Title: Investigating determinants of compliance with wildlife protection laws: Bird persecution in Portugal.

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Abstract

Conservation interventions are generally underpinned by formal rules. These rules often suffer from high rates of non-compliance which is difficult to investigate due to its clandestine nature. Here we apply socio-psychological approaches to investigate the prevalence and determinants of three illegal bird-threatening behaviours - shooting raptors, trapping passerines for consumption, and poison use - by surveying 146 respondents in Portugal. We apply the Theory of Planned Behaviour to understand behavioural determinants, and an indirect questioning method, the Unmatched Count Technique (UCT), to estimate behaviour prevalence. The UCT estimated a high prevalence of trapping for consumption (47% SE 15) and shooting raptors (14% SE 11); both estimates being higher than from direct questioning. Poisoning had a lower prevalence according to direct questioning (7%), while the UCT generated a negative estimate suggesting that poisoning is a particularly sensitive behaviour. Different demographic groups were associated with different behaviours and determinants; men with greater rule knowledge were more likely to trap birds, while locally-born people were less likely to approve themselves, or to think others approved of, trapping. Those with more positive attitudes to poisoning were more likely to admit to it, and these positive attitudes were found more in older non-hunters. Rule knowledge was better in younger male hunters. These findings suggest that NGOs aiming to reduce poisoning could enlist the support of hunters, while locally-born people may be more receptive than others to working with NGOs to reduce trapping. These groups may be powerful allies in reducing illegal behaviours in their communities.

1. Introduction

Conservation interventions commonly rely on the use of rules and regulations to alter human behaviour (Keane et al. 2008). However rules are often rendered ineffective due to high rates of non-compliance (Rowcliffe et al. 2004). Understanding rule-breaking involves investigating the complex processes by which different factors, such as knowledge of the rules, attitudes and societal norms, combine to impact behaviour (St John et al. 2013). Effective rules are designed based on an understanding of the factors that affect compliance (Schlager 2005).

Despite having some of the strongest legal protection in the world (Stroud 2003), European birds continue to suffer from illegal persecution that threatens their conservation status (Birdlife 2011). The Portuguese Society for the Study of Birds (SPEA) has identified a number of illegal activities that continue to threaten birds in Portugal, including trapping songbirds for consumption, poison use, and shooting of raptors (Birdlife 2011). These activities are illegal under the European Birds Directive (Council Directive 79/209/EEC) and the Berne Convention (19.IX.1979), both of which Portugal is a signatory. Despite investigation of these behaviours in neighbouring Mediterranean countries (Martínez-Abraín et al. 2013; Mateo-Tomás et al. 2012; Murgui 2014) there remains limited information on the prevalence of these activities in Portugal (Birdlife 2011). Without data on prevalence rates and the demographic groups involved it remains difficult to tackle these issues.

Identifying ineffective conservation rules requires understanding associated rates of non-compliance, the true extent of which is difficult to quantify. Participants' fear of reprimand and legal sanction makes investigation susceptible to bias due to low response rates and evasive answers (Gavin et al. 2010). Indirect questioning techniques have been developed to minimize these sources of bias and have been applied to the investigation of conservation problems (Nuno and St John 2014). The Unmatched Count Technique (UCT) (Droitcour et al. 1991) has been shown to work well when investigating sensitive behaviours that threaten wildlife (Nuno et al. 2013). In the western Serengeti, researchers using direct questions to assess prevalence of illegal bushmeat hunting reported participation rates of between 8 (Kaltenborn et al. 2005) and 57 percent (Loibooki et al. 2002) of

households, depending on the study. In the same area of the Serengeti, a UCT study reduced rates of evasive answers and suggested that 18% (SE 5) of people hunted bushmeat illegally (Nuno et al. 2013).

To intervene effectively, it is not only necessary to know the prevalence of behaviours, but also the characteristics of those involved, and what affects their personal choices to comply. Socio-psychological models have been advocated to investigate the complexities of the decision-making process in conservation (Schlüter et al. 2012; St John et al. 2010). The Theory of Planned Behaviour (TPB) (Ajzen 1985), a well-researched theory of human behaviour, posits that an individual's behavioural intention is shaped by three aspects; their attitude towards a behaviour, their perceptions of social expectations (subjective norms), and the measure of control they perceive they have over performing a behaviour (perceived behavioural control; Fig. 1). Meta-analyses of studies using the TPB to investigate multi-domain (Armitage and Connor 2001) and pro-environmental (Bamberg and Moser 2007) behaviours illustrate the importance of these aspects in predicting behavioural intention, while highlighting the need to expand the TPB with additional aspects to increase its explanatory power.

