



Increased information and marketing to specific individuals could shift conservation support to less popular species

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ABSTRACT

Flagship species are widely used in conservation to raise awareness and funds, and recent observational research suggests that less popular species can be marketed to increase support for their conservation. Using two species groups, sharks and dolphins, this paper experimentally investigates whether stated conservation preferences can shift from more charismatic species to those not typically considered as flagship species. Although universal appeal is considered a desirable trait for flagship species, there are individual differences in preferences for species. Therefore, this paper also investigates the role of individual demographic and attitudinal differences on choices, as these may impact the success of conservation marketing. Using discrete choice experiments, six forced choice sets of two species were presented to 168 participants, with species shown and the amount of information presented about each one varied. Demographic differences between participants was found to affect donating behavior: individuals with more positive attitudes to sharks were more likely to donate to shark conservation, as are individuals with a biology background. However, it was found that individual choices can also be shifted through the provision of additional information. Participants chose to conserve species with more information, whether the two species in the choice set were both sharks, both dolphins, or a shark and a dolphin. When equal amounts of information were provided about two species, potential donors preferred the more endangered species. This research suggests that by selecting appropriate populations to target for marketing, even less charismatic species can be used as flagship species and attract potential donors.

1. Introduction

1.1. Choosing flagship species for conservation

Flagship species are frequently used in conservation, generally to generate awareness and promote conservation to a wide audience, and as a tool to generate money [8]. In spite of this frequent use, there is variation in the definition and role of flagship species [3], but here we follow Heyworth's [17] definition of 'popular charismatic species that serve as symbols and rallying points to stimulate conservation awareness and action'. Past research has focused on identifying the physical characteristics which make species appealing (e.g. large bodied mammals with forward facing eyes, [31]). Species selected as flagships tend to be attractive and recognizable [31], even though there is evidence that knowledge and positive attitudes are key determinants of conservation support [32]. Although one function of flagship species is as a key fundraising tool for international conservation non-governmental organizations (NGOs) [31], primarily focusing on aesthetics restricts the number of taxonomic groups which are deemed appropriate for use

as a flagship species [31]. Flagship species also perform other roles where attitudes may be more important than appearance, such as influencing policy and promoting conservation awareness [4]. If attitudes are key to preferences for different species, there should be less focus on a species' visual appearance, and more on the cultural importance of potential flagship species, as suggested by the theory of flagship species action [19]. The theory of flagship species action describes how species should be selected based on their cultural importance and broad appeal [19]. Under this theory, and also other recent analyses of flagship species selection processes (e.g. 34,35), identifying the relative appeal of different potential flagship species for different demographics is an important step in flagship species selection. Although flagship species are sometimes conceptualized as species with general appeal, there is increasing recognition that flagship species may be more effective if both their purpose (e.g. to raise funds or awareness) and the specific audience is considered [4,8,34,36]. Regardless of the exact process for determining which species will function best as a flagship species, conservation organizations may wish to position less obviously popular species as 'flagship species'. This may be to align public support and the

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image of a conservation project with the goals of a specific organization. For example, tigers are a frequently used flagship species [3] but are unlikely to act as a rallying point for coral reef conservation: conservation projects which focus on a particular species group or area are likely to want to select a flagship species from within that group or area [8]. Under these circumstances, the chosen flagship species might appeal to a smaller public, but could still act as a charismatic representative of their group and a rallying point for conservation.

1.2. Individual traits which may influence attitudes to potential flagship species

If conservation organizations wish to use a more unusual species as a flagship, initial market research may help to identify which individuals might be more likely to support conservation of the species.

Various definitions of flagship species emphasize the importance of public attitudes to the species, rather than the appearance or ecological significance of a flagship species e.g. [37,39]. Attitudes are specific indicators of broadly integrated feelings, beliefs and values [20], all of which vary between individuals. Furthermore, as attitudes are an important contributor to pro-environmental behavior [1], identifying the individual traits which contribute to the formulation of an attitude is an important part of flagship species use. Initial research on potential determinants of attitudes to animals suggested gender was of primary importance [20]. While more recent research showed no general differences between males and females in attitudes to animals, it was found that females tended to show higher empathy towards 'loveable animals' and less empathy towards animals which evoke a sense of fear [30]. This study also found that the type of education institution attended (ranging from primary, grammar and agricultural schools to a Swiss university of applied sciences) affected the attitudes individuals held towards species. For example, students from agricultural schools considered mammals and reptiles undesirable, while university students showed a greater preference for insects than students from other educational backgrounds [30]. Davey (1994) [12] also identified gender differences in attitudes to invertebrates and animals which evoke a sense of fear, such as rats, snakes and bats. Female participants reported significantly greater levels of fear relative to male participants, but there was no relationship between fear and age. These studies suggest that both gender and educational background are demographics which may impact which species are appropriate as flagship species, particularly for species which invoke fear.

