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Comparative Public Support for Conserving Reptile Species is High: Australian Evidence and its Implications

Abstract

This paper investigates factors influencing the public's support for conservation of tropical reptile species in a focal group drawing on Australian data and an experiment involving a sample of the Australian public. The influences of the likeability of the species, their degree of endangerment, ethical considerations as well as knowledge are examined and found to be important. Likeability is found to be much less important than the existing literature suggests. This is highlighted by comparing the likeability of the focal group of reptiles with that for a group of birds and a group of mammals with differences in willingness to pay for their conservation.

Keywords: Conservation, endangerment, ethics, knowledge, likeability, reptiles, WTP (willingness to pay).

Comparative Public Support for Conserving Reptile Species is High:
Australian Evidence and its Implications

1. Introduction

Approximately 40% of Australia lies above the Tropic of Capricorn and this tropical zone is home to a large variety of tropical fauna. This paper examines attitudes of a sample of the public towards a focal group of tropical Australian reptile species and this sample's comparative support for the conservation of these species.

We collected data on the extent to which a sample of the Australian public drawn from Brisbane like or dislike different reptile species in a focal set and relate this to their support for the survival of each of these species and their willingness to allocate funds for the conservation of each. The public's likeability of this set of reptiles is estimated and compared with that for a set of Australian mammals and for a set of Australian birds. The literature suggests that mammals and birds are on the whole preferred to reptiles (DeKay & McClelland, 1996; Plous, 1993). DeKay & McClelland (1996) suggest that this will be reflected in differences in the public's support for wildlife species in these different groups. Gunnthorsdottir (2001) reached a similar conclusion. We test this by considering how the reptiles fare when the public is offered the option of apportioning funds between charities helping people in need and conservation schemes for reptiles.

It is hypothesised that the degree of the public's support for the conservation of the selected reptilians is a function of species' likeability, the perceived endangerment of the species and the moral or ethical values that individuals have for the conservation of species. We test whether members of the public allocate significantly less funds for conserving least liked taxa than for those that are more liked. Existing literature suggests they would.

The preference people have for different species is influenced by their knowledge of the species. Changes in the knowledge people have of species can alter their perceptions of likeability and affect their understanding of the survival status of a species. In our experiment, we examined the impact of increased knowledge of individual species on likeability and ideas about the endangerment of a species and how in turn this affects willingness to pay (WTP) allocation decisions for conservation of species. It is expected that increased knowledge will increase discrimination in the willingness to pay for the conservation of species.

A group of five Australian tropical reptiles forms one of the focal groups. It comprises of the saltwater crocodile *Crocodylus porosus*, the Australian freshwater crocodile *Crocodylus johnstoni*, the taipan snake *Oxyuranus scutellatus*[1], the northern long-necked turtle *Chelodina rugosa* and the hawksbill turtle *Eretmochelys imbricata*. This focal group of reptiles was selected purposely so that significant differences in the public's awareness of and feelings towards the species could be clearly distinguished. Brief background information on the reptiles is provided in a subsequent section, as is the list of other tropical mammals and bird referred to in the study.

We begin with a discussion of the relevant literature and the place of this study in the body of work on species valuation and conservation.

2. Importance of Study and Relevant Literature

Kellert (1980) and Plous (1993) discovered that people's priorities for saving endangered species corresponded closely to perceptions of the similarity of the animals concerned to humans. Plous (1993) termed this the Similarity Principle. Based on United States government conservation spending data for the conservation of endangered wildlife, Metrick & Weitzman (1996, 1998) argued that visceral characteristics (physical size and degree to which species are considered higher order life forms or human-like) of wildlife species plays a major part in government allocation of funds for conservation of endangered species and swamps the influence of more scientific characteristics like degree of endangerment or uniqueness. Studies by Samples *et al.* (1986) and DeKay & McClelland (1996) arrived at the similar conclusion that higher order animal species are valued more highly than lower order species. Our study, by comparing animal species categorised into three taxonomic groups (mammals, birds and reptiles) show that the effect of visceral (likeability) characteristics on allocation of funds for conservation of wildlife species have been overrated. This is tested by comparing allocations of funds between conservation schemes for classes of species and charities for needy people. We also find that the effect of survival status (degree of endangerment) on allocation of funds for conservation of species may have been underrated by Metrick & Weitzman (1996, 1998). Support is given to the findings of Samples *et al.*

(1986) and DeKay & McClelland (1996) that WTP for conservation of species that are endangered is increased by revelation of this endangerment. This also accords with the findings of Gunnthorsdottir (2001). We tested how a change in the apparent perception of the degree of endangerment of a single species (in our case for the hawksbill turtle) affected funding allocation for conservation[2]. We point out that Gunnthorsdottir's (2001, p. 211) argument that "an animal's external characteristics may seal its fate" and "selective preferences for certain animals are therefore likely to shape the future fauna of our planet" may be an exaggeration; species that are less attractive or less liked (thus less preferred) such as some reptile species do obtain a considerable degree of support for their conservation too.

3. Methodology and Wildlife Species included in the Study

Experiment methodology

The surveys conducted for this study were based on two questionnaires. The questionnaires were designed to elicit the following information: (i) the Brisbane (Queensland, Australia) public's knowledge and likeability of the focal tropical reptiles species, (ii) their stated degree of support for the survival of these species, (iii) the pattern of allocation of funds for the conservation of the reptiles species, and (iv) their allocation of funds between the conservation of reptiles and charity for people.

This experimental survey conducted from July to September 2002 involved 204 residents of Brisbane, Australia. This cross-sectional sample of the population was drawn from various suburbs to reflect the spectrum of demographic and socio-economic characteristics. The potential survey participants were reached by letterbox-dropped circulars distributed in the Brisbane area. It was mentioned in the circular that it was an invitation to participate in a survey on wildlife valuation and that selected participants will be offered $20 for attendance, a public lecture, refreshments and a chance to win $200[3]. The real aims of the survey were not revealed to the participants to avoid bias.