The TPB has been applied to the investigation of compliance with rules regarding digital downloading (Wang and McClung 2011), drug use (Armitage et al. 1999), and recently to compliance with wildlife-protection laws (Shrestha et al. 2012). Normative compliance is influenced by what people regard as just and moral. The TPB reveals psychological aspects relevant to normative compliance in the form of personal attitudes and perceived social norms. The different aspects of the TPB framework vary in their influence, depending on the behaviour. For example, attitudes have been found to be of importance in relation to the conservation of forest habitat (Primmer and Karppinen 2010), natural resource use (Holmes 2003) and illegal poaching (St John et al. 2012), but not compliance with protected area restrictions (Aipanjiguly et al. 2003; Seeland et al. 2002). Subjective norms have been shown to influence conservation behaviours including compliance with fishery regulations (Gezelius 2004; Hatcher et al. 2000) and protected area restrictions (Aipanjiguly et al. 2003) and to vary in importance by behaviour and demographic group (Beedell and Rehman 2000;

Zubair and Garforth 2006). Identification of the most important behaviour-specific aspect(s) of the TPB can inform the design of behaviour-change interventions (St John et al. 2013).

Instrumental compliance is the behaviour occurring in response to external factors, such as formal rules and regulations. Knowledge of conservation rules may influence a person's behaviour and compliance (Keane et al. 2011) but there is limited evidence as to the routes by which it affects behavioural intention (whether directly, or through aspects of the TPB; Fig. 1). We use the TPB to investigate the influence of attitudes, subjective norms, and rule knowledge on the decisions of individuals to comply with wildlife-protection laws. Rather than explicitly testing the theory itself, we chose key aspects of the TPB to frame the investigation of predictors of compliance (knowledge, attitudes and subjective norms), similar to previous work (Steinmetz et al. 2014). We do not investigate perceived behavioural control, because our study aims to explore the TPB aspects most relevant to the public engagement activities of NGOs.

As well as understanding the predictors of non-compliance, it is also important to understand the characteristics of rule-breakers. Hunting, including of birds, is an important part of rural culture in Portugal, practiced by 8% of the adult male population (Apollonio et al. 2010), although the number of younger hunters has been decreasing. Laying of poison in this region is associated with the control of pest and predator species on agricultural and hunting land (Hernández and Margalida 2008). We investigate three demographic characteristics: age, gender, and locality of birth, to test whether the individuals associated with the illegal activities investigated are similar to the demographics typical of the Portuguese hunting and agricultural industries i.e. the older, rural male population.

We apply the UCT to estimate prevalence rates and the TPB to identify important behaviour-specific aspects of three illegal behaviours that threaten biodiversity in Portugal: the shooting of raptors, trapping of passerines for consumption, and use of poison to control wild animals (Birdlife 2011). Given the lack of data for validation purposes, we followed previous researchers' assumption that any prevalence estimate produced by the UCT higher than one produced by direct questioning is potentially more accurate (Dalton et al. 1994; Rayburn et al. 2003; Tsuchiya et al. 2007). We test the

UCT alongside direct questioning to assess whether it does estimate higher prevalence rates in this study system. To investigate predictors of the three behaviours, we apply the TPB to quantify the role of attitudes, subjective norms, and wildlife rule knowledge on individuals' self-reported behaviours under direct questioning.

2. Materials and Methods

2.1 Study system and population

Portugal supports 308 bird species, including eight globally threatened species including *Neophron percnopterus* (Egyptian Vulture) (Birdlife International 2014). Hunting, including of birds, is an important part of rural Portuguese culture, practiced by 8% of the adult male population (Apollonio et al. 2010). A general hunting licence is required to hunt game birds in Portugal, which is obtained by passing an examination on hunting capabilities and knowledge.

