

# Significance of Perceived Social Expectation and Implications to Conservation Education: Turtle Conservation as a Case Study

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**Abstract** The likelihood of participating in wildlife conservation programs is dependent on social influences and circumstances. This view is validated by a case study of behavioral intention to support conservation of Asian turtles. A total of 776 college students in China completed a questionnaire survey designed to identify factors associated with their intention to support conservation. A regression model explained 48 % of variance in the level of intention. Perceived social expectation was the strongest predictor, followed by attitudes toward turtle protection and perceived behavioral control, altogether explaining 44 %. Strong ethics and socio-economic variables had some statistical significant impacts and accounted for 3 % of the variance. The effects of general environmental awareness, trust and responsibility ascription were modest. Knowledge about turtles was a weak predictor. We conclude that perceived social expectation is a limiting factor of conservation behavior. Sustained interest and commitment to conservation can be created by enhancing positive social influences. Conservation educators should explore the potential of professionally supported, group-based actions that can nurture a sense of collective achievement as part of an educational campaign.

**Keywords** Asian turtles · Environmental attitude · Environmental behavior · Social expectation · Wildlife conservation · Conservation education · China (Guangzhou) · Asia

## Introduction

The loss of wildlife species is not a primary environmental concern of people in China. According to a national survey commissioned by the China Environmental Awareness Program (2008), the ‘decline of wildlife resources’ was commonly rated as ‘not so serious’, ranking it at 9th among 16 listed environmental issues in terms of perceived seriousness. Turtles are one species that are under threat and lack public concern in China.

Many turtle species are considered endangered in the world. According to the 2008 Red List of Threatened Species of the International Union for Conservation of Nature, more than 40 % of the world’s 313 turtle species are listed as ‘Threatened’; 29 species are categorized as ‘Critically Endangered’. Trade in turtles is a major factor leading to the rapid decline and local extinction of many populations (Baillie and others 2004). Asia is currently the biggest supplier and consumer in the turtle industry. Over 95 species in the region are seriously affected by the trade, and many species have been driven to extinction by commercial consumptive use. China plays an important role in the consumption of Asian turtles. Southern provinces, notably Guangdong, are home to major turtle food markets where some of the endangered species are actively traded (Cheung and Dudgeon 2006; Gong and others 2009)

Consumption of freshwater turtles is part of the traditional Chinese food culture. Live turtles and associated products are a common source of traditional medicines and

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are used in food production for their allegedly high medicinal values. Hunting and killing of endangered species are regarded as culturally acceptable. Indeed, in the Cantonese language (the dominant dialect in Guangdong Province), the term wildlife has a synonym carrying the meaning of delicacy (“yě wèi”). The prevalence of the consumptive use of turtles in China is evidenced by Zhang and others (2008) findings that 60 % of respondents admitted consuming wildlife in the last 2 years. As a result, the community has a little motivation to protect the species from commercial exploitation connected to traditional food production.

The cultural acceptance of turtle consumption creates barriers to efforts in educating and motivating the public, particularly students, toward behavioral changes that are conducive to the continued survival of the species. Conservation education activities that confront the food culture challenge local tradition. Limited success is expected because students are effectively asked to act against established cultural norms to which they are expected to conform. Confronting the established culture head-on may not be a fruitful strategy of conservation education in an Asian context. Alternative strategies to motivate youth to embrace conservation are needed.

The search for alternative strategies should begin with a fundamental question: what motivates participation in conservation programs? In Asia, research into the deeper attitudinal and behavioral dimensions of conservation remains scant. There is a need for more theoretically sound research focused on local cultural influences that affect conservation. Moreover, some scientific activities require cooperation with local volunteers. On-site market surveys, for instance, demand considerable efforts from trained local volunteers to get access to information restricted to local illegal traders (Cheung and Chow 2011). Against this background, we attempt to draw a more complete picture of the behavioral drivers and hurdles concerning involvement in turtle conservation. Of particular interest are the motives behind participation of college students in voluntary conservation activities.

Pro-environmental behavior is widely believed to be motivated primarily by enhanced scientific understanding. Enhancing factual knowledge and skills has been seen as a central theme in conservation education. Conservation education, according to Kobori (2009, p. 1950), aims to

“teach the theory and practice of preservation and restoration of biodiversity affected by human activities so that people can increase their awareness of conservation issues and change their attitudes and behavior to promote environmental conservation.”

This statement puts emphasis on the assumption that the desired attitudinal and behavioral changes are casually

dependent on people’s understanding of the ways in which species are threatened by human activities and their knowledge about the remedial strategies and skills required for conservation.

The above assumption has been adopted by many conservation educators and concerned scientists in Asia as an organizing principle for educational programs. For instance, the design of an educational workshop commissioned by the Cambodian Turtle Conservation Project has illustrated the belief that awareness and action are causally related. Awareness is understood as a function of factual knowledge:

“Lack of local people awareness is a big factor threatening the turtles and tortoises because the villagers do not understand the importance or biology of turtles.....We need to tell the villagers this so they understand more about the lives of the turtles and how they should protect them or lose them forever.” (Som and others 2006, p. 13)

Conservation education in China is predominately implemented using passive forms of information transfer (Hau 2005). Zhang and others (2008, p. 1493), for example, have clearly expressed this view: ‘The key in public awareness publicity and education is to give them more information on the negative impacts of wildlife consumption and knowledge of protection.’

This organizing principle illustrates the well-discussed ‘information-deficit’ model, which assumes that receiving the right information will lead to appropriately responsible environmental behavior. Lay people are construed as ignorant of environmental science and irrational in their response to complex environmental issues; they must be engaged and educated in order to be better informed and converted to a “more objective” view (Owens 2000). Pro-environmental actions are seen as a mechanical response to enhanced appreciation of the connections between their behaviors and environmental threats. The information-deficit model has failed to improve environmental education and policy communication (Bulkeley 2000; Owens 2000; Bell 2005).