Respondents were selected to match the age distribution of Brisbane city to obtain a sample of participants that would be reasonably representative of Brisbane residents. The 204 participants were invited to attend survey sessions and were divided into five groups of about 40 people. Four groups were asked to attend sessions held at the University of Queensland—two groups during the working week and two during the weekend. The fifth group of participants were asked to attend a session held in a church hall on a Sunday. The intention of such an arrangement was to allow participants adequate flexibility, thereby ensuring maximum participation.

In the first part of the survey sessions, participants were asked to fill out a structured questionnaire, called Survey I, to gather background information and their initial knowledge, likeability and support for the conservation of 24 Australian tropical wildlife species consisting of mammals, birds and the five reptilians addressed herein. The completed questionnaires were collected and participants given a tea break.

In the second part of the survey sessions, participants attended an informative and illustrative public lecture presented by Dr. Steven Van Dyck, the then Curator of Mammals and Birds at the Queensland Museum. This lecture dealt primarily with bird and mammal species. After the lecture, participants were given coloured photo booklets with descriptions of all the species concerned including the reptiles in this study, their geographic range, current statuses and other pertinent information such as their human uses. Approximately equal amounts of information on each species were provided in the brochure. Normative statements which can cause bias was avoided. Participants were asked to take home this brochure along with a second questionnaire, Survey II, and were asked to read the brochure, complete the questionnaire and return it in the provided postage pre-paid envelopes. Survey II contains several overlapping questions with Survey I. This overlap was intended to shed light on changes in respondents' knowledge and likeability of species and alterations in their allocation of funds for their conservation.

4. Brief background information on the reptile species included in this study

Saltwater crocodile

The saltwater crocodile is one of the world's largest crocodilian species and reptile (Grenard, 1991; Ross, 1998). Adults usually are five metres long and weigh around 500 kg, but some adult males can reach sizes of up to six or seven metres and weigh above 1,000 kg (Ross, 1998). Its distribution in Australia is shown in Figure 1. It lives in coastal brackish water habitats, tidal sections of rivers, freshwater rivers and swamps and inland lakes (Ross, 1998). Widespread hunting for the skin trade in the middle of the 20th century decimated its population, but since its protection in Australia in the early 1970s the saltwater crocodile population has recovered significantly (Webb *et al.*, 1994; Webb *et al.*, 2000).

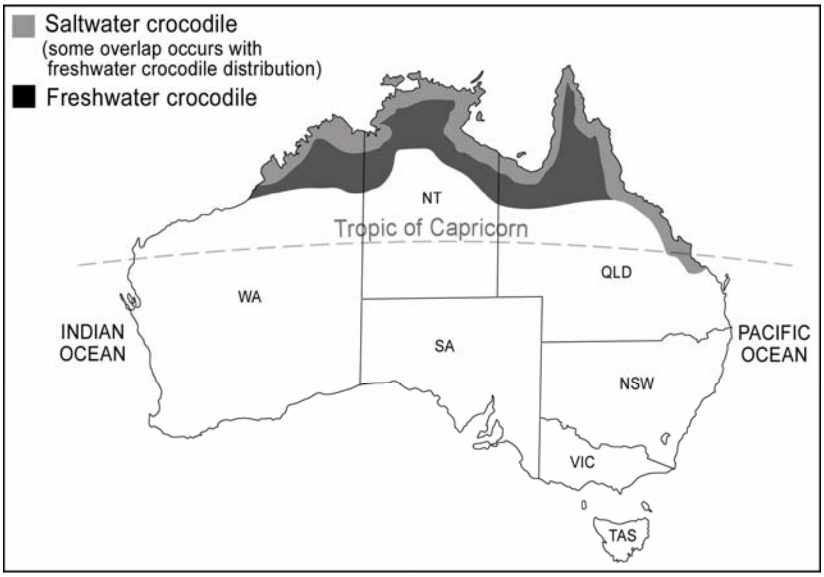

Figure 1: Distribution of the saltwater and freshwater crocodiles in Australia (based on Cronin, 2001; Ross, 1998).

Australian freshwater crocodile

The Australian freshwater crocodile is unique to Australia (Ross, 1998). Adult males are about two and a half to three metres long and weigh around 70 to 80 kg (Webb & Manolis, 1993; Ross, 1998; Britton, 2002). This species is considered harmless to man (Webb & Manolis, 1993). The freshwater crocodile's distribution is shown in Figure 1. It inhabits mostly freshwater areas such as floodplain lakes, billabongs and swamps, including less saline upstream areas of rivers and creeks (Ross, 1998). The freshwater crocodile is generally not found near the coast because of high salinity and competition with the more dominant saltwater crocodile (Britton, 2002). The freshwater crocodile was targeted by hunters for skin when saltwater crocodile populations declined at the end of the 1950s, causing widespread reduction of its population (Britton, 2002). In the late 1960s and early 1970s, it was accorded protection (Letts, 1987) and its population has recently recovered to a considerable extent (Britton, 2002).

Taipan snake

Australia's two species of taipan snakes, the coastal taipan and the western taipan, are among the continent's largest snakes and most poisonous snakes (Shine & Covacevich, 1983; Cogger, 2000). Mature adults of both species measure on average two metres in length (Cogger, 2000). The coastal taipan, which we focus on, has a distribution as shown in Figure

2. The habitats of the coastal taipan are tropical wet and dry sclerophyll forests, open savannah woodlands and cultivated areas such as sugarcane fields (Cogger, 2000; Queensland Museum, 2003a). The taipan snake populations, though distributed sparsely, are presently considered secure (Cronin, 2001).