2.2 Data collection

Between 1st and 31st May 2012 interviews were conducted in two villages in the Alentejo, Portugal. Village identities are not reported to preserve respondents' anonymity. The two villages had demographic and livelihood profiles consistent with the region as a whole but were of interest due to the presence of an environmental organisation in one of the villages (Village A). This organisation had not worked on hunting or bird conservation, but was interested in our findings. Village B had a slightly larger population than A, and was the location for meetings of a local hunting association. 146 interviews were conducted in Portuguese, by the first author (AF) or local interpreters. Sampling was conducted opportunistically through household visits. In 48 households, two interviews were conducted with different household members simultaneously in separate rooms. These interviews were treated as independent data points, because decisions about the behaviours concerned are made by individuals not at household level. As a pilot methodological study, issues of non-independence could not be addressed with the sample size available; for this reason the study focus is on areas of future investigative potential rather than drawing general conclusions about the wider population. Research was conducted according to the Imperial College London research ethics policy.

2.3 Interview protocol

Respondents were randomly assigned to a control or treatment group for the UCT using a coin toss. The questionnaire commenced with an explanation of the study purpose, the interviewer's independent student status, and assurances that participants' responses would be anonymous, at which point respondents could decline to proceed. Consenting respondents (146/147) were firstly asked several socio-demographic questions, then administered the UCT, followed by a series of attitudinal questions, a rule knowledge quiz, a series of perceived subjective norms questions, and finally the direct questions.

To administer the UCT, respondents were shown four cards, one initial non-sensitive training card, and one card for each of the three behaviours investigated. For each card, respondents were asked to state a number in response to the question, "How many of these activities have you conducted in the past 12 months?". Each control card depicted four non-sensitive behaviours. Each treatment card contained the addition of one of the illegal behaviours under investigation. Cards were shown to all respondents in the same order. All non-sensitive items related to legal behaviours typical of the local population and were chosen based on the authors' knowledge of the study system. Items were grouped based on similarity of activity. For example, catching wild birds was grouped with other activities related to harvesting resources, such as picking olives. Laying of poison was grouped with other activities related to the use of chemical substances such as the use of insect repellent.

Next, respondents were asked about their attitudes toward the three investigated behaviours by stating on a seven-point Likert scale (1="completely disagree" through 7="completely agree") their feelings towards the statements, "[Conducting specific sensitive behaviour] *would be useful*", and, "[Conducting specific sensitive behaviour] *would be enjoyable*".

Next, respondents were shown a randomised series of cards depicting 13 Portuguese animal species accompanied by their locally-common names and asked to state whether killing of the species was '*always legal*', '*always illegal*', or '*legal only at certain times of the year*'.

Respondents were then asked about their perceived subjective norms by stating in a seven-point Likert scale their feelings towards the statements "*The majority of people in this village* [conduct specific sensitive behaviour]", "*The majority of people important to me think that I should/I should not* [conduct specific sensitive behaviour]", and "*The approval of my family and friends is important to me*.".

Finally, respondents were asked the direct question, "Have you undertaken [sensitive behaviour] in the past 12 months?", and asked to respond with either "Yes", "No", "I don't know", or "I don't want to answer". The order of asking about the three behaviours was randomised. A sample questionnaire, full list of UCT behaviours, and full list of the species tested and protection status are provided in the Electronic Supplementary Material.

2.4 Statistical Analysis

2.4.1 Prevalence estimates

UCT prevalence estimates were calculated as the mean difference between the sample means of the UCT treatment (74) and control (72) group counts (i.e. number of self-reported activities). As respondents were randomly assigned to the two groups, the difference in means represents the estimated proportion of the treatment group engaging in the sensitive behaviour. Welch's t-test was employed to calculate the standard error of the estimates as the variance of the error term was likely to be different between the two groups. Direct question prevalence estimates were calculated as the proportion of respondents who answered "Yes" to the direct questions regarding participation in each behaviour investigated.

2.4.2 Multivariate analysis

One drawback of the UCT is that large sample sizes are required to conduct multivariate analysis using UCT counts. Unfortunately the sample size of this study was not sufficient to reliably conduct multivariate analysis with the UCT data. Instead, multivariate analysis was used to identify predictors of two illegal behaviours based on the direct question data. TPB variables were used as predictor

variables, as well the demographic variables which were judged to be of importance. Due to the small number of respondents answering affirmatively to the direct question regarding shooting of raptors this behaviour was omitted from multivariate analysis. Those answering positively to direct questions are a biased sub-sample of those who have actually undertaken the behaviour (hence the need for indirect questioning for accurate prevalence estimation). Therefore, the results of this analysis are an indication of who is prepared to admit to the behaviour rather than of who is actually undertaking it.

