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PLANNING THE REINTRODUCTION OF THE CLOUDED LEOPARD (NEOFELIS NEBULOSA) TO TAIWAN: AN ASSESSMENT OF ATTITUDES AND POTENTIAL SUPPORT

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by

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Large felid populations are in decline globally and wildlife managers have increasingly used reintroductions as a conservation tool, yet few studies have assessed public attitudes towards potential large felid reintroduction candidates prior to release. The clouded leopard was recently declared extinct in Taiwan; however, a reintroduction effort is ecologically feasible and success largely depends on resident attitudes towards clouded leopards and support for its reintroduction. In 2017, 263 semi-structured interviews with indigenous locals were conducted in southern Taiwan and an internet questionnaire was distributed to 500 urban residents for comparison. Rural and urban attitudes were 67% and 76% positive toward clouded leopards, respectively. Males, younger respondents, and residents with more clouded leopard knowledge exhibited more positive attitudes among rural respondents. In addition to these predictors, urbanites with more household children were more positive. Rural support for reintroduction to the Tawushan Nature Reserve was 48% positive, 31% neutral, and 21% opposed, while urban support was 71% positive, 22% neutral, and 7% opposed. Environmental group membership, increases in attitudinal positivity, and lower levels of risk perception and knowledge influenced support for reintroduction in both samples. Although support is substantial among urbanites, a knowledge-based education campaign that targets women and older residents living adjacent to the reintroduction site would benefit reintroduction efforts.

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CHAPTER 1

INTRODUCTION

Large felid populations are in decline globally due to habitat loss, fragmentation, overexploitation, and direct persecution (Nowell and Jackson 1996, Weber and Rabinowitz 1996), but they are now recognized as essential components to healthy ecosystem function, delivering broad biodiversity benefits (Sergio et al. 2006, 2008). Frequently used by managers as surrogate species, evidence suggests that large felids qualify as keystone species due to their disproportionate ecosystem impacts relative to their population size (Noss et al. 1996). They therefore execute indispensable ecological roles, such as the suppression of mesopredator release and the prevention of trophic cascades (Terborgh et al. 2001, Ripple and Beschta 2006, Ritchie and Johnson 2009). Moreover, large felids may function as umbrella species whose large habitat area requirements encompass the habitats and needs of many other species and can be utilized by managers to aid in the creation of protected areas that benefit co-occurring species (Thornton et al. 2016).

Regardless of the imperative ecological role large felids play, the presence of large cats can lead to varying levels of social acceptance among human populations. Viable large felid populations are as contingent on public social acceptance as on the biological landscape (Treves and Karanth 2003) for acceptability is known to influence a species' distribution and density (Bruskotter and Wilson 2014) and human activities are the principal source of large felid decline (Woodroffe 2000). Therefore, human dimensions surveys are employed to extrapolate attitudinal trends towards large felids to aid in the management decision-making process.

The reintroduction of extirpated large felids to areas within their former range is increasingly used as a last effort conservation tool by wildlife managers (Hayward and Somers

2009) and benefits from knowledge of the level of social acceptability relative to those activities. Acceptability is based on a cognitive hierarchy framework where general concepts, such as value orientations and societal norms, influence more specific notions, such as attitudes towards a reintroduction initiative (Vaske and Manfredo 2012). Attitudes are a particularly important construct of acceptability due to their direct influence on behavior (Vaske and Donnelly 1999, Vaske and Needham 2007) and are often gauged by conservation stakeholders (Bath et al. 2008, Parker et al. 2014, Farhadinia et al. 2017, Fort et al. 2018). Attitude assessments have been advocated for prior to reintroduction efforts (Reading and Clark 1996, MacDonald 2009); however, few such studies have been completed for large felids (Caruso and Pérez 2013). Humans surrounding potential reintroduction sites largely influence the outcome of these initiatives based on their attitudes towards the species to be reintroduced and potential reintroduction impacts (Dickman 2010, Hudenko et al. 2010); impacts are the positive and negative effects arising from interactions involving humans and wildlife or management interventions (Riley et al. 2002). For example, positive attitudes may be the result of tourist revenue associated with the presence of large felids (Caruso and Pérez 2013), while negative attitudes may be the result of a perceived high degree of risk (Oli et al. 1994, Riley and Decker 2000). The perception of these impacts results in varied responses from surveyed human populations whose attitudes towards large felids can be antipathetic, but also moderate and tolerant (Fort et al. 2018).