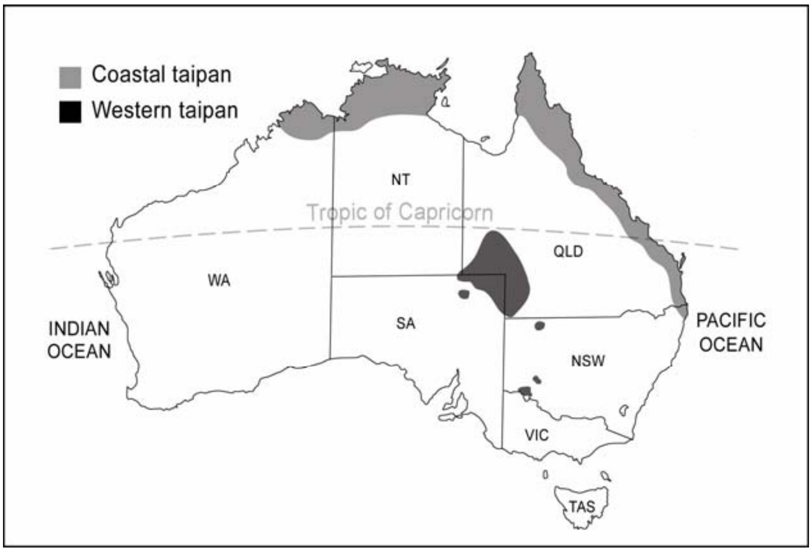

Figure 2: Distribution of taipan snakes in Australia (based on Queensland Museum, 2003a, 2003b; Cogger, 2000).

Northern long-necked turtle

The northern long-necked turtle is a tropical freshwater turtle. Its flattened head and long neck when extended together exceed the length of its shell (Cronin, 2001). Adults weight up to four kg and their shell length measures about 40 centimetres long (Cogger, 2000; Cronin, 2001; Kennett, 2004). The northern long-necked turtle occurs in the distribution shown in Figure 3. The habitats of the northern long-necked turtle are large slow-flowing rivers, freshwater lagoons, lakes and swamps (Cann, 1998; Cronin, 2001). Its population is considered secure (Cronin, 2001).

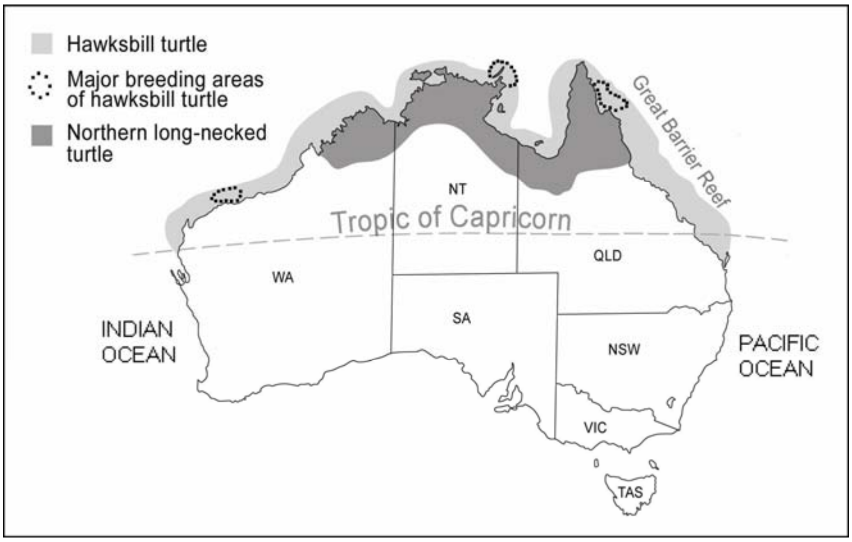

Figure 3: Distribution of the hawksbill and northern long-necked turtles in Australia (based on GBRMPA, 1996; Cann, 1998; Cogger, 2000; Cronin, 2001; DEH, 2004)

Hawksbill turtle

The hawksbill turtle is a medium-sized marine turtle that has a beak-like upper jaw and beautiful shell that is highly sought after for ornamental trade (Cronin, 2001; NMFS, 2001). It grows to about 90 centimetres in length and weighs 60 to 80 kg on average (NMFS, 2001; WWF, 2004). The hawksbill turtle occurs in tropical and subtropical seas around the world, and in Australia its distribution is shown in Figure 3. Its major breeding areas in Australia, which include the northern Great Barrier Reef, are also shown. Its common habitats are tidal and sub-tidal coral and rocky reefs (DEH, 2004). Its global population is estimated to have declined by 80% over the past few decades (Red List Standards & Petitions Subcommittee, 1996), and is attributed to intense national and international trade in hawksbill shell (Meylan, 1998; Bjorndal, 1999; WWF, 2002). The hawksbill turtle is listed in World Conservation Union's (IUCN) Red List (2003) as 'critically endangered' (WWF, 2002). Because populations in Australia are relatively secure, it is only listed as vulnerable in Australia (DEH, 2003).

5. The tropical mammal and bird species referred to in the study

The likeability and support for the conservation of the group of reptiles in this study is juxtaposed against those of two other groups of Australian tropical wildlife species, i.e. mammals and birds in some sections of our study. The common and scientific names of the reptiles, mammals and birds and the abbreviations with which they are identified are summarised in Table 1.

Table 1:

List of Australian wildlife species covered in our survey of likeability, attitude towards species survival and respondents' comparative economic valuation