Data were visually assessed for normality. The two variables related to attitude were combined to generate a composite score, and similarly for the two variables related subjective norms. Composite scores were not checked for internal consistency as they were a product of just two variables each. These two composite scores, along with the answer to whether others' approval mattered to the respondent, were binomially transformed, due to their positive skew. To estimate the correlates of behaviour, generalised linear models (GLMs) were fitted with a binomial error structure and a logit link function, with respondents' direct question answers as binomial dependent variables. Where TPB variables were included in the top models, their predictors were investigated using GLMs fitted with binomial error structure and a logit link function, with composite attitude, social norm, and approval scores as binomial dependent variables. Residuals of all models were checked with QQ-plots and found to be Normal.

Knowledge scores were computed as the total of correctly answered questions regarding the legal protection of 13 Portuguese animal species, and arc-sine transformed for normality. GLMs fitted with a Gaussian error structure were employed to model knowledge scores against demographic and TPB variables. Respondents' ability to correctly classify species' protection status (game, protected, unregulated) was compared using Wilcoxon paired-tests for proportional data.

In all multivariate analyses, the relative importance of predictor variables was computed as the sum of the Akaike weights (based on the Akaike information criterion, AIC) for the variables included in the averaged models (Burnham & Anderson 2002). GLMs were fitted in R v.2.15.1 (R Development Core Team 2011). Parameter estimates were averaged across models with $\Delta AIC < 4$, and the corrected AIC

was used to select and rank the most parsimonious models using the MuMIn package v.1.7.7 (Bartoń 2012). Details of predictor variables and models considered are given in the Electronic Supplementary Material.

3. Results

3.1 Sample characteristics

More men (60%) were interviewed than women (40%). The treatment group contained significantly more men (Treatment: 70% Control: 49%, χ^2 (1)=6.24, p=0.013) and non-significantly more hunters (T: 32% C: 18%, χ^2 (1)=3.26, p=0.071) than the control group. The groups did not differ by age (χ^2 (7)=8.16, p=0.32), village (χ^2 (1)=0.055, p=0.81), knowledge (two-sample t-test (144)=-0.15, p= 0.56), or locality of birth (χ^2 (1)=0.99, p=0.32).

3.2 Prevalence estimates

UCT prevalence estimates suggest that trapping birds for consumption was conducted by approximately 47% (15 SE) and shooting of raptors by approximately 14% (11 SE) of respondents during the 12 months prior to interview, 31% and 12% higher than direct question estimates respectively (Fig. 2). In the case of poison use, the UCT failed to produce a valid prevalence estimate, estimating a negative prevalence rate for the behaviour (Fig. 2).

3.3 Correlates of trapping and poison use behaviours

Due to the small sample size of this study, the direct question results were used to investigate determinants of the illegal behaviours rather than the results of the UCT, which limits inference to the characteristics of people prepared to admit to the behaviour in question. Individuals admitting to trapping birds for consumption in answer to a direct question tended to be male hunters who scored highly on the knowledge quiz (Table. 1). Those admitting to trapping were more likely to come from village B. Three variables from the TPB, relating to social norms, social approval and individual attitudes, were also positively but weakly related to admitting to trapping (Table 1). The admission of using poison to control populations of wild animals was strongly predicted by an individual's attitude

towards the behaviour, with individuals with a positive attitude being more likely to admit to engaging in it (Table. 1).

3.4 Correlates of underlying constructs affecting trapping and poison use

We investigated the correlates of TPB aspects that were included in the minimum model set for trapping birds (attitudes, approval and social norms). The main correlate of all three aspects was respondents' location of birth (Table. 2). Locally born respondents held a more negative attitude towards trapping and perceived it to be less socially acceptable, while also attributing less importance to the approval of others. Older hunters perceived trapping to be less socially-acceptable, while male respondents attributed greater importance to the approval of others. We investigated the correlates of attitudes surrounding poison use, as attitude was an important predictor in the minimum model set. Individuals who held a positive attitude towards poison use tended not to hold a hunting licence, to be older, and scored highly on the knowledge quiz (Table. 2).