Although environmental attitude is a function of information supply and quality, it is also subject to the stronger influence of social and institutional factors, which frame and shape people’s capacity to respond. Dunlap (1998) observed that increasing awareness and concern among individuals often does not translate into effective behavioral changes due to a variety of cognitive and structural barriers. Rather than creating positive responses, messages based on impending ecological crisis and tragedy might even make people feel powerless and disengaged (Fien and others 2009; Moser 2007). Subjective considerations and experiences crucially determine the ways in which

information is received and processed, and that actions upon enhanced knowledge are shaped. Key determinants of an individual's efforts towards conservation include other factors, such as perceived social expectations, fundamental values, and institutional constraints (Stern and others 1995; Kaiser and others 1999; Spash and others 2009; Lo 2012).

Previous research has failed to provide insight into the deeper attitudinal and behavioral dimensions of Asian turtle conservation. An Indonesian research project on attitudes toward turtles found statistical association between 'knowledge' and 'attitude' indicators (Ruyani 2009). The author believes "knowledge is an important factor in developing some attitudes and then the internalized attitudes will be expressed later in certain behavior" (Ruyani 2009). This claim appears to be speculative because no actual or intended behavior was measured. The study failed to provide sufficient details on the attitudinal scales employed or the role of social and institutional factors in motivating behavior.

A more recent study on marine turtles in Asia usual socio-economic variables also paid little attention to attitudes (Jin and others 2010). The only attitudinal scale was over-simplified, consisting of a binary choice concerning membership in an environmental non-governmental organization (NGO). The study concluded that although the individuals surveyed were well-informed about marine turtle and recognized the importance of conservation, turtle conservation was not their priority. A more sophisticated attitudinal scale could have provided more insights into the expressed preference. Also parameters of social influence, personal constraints, and fundamental values remain unexplored. The existing literature has provided limited guidelines or hints as to which set of measurements requires further investigations to better educate people on conservation practice in the region.

Voluntary and participatory conservation has to be based on a more solid understanding of the motives behind participation (Campbell and Smith 2006; Genskow and Wood 2011; Lo and Jim 2012). The limited number of scientific studies conducted in Asian societies has failed to explore other possible factors that have been mentioned. The present study addresses the issue in more depth, and is based on a survey conducted in Guangzhou, China. Our primary goal was to ascertain the intention of youths to participate in turtle conservation campaigns, rather than to test social psychological theories. The research involved a student sample, and we did not pursue representation of the city's demographics.

We sought empirical support to the relevance of other motives behind the intention to contribute to turtle conservation. The study sought to identify theoretical account(s) potentially requiring attention from field researchers. We examined a number of unexplored

candidates in an attempt to outline conceptual boundaries and provide clearer recommendations to future efforts in conservation education. The operational objective was to test the statistical significance of a wider range of attitudinal variables, which are introduced in the next section. The guiding research question was to what extent do people's intention to contribute to turtle conservation initiatives associated with environmental beliefs, knowledge, ethics, norms, and personal behavioral constraints. We compared the importance of different types of beliefs, ethics and norms. The comparisons focused on general versus specific beliefs, consequentialist versus rights-based values, and personal versus social norms. Implications to conservation education are discussed at length.

### Major Theoretical Accounts of Environmental Attitude, Value, and Behavior

Environmental attitude can be classified into two categories: attitudes toward the environment, and attitudes toward ecological behavior (Kaiser and others 1999). Attitude refers to the level of like or dislike for something, whereas belief refers to the level of acceptance of something as true or false. Environmental beliefs can be measured by the New Environmental/Ecological Paradigm (NEP) (Dunlap and Van Liere 1978; Dunlap and others 2000). The NEP scale measures a worldview, involving general beliefs about the biosphere and human's adverse impacts on it. Specific themes covered include "humanity's ability to upset the balance of nature, the existence of limits to growth for human societies, and humanity's right to rule over the rest of nature" (Dunlap and others 2000, p. 427). The NEP captures subjective perceptions of the adverse impacts of environmental change.

Consequences of general environmental conditions are also a focus of another widely used psychological scale. The 'General Awareness of Consequences' (GAC) scale developed by Stern and others (1995, p. 729) captures the idea that "beliefs about specific problems are formed in large part by reference to more general beliefs". The underlying assumption is that survey respondents tend to ignore details and problem-specific information and appeal to general beliefs and values in responding and filtering information.

Awareness of consequences could activate personal moral norms. Pro-environmental actions are envisaged as a response to personal normative values about such actions. According to the norm-activation theory (Schwartz 1968, 1977), personal norms are activated when the individual becomes aware of the consequences of their behavior for the welfare of others, and the individual ascribes some responsibility for these consequences to themselves. The activation could then create a feeling of personal obligation

that guides behavior. Ascription of responsibility is closely related to perceptions of distributive and procedural justice and trust in other parties (Harrison and others 1996; Blamey 1998a, b; Montada and Kals 2000). Individuals want to be assured that other involved parties are doing their part and that this is done in accordance with standards they consider to be acceptable.