Greater knowledge has been associated with the development of pro-environmental attitudes in a number of contexts. For example, individuals with better knowledge of sharks and dolphins are more likely to favor their conservation and disapprove of harmful behavior such as recreational activities with captive individuals [2,23]. Similarly, students who experience environmental education about lemurs tend to have greater knowledge about lemurs and more positive attitudes towards them than those who do not [27]. Personal knowledge in the form of experience is also an important variable which influences pro-environmental attitudes [16]. Yore and Boyer (1997) [40] demonstrated that students who had direct experience with wildlife through bird watching had more pro-environmental attitudes, showing greater concern for and interest in other species than students who did not have this experience.

1.3. The impact of information provision on pro-environmental behavior

Greater knowledge is not only associated with pro-environmental attitudes, but there is also a relationship between information provision and pro-environmental behaviors. Recent research suggests that when more information is provided on less popular species and they are featured on their own webpage, these species can gain as many as 15 times more conservation donors than when they are not featured on their own webpage [36]. Likewise, stated consumer preferences for

keeping species as exotic pets was reduced by 39% when individuals were presented with information about potential diseases and the legality of keeping these animals [22]. In contrast, information on welfare and conservation impacts did not have any impact on stated likelihood of purchase in this sample. This suggests that although greater knowledge about environmental issues is associated with pro-environmental behaviors, it may only be some types of information which produce this effect. If the information a conservation donor holds about a species can have such a great influence on their behavior, the way that flagship species are used could be completely rethought: conservation NGOs may be able to use educational campaigns to increase the profile of less charismatic species which require conservation attention but are underfunded.

The influence of one type of information on flagship species conservation has attracted particular attention. The International Union for Conservation of Nature (IUCN) red list categorizes species by threat status as extinct in the wild, extinct, critically endangered, endangered, threatened, and least concern by their decreasing likelihood of extinction [18]. Declaring a species extinct is deemed an effective way of raising awareness of the effects of anthropogenic activity, even though the public's interest in extinction events is short lived [10]. However, relative risk of extinction may still be relevant information when individuals are making decisions about one-off donations, and providing donors with information on IUCN threat status could boost donations, although the evidence for this appears mixed. In one study at Paris Zoological Park there was no effect of IUCN threat status on donating behavior [11] but information on threat status was not explicitly available to potential donors while they were making their choice, which may explain the lack of result. World Wildlife Fund (WWF) donors prefer more endangered species, but donors to the Zoological Society of London's Evolutionarily Distinct and Globally Endangered (EDGE) do not show any preference for more or less endangered species [36]. Instead, EDGE donors prefer more appealing species which are more prominent and have more information provided on the EDGE website. Verissimo et al., (2017) [36] suggest this lack of effect may be as all EDGE species are threatened, and so no effect of IUCN status is found as all species are perceived as threatened. However, it may be that the relative difference between adjacent IUCN threat categories are not distinguished by potential donors. In the WWF study, adjacent categories were grouped for analyses (e.g. near threatened and least concern were grouped, and compared to the group critically endangered and endangered in the wild) whereas this grouping was not used in the EDGE study [36]. Therefore, the preference for more threatened species found in the WWF study cannot conclusively show that donors distinguish between individual IUCN threat statuses. If IUCN threat status is something which might be used to encourage donations, we need to demonstrate whether individuals will shift their choices towards the more threatened species when information on IUCN threat status is presented.

1.4. Sharks and dolphins as flagship species

The observational research outlined above suggests that the information provided about species can affect the behavior of conservation donors, potentially increasing support for less charismatic species. However, it has not been experimentally demonstrated that information provision can shift stated conservation preferences from more charismatic species to those which are not typically considered as flagship species. This study investigates this using two species groups, sharks and dolphins. Sharks often invoke fear and are thus not often considered as potential flagship species. One suggested characteristic which makes a species potentially unsuitable as a flagship species are negative reputations attached to the species [8]. Negative stigmas are attached to sharks, and this is only further fueled by negative and inaccurate portrayals of sharks in news and entertainment broadcasts [24]. Although the whale shark (*Rhincodon typus*) was used as a flagship

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