Common name	Scientific name	Abbreviation
Reptiles		
Saltwater crocodile	*Crocodylus porosus*	*Sc*
Australian freshwater crocodile	*Crocodylus johnstoni*	*Fc*
Hawksbill turtle	*Eretmochelys imbricata*	*Ht*
Taipan snake	*Oxyuranus scutellatus*	*Ts*
Northern long-necked turtle	*Chelodina rugosa*	*Lt*
Mammals		
Lumholtz's tree kangaroo	*Dendrolagus lumholtzi*	*Tk*
Red kangaroo	*Macropus rufus*	*Rk*
Koala	*Phascolarctos cinereus*	*K*
Mahogany glider	*Petaurus gracilis*	*Mg*
Northern bettong	*Bettongia tropica*	*Nb*
Northern quoll	*Dasyurus hallucatus*	*Nq*
Dugong	*Dugong dugon*	*D*
Northern hairy-nosed wombat	*Lasiorhinus krefftii*	*Nw*
Eastern pebble-mound mouse	*Pseudomys patrius*	*Em*
Birds		
Southern cassowary	*Casuarius casuarius*	*Scw*
Brolga	*Grus rubicundas*	*B*
Golden-shouldered parrot	*Psephotus chrysopterygius*	*Gp*
Palm cockatoo	*Probosciger aterrimus*	*Pc*
Eclectus parrot	*Eclectus roratus*	*Ep*
Gouldian finch	*Erythura gouldiae*	*Gf*
Red-tailed black cockatoo	*Calyptorhynchus banksii*	*Bc*
Golden bowerbird	*Prionodura newtoniana*	*Gb*
Australian magpie	*Gymnorhina tibicen*	*Am*
Kookaburra	*Dacelo novaeguineae*	*Kb*

6. Results

Effects of increased knowledge of species on likeability

Knowledge of survey participants varied between the different reptile species in our study. In Survey I, respondents were asked to state whether they knew the species or not. Less than half the respondents said they knew the hawksbill turtle while at least 95% said they knew the crocodiles (see Table 2). Species dangerous to man were better known than those that are not, like the turtles.

Table 2:

The percentage of respondents who said they knew the reptile species in Survey I

	Hawksbill turtle	**Northern long-necked turtle**	**Taipan snake**	**Freshwater crocodile**	**Saltwater crocodile**
Percentage of respondents who said they knew the species	42	65	82	95	96

Respondents were asked in the surveys to indicate how much they knew about each species and the extent to which they liked the species according to the rating possibilities shown in the first and third rows respectively of Table 3. We assigned the weights shown in the second and fourth rows of the table to these ratings.

Table 3:

Knowledge rating and likeability rating and associated weights.

Rating	**Very good**		**Good**	**Poor**	**Non-existent**
Knowledge weights	3		2	1	0
Rating	**Strongly like**	**Like**	**Ambivalent**	**Dislike**	**Strongly dislike**
Likeability weights	2	1	0	-1	-2

The knowledge and likeability weights shown in Table 3 were used to calculate and construct knowledge and likeability indices for each reptile species. Each of these is a simple average of the weights determined for each of the 204 survey respondents in Survey I and Survey II. The results are shown in Table 4.

Table 4:

Knowledge and likeability indices (Survey I and Survey II) for the reptile species.

	Hawksbill turtle	**Northern long-necked turtle**	**Taipan snake**	**Freshwater crocodile**	**Saltwater crocodile**
Survey I					
Knowledge index	0.55	0.81	1.22	1.51	1.66
Likeability index	1.00	1.07	-0.31	0.40	0.30
Survey II					
Knowledge index					
Likeability index	1.49	1.51	1.51	1.69	1.77
	1.21	1.08	-0.15	0.32	0.18

From Table 4 we note that the knowledge indices of the species in Survey I is consistent with the data in Table 2 and that the least liked species are those most dangerous to man whereas the turtles (not dangerous to man) are the most liked. The ordering of likeability of the species is broadly similar in Survey I and Survey II but some differences are apparent. The differences are due to extra information being provided to survey participants about the individual species. As a result of this, knowledge about all the species increased (compare Survey I and Survey II knowledge index rows in Table 4) and become more even or balanced; knowledge of the more poorly known species increased relatively more than for the best known species. As a result, the hawksbill turtle displaced the northern long-necked turtle as the most liked species, but the latter remained a highly liked species. The taipan snake remained the least liked species, but it improved its likeability rating in Survey II, possibly because participants became aware of its possible use value in medicine, mentioned in the information booklet they were provided with. The saltwater crocodile and the freshwater crocodile displayed reductions in likeability, but the saltwater crocodile remained the more disliked of the two probably because its comparative ferociousness was noted by participants from their information booklet. Both crocodilians had low likeability indices, but not negative ones. On average, the turtles may have been perceived by the participants as innocuous compared to the crocodiles and the taipan snake which would have been perceived as very dangerous, thereby influencing participants' likeability accordingly.

While likeability of species appears to be influenced by several factors, it seems that the stated degree of endangerment can have some influence on it. Gunnthorsdottir (2001, p. 211) found that "the perceived attractiveness of an unattractive animal can be slightly increased if the animal is presented as endangered". Apart from this, individuals are more inclined to want to help species that are endangered than those that are not (*cf*. DeKay & McClelland, 1996). Let us see to what extent the stated likeability of different species of reptiles in this set influences support for their survival and WTP for their conservation. It is hypothesised that perceived likeability of species is a major influence on support for their survival, and that this, as well as the perceived level of their endangerment, are major influences on the WTP for the conservation of species.

7. Likeability and support for the conservation of individual reptile species

Likeability and support for survival of species

Based on the data from Survey II, comparing the average stated likeability of reptilian species to the percentage of participants who said they are in favour of the survival of the species, the pattern emerges as shown in Figure 4. The reptile species are identified there by the abbreviations of their names as listed earlier in Table 1.