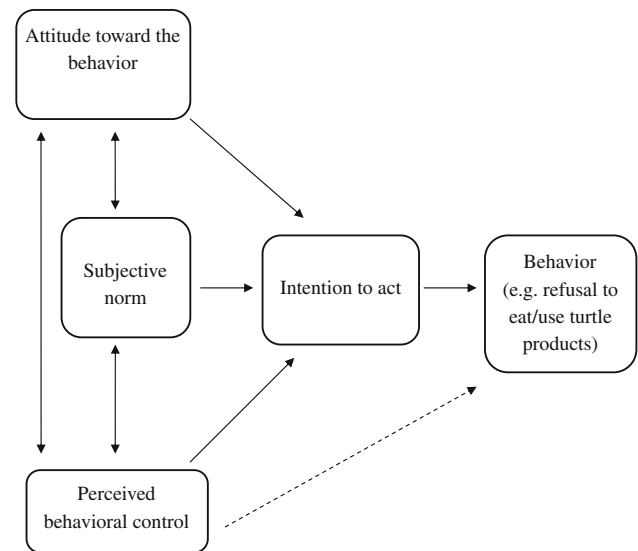
The ‘value-belief-norm’ (VBN) theory is one of the prominent attempts to integrate these proven theoretical accounts (Stern 2000; Stern and others 1999). The VBN theory links the NEP and the norm-activation theory to value orientations. Individuals who accept an environmental movement’s basic values, believe that valued objects are threatened, and believe that their actions can help restore those values then experience an obligation for pro-environmental action that creates a predisposition to lend support (Stern and others 1999, p. 81). Nevertheless, there is disagreement over its core features, such as the focus on consequentialist values and threat-based beliefs.

Rights-based beliefs are an alternative to the consequentialist accounts. Individuals might act upon a belief as inviolable rights, so that actions are intrinsically of value, irrespective of potential utilitarian gains (Spash 2000, 2006; Spash and others 2009). Spash (2006) has demonstrated the predictive power of an ethical beliefs model, which separately defines environmental ethics in terms of utilitarian consequences and inviolable rights. Intended contributions to environmental conservation are shown to be a function of principles and not just utilitarian desires.

Attitude toward behavior lies at the core of the theory of planned behavior (TPB) (Ajzen 1988, 1991). According to this theory, behavioral achievement depends jointly on the individual’s motivation to perform a given behavior as well as the perceived ability to control the situation. Behavioral *intention* is regarded as an immediate antecedent of actual behavior and a function of three conceptually independent factors (Fig. 1):

1. Specific attitude: the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question.
2. Subjective norm: perceived social pressure to perform or not perform the behavior.
3. Perceived behavioral control: perceived ease or difficulty of performing the behavior.

As a general rule, the more favorable attitudes are towards a behavior, subjective norms, and the stronger the perceived behavioral controls are with respect to a specified behavior, then the stronger an individual’s intention to perform the behavior (Ajzen 1991, p. 188). The TPB has been successful in predicting environmentally responsible behaviors (Bernath and Roschewitz 2008; Fielding and others 2008; Spash and others 2009).



**Fig. 1** Theory of planned behavior (adapted from Ajzen 1991)

The three components of the TPB are supported by factual knowledge, information, and beliefs about a given behavior (Ajzen 1991; Kaiser and others 1999). Unlike the ‘information deficit’ model, it does not focus on the evaluation object per se (e.g., the environment), but on knowledge and information related to the estimation of the likelihood of a certain outcome, the likelihood of being expected to comply with social norms, past experience, and anticipated impediments and obstacles.

The core elements of the TPB offer alternatives to other theoretical accounts. Subjective norms, for example, concern social connections and pressures; whereas, the norm-activation theory accentuates personal norms, which involve evaluation of acts in terms of their moral worth to the self. Also, under the TPB, behavior in specific situations is explained in terms of specific dispositions, rather than general attitudes as conceptualized under GAC and NEP models. A limitation of the TPB is that it does not explicitly address normative value orientations. Other accounts that include an ethics scale, such as the VBN, add to the TPB by highlighting their relevance. Findings from previous research into motives behind turtle conservation do not provide sufficient justification to follow any one of these accounts (Ruyani 2009; Jin and others 2010). As an exploratory study, our survey included elements of the TPB, GAC and NEP scales, as explained in the “Methods” section.

## Methods

### Study Area

The study area selected for the survey was Guangzhou, China. Yuehe Pet Market in Guangzhou is one of the largest

turtle markets in China (Gong and others 2009). Approximately 1 million turtles were traded in Guangzhou between 2000 and 2003 (Cheung and Dudgeon 2006). Turtles sold in the markets made up around 60 % of the global turtle fauna. Over one hundred species can be obtained in the market, including many critically endangered species.

College students could be a major source of labor support to local conservation initiatives. Yet the majority remain uninterested, despite continued educational efforts over the years in China. The city of Guangzhou recently built a town named Guangzhou University City, which is one of the major higher education developments in China. Ten local higher education institutions with different teaching and research focuses have campuses in Guangzhou University City with a total of 120,000 students. Students are from all over the China although the majority (~50 %) are from Guangdong Province, South China.

### Sampling Method

A survey was administered to students of six universities in Guangzhou University City. These include South China University of Technology, South China Normal University, Sun Yat-sen University, Guangzhou University, Guangdong University of Technology, and Guangdong University of Foreign Studies. About 50 % of the samples were collected using a random sampling. Each university was assigned a quota according to the size of student population. Four to six dormitory blocks were randomly selected, and then three to four floors were selected from each block. On each floor, three to five residents were invited to participate in the study. Those who agreed to participate completed a self-administered questionnaire in the presence of a trained research assistant. The remainder of the samples came equally from two disciplines: environmental science and engineering, and economics and business-related. Students were directly approached in dormitories based on their major (their distribution was known to the researchers).

The quasi-random sampling procedure was intended to provide a basis for a cross-disciplinary comparison. However, the data revealed little significant difference between the three sets of samples (the two majors and a random sample as control), in terms of the variations in the behavioral and attitudinal variables introduced in the next section. Moreover, the random sample yielded a regression model almost identical to that of the combined sample. Therefore we did not pursue a cross-disciplinary comparison and used a combined sample for the following analysis.

