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The Australian public worries more about losing species than the costs of keeping them

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Research Paper

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Summary

Government conservation measures will always depend on public support. While more has been learnt about which species the public values and which conservation measures are socially acceptable, less is known about the criteria that the public thinks government should consider when making conservation investment decisions. This study uses a stated preference best–worst scaling method to gauge the views of a sample of the Australian public on what they think government should consider when allocating funding to threatened species conservation. We found that the three most important factors were the risk that a species might become extinct, the likelihood that a conservation intervention might be effective and the risk of unintended consequences for other species that could potentially arise if the measure was implemented. Costs of conservation measures and the degree to which the society accepts these costs were considered much less important. The latter aspect was consistent with the high level of trust that respondents placed in the judgement of experts and scientists concerning threatened species conservation. We conclude that the Australian Government has a societal mandate to spend more money on threatened species conservation, provided that there is little risk and that it is backed up by science.

Introduction

The loss of biodiversity is a major challenge facing humanity, despite global conservation efforts (Otto-Pörtner et al. 2021). Reversing the accelerating rate of extinction, with 500 species likely to go extinct in the next two decades (Ceballos et al. 2017), requires translation of ambitious conservation goals into real-world action (Butchart et al. 2016); 'urgent decisions are needed about where, when and how to allocate scarce conservation resources to mitigate threats and recover populations' (Tulloch et al. 2020).

Not all conservation measures that can be applied are necessarily acceptable to the broader public which, either through taxes or donations, pays for them. Scientists have debated, for example, the ethics of managing feral animals harmful to threatened species by either killing them (Wallach et al. 2018, Hayward et al. 2019) or containing the threatened species within protective fencing (Mallon & Price 2013, Child et al. 2019). Other ethical debates have been around taking threatened species into captivity, such as wildlife parks or zoos (Keulartz 2015), and relocating them somewhere safer (referred to as assisted migration; Albrecht et al. 2013, Ahteensuu & Lehvävirta 2014). One of the most controversial ethical issues is genetic management of threatened species, such as interbreeding previously separated populations (Frankham et al. 2011), deliberate hybridization (Todesco et al. 2016, Quilodrán et al. 2020) and applying genetic engineering and gene drives (Kirk et al. 2020, Sandler 2020). As a consequence of some debates, society has determined that there should be legal constraints on action or at least stronger actions (e.g., Braverman 2017). To date, debates on the ethics of conservation have mainly been confined to conservation experts, who advise on conservation investment based on biological and physical factors (Manfredo et al. 2021), feasibility, effectiveness and costs (Joseph et al. 2009, Hagerman & Satterfield 2013, Moore et al. 2021), as well as the risk of doing harm (Hagerman & Satterfield 2013, Meek et al. 2015, Robinson et al. 2021). However, understanding the values of the broader society can help ensure conservation decisions are socially acceptable (Manfredo et al. 2021). Governments are more comfortable spending taxpayers' money and licensing actions if they know that the investment and permission reflect societal preferences and values and the public's priorities for what should be conserved and how (Kirk et al. 2020, Zander et al. 2021).

Recent studies have investigated which conservation measures society finds socially acceptable and likes to see supported by their government (see St-Laurent et al. 2019, Pelai et al. 2021, Zander et al. 2021, Eyster et al. 2022). Even more is known about the preferred characteristics of the species that the public likes to see prioritized for conservation, such as the taxa (Troudet et al. 2017), the threat status (Ridley et al. 2020), the appearance and charisma

(de Pinho et al. 2014, Colléony et al. 2017, Garnett et al. 2018a) and intangible aspects such as cultural importance (Garibaldi & Turner 2004) and familiarity (Danley et al. 2021). However, what government policymakers need to know is the extent to which extinction risk should be traded off against costs, the acceptability of different conservation measures, their feasibility and likelihood of success and whether the measure is acceptable to the public. Previous studies have focused on these aspects separately, preventing comparisons of different approaches and the public acceptability of trade-offs.

