct experience and exploration of wildlife and can be categorized in consumptive and nonconsumptive. Consumptive activities involve the harvest of wildlife, as in hunting and fishing. In contrast, nonconsumptive use includes non-extractive activities, such as wildlife-watching and photography. Cooper et al. (2015) found that wildlife recreationists, both hunters and birdwatchers, were 4–5 times more likely than nonrecreationists to engage in conservation behaviors. Hunters have a long tradition of helping to conserve game animals and their habitat in many countries (Holsman, 2000; Loveridge et al., 2007). However, studies have shown that hunters'

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