### Questionnaire Design

The questionnaire began with a brief introduction of the study background and species information. The remainder

of the questionnaire consisted of four sections in terms of analytic relevance. The first section had four items to gauge behavioral intention in relation to turtle conservation (Section A, see Appendix for exact wording). Questionnaire themes included low-commitment to environmental citizenship and non-political personal actions (Stern and others 1995, 1999; Stern 2000), and were presented as intended behaviors in personal and public spheres. These items were willingness to (1) contribute financially (2) do voluntary work (3) encourage others to boycott turtle products, and (4) join a NGO. Committed activism was not included in the behavioral scale, because it was considered less relevant in China (Liu 2009; Lo 2010).

Section B of the questionnaire consisted of a range of attitudinal items that might be associated with behavioral intention (Ajzen 1991). Subjective norms were expected to be a key factor because young people might be behaviorally more dependent on the people around them. The three questions about subjective norms measured the likelihood that the respondents would be subject to the expectation of peers, family, and society to protect species. Specific attitudes toward possible means to prevent species extinction were probed by three items, i.e., boycotting turtle-made food or medical products, and education. These items assessed the level of affirmation of potential actions or measures that could contribute to turtle conservation. The four questions that followed elicited the respondent's perception of control over the situation, including expected effectiveness of social or individual actions, time availability and affordability. These three sets of questions constituted the basic elements of the TPB.

Actions for the environment might be related to distrust over experts and bureaucrats. The questionnaire had four questions to gauge the level of perceived trust to relevant parties<sup>1</sup>. Each of them concerned a different subject, namely, society, retailers, NGOs, and scientists. In addition, the respondents were asked to ascribe responsibility of species protection to the government, self, or scientists. The inclusion of these variables related to Blamey's (1995, 1998b) hypothesis that social trust and responsibility ascription could affect willingness to contribute.

Individuals might appeal to general beliefs and values when responding to environmental issues. Considering the length of the questionnaire, we combined the GAC and NEP items, which are regarded as 'indistinguishable psychometrically and in terms of their relationships to

<sup>1</sup> Although three of these items contained the word 'believe', the Chinese wording conveyed the meaning of 'trust'. In Chinese language, in which the survey was conducted, 'believe' is read as 'xiāng xìn' which means 'trust' as well (as a verb). In the questionnaire it was literally used in the form 'I 'xiāng xìn' that someone would (or would not) do something for the turtles', bearing the meaning of trust.

behavioral intention' (Stern and others 1995, p. 739), into one measurement scale. Seven items were employed to assess general environmental awareness, involving awareness of consequence and perceived seriousness of the threats to the environment. Except for the responsibility question, all of the above questions were measured using a five-point Likert scale.

Ethical questions were constructed based on a specific method to examine the consequentialist arguments (Spash 2000, 2006; Spash and others 2009)<sup>2</sup>. Consequential positions involve judgements that are based on the expected consequences of turtle conservation, such as net economic benefits. According to Harris (2004), Chinese environmentalism tends to be utilitarian; that is, justifications of environmentally benign policies are couched in terms of their expected contributions to the material benefits of the society. Western-style consumption is currently pervasive in China, whereas traditional Chinese values, with a generally non-utilitarian orientation, have not led to a bio-centric worldview (Weller and Bol 1998; Harris 2004). In contrast, Spash (2000, 2006) has found evidence for an alternative, rights-based model by which environmental behavior is explained in terms of intention to defend inviolable rights irrespective of consequences. Applicability of this model to Chinese society remains unexplored.

The present study compares the consequentialist and rights-based models. Support for species protection was measured in terms of rights and economics. The respondents were presented statements concerning ethical beliefs about turtle conservation: protection based on economic consequences and protection based on rights (Section B2, Appendix). They were asked which of the statements most closely matched their opinion. Advocates of the rights position were prompted using an additional question which split them into strong and weak categories. Those who would not relinquish rights in the face of significant personal costs were classified as strongly rights-based. A fourth option 'no protection needed' was also provided.

We also tested the importance of prior knowledge. Basic knowledge about Asian turtles was gauged based on eight questions in Section C. These questions concerned the state of Asian turtles or the anthropogenic threats to their survival. Three choices were offered to respondents: 'yes', 'no' and 'not sure'. Responses that accorded with the current science were scored '1'. The last section collected the respondents' socio-demographic information. This included their major and prior experience in attending a wildlife conservation course in a classroom setting or participating in extra-curriculum activities organized by a wildlife conservation club or organization.

We acknowledge that a more exhaustive set of attitudinal and social parameters is generally desirable. However, long questionnaires discourage response. This was a problem in our study particularly, because the questionnaires were completed by the respondents themselves, due to our limited resources. We therefore simplified the scales being tested, most of which consisted of three to four items. This is considered to be sufficient to such an exploratory and initial study which seeks support for future scientific and educational efforts.

The survey was conducted in Chinese. Twenty students took part in a pre-test and provided feedback for adjusting the language and structure of the questionnaire. The main sample consisted of 930 face-to-face requests, of which 75 % took place in May 2009 and the rest in January 2010. We analysed the data by using standard statistics, including linear regression modelling.

## Results

A total of 816 students responded to the survey, a response rate of 88 %. Forty samples were discarded for providing incomplete or unreliable data (e.g., identical responses throughout the questionnaire). The following analysis was based on the remaining 776 valid responses. The first part of this section describes the sample and the model variables. The second part examines the variation in behavioral intention according to socio-demographic traits, knowledge and social psychology.