The aim of this study was to understand which aspects of threatened species conservation that the Australian public think should be afforded the highest priority. This we did by means of a best–worst scaling (BWS) experiment with a panel of survey respondents that revealed what they thought the government should trade off when allocating conservation funds. Australia has a history of species extinction (Woinarski et al. 2015). Most threatened Australian species are endemic (Chapman 2009), so their persistence largely depends on the conservation measures licensed and funded within the country (Wintle et al. 2019). The research also has relevance to Australia's national action plan for threatened species (DCCEEW 2022), particularly the targets for species conservation and community engagement. The results have relevance to discussions in government about what voters consider most important when conservation budgets are being determined. Our paper further contributes to the methodological advancement of the use of BWS experiments by using a split sampling design addressing the effect of whether respondents were asked to choose the best or worst item first, an important consideration for BWS designs.

Material and methods

Data collection and sampling

An online survey was conducted in October 2021. For this, we paid a research company (Dynata), which maintains a panel of people living in Australia recruited through different online and offline approaches and representing a snapshot of Australian society. The panel sample is representative of people in Australia with access to the Internet, which is c. 92% of the Australian population. The panel includes c. 400 000 people (c. 2.0% of the Australian adult population) from which the company selected 30 000 potential respondents. These 30 000 people were selected randomly while fulfilling certain criteria to make the sample representative of the Australian public in terms of gender, age and location (states and territories and urban/regional) because the research company assumes a 10% response rate, and we aimed for 3000 responses. Participants were remunerated for their time according to the company's policies.

The questionnaire was tested with 20 people face to face, and then a pilot study with 200 respondents was carried out. The final questionnaire consisted of four parts. The first part included an introductory text about the aim of this survey, the ethical considerations and explanations about respondents' rights. After this, we presented the BWS tasks, followed by questions on environmental and conservation attitudes and finally on the respondent's demographic background. To gauge respondents' connection to nature, we assessed their level of agreement with two statements ('I always think about how my actions affect the environment' and 'I take notice of wildlife wherever I am') that have been found to be helpful for characterizing a respondent's attitude towards the environment. The questions were adopted from the 'Nature Relatedness Scale' (Nisbet & Zelenski 2013). Respondents were asked about their degree of agreement with potential responses on a four-point scale ('Strongly agree', 'Agree', 'Disagree', 'Strongly disagree'). Two more statements, assessed on the same scale, were included to assess respondents' attitudes towards the economy ('The best measure of progress is economic growth') and technological solutions for resource shortages ('Future resource shortages will be solved by technology'). These two questions are meant to assess respondents' beliefs about economic growth and technology advancements and were adopted from the Dominant Social Paradigm scale (Kilbourne et al. 2001) and other studies which used them to explore risk perceptions and attitudes (e.g., Fletcher et al. 2021, Zander et al. 2021).

To gauge conservation attitude, we included responses to four statements ('Species extinction should be prevented regardless of the costs', 'It is more important to spend taxpayers' money on things such as education and healthcare than on saving threatened species', 'It is the government's responsibility to save our threatened species' and 'Decisions about which threatened species to save should be made by experts'). The questionnaire was developed in Qualtrics and tested online and offline with 20 people before the main survey began. Ethical approval for the survey was obtained from the Charles Darwin University ethics committee (H19047).

BWS design

In the BWS case 1 design (Louviere et al. 2015), as used here, respondents were asked to state which of a set of items they consider as Best/Most and Worst/Least (the exact framing depending on context). The question associated with the BWS tasks was: 'When the Australian Government considers how to invest in threatened species conservation, what do you think should have least and most influence on their decision?'.

Our BWS experiment had seven items from which to choose based on a literature review and our aims (terms in brackets signify terms used for each item throughout this paper):

- Risk of measure (to threatened species, to other species and to humans) [Consequences]
- Cultural importance of species [Cultural importance]
- Acceptability of the measure [Acceptance]
- Difference of the species from others [Distinctiveness]
- Proximity to extinction [Extinction risk]
- Cost of measure [Costs]
- Likelihood of success in preventing extinction [Feasibility]

As recommended by Louviere et al. (2015), we applied a Balanced Incomplete Block Design (BIBD), which stipulates that every respondent see each item the same number of times and that each item co-occurred with another item the same number of times. Using the *R* package 'crossdes' (Sailer 2015), we created a design in which the seven items were always grouped into four. In each of the seven different tasks we created, we included four of the items in combinations that ensured each item co-occurred with each of the other items twice. Respondents were presented with all seven of the BWS tasks (see Fig. 1 for an example).