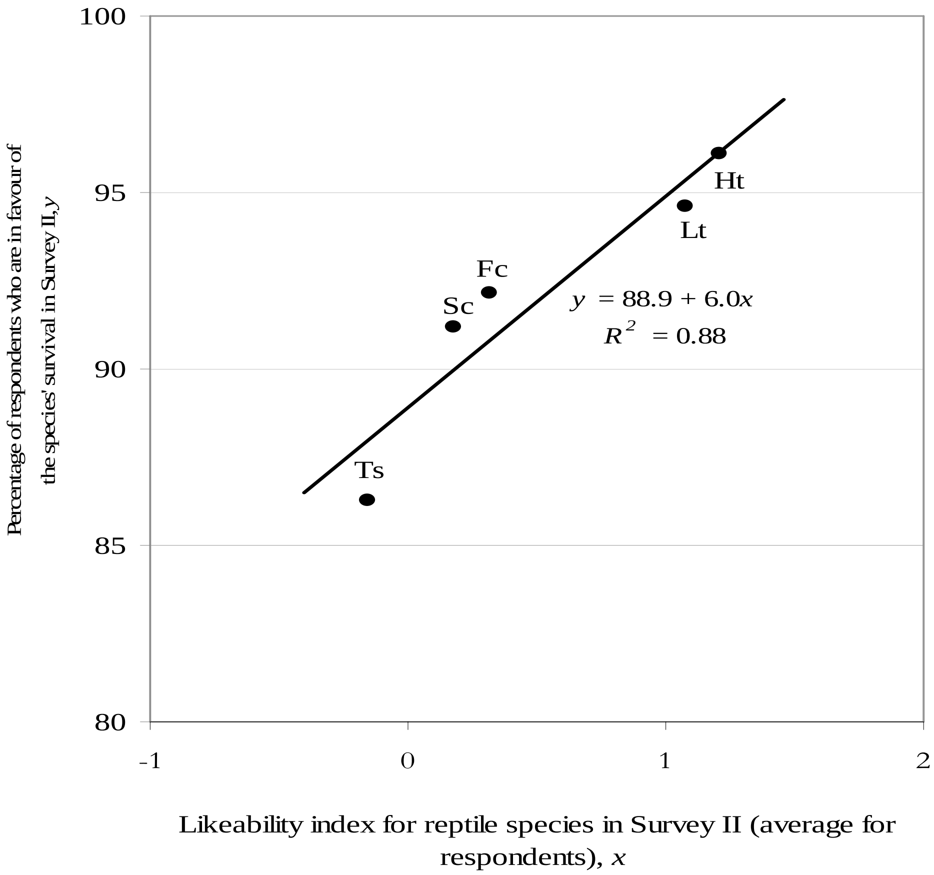

Figure 4: Likeability versus percentage of respondents in favour of survival of the reptile species in Survey II

A positive relationship is present between stated likeability and the percentage of participants in favour of its survival. Linear regression analysis provides the following equation for the trend of the relationship:

$$y = 88.9 - 6.0x \quad (1)$$

($R^2 = 0.88$; $t_{slope} = 4.69$, $p = 0.02$)

The relationship is statistically significant at the 95% confidence level. It should be noted that, overall, most individuals supported the survival of all the reptile species, regardless of the likeability. For example more than 85% of the respondents favoured the survival of the taipan snake, the least liked species in the set of reptiles considered. The most frequently cited reason was that all species have a right to exist. Thus moral or ethical sentiment is involved (*cf.* Spash, 1997; Kotchen & Reiling, 2000).

8. Likeability and the allocation of funds for conservation – the effects of endangerment

Respondents were asked to complete the following exercise:

'Suppose that you are given Aus $1,000, but you can only use it to donate funds to support the conservation of the reptiles in Australia listed below. Suppose that a reliable organisation were to carry out the conservation work and your money would supplement other funds for this purpose. What percentage of your $1,000 would you contribute for the conservation of each of the reptiles listed below? Your total should add up to 100%.'

Reptiles	**(%)**
Saltwater crocodiles	
Freshwater crocodiles	
Hawksbill sea turtles (a marine species with a beautiful shell)	
Northern long-necked turtle (freshwater) turtle	
Taipan snakes (also known as Fierce snakes)	
	100

The scatter of average allocations that emerged is shown in Figures 5 and 6 for Survey I and II respectively and is plotted against the likeability index for each species.

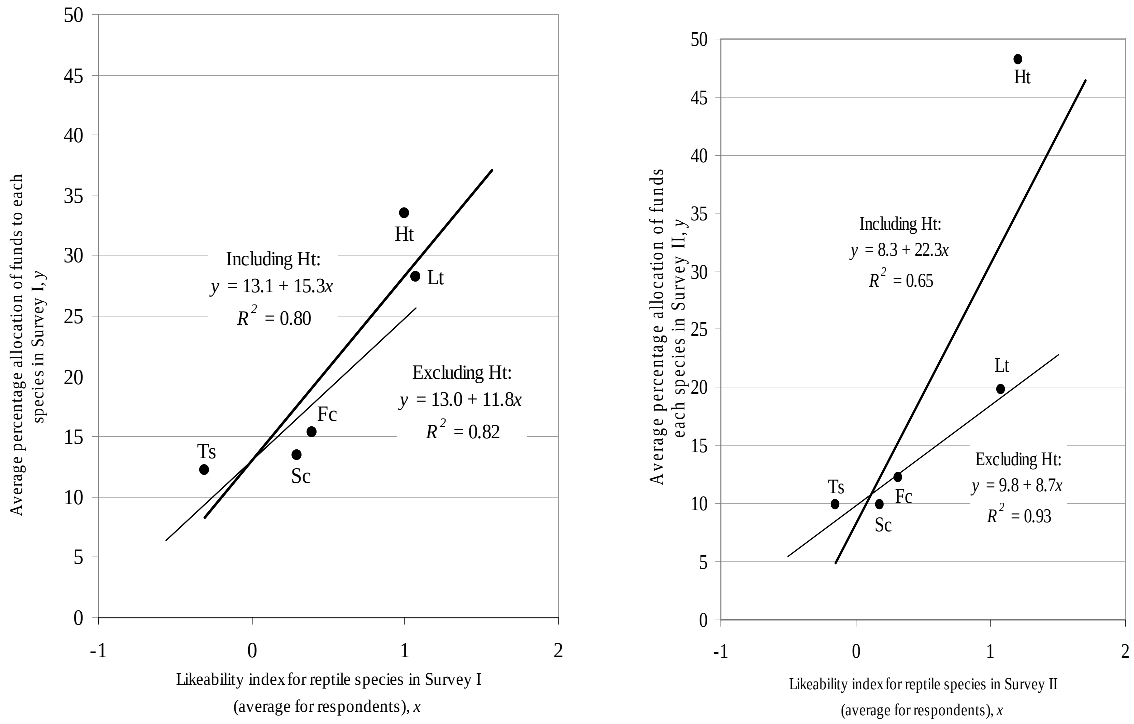

Figure 5 and Figure 6: **Likeability versus average percentage allocation of funds for the conservation of reptiles in Survey I and II respectively.**

A positive association exists in both Survey I and II between the percentage of funds allocated for the conservation of each of the species and their likeability.