### Model Statistics

Table 1 displays the descriptive statistics for the socio-demographic variables of the sample. Male and female respondents were equally represented. Half were Year 4 students (final year). The remaining population was evenly distributed between Years 1 to 3 with less than 1 % being postgraduate students. Only 17.1 % attended a wildlife course and 10 % participated in wildlife conservation activities. A total of 20.3 % were from a lower-income family (RMB\$1,000<sup>3</sup> or below), 48.6 % from a middle income family (RMB\$1,000–3,000), and 31.1 % from a high income family (RMB\$3,000 or above). The majority (77.7 %) of respondents were from Guangdong Province. Thirty-one per cent were pursuing an environmental science or engineering degree. The great majority (88.2 %) had no religious beliefs.

Table 2 displays the descriptive statistics of the behavioral, attitudinal and knowledge variables. These model

<sup>2</sup> Spash (2006, p. 611) notes that the ethical categories tested have equivalence in Schwartz's (1977) norm activation theory.

<sup>3</sup> RMB / USD = 6.83, as of May 2009 when the main survey was conducted.

**Table 1** Descriptive statistics for the socio-demographic variables

		N	Percentage
COURSE	Attended a wildlife course	768	17.1
ACTIVITIES	Participated in extra-curriculum activities about wildlife conservation	761	10.0
MALE	Male	772	51.4
CLASS	Class	755	
	Year 1		12.1
	Year 2		14.8
	Year 3		17.6
	Year 4		54.8
	Year 5 or postgraduates		0.7
INCOME	Household income (RMB)	724	
	less than \$1,000		20.3
	between \$1,000 and \$3,000		48.6
	more than \$3,000		31.1
HOMETOWN	Hometown = Guangdong	705	77.7
ENVSTU	Environmental science or environmental engineering student	772	31.1
RELIGION	Have religious beliefs	763	11.8

variables include several aggregate measures. Scale integrity was tested using reliability and factor analysis. The four items under intended conservation behavior loaded on one factor at 0.4 level. A behavioral scale (BEHAVIOR) was constructed by including all the items; it had a good reliability with a Cronbach's alpha of 0.76. Subjective norms yielded similar results: an alpha value of 0.72 and the three items loaded on one factor (SNORMS). Specific attitudes formed one factor (SATTITUDE), although the scale reliability was weaker (alpha 0.51). Perceived behavioral control also had a marginal alpha value (0.56), but all four items passed the 0.4 factor loading criteria (PBCONTROL).

Scale reliability for perceived trust was too low to form an aggregate scale. Factor analysis gave two factors: statements 1 and 3, and 2 and 4. Aggregating any one pair as a separate scale did not work in terms of scale reliability. The four items were therefore treated as separate variables in subsequent analyses (i.e., TRUST1, TRUST2, TRUST3 and TRUST4). General environmental awareness managed to produce a reliable scale with an alpha value of 0.66 (GENAWARE) (reverse coding was applied to negatively formulated items, i.e. statements B16, B18 and B19). Factor analysis supported the aggregation.

Dummy variables were used to represent the two ordinal measures regarding ethics and responsibility ascription. A binary variable was created for each of the three ethical categories, as well as the protection denial position (SRIGHTS, WRIGHTS, CONSEQ, and NOPROTECT). For example, respondents who indicated agreement on statement B25 were coded '1' under SRIGHTS. The same

procedure was applied to the responsibility question, creating three binary variables corresponding to government, self, and scientists respectively (GOVRESPON, MYRESPON, and SCIRESPON). Respondents who attributed conservation responsibility to themselves were coded '1' under MYRESPON.

Responses to the knowledge questions indicated that the majority of respondents were not intimately familiar with Asian turtles. About 64 % failed to provide correct responses to more than four questions under Section C.

### Regression Models

Standard regression models were constructed to predict BEHAVIOR. The above explanatory variables were divided into four groups, each examined with a separate model. A combined model was then developed. Statistically significant variables in this model were identified and explored using a stepwise procedure.

The separate regression models are presented in Table 3. Socio-demographic factors failed to explain more than 10 % of variation in BEHAVIOR. Four variables were significant at the 0.01 level. Prior experience in wildlife conservation activities (ACTIVITIES) increased with intention to contribute to turtle conservation. Male respondents (MALE) and senior classes (CLASS) were less inclined to be involved. Environmental science or engineering students were more likely to take actions (ENVSTU). The second model explained little variation (2 %). General environmental awareness (GENAWARE) increased with the dependent variable. The effect of knowledge was less clear. Although

**Table 2** Descriptive statistics for the behavioral and attitudinal variables

		<i>N</i>	Min	Max	Mean	SD
BEHAVIOR	Intended conservation behavior	768	4	20	12.62	2.88
SNORMS	Subjective norms	765	3	15	9.05	2.23
SATTITUDE	Specific attitudes	769	5	15	10.53	1.91
PBCONTROL	Perceived behavioral control	766	6	20	13.20	2.34
TRUST1	Perceived trust: society	771	1	5	3.39	0.88
TRUST2	Perceived trust: retailers	772	1	5	2.46	1.04
TRUST3	Perceived trust: green groups	775	1	5	2.80	0.78
TRUST4	Perceived trust: scientists	774	1	5	3.59	0.81
GENAWARE	General environmental awareness	753	11	35	27.22	3.75
NOPROTECT	No protection needed	776	0	1	0.02	0.15
CONSEQ	Consequentialist	776	0	1	0.53	0.50
WRIGHTS	Weak species rights	776	0	1	0.21	0.41
SRIGHTS	Strong species rights	776	0	1	0.21	0.41
GOVRESPON	Government's responsibility to protect species	730	0	1	0.66	0.47
MYRESPON	My responsibility to protect species	776	0	1	0.26	0.44
SCIRESPON	Scientists' responsibility to protect species	730	0	1	0.06	0.24
KNOWLEDGE	Knowledge about Asian turtles	776	0	8	3.73	1.78

KNOWLEDGE correlated with BEHAVIOR ( $r = 0.075$ ,  $p < 0.05$ ), statistically it was too weak to survive any combined model. It is important to note that KNOWLEDGE was not associated with attitudes (SATTITUDE) ( $r = -0.018$ ,  $p > 0.05$ ).