Respondents may process the information provided by the presented BWS tasks differently, and the positioning of the items within a task can affect how people make their choices. Campbell and Erdem (2015), for example, found that respondents were more likely to choose the item at the top of a list. To overcome this

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Version 1: best-worst order

Question: Please select exactly one most (left hand column) and one least (right hand column) important aspect that you would like the Government to take into consideration when deciding about conservation measures.

Most important aspect		Least important aspect
○	Likelihood of success in preventing extinction	○
○	Cost of measure	○
○	How culturally important it is	○
○	Risk of measure (to threatened species, to other species and to humans)	○

Version 2: worst-best order

Question: Please select exactly one least (left hand column) and one most (right hand column) important aspect that you would like the Government to take into consideration when deciding about conservation measures

Least important aspect		Most important aspect
○	How culturally important it is	○
○	Likelihood of success in preventing extinction	○
○	Cost of measure	○
○	Risk of measure (to threatened species, to other species and to humans)	○

Fig. 1. Example of one of the seven best–worst scaling tasks. We applied a split design and half of the respondents saw one of the two versions each, and we also randomized the order in which the four items appeared in each task.

problem, we randomized the positioning of the four items within each BWS task. Another important aspect of the design is the order in which the response for the best and for the worst item occurs (either best–worst from left to right or worst–best). Hawkins et al. (2014) found that this order affects decision-making, in terms of decision-making time, and recommended varying the response order, which we did in our design. Using a split sample approach, half of the respondents saw all seven BWS tasks in which the response for the best item had to be made in the left-hand column, the other half saw seven BWS tasks where the best item had to be selected in the right-hand column (see Fig. 1 for the two designs and the associated questions). Each respondent was randomly assigned to one of the versions.

Data analysis

Data from a BWS experiment can be analysed using two broad approaches: a count approach and a statistical model approach. For designs that are BIBD, Marley and Louviere (2005) showed that results from the counting approach are almost identical to the results from the statistical model approach. First, we applied the counting approach to show the relative importance of the items. For this, we tallied how often each item was chosen as best and worst and then subtracted the total number of 'WORST' (least important) choices for each item across all respondents (i.e., on an aggregated level) from the total number of 'BEST' (most important) choices. This resulted in a best–worst (BW) score for each item. A positive BW score indicated that the item was chosen more often as 'most preferred' than as 'least preferred'. Each respondent saw each item four times in different combinations, which meant an item could get a maximal BW score of 4 if always chosen as most important and a minimal score of –4 if always chosen as least important (see Louviere et al. 2015). The standardized BW scores for each item were calculated by dividing these BW scores by the number of times each item was seen by a respondent (here 4). We used the software *R* for all data analyses and the package 'support.BWS' (Aizaki 2021) to organize and analyse the BWS data.

We then applied non-parametric Kruskal–Wallis H tests to assess the effect of independent variables (gender, age, education, income and attitudes, as well as the order in which the response for the best and for the worst item occurred) on the individual BW scores for each item.

Finally, we clustered the individual BW scores for each item using a polytomous variable latent class analysis (LCA). For this, we used the 'poLCA' *R* package (Linzer & Lewis 2011). The LCA clusters respondents with similar scores for the seven BWS items and thereby identifies latent patterns of respondents' values regarding what to save. This model is often described as a special case of cluster analysis – a probabilistic extension of the k-means method (McLachlan & Basford 1988) that is particularly applicable when the variables in question are not continuous, such as the scores used here (Linzer & Lewis 2011). The application of LCA also permits the inclusion of covariates to predict latent class membership; here, we included the same demographic and attitudinal parameters as tested before for the BW scores. While the non-parametric tests only tested whether these parameters had a statistically significant impact on the item selection, the LCA can cluster those respondents who score the items in a similar way and test whether respondents belonging to one class can be characterized by the same demographic background and attitudes.

Before the LCA, we carried out a correlation analysis using the *R* package 'corrplot', which showed four pairs of strongly correlated variables: 'education' and 'income'; 'prevent extinction at all costs' and 'government responsibility'; 'economic growth' and 'technology'; and 'wildlife' and 'think about actions' (Fig. S1). We subsequently dropped 'education', 'government responsibility', 'technology' and 'think about actions' from the final model.