The linear regression equation based on the Survey I data for all five species is:

$$y = 13.1 - 11.8x \qquad (2)$$

$$(R^2 = 0.80;\ t_{slope} = 3.44,\ p = 0.04)$$

The relationship is statistically significant at the 95% confidence level. Likeability explains the percentage of funds allocated fairly well ($R^2 = 0.80$) (see bold trendline in Figure 5). For the same survey, a linear regression analysis was also performed for four of the five species by excluding the hawksbill turtle and the result is

$$y = 13.0 - 15.3x \qquad (3)$$

$$(R^2 = 0.82;\ t_{slope} = 3.00,\ p = 0.096)$$

The relationship is statistically significant at the 90% confidence level. The R^2 is about as equally high and the trendline slope ($b_{4\text{-}species}$ = 15.3) does not differ very much from the trendline slope of the five-species case ($b_{5\text{-}species}$ = 11.8).

In Survey II, however, the hawksbill turtle becomes an outlier. This seems to reflect the acknowledgement of the participants of the hawksbill turtle's reported critically endangered status. In the booklet, the IUCN's listing of it as 'critically endangered' was conveyed to participants, but most probably were unaware of this before.

Fitting a linear regression to all the observations by ordinary least squares, the following is the result:

$$y = 8.3 + 22.3x \qquad (4)$$

$$(R^2 = 0.65;\ t_{slope} = 2.38,\ p = 0.097)$$

The relationship is statistically significant at the 90% confidence level. However, the strength of association between the likeability index and funds allocated for conservation for all five species is now weak (R^2 = 0.65) (refer bold trendline in Figure 6). This may be caused by the outlying hawksbill turtle observation. However, if the observation for the hawksbill turtle in Survey II is excluded, the linear regression line is:

$$y = 9.8 + 8.7x \qquad (5)$$

$$(R^2 = 0.93;\ t_{slope} = 5.20,\ p = 0.035)$$

The relationship is statistically significant at the 95% confidence level and the strength of association between likeability and funds allocated for conservation for four species excluding the hawksbill turtle is strong (R^2 = 0.93) (see fine trendline in Figure 6). The trendline slope for the four-species case also now differs considerably from the trendline slope for the case that includes the hawksbill turtle ($b_{4\text{-}species}$ = 8.7, $b_{5\text{-}species}$ = 22.3).

While all five species have populations within Australia that are relatively secure and are in no imminent danger of extinction, the hawksbill turtle is the only one that has been classified globally in the IUCN Red List (2003) as 'critically endangered'. Having learnt about this, participants appear to have singled out the hawksbill turtle and felt more concern for it. This seems to be reflected not only in the marked increase in likeability for the turtle (1.00 to 1.21), but also in the higher allocation of funds for to it in Survey II for its conservation.

In Survey I, when participants had less knowledge of the species, allocations of WTP tended to be close particularly when species were perceived to be similar. For example, participants allocated on average 33.6% and 28.2% of the available hypothetical fund for the hawksbill turtle and the northern long-necked turtle respectively. This corresponds with Laplace's Principle of Insufficient Reason (Laplace, 1814/1951), which implies that if there is no reason to favour a particular possibility, then the chances are that each possibility will be assigned equal weight. While some participants may have been aware of the endangered status in Survey I, all were only informed of its official IUCN 'critically endangered' status in Survey II. In Survey II, the hawksbill turtle received 48.2% of funding allocation compared to 19.85% for the northern long-necked turtle. If likeability as measured in Survey II is the only influence on the relative allocation of funds for conserving species, then, according to equation (5), the hawksbill turtle would be allocated 20.3% of available funds for its conservation in Survey II. Thus more than half the allocation of funds for conservation of the hawksbill turtle (28%) may be accounted for by its critically endangered status. Also, in general, it is observed that increased knowledge allowed participants to discriminate increasingly in their decision-making. The variance in the average allocation of funds for the conservation of the reptile species increased from 93.6 in Survey I to 265.3 in Survey II, and is significant at the 80% confidence level ($F = 0.35$; $p = 0.17$).

Respondents were also asked their reasons for choosing the reptile (the hawksbill turtle in this case) for the largest allocations of funds for their conservation. The reasons respondents provided include:

- 'they are harmless and beautiful' and 'they are gentle creatures'
- 'this appears to be the only one of the reptiles that is endangered' and 'more danger facing the animal'

The reasons essentially relate to factors of likeability (attractiveness of species, benign nature of species) and the perceived endangerment of species. Quite a number of participants also said that ecological and tourism values of the species were important as an influence. Respondents who decided to give equal allocations for all species justified their decision by stating: ‘do not have enough knowledge about species’, ‘all species have intrinsic values’ or ‘the right to exist’ and the desire to protect ‘the balance of nature’.

The results tend to support the view of Metrick & Weitzman (1996, 1998) that visceral factors play an important role in support for conservation of wildlife species. However, the degree of endangerment also appears to be important as illustrated by the case of the hawksbill turtle. Furthermore, even species that are not very much liked (taipan snakes and crocodiles in this case) and were known to be abundant and not endangered were allocated at least 10% of funds available for allocation to conservation of reptiles in the selected set. This appears to be irrational or illogical. It has parallels with the observation of DeKay & McClelland (1996) that some individuals are prepared to allocate funds for the conservation of species when there is little or no chance of conservation efforts succeeding. An explanation of this phenomenon could be that it indicates moral signalling by participants that all species have a right to survival, and/or it may involve the purchase of moral satisfaction (Kahneman & Knetsch, 1992; Kopp, 1992). The importance of such sentiments may have grown in recent times. We can conclude that although likeability of species is very important, it is far from the sole arbiter of human support for conservation of wildlife species.