Trust and ethics had moderate impacts on the behavioral intention. Six variables out of eleven were significant, contributing to 17 % variation. The respondents would be motivated if they trusted retailers (TRUST2) and scientists (TRUST4). Accepting personal obligation (MYRESPON) was associated with stronger willingness to contribute ( $r = 0.199$ ,  $p < 0.01$ ). However, this variable failed to remain statistically significant in a multivariate model. The alternative dispositions had a strong and negative impact. Ascribing responsibility to the government (GOVRESPON) or scientists (SCIRESPON) weakened the behavioral intention. Stepwise procedure revealed that GOVRESPON absorbed the explanatory power of MYRESPON. Thus, the intention to commit to conservation might have been inhibited by the tendency to shift responsibility—in this case, to the government—more than the tendency to deny personal responsibility.

Denying the need to protect species (NOPROTECT) was another negative factor. While the behavioral import of this pessimism is self-evident, the role of the strong rights-based belief (SRIGHTS) has received little attention from previous studies. Those individuals who accept obligation, regardless of economic consequences, are more likely to contribute. Appeal to potential costs and benefits associated with conservation (CONSEQ) did not encourage positive behavior. Nevertheless, both CONSEQ and WRIGHTS became

significant when NOPROTECT, which applied to only 2.3 % of the respondents, was removed from the model. CONSEQ negatively correlated with BEHAVIOR ( $r = -0.174$ ,  $p < 0.01$ ) in a univariate model.

The TPB proved enormously effective in explaining the intended behavior. The adjusted  $R^2$  for this model reached 0.44, which is much higher than the other three models. Subjective norms (SNORMS) had an exceptionally strong positive impacts, suggesting that other people's expectations played a crucial role. Optimism about the means to conservation was favorably associated with voluntary actions, evidenced by the significance and positive sign of SATTITUDE in the model. BEHAVIOR decreased with PBCONTROL. The individuals are less likely to act when they believe that they could not make a difference or afford the time or money required.

The next step of analysis was to construct a combined model based on all of the independent variables. A stepwise procedure was employed to identify variables that retained their explanatory power when loaded on the same model to compare their contributions. This allows interpretation to be restricted to the most relevant variables or theoretical accounts. A reduced form model was created involving significant variables only to indicate the combined effects of key predictors. It contained nine variables with an adjusted  $R^2$  of .48 (Table 4), which is well above the normal range of 20–30 % (Armitage and Conner 2001<sup>4</sup>). SNORMS alone explained 37 % of the variation,

<sup>4</sup> Armitage and Conner (2001) found that the TPB accounted for 27 and 39 % of the variance in behavior and intention respectively.



**Table 3** Regression models of intended support to turtle conservation

	Sociodemographic variables		Awareness and knowledge		Trust and ethics		Theory of planned behavior	
	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
(Constant)		0.00**		0.00**		0.00**		0.00**
COURSE	0.03	0.44						
ACTIVITIES	0.14	0.00**						
MALE	−0.16	0.00**						
CLASS	−0.17	0.00**						
INCOME	−0.06	0.13						
HOMETOWN	0.01	0.70						
ENVSTU	0.15	0.00**						
RELIGION	0.02	0.66						
GENAWARE			0.12	0.00**				
KNOWLEDGE			0.05	0.23				
TRUST1					0.01	0.67		
TRUST2					0.18	0.00**		
TRUST3					0.03	0.38		
TRUST4					0.08	0.03*		
GOVRESPON					−0.20	0.00**		
MYRESPON					−0.02	0.72		
SCIRESPON					−0.17	0.00**		
NOPROTECT					−0.11	0.02*		
CONSEQ					0.05	0.67		
WRIGHTS					0.12	0.17		
SRIGHTS					0.25	0.01**		
SNORMS							0.51	0.00**
SATTITUDE							0.17	0.00**
PBCONTROL							−0.18	0.00**
Adj. $R^2$		0.08		0.02		0.17		0.44
F statistic		7.66		6.91		14.37		191.90
Std. error		2.79		2.85		2.62		2.17
Total $df$		646		745		713		742

Dependent variable: BEHAVIOR

\* Indicates significant at 0.05 level, and \*\* at 0.01 level

increasing to 43.6 % when combined with the other two components of the TPB. The remaining six variables explain an additional 4.5 % of the variation. These include three socio-demographic variables, namely, MALE, CLASS and ENVSTU, and a trust variable (TRUST2). Both SRIGHTS and WRIGHTS contributed to the additional explanatory power, although the contribution of the latter was marginal.

## Discussion

The TPB explained much of the variation in the expressed intention to support turtle conservation. The statistical significance of subjective norms, in particular, is

impressively strong. The greater explanatory power of subjective norms may be related to the measurement employed; three of the behavior variables (A2, A3, and A4) involve some kind of social engagement. The fact that young people are more susceptible to peer and family influence may also offer an explanation. Our results agree with Zhang and others (2008) findings that social and community influences play a decisive role in encouraging consumption of edible wildlife.