Results

Sample description

Of the 3000 completed surveys, 513 could not be used for analysis; 392 surveys were incomplete and 121 were submitted in an unacceptably short time (<4 min; mean completion time was 14 min). The final dataset contained 2487 valid and complete responses. The sample contained as many responses from male as from female respondents (Table S1). On average, respondents were 48 years old (SD: 16), with a median of 48 years, and thus were older than the national median (38 years; ABS 2022). Most respondents (71%) had an annual personal gross income of less than AU$80 000 and 39% had a university degree. This means that our sample had a similar income distribution to people across the whole of Australia (Table S1). People in our sample were on average slightly better

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Table 1. Summary of bivariate analyses of the effect of independent variables on the best–worst scores for each of the seven items.

Variable	Extinction risk	Feasibility	Consequences	Culture	Acceptance	Distinctiveness	Costs
Female	ns	ns	ns	* (+)	ns	ns	ns
Age	ns	ns	** (+)	** (–)	ns	ns	ns
Income	ns	** (–)	ns	ns	ns	ns	** (+)
Prevent extinction	ns	ns	ns	ns	ns	ns	ns
Other priorities	ns	ns	ns	ns	ns	ns	ns
Economic growth	ns	ns	** (+)	ns	ns	ns	* (–)
Belief in experts	ns	** (–)	ns	ns	ns	ns	ns
Wildlife	ns	ns	ns	ns	ns	* (–)	ns
Order effect	ns	ns	ns	ns	ns	ns	ns

**p < 0.05, ***p < 0.01, ns = not significant.
Prevent extinction: agreed that 'Species extinction should be prevented regardless of the costs.'
Other priorities: agreed that 'It is more important to spend taxpayers' money on things such as education and healthcare than on saving threatened species.'
Economic growth: agreed that 'The best measure of progress is economic growth.'
Belief in experts: agreed that 'Decisions about which threatened species to save should be made by experts.'
Wildlife: agreed that 'I take notice of wildlife wherever I am.'
Order effect: order in which the response for the best and for the worst item occurred in the best–worst tasks.

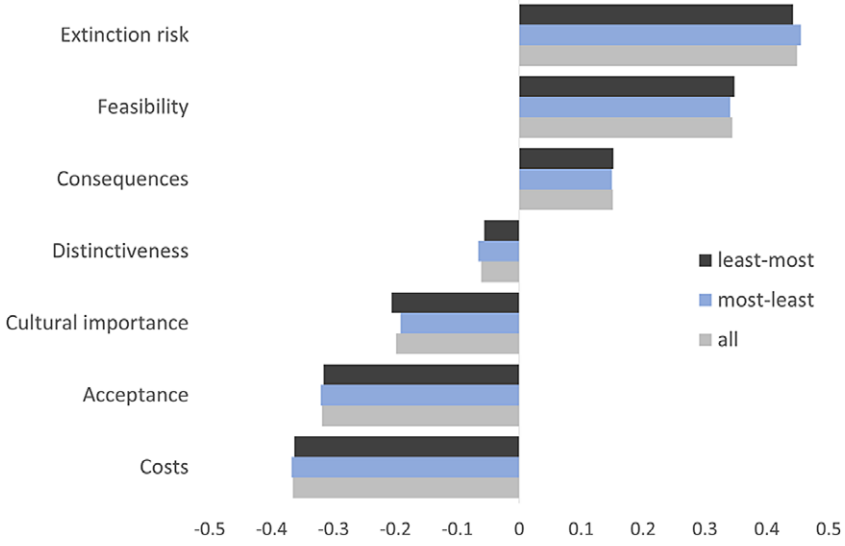

Fig. 2. Standardised best–worst scores – by design version and overall (n = 2487).

educated than the average for people in Australia, a common feature of online surveys (e.g., Fenner et al. 2012, Zander et al. 2019, Hemsworth et al. 2021). One reason for our sample being older and better educated than the average is that we only included adults, whereas the data from the national census contain all age groups and therefore many young people still being educated. Most respondents lived in the densely populated south-eastern parts of Australia (Victoria, New South Wales and Queensland; Table S1), as do most Australians, although there was a very slight over-representation of respondents from South Australia and Tasmania. Seventeen percent of respondents participated in voluntary conservation activities or worked in the conservation sector.