3.5 Knowledge of wildlife laws

Respondents correctly classified on average 86% of protected and unregulated species and 65% of game species. Game species were correctly classified significantly less often than protected (W=968.5, p=<0.001, paired-test) and unregulated species (W=1163.5, p=<0.001, paired-test). Knowledge of wildlife laws was a relatively important correlate of admitting to trapping birds for consumption and was strongly associated with age, gender, and possession of a hunting licence (Table. 3). Younger male respondents scored highest in the quiz, while respondents in possession of a hunting permit scored higher than those without (W=1063, p=<0.001). Respondents from village B performed better than respondents from village A, and locally born respondents performed better than those born outside the local area.

4. Discussion

Here we use two socio-psychological approaches, the UCT and the TPB, to investigate illegal wildlife-threatening behaviours. The UCT revealed that trapping birds for consumption remains

widely practiced in our sample, and that a smaller number of people continue to shoot raptor species. Our analysis indicated that the characteristics of self-confessed rule-breakers were behaviour-specific. A positive attitude towards poisoning was found to be the most important correlate of admitting to poison use whereas men from one of the villages and those with a good knowledge of game laws were more likely to admit to trapping birds for consumption. We also showed that the demographic groups who approved of these behaviours differed. Those who felt trapping was socially acceptable and held a positive attitude towards this behaviour tended to be from outside the area, while those admitting to poisoning were less likely to be registered hunters.

There currently exists only limited and anecdotal information on the prevalence of shooting, trapping and poisoning of birds in Portugal (Birdlife 2011). Our results reveal that Portuguese bird populations continue to be threatened by these illegal activities, and that the demographics of offenders differ between the activities. Ongoing initiatives include a broad national assessment of illegal bird persecution behaviours in Portugal which has focused on law enforcement records, advertisements in online platforms, reports on injured, sick and dead animals, and direct observation reports by the public (Leitão et al. 2014). Our results highlight the need for further investigation into this topic using techniques from social science to understand the attitudes and characteristics of offenders. There is also a need for greater conservation attention on these behaviours in Portugal, and in the other Mediterranean countries where these behaviours remain widespread.

The characteristics of respondents admitting to catching birds for consumption were congruent with a formal association to hunting. This finding suggests that a targeted conservation intervention to tackle this behaviour in the region should focus resources on changing behaviours of the hunting community. Respondents admitting to using poison to control populations of wild animals were strongly predicted by expressing a positive attitude towards this behaviour and tended not to be hunters. Examples of conservation behaviour-change interventions elsewhere suggest that members of local hunting organisations are likely to influence attitudes and subjective norms of the local community more than external environmental organisations (Heberlein 2012). This, together with the

importance of holding a hunting licence as a correlate in our models for knowledge and attitudes, suggests that Portuguese hunters are potential partners for organisations wishing to tackle poison use in this region. A partnership between hunting associations and *Programa Antídoto*, a national platform incorporating a range of organisations dedicated to tackling this issue, could focus on influencing the attitudes of non-hunters towards the use of poison in Portugal. Successful partnership on this issue may then make it easier to work with hunters to reduce their trapping of songbirds for consumption.

Our results suggest that the UCT was effective in reducing the response bias associated with investigation of two illegal activities, but not for poison use. It is unclear why this might be in the absence of more detailed study. The confidence interval of the UCT overlaps both zero and the estimate of the direct question, suggesting that people were answering the sensitive card in a strategic manner to avoid revealing their behaviours. One explanation may be that poison use is a highly sensitive behaviour because of its indiscriminate nature; there were anecdotal claims that domestic pets had been killed by poisoning in the villages and that this was a source of conflict between people. The direct question regarding poison use noticeably elicited the most evasive answers, with one respondent refusing to respond and two respondents appearing to give false negative answers. It has been argued that conservationists should take advantage of social taboos by using them in partnership with formal rules, involving cooperation between conservationists and local communities (Colding and Folke 2001). This supports our argument for a partnership between the Portuguese hunting and conservation communities to tackle poison use, with hunters strengthening the social taboo of the use of poison and acting as advocates for conservation.