To the contrary, personal norms have weaker impact. The sense of personal obligation does not constitute a strong push to taking action. Yet, shirking the responsibility seems strong enough to prevent people from making contributions. The political tradition in China could offer an explanation. Environmental governance in China has

**Table 4** Combined model of intended support to turtle conservation

	B	Std. error	Beta	<i>t</i>	Sig.	Adj. $R^2$ (accumulative)
(Constant)	8.043	0.868		9.263	0.000	
SNORMS	0.559	0.043	0.440	12.969	0.000	0.369
SATTITUDE	0.235	0.050	0.155	4.730	0.000	0.402
PBCONTROL	−0.198	0.040	−0.161	−5.005	0.000	0.436
MALE	−0.750	0.173	−0.131	−4.330	0.000	0.450
SRIGHTS	0.897	0.228	0.128	3.931	0.000	0.459
TRUST2	0.247	0.089	0.088	2.781	0.006	0.463
CLASS	−0.320	0.087	−0.119	−3.682	0.000	0.468
ENVSTU	0.668	0.197	0.109	3.393	0.001	0.477
WRIGHTS	0.530	0.217	0.077	2.444	0.015	0.481
Overall	Adj. $R^2$		F statistic		Std. error	Total <i>df</i>
	0.48		60.93		2.07	581

been built upon a centralized, expert-led model. Citizens, who tend to assume that governmental bodies have full responsibility for environmental management, are accustomed to playing a passive role in environmental conservation (Chen and Jim 2010; Lo 2010). The entrenched mentality of ‘leave it to the government’ may discourage voluntary actions. To motivate individuals, educators and campaigners should explain the importance of fair responsibility sharing and highlight those areas where bureaucrats and scientists inherently lack capacities.

Another factor that could activate personal norms is awareness of consequences. General environmental beliefs contributed to the variation, but were not as strong as beliefs about specific problems. The expected strength of general beliefs, in Stern and others (1995) account, is grounded on the observation that people often ignore details and problem-specific information. This may be true when people have little prior knowledge about the issue in question, so that they tend to refer to a general context in order to give a response. In China, however, freshwater turtles are a common food item actively traded in the markets and some species are taken as pets. Given the general familiarity, the individuals may have responded under problem-specific cognitive routes. Specific beliefs may therefore become operative.

Trust in retailers was a strong predictor. Students believed that commercial exploitation is the major source of turtle extinction. Reluctance to stop trading a protected species on the part of the retailers might be understood as the most important challenge to wildlife conservation. That is, wildlife conservation would never succeed without positive engagement of the retailers. Consequently, students who held this skeptical view experienced a low motivation to contribute voluntarily. Stronger forms of ethics are relevant. This corroborates the well-evidenced

observation that intended actions for species protection depend upon rights-based principles (Spash 2000, 2006; Spash and others 2009). On the other hand, utilitarian considerations did not exhibit the expected positive impact (Harris 2004; Chen and Jim 2010). This means that turtle conservation campaigns may fail to motivate people if they are framed in economic terms where species protection is justified by net material benefits to the society. Scientists have been divided in their views about consumptive use of turtles, and some still advocate sustainable utilization as a means of conservation (Campbell 2002). The behavioral implications of this approach need to be taken into consideration in light of the observation that non-utilitarian values are more closely linked to the intention to participate in conservation activities. The negative effect of consequentialist ethics also raises the question of the role of threat-based persuasion, a public education strategy that could be drawn from the ‘awareness of consequence’ model (Stern and others 1995, 1999; Stern 2000).

Our study included some threat-based variables. Two items in the specific attitudes (B4 and B6) were related to the survival of Asian turtles, but not directly to the threat per se. One of the trust items (TRUST4, or B14) was relevant as well as significant, but this single-item variable, again, was more about trust in scientist than the threat per se. Seven items in the knowledge scale concerned the causes and current state of turtle extinction (all except C1). The combined variable (KNOWLEDGE) produced a significant effect only in a univariate model.

Two conclusions could be drawn from the relatively low significance of the knowledge scale. First, the linkage between knowledge and intended actions proved to be far from straightforward. Tisdell and Wilson (2005) found that field education raised behavioral intention to protect sea

turtles. In our study, however, the knowledge factor had limited predictability and did not correlate with specific attitudes. Merely having a good understanding about a species status is not likely to strengthen the intention to protect them. This observation casts doubt to the presumption that ecological literacy drives corresponding behavioral change and the proposed educational strategy of focusing upon knowledge enhancement (Zhang and others 2008)

Behavioral modelling studies must consider a much broader range of factors beyond factual knowledge and socio-economic characteristics. Social norms and ethics are promising candidates for further research into the attitudinal or behavioral change in relation to turtle conservation. Specific attitudes and perceived control also warrant research attention, although more efforts on verification are needed given their low reliability values recorded in this study. Measurement of special attitudes could be improved by more closely adhering to the TPB convention.

Secondly, conservation education can create a greater impact on behavior by adopting a social learning approach. Of critical importance are experiential support and a participatory approach (Campbell and Smith 2006; Cheng and Sturtevant 2012; Harris and others 2012; Lo 2011), which is lacking in China (Hau 2005). Understanding science is necessary; in fact, environmental learning through eco-tour (seeing and learning more about turtles) can make a difference in stimulating intended conservation behavior (Tisdell and Wilson 2005). Yet we found that sufficient conditions are favorable social circumstances and enhanced capacities to respond. Learning to protect wildlife would be more effective if opportunities to take group-based action are available.

Active involvement in field studies, for example, significantly promoted students' positive attitudes toward turtle conservation (Cheung and Chow 2011). Other examples include student-led educational seminars in primary schools, tours to GuangZhou Government Turtle Farms and Hong Kong Kadoorie Farm and Botanic Garden, and involvement in the Asia Turtle Rehabilitation Project (ATRP 2009). Findings of this study provide theoretical backing for such a 'project-based learning' approach to conservation. Students participating in collective field experiments gain motivations to act in a small-group setting where peer pressure is implicit, and where they could obtain immediate support and mutual recognition from fellow students. These projects, however, are moderately difficult. Guided by teachers, students who complete assigned tasks experienced a strong sense of achievement, and a feeling that college students could make a difference (Cheung and Chow 2011).