More than 80% of respondents thought that it was the government's responsibility to save Australia's threatened species, that conservation decisions should be made by experts and that species extinction should be prevented regardless of the costs (Fig. S2). Approximately half of the respondents thought that it was more important to spend taxpayers' money on things such as education and healthcare than on saving threatened species, while the other half did not think so.

Importance of aspects in conservation decision-making

The aggregate counting approach showed that three aspects were considered more often as 'most important' than 'least important' (i.e., they had a positive standardized BW score; Fig. 2; see Fig. S3 for histograms of the BW scores). The highest importance was assigned to the extinction risk of the threatened species to be conserved, followed by the likelihood of success of the conservation measure (its feasibility) and the potential consequences. The costs were regarded as least important (see Table S2 for the detailed BW scores). The standardized scores were very similar across the two versions of the BWS design (i.e., there was no order effect; Fig. 2 & Table 1).

Determinants of importance

Female respondents had significantly higher BW scores for the cultural importance of species (H = 2.77, df = 1, p = 0.0959) than males (Table 1). Older respondents placed higher importance on 'Consequences' (H = 14.89, df = 8, p = 0.0613) and lower importance on 'Cultural importance' (H = 19.14, df = 8, p = 0.0142) than younger respondents. High income was associated with higher BW

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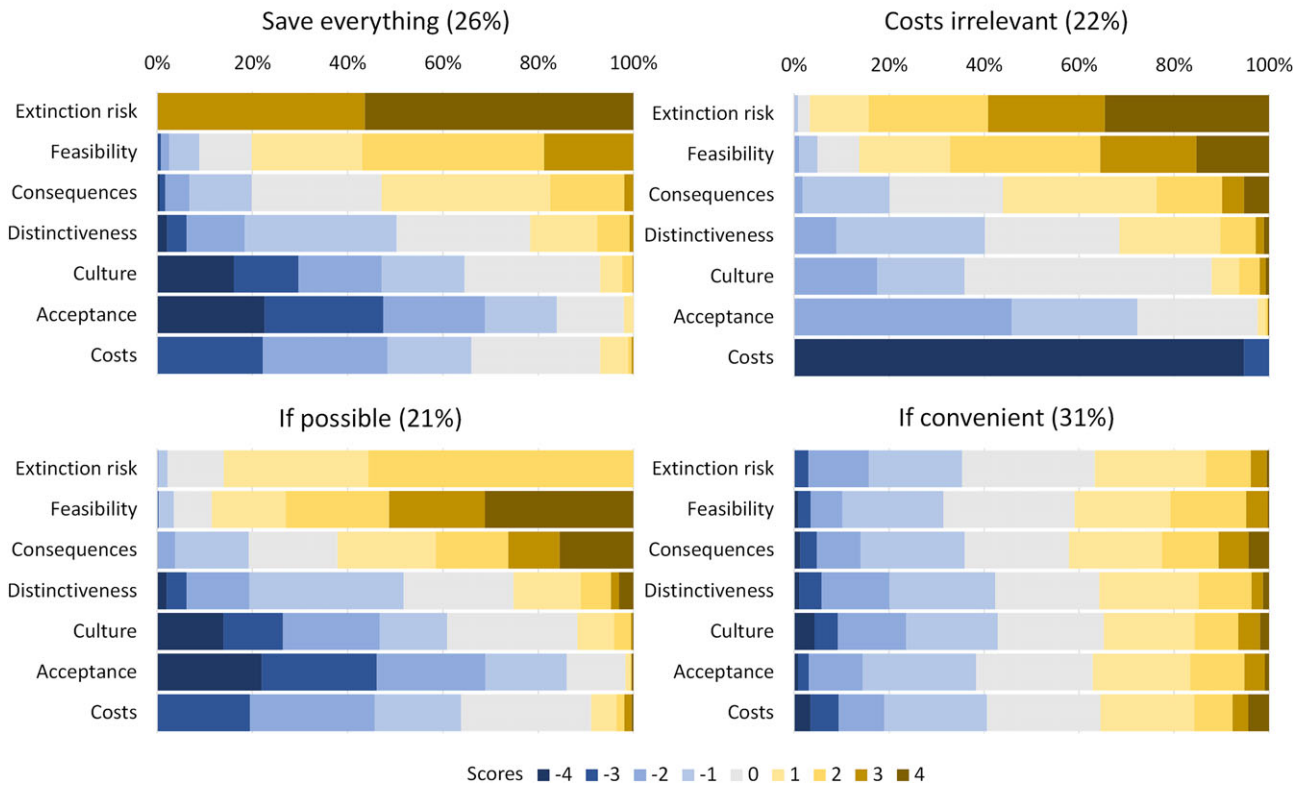