Alternatively, it may also be that the non-sensitive behaviours on this card were not well aligned with the sensitive behaviour, revealing it too clearly as being an outlier. This experience highlights the limitations even of indirect questioning methods when the behaviour concerned is seen as particularly shameful, when prevalences are relatively low and sample sizes small.

Unfortunately we did not have the sample size to be able to use the UCT results in the TPB model. A larger sample size would have allowed this work to be extended to use the UCT estimates in multivariate analyses including socio-psychological constructs, thereby producing an integrated approach to investigating illegal behaviours. We propose that such an integrated approach could facilitate the investigation of illegal and socially-unacceptable behaviours that threaten biodiversity, and could be used to supplement SPEA's ongoing investigation into illegal activities in Portugal. Our results suggest that the illegal trapping of birds for consumption, use of poison to control populations of wild animals, and shooting of raptor species continue to be practiced in Portugal. Future conservation efforts aimed at combating these activities require a greater understanding of the characteristics of the demographic groups undertaking each activity, and of the attitudes and perceived subjective norms which they hold. Conservation interventions designed to alter human behaviours must take these differences into account and should tailor behaviour-changing interventions to specific activities and target groups.

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6. Electronic Supplementary Material

The Electronic Supplementary Material contains Portuguese and English versions of the study questionnaire, UCT protocol and example set of UCT cards, list of the species included in the

knowledge quiz and their protection status, and a summary of the predictor variables used in the multivariate analysis and details of all models considered.

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8. Figures

Fig. 1 Adapted model of the theory of planned behaviour which includes knowledge of conservation rules as a predictor of behavioural intention, attitudes, and subjective norms. Knowledge may affect several aspects so we consider multiple pathways. Shading indicates the aspect not present in Ajzen's (1985) original model. Dashed lines indicate relationships that were investigated in this study

Fig. 2 Prevalence rates (+/- standard error) estimated by the UCT and direct questions for illegal trapping of birds for consumption, shooting of raptors, and use of poison in the villages in the 12 months prior to the study

9. Tables

Table. 1 Parameter estimates obtained from the averaged generalised linear models for answers to direct question about (a) trapping birds for consumption, and (b) using poison. Variables of importance <40% omitted

Table. 2 Parameter estimates obtained from the averaged generalised linear models for : (a) perceived subjective norms of trapping birds for consumption, (b) attitudes towards trapping birds for consumption, (c) respondent's stated importance of approval, and (d) attitudes towards poison use. Variables of importance <40% omitted

Table. 3 Parameter estimates obtained from the full generalised linear model of knowledge of wildlife laws. Variables of importance <40% omitted