9. Likeability of reptiles compared to mammals and birds and comparative support for their conservation compared to helping needy humans

Several authors claim that humans have less concern for reptiles than for birds and there is less concern for birds than for mammals (DeKay & McClelland, 1995; Eddy *et al.*, 1993; Plous, 1993). DeKay & McClelland (1995, p. 64-65) suggest that this is correlated with individuals’ WTP to protect species in these groups. They claim on the basis of experimental evidence that the concern for species in decreasing order is mammals, birds, reptiles, amphibians, fish, invertebrates, trees and other plants, and WTP allocations correspond.

Our results indicate that in our group of animals, mammals are liked more on average than birds and birds are liked more than reptiles. The average likeability in both surveys are shown in see Table 5. In both surveys, average likeability of reptiles is less than half of the average likeability of mammals or birds. This accords with the previous findings by Plous (1993) and DeKay & McClelland (1996) and would appear to be consistent with Gunnthorsdottir (2001).

Table 5:

Average likeability for all three taxa in Survey I and Survey II

Taxa	Average likeability in Survey I	Average likeability in Survey II
Mammals	1.15	1.19
Birds	1.12	1.13
Reptiles	0.49	0.53

Differences in average likeability between mammals and birds in both surveys are not statistically significant in a two tail ANOVA ($F_{Survey\ I}$ = 0.06, p = 0.81; $F_{Survey\ II}$ = 0.73, p = 0.41), but their magnitude do reveal that order of likeability set out above. The difference in average likeability between mammals and birds and reptiles is, however, significant at the 99% confidence level ($F_{Survey\ I}$ = 7.71, p = 0.003; $F_{Survey\ II}$ = 9.16 , p = 0.001).

Despite the hierarchy in likeability, we do not find large and significant differences in WTP for the conservation of these different groups of species. In Survey I and Survey II, individuals were asked:

'Suppose you have a choice of donating your AUS$1,000 to support conservation of the above reptiles or donating it or a part of it to support a charity of your choice to help people in need (e.g, Lifeline, Smith Family, The Salvation Army, St Vincent de Paul). What percentage would you allocate to each of the following?

Support for conservation of the above reptiles ………%
Support for charity to help people in need ………%'

Similar questions were asked for the focal groups of mammals and birds. The results shown in Table 6 were obtained.

Table 6:

Average allocations of funds for wildlife conservation versus charity for people in need for the three taxa in Survey I and Survey II

	Average allocation of funds in %					
	Reptiles		Birds		Mammals	
	Conservation	Charity	Conservation	Charity	Conservation	Charity
Survey I	46.6	53.4	48.3	51.7	48.8	51.2
Survey II	49.9	50.1	51.2	48.8	51.7	48.3

Performing a two tail ANOVA, no significant difference was detected in the average amounts of funds allocated for conservation (as compared to charity) between the animal groups in both surveys ($F_{Survey\ I}$ = 0.33, p = 0.72; $F_{Survey\ II}$ = 0.23, p = 0.79). Differences are also relatively minute even though slightly greater allocations were given for the conservation of mammals and birds than for reptiles. The changes are also small between surveys. Support is approximately equal for all three animal groups, despite the likeability of reptiles being much less than for the other groups and statistically being significantly different.

Despite being a group of animals with which most humans have limited empathy compared to mammals for example, the reptiles managed to retain a considerable proportion of funds for their conservation even when participants had the option to contribute funds instead for humans in need.

Human interests do not completely displace support for wildlife conservation when the option exists for reducing support for conservation of wildlife to benefit humans in need. Furthermore, funding support for the conservation of reptiles versus support of humans in need is not confined to just a few participants but is broadly based as can be seen from the relative frequency distribution in Table 7. This is graphed in Figure 7 to provide a visual representation. Note that in order to graph the distribution of relative frequencies, possible observations have been divided into class intervals primarily of ten. However, since there are 101 observations there is a remainder. We have treated zero, therefore, as a separate class and drawn the graph in Figure 7 accordingly. However, for comparability we also included the relative frequency for the class 1-9 and for 100 in Table 7.

Table 7 and Figure 7 highlight the fact that very few participants were highly biased against conservation of reptiles. While there are segments of participants who allocated funds predominantly to either reptile conservation (allocations falling into intervals greater than 50%) or to charity for the needy (allocations falling into intervals less than 50%), the mode lies in the 41% to 50% interval in both surveys (about 29% and 27% respondents in Survey I and Survey II respectively allocated exactly 50% for reptile conservation). This is so even though the distributions in Figure 7 have a fatter tail on their left-hand side than on their right-hand side. This slight skewness to the right is apparent from the positive values obtained from statistical tests performed ($Skewness_{Survey\ I}$ (Pearson) = 0.34; $Skewness_{Survey\ II}$ (Pearson) = 0.29). Allocations for humans in need count more on average than allocations for reptiles (as we observed for mammals and birds too), but not to such an extent that no substantial allocation is made for the conservation of reptile species. In fact, the degree to which the left hand tail is 'fatter' (larger) than the right hand tail is less in Survey II than in Survey I [$Skewness_{Survey\ II}$ (Pearson) < $Skewness_{Survey\ I}$ (Pearson)], suggesting increasing uniformity in empathy of participants for reptiles in Survey II.