Fig. 3. Summary results of a four-class latent class model with covariates, showing the distribution of best–worst scores of each item across the classes.

scores for 'Costs' (H = 16.95, df = 8, p = 0.0397) and lower scores for 'Feasibility' (H = 18.09, df = 8, p = 0.0205).

Those who believed that economic growth is essential placed greater importance on 'Consequences' (H = 4.45, df = 1, p = 0.0350) and lower importance on 'Costs' (H = 2.99, df = 1, p = 0.0834) than those not believing economic growth to be essential. Those who believed in expert decisions placed less importance on 'Feasibility' (H = 4.25, df = 1, p = 0.0382). Respondents strongly connected to wildlife had lower values for 'Distinctiveness' (H = 3.23, df = 1, p = 0.0724) than those without this connection. The order in which the responses for the best and for the worst item occurred in the BWS tasks had no significant impact on any of the seven items.

Clusters of respondents

Using the individual specific results from the counting approach, we tested latent class models with two, three, four, five and six classes and found that, based on the Bayesian information criterion, a model with four classes performed best (Table S3), with a distribution of c. 26%, 22%, 21% and 31% of respondents within classes 1–4, respectively. The LCA statistically confirmed latent classes present in the sample which were influenced by gender, not by age or income, and particularly by environmental and conservation attitudes (Table S4).

Respondents belonging to class 1 (26%) had a strong preference for 'Extinction risk', with all respondents within this class choosing this item as most important three or four times. 'Feasibility' was also important for respondents belonging to this class, while 'Cultural importance' had a negative BW score for 65% of respondents. Women were more likely to belong to this class. Those who strongly believed in economic growth were less likely to belong to this class. We labelled this group 'Save everything'.

Respondents in class 2 (22%) considered 'Costs' unimportant in decision-making, with 95% of respondents having chosen this item as least important every time (BW score = –4). Respondents within this class were likely to think that species extinction should be prevented at all costs, that taxpayers' money should be used for threatened species conservation and that they were connected to nature ('wildlife'). We labelled this group 'Costs irrelevant'.

Respondents belonging to class 3 (21%) had a strong preference for 'Feasibility', with half of the respondents having chosen this item as most important three or four times (Fig. 3): they had a BW score of 3 or 4 (see Table S4). Respondents in this class also favoured 'Extinction risk' and 'Consequences', albeit to a lower extent. We labelled this group 'Save if possible'.

Respondents in class 4 (31%) did not show strong preferences for any of the items; they placed importance on 'Feasibility' and 'Consequences', not on 'Extinction risk'. Of all respondents, respondents in this class placed the highest importance on 'Acceptance', 'Cultural importance' and 'Costs'. Respondents within this class were characterized by low connection to nature, low level of belief in conservation experts, high belief in the benefits of economic growth and a belief that taxpayers' money should be spent on causes other than preventing threatened species extinction. We labelled this group 'Save if convenient'.

Discussion

Important versus not-so-important aspects

The main message from this survey is that the Australian public thinks that governments should spend what is needed to prevent extinction provided the actions have a reasonable chance of success or cause no unintended harm. This reflects the three

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considerations considered most important by our sample of the Australian public when allocating resources to threatened species: how close a species is to extinction, the feasibility that the proposed conservation measure will prevent extinction and the risk that the conservation measure will have unintended consequences for humans and/or other species. Of these, proximity to extinction received the greatest support; this corroborates an aversion to extinction among the Australian public regardless of cost, with a willingness to pay substantial amounts towards preventing the extinction of almost any entity (a high existence value for species), not just pretty parrots and plants but also rats and snails (Gunawardena et al. 2021).