Figure 1

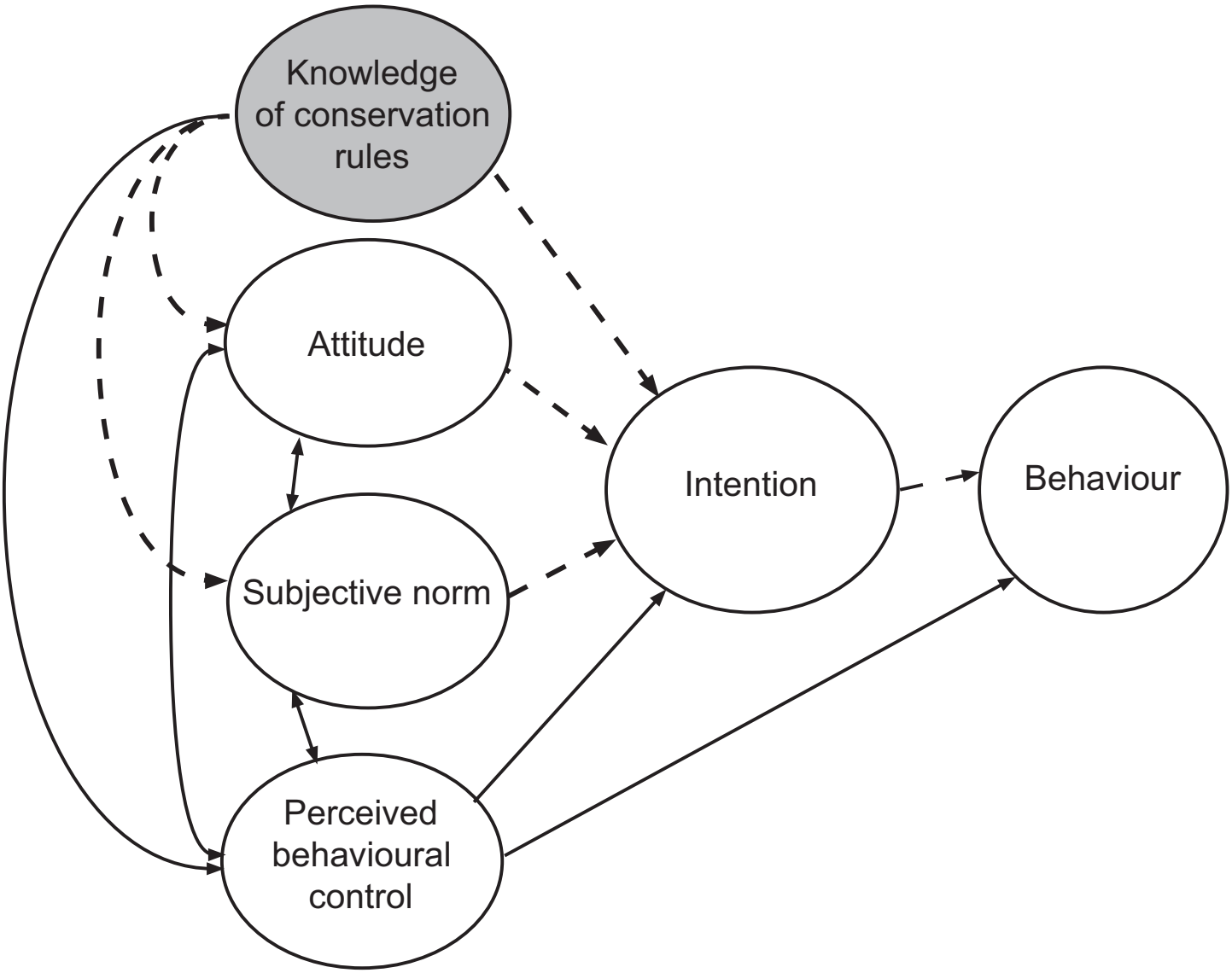
Knowledge of conservation rules
Attitude
Subjective norm
Perceived behavioural control
Intention
Behaviour