Table 7

Frequency table for average percentage of funds allocated for the conservation of reptiles

Class sizes	Survey I		Survey II	
(%)	No.	%	No.	%
0	15	7.5	10	4.9
0-9	20	10.1	14	6.9
1-10	17	8.5	11	5.4
11-20	17	8.5	19	9.4
21-30	21	10.6	23	11.3
31-40	19	9.5	22	10.8
41-50	59	29.6	55	27.1
51-60	4	2.0	7	3.4
61-70	8	4.0	10	4.9
71-80	13	6.5	14	6.9
81-90	3	1.5	4	2.0
91-100	23	11.6	28	13.8
100	22	11.1	28	13.8
Total*	**199**	**100**	**203**	**100**

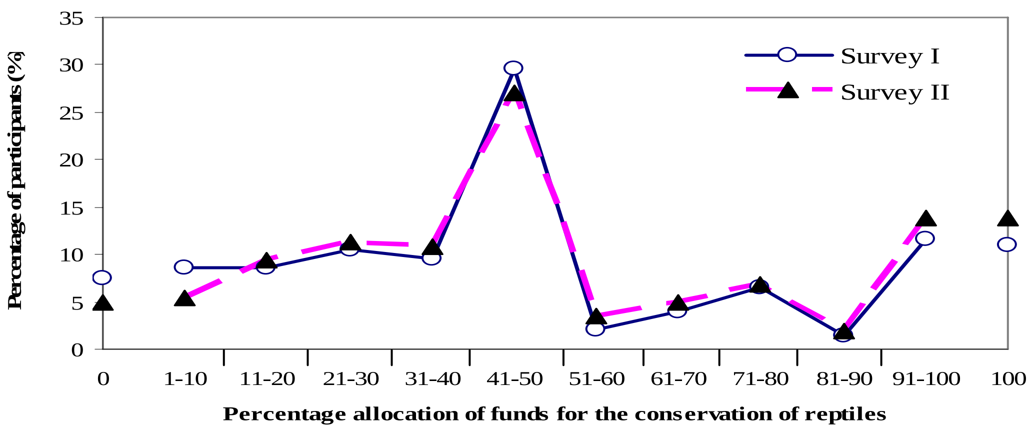

Figure 7: **Frequency distribution for percentage of allocation of funds for the conservation of reptiles.**

Reasons given by participants in support of a positive allocation of funds to the conservation of reptiles in the focal set included the following:

- *'Reptiles are endangered due to human mismanagement'*
- *'Some reptiles are endangered, humans are not'*
- *'Both causes are of equal concern to me' and 'both equally need help'*
- *'A lot of financial support is available to charities'*

Comments of those more partial towards charity for the needy included the following:

- *'Human life is more important' and 'people in need come before animals'*
- *'I suppose I value people more than animals'*
- *'Problems of people seem more pressing' and 'I see the suffering of people more and thus understand this more'*

Although participants varied in their degree of support for conserving reptiles, overall there was considerable support despite some species not being liked very much. Furthermore, none of the reptile species closely resembled humans.

10. Concluding Comments

It is found that likeability of reptile species is closely associated with support for their survival. However, independent of their likeability, there is a high level of support for survival for all reptile species in the set considered here. Moral or ethical considerations and/or the perceived utility of the species in the whole ecological system seem to be responsible for this result. Furthermore, it has been found that WTP for the conservation of reptile species is positively associated with the stated likeability of these. But likeability is a less powerful force in this regard than available literature suggests. For example, the case of the hawksbill turtle indicates that beliefs about the degree of endangerment of a species can have a substantial influence on willingness of members of the general public to contribute to its conservation.

The perceived degree of relative endangerment of species conveyed to the public seems capable of impacting heavily on its relative support for conservation of the different species. When funds are limited, this can alter comparative funding for conservation of different species. There are, therefore, apparent dangers in scientists or conservation organisations exaggerating the degree of endangerment of particular species, especially if there are other species that are equally endangered but for which no exaggeration occurs.

However, it was also found that respondents were willing to donate funds for the conservation of reptile species that they disliked or did not like very much and which were not endangered. As pointed out earlier, such action seems illogical or irrational. One possible explanation of it is that it involves a type of signalling behaviour. By giving such donations, participants seem to be signalling that these species have a right to exist and have intrinsic value.

While this study discovers that, on average, mammals and birds are liked more than reptiles (and this accords with findings of others), this does not translate into significant differences between financial support for conservation of species as a whole in these different taxa. In that respect, our conclusions differ from the hypotheses of previous studies. When faced with the option of donating funds to the conservation of species of mammals, birds and reptiles in the focal sets or to charities to help people in need, participants on average allocated about half the funds to each. While the allocation for reptiles was slightly less than that for birds and mammals, the differences were negligible and not statistically significant. This indicates that even though reptiles on the whole are much less liked than birds and mammals, the public's support for the conservation of reptiles (judging from the Australian sample) is strong relative to that for conservation of birds and mammals. However, there may be some sensitivity to the composition of species in the taxa compared. For example, one might expect support for reptile conservation to be much less if turtles were excluded from the reptilian set. Nevertheless, DeKay & McClelland (1996) did include crocodiles, snakes and turtles in their reptilian set, as we have done.

Both the external attractiveness of wildlife species and the extent to which they are liked by human beings appear to have been overrated in the literature as influences on the public's support for their conservation (*cf.* Gunnthorsdottir, 2001, pp. 211-212). While undoubtedly the external appearances of animals and their likeability do influence the public's support for the conservation of different wildlife species, these effects are much less powerful than the existing US-based literature suggests. This is apparent from our study of support for the conservation of Australian reptiles. The results imply, for example, that conservation organizations could obtain considerable public support for the conservation of threatened reptile species.

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Notes

1 The taipan snake consists of two subspecies, but for the purpose of this survey were treated as one, the focus primarily intended on the tropical, coastal taipan (*Oxyuranus scutellatus*).

2 The IUCN status of 'critically endangered' mentioned to survey participants was expected to have an effect on their perception. Note however that the validity of the IUCN's 'critically endangered' classification for the hawksbill turtle is still subject to debate amongst sea turtle scientists and experts (see Meylan, 1998; Mrosovsky, 2003).

3 All dollar values mentioned in this article refer to the Australian dollar.

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