Campbell and Smith (2006) reached a similar conclusion that active participation in science (e.g., morning nest surveys of sea turtles in Costa Rica) was an important motivator for volunteering. They explain the observation in

terms of expectations for intensive wildlife interactions. Based on our field experiences and findings, we believe that other possible explanations include anticipated support from fellow students and family as well as expectations of the larger society. The relative significance of scientific and social experiences warrants dedicated comparative studies.

## Conclusions

Actions for wildlife conservation are a social act with social meanings. The present study demonstrated the high relevance of social psychological factors in explaining the variation in the intended commitments to turtle conservation. The TPB was particularly effective in predicting behavioral intentions. Perceived social expectations were the strongest predictor, followed by specific attitudes and perceived behavioral control. Strong ethics and socio-economic variables had significant impacts. The effect of general environmental awareness, trust and responsibility ascription was modest. Knowledge about turtles was a significant but weak predictor. A conservation education initiative could bring about only limited changes in behavior, if its operational objective is merely to promote general awareness and improve understanding of the ways in which a species is threatened.

Public education campaigns should pay more attention to the social psychology of individuals. Public support of wildlife conservation crucially depends upon social contextual factors. Educational initiatives should aim at building capacity to respond and social capital, and not just communicating scientific knowledge. This is a rather new idea in China. School education in this country is largely limited to passive forms of knowledge transfer; even college students are treated as merely recipients of subject knowledge. Changing values and attitudes toward wildlife would require more fundamental change in the practice of conservation education. Possible strategies include providing more opportunities for social learning and moral deliberation on the subjects being studied. Sustained commitment might be promoted through experiential actions and guided group-based investigation into real environmental problems. Social support is a limiting factor. The present report resonates to the previous successful experience of project-based learning which captures this dimension.

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## Appendix: Survey Questions

### Section A Intended Behavior

- 
- A1 Are you prepared to spend more money in turtle protection?
- A2 Are you prepared to do voluntary work for turtle conservation activities, such as educational seminar?
- A3 Are you prepared to encourage your family or friends to refuse food or medical products that contain turtle materials?
- A4 Are you prepared to join green groups dedicated to turtle conservation?
- 

Score: 1 = definitely not, 2 = probably not, 3 = not sure, 4 = probably, 5 = definitely

### Section B1 Social Circumstances and Environmental Attitudes

#### Subjective norms

- B1 My friends would encourage me to participate in turtle conservation activities
- B2 My family would encourage me to participate in turtle conservation activities
- B3 The society would appreciate my participation in turtle conservation activities

Score: 1 = definitely not, 2 = probably not, 3 = not sure, 4 = probably, 5 = definitely

#### Specific attitudes

- B4 Boycotting food or medical products that contain turtle materials could prevent turtles from distinction
- B5 Publicity and education could promote turtle conservation
- B6 Stop eating wildlife turtles could save these animals

#### Perceived behavioral control

- B7 I don't think that turtle conservation campaigns are effective
- B8 I don't have free time to participate in turtle conservation activities
- B9 We cannot stop retailers from selling turtles
- B10 I don't have money to support turtle conservation activities

#### Perceived trust

- B11 I don't believe that the majority of people in the society would support turtle conservation
- B12 I believe that some retailers would be willing to stop selling food or medical products that contain turtle materials for the sake of conservation
- B13 Green groups cannot be trusted because they sometimes exaggerate
- B14 Scientists suggest that many turtle species are becoming extinct. I strongly believe that.

#### General environmental awareness

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- 
- B15 Environmental protection is beneficial to our quality of life and health
- B16 Environmental protection slows down economic development
- B17 Many species will come to extinction in the decades to come
- B18 Extinction of individual species will not significantly affect human society
- B19 Ecosystems self-regulate; human beings don't need to worry too much
- B20 Human beings are abusing natural resources
- B21 Human beings will be confronted severe environmental catastrophes if the current lifestyle continues
- 

Score: 1 = strongly disagree, 2 = disagree, 3 = not sure, 4 = agree, 5 = strongly agree

### Section B2 Categories of Ethical Beliefs

- 
- B22 No protection needed 'Protection of such turtles is not necessary'
- B23 Consequentialist 'Protection of such turtles must be weighed against economic considerations (i.e. costs and benefits).'
- B24 Weak species rights 'Such turtles need protection because they have a right to life which cannot be measured against economic considerations.' Plus right withdrawn in face of significant personal costs.
- B25 Strong species rights 'Such turtles need protection because they have a right to life which cannot be weighed against economic considerations.' Plus right defended in face of significant personal costs.
- 

### Section B3 Responsibility Attribution

B26 Which of the followings are you most likely to agree with (exclusive chose)?

Protecting the turtles is (1) the government's responsibility; (2) my responsibility; or (3) the scientist's responsibility.

### Section C Knowledge

- 
- C1 Turtles are amphibians
- C2 Turtles are still in the markets for sale. This means that a large number of wild turtles still exist at least in the southern provinces
- C3 Turtles are no longer used as a raw material for 'turtle jelly' [a traditional Chinese medicine]
- C4 Wild 'golden coin turtle' has been listed as national protected animals
- C5 Turtles that are available in the markets for sale are not endangered
- C6 Releasing turtles means protecting them
- C7 Few turtle species are endangered. Other species have much room for survival
- C8 Turtle is a long-lived species, therefore extinction is unlikely
- 

Scale: 'yes', 'no', and 'not sure'

Modified score: 1 = accord with the science, 0 = otherwise, or not sure (for all except C4, a 'no' response was scored '1')

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