Figure 2

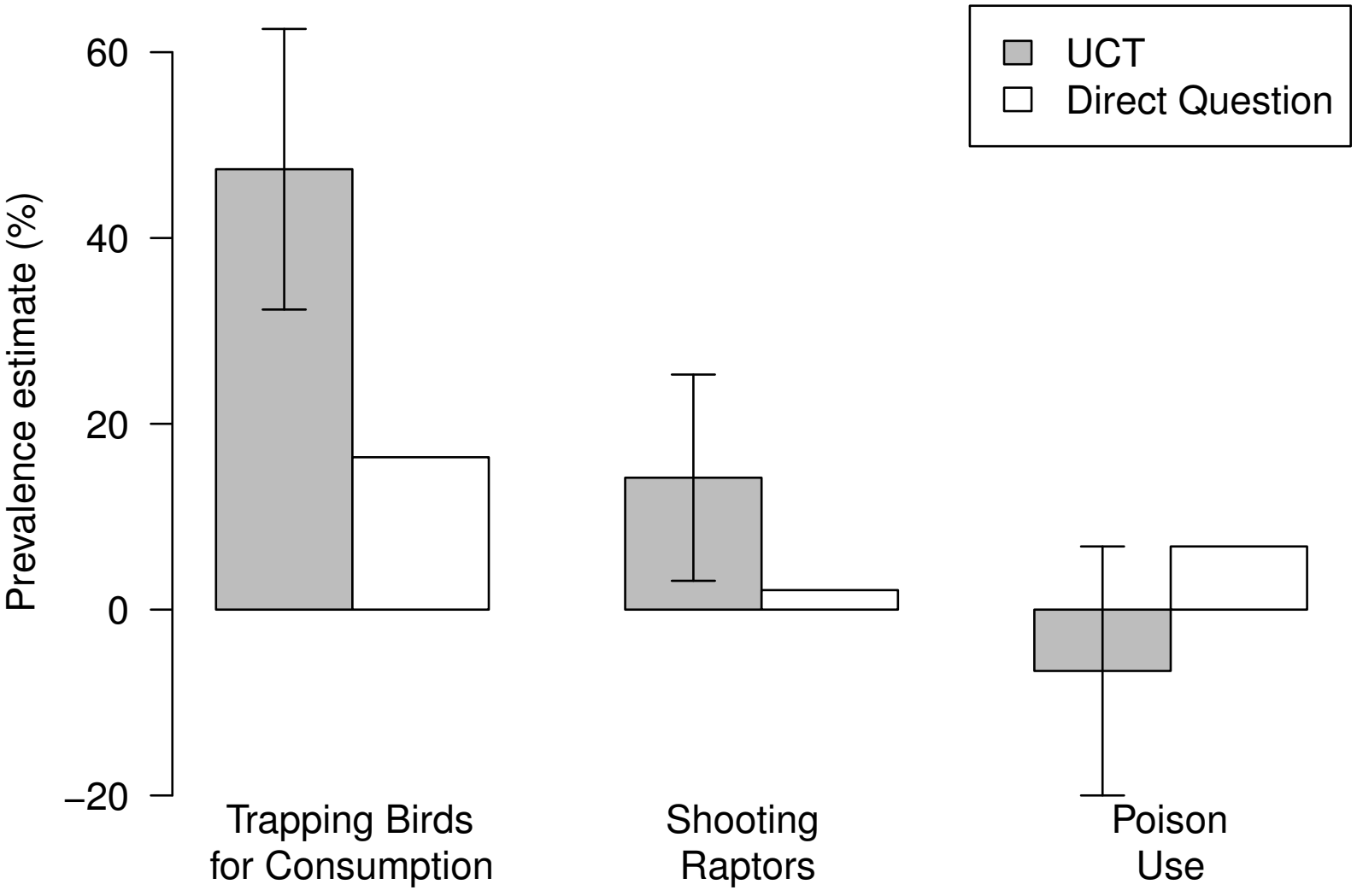
UCT
Direct Question
Prevalence estimate (%)
60
40
20
0
−20
Trapping Birds for Consumption
Shooting Raptors
Poison Use

Table 1

Parameter	Estimate	S.E.	z-value	Relative variable importance
(a) Model of predictors of answers to direct questions about trapping birds for consumption				
Intercept	-7.470	2.051	3.622	1
Gender: Male	2.630	1.108	2.353	1
Knowledge	2.358	1.131	2.069	0.85
Village: B	1.169	0.555	2.088	0.83
Hunting permit: Yes	0.949	0.597	1.578	0.54
Social norm	0.939	0.627	1.486	0.52
Approval	0.797	0.604	1.310	0.47
Attitude	0.822	0.588	1.386	0.46
(b) Model of predictors of answers to direct questions about poison use				
Intercept	-4.623	1.352	3.395	1
Attitude	2.664	0.833	3.170	1

Table 2

Parameter	Estimate	S.E.	z-value	Relative variable importance
(a) Model of predictors of perceived subjective norms of trapping birds for consumption				
Intercept	2.728	0.928	2.918	1
Local Born: Yes	-2.104	0.771	2.704	1
Age	-0.015	0.010	1.487	0.52
Hunting permit: Yes	-0.520	0.442	1.168	0.42
(b) Model of predictors of attitudes towards trapping birds for consumption				
Intercept	1.677	0.753	2.211	1
Local Born: Yes	-1.291	0.586	2.182	0.97
(c) Model of predictors of respondents stated importance of approval				
Intercept	0.839	0.624	1.336	1
Local Born: Yes	-1.253	0.484	2.567	1
Gender: Male	0.495	0.379	1.296	0.46
(d) Model of predictors of attitudes towards poison use				
Intercept	-2.538	1.374	1.839	1
Hunting Permit: Yes	-1.748	0.678	2.560	1
Age	0.023	0.012	1.969	0.83
Knowledge	1.387	0.931	1.477	0.52

Table 3

Parameter	Estimate	S.E.	z-value	Relative variable importance
Intercept	1.083	0.064	16.746	1
Age	-0.002	0.001	2.527	1
Hunting Permit: Yes	0.195	0.052	3.661	1
Gender: Male	0.114	0.043	2.582	1
Village: B	0.069	0.042	1.624	0.57
Local Born: Yes	0.065	0.052	1.240	0.43

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