Of least importance to the public were the costs of conservation. When asked directly to trade off spending on health and education against conservation of threatened species, half considered the latter more important. However, that means that half expressed a willingness to support persistence of another species over their own self-interest. The results are broadly similar to those of a survey in the USA where 74% of people supported the implementation of biodiversity conservation and 53% did so when people were asked to trade conservation off against economic development (Wang 2022). Support for conservation is also reflected in the ongoing popularity of the Endangered Species Act in the USA (Tulchin et al. 2015), which demands the protection of endangered species regardless of the costs.

Also unimportant was the cultural significance of a taxon, its distinctiveness from other species or the acceptability of the methods used to conserve it. Such results are consistent with the great faith placed in conservation scientists and managers (91% trusted scientists in their decision-making in conservation and their ability to make the right decisions when it comes to threatened species conservation and 86% agreed that decisions about which threatened species to save should be made by experts). Trust in Australian conservation scientists, which has emerged in other studies (Garnett et al. 2018b), is implied for all stages in the process of threatened species conservation: taxonomists are trusted to identify which forms of life are different from others; conservation biologists are trusted to identify which of these life forms are threatened with extinction; and conservation managers are trusted to do what is needed and to do whatever is necessary to save those species.

However, trust in science to do what is right does not extend to scientists imposing their own values on conservation. As has been found in other studies, scientists may consider distinctive forms more important than those with many close relatives (e.g., Garnett et al. 2018b), but not so the public. While the public may be willing to pay more for the conservation of some species than they are for others (Pandit et al. 2022), they do not want any form actually to go extinct (Zander et al. 2021). Similarly, while scientists and some advocacy groups may be concerned about the ethics or efficacy of particular approaches (Subroy et al. 2018), the public is not troubled by such matters provided they are effective, whether it be killing feral animals (Zander et al. 2021) or intensive genetic management (Zander et al. 2022).

Similarly, cultural values include not just culture or spirituality, but also aesthetic, place and educational aspects (Belaire et al. 2015), and the public and local people place value on cultural ecosystem services (Milcu et al. 2013) and culturally important species (Garibaldi & Turner 2004). However, such values were given low priority here compared to extinction risk. This may reflect the make-up of the panel. In Australia, the cultural value of a species is often linked to species that have connection to First Nations Peoples. However, as in the Australian population more broadly, only a small proportion (5%) of our sample identified as Indigenous. Had this share been larger, cultural aspects might have been judged as having a higher priority.

Sample heterogeneity

Within the broad trends in priorities, there was substantial variation in the priority placed on some of the variables, though not all, with the population falling into four classes. People in the 'Save if convenient' group were characterized by their lack of strong opinion about any of the factors affecting fund allocation, with only a mild preference for reducing extinction risk, feasibility and consequences. Based on the pattern of funding made available for threatened species to date, this group of 31% of respondents could be said to represent the status quo in terms of policy, given that people in this group have a low connection to nature, a low level of belief in conservation experts and strong beliefs in the benefits of economic growth and that taxpayers' money should be spent on causes other than preventing threatened species extinction. This leaves nearly 70% of the respondents not wanting extinction, but with three classes of people, each of similar size (between 21% and 26%). Those in the largest of the groups, the 'Save everything' group, were adamant that nothing actually goes extinct, but they thought that factors such as feasibility and unintended consequences should be considered. Members of this group acknowledged the likelihood that cost may be limiting, suggesting trade-offs may be needed, but they suggested that the resources needed to prevent extinction itself should be quarantined because extinction is unacceptable, an approach embodied in McDonald et al. (2015). People in the 'Costs irrelevant' group were emphatic that cost should not be a consideration in any prioritization, and they had the strongest affinity with 'Nature'. Although the beliefs of this group were not challenged by real dollar figures, which can sometimes be very high (Wintle et al. 2019), these group members would be the most likely to reject arguments that imply resources are both fixed and constrained, rejecting concepts of 'triage' that might allow some species to go extinct because recovery is too expensive (Vucetich et al. 2017). However, this group was willing to consider issues such as feasibility and unintended consequences in addition to extinction risk when deciding how to allocate resources. The third group was much more cautious, with extinction risk considered less important than feasibility and the risk of unintended consequences. However, in other ways this group was more closely aligned with the two other groups, favouring extinction prevention than the 'Save if convenient' group.

Also noteworthy were the factors of low importance. The distinctiveness, cultural importance and the acceptability of the management approaches were largely unimportant to those in the 'Save everything' and the 'Save if possible' groups, and even the 'Costs irrelevant' group was less likely to consider these factors than the 'Save if convenient' group. Together these results suggest that over two-thirds of the respondents were more concerned about extinctions than many of the drivers that have tended to characterize government policy on the environment.

Policy implications

The strong support for the prevention of species extinction found here and in other studies (e.g., Rogers 2013, Subroy et al. 2018, Zander et al. 2022) has not been reflected historically in legislation or budgetary support. For example, unlike the widely supported Endangered Species Act in the USA, the Australian Endangered

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Species and Biodiversity Conservation Act 1999 (EPBC Act 1999) does not require that species extinction be prevented. Similarly, annual spending on targeted threatened species recovery in Australia has been far less than that spent by the USA on endangered species recovery and a fraction of what is thought to be needed to avoid extinctions and recover threatened species (Wintle et al. 2019). Policy, however, has been more responsive. Australia's first Threatened Species Strategy (Department of the Environment 2015) aimed to halt the decline of Australia's threatened plants and animals and support their recovery by addressing the threats and by acting to support recovery, while at the same time ensuring that the development that underpins the country's economic and social wellbeing is sustainable. Six years later, the aspiration to prevent extinction is explicit in 'Objective 3: New extinctions of plants and animals are prevented' (Australian Government 2022). Our results suggest that the Australian Government could support the strategy with substantial resources, especially as the species in greatest peril are known (Garnett et al. 2022).

Methodological implications

Making choices is a complex psychological concept, and it is known that the design of tasks created by a researcher can affect how people process the information presented and how they make their choices (Hensher 2006, Greiner et al. 2014). Understanding how stated preference questionnaire design affects responses can prevent bias in future designs. While a large body of literature exists on the design and context effects of choice experiments (e.g., Greene & Hensher 2010, Leong & Hensher 2012), there has been less research on the impacts of survey design on BWS. One study (Hawkins et al. 2014) postulated that the way people process items in a BWS task might depend on whether respondents encounter the 'Best' or the 'Worst' items on the left-hand side. Both versions of the design are used in the literature ('Worst' on the left: Louviere et al. 2015, White 2021, Zander et al. 2021; 'Worst' on the right: Campbell & Erdem 2015, Tyner & Boyer 2020, Bhatta et al. 2022). Both designs have psychological and philosophical merits. Cultures in which people read from the left to the right might expect the 'Best' choice to be made first, but scales often start low and with better or higher scores on the right (e.g., other ranking or Likert-scale questions; e.g., Kazandjian & Chokron 2008). We know of no publications in which the orders Best–Worst and Worst–Best in BWS have been compared. We found that the order was unimportant for all seven items that we presented. We therefore do not support recommendations that the order in such experiments be alternated (Hawkins et al. 2014).

Conclusions

Our results from an Australia-wide online survey using a BWS experiment – a stated preference method – suggest that the trend in Australian government policy towards a commitment to prevent future extinctions has strong support from the Australian people, particularly if the proposed actions have a reasonable chance of success and do not place other species at risk. This commitment held true even when traded off against healthcare and education. The strong support for preventing extinction regardless of the costs suggests that there would be public support for embedding the sentiment within threatened species legislation just as it was nearly 50 years ago with the US Endangered Species Act. The results also imply that rhetoric should be supported by adequate resourcing to make up for what appears to be a substantial deficit in threatened species funding compared to most other countries (Wintle et al. 2019). However, our research establishing that people support greater investment in principle could usefully be extended to explore some of the limits of acceptability around cost and feasibility using quantitative case studies.

A second major finding was that the public retains a strong belief that conservation managers will make sound decisions on how to prevent extinction. This also reflects sentiment in the USA (Tulchin et al. 2015) and places a heavy responsibility on conservation professionals to meet public expectations not only to prevent extinctions but to do so efficiently with minimum risk of unintended consequences.

Third, this study makes a significant contribution to the application of BWS experiments. We split the sample to test whether or not the order in which the response for the best and for the worst item occurs (the column for selecting the best item being either on the left or on the right) significantly affected respondents' choices. The standardized scores were not statistically different across the two versions of the BWS design, and we conclude that the positioning of the column for selecting the best and the worst items (right-hand or left-hand) does not influence respondents' decision-making.

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/S0376892923000073.

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