Utilizing 1 large felid species as an example, Vancouver Island, Canada, has the densest population of pumas (*Puma concolor*) in North America (5.0 / 100km^2) and a high incidence of human-puma interaction (Beier 1991, Hahn 2001). However, the majority of surveyed Vancouver Island residents had positive attitudes towards pumas and were opposed to shooting problem animals, preferring trap-and-transfer methods (Campbell and Lancaster 2010). In southern Chile, however, the majority of residents possessed negative attitudes towards pumas, citing livestock losses as the cause, even though documented losses are infrequent (Silva-Rodríguez et al. 2007). In Illinois, USA, mean attitudes towards recolonizing pumas were generally neutral, albeit with low demographic consensus on normative beliefs regarding existence values (Smith et al. 2014). In Kentucky and North Dakota, USA, mean affective responses were neutral with a high variability about the mean and a significant positive correlation between favorability and puma protection (Davenport et al. 2010). An assessment of variable human attitudes is integral to the incorporation and development of feasible management options for large felid populations and are essential prior to any effort to reestablish an extirpated population (Mech 1995, Kellert et al. 1996, Reading and Clark 1996, MacDonald 2009, Smith et al. 2014).

The mainland clouded leopard (*Neofelis nebulosa*), a potential reintroduction candidate, is the smallest of the big cats, sharing a common ancestor with the *Panthera* lineage (Johnson et al. 2006, Kitchener et al. 2017) and has received little research attention compared to its larger cousins (Rabinowitz et al. 1987, Chiang 2007, Brodie 2009). The clouded leopard is an Appendix I species (CITES 2018) and its status is currently classified as Vulnerable by the international community (IUCN 2017). Habitat destruction of primary and secondary tropical forests, as well as direct persecution through illegal trade of parts, has led to a decrease in the clouded leopard population across much of its range (Nowell and Jackson 1996, Nowell 2007, D'Cruze and Macdonald 2015, Grassman et al. 2016). Competition with humans and prey depletion in regions with heavy human settlement also have caused populations to decline (Chiang 2007). Historically, the clouded leopard ranged from the Himalayan foothills through southern China and Southeast Asia. Although its distribution in China is currently unknown (Smith et al. 2010), the clouded leopard was recently declared extinct in Taiwan after an extensive study found no direct evidence that the species still persists there (Chiang et al. 2014). Despite its probable extinction on the island, mtDNA and morphometric analysis (Kitchener et al. 2006, Wilting et al. 2007) suggested that what was formally known as the clouded leopard (*N. nebulosa*) is in fact 2 distinct species: the mainland clouded leopard (*N. nebulosa*), which ranges across mainland Asia, and the Sunda clouded leopard (*N. diardi*), which is confined to the islands of Borneo and Sumatra. After a single specimen taken from a pelt at the National Taiwan Museum in 2006 was analyzed, it demonstrated no clear genetic distinction between the mainland clouded leopard and the extinct population that once inhabited Taiwan (Buckley-Beason et al. 2006). The obvious implication of this taxonomic reclassification to reintroducing clouded leopards to the island is that source animals could originate from the closest mainland populations.

Taiwan has recently made wildlife conservation a priority issue. Despite its extirpation, the clouded leopard is still listed as "endangered," and is officially protected by the Wildlife Conservation Law (1989). During a 15-year exhaustive search for clouded leopards on Taiwan, Chiang et al. (2014) ascertained that the ecological factors needed to support a viable population of felids were probably intact. Tight restrictions on hunting, and a logging ban in effect for natural forests since 1991, have allowed populations of prey species to increase over the last few decades (Chiang et al. 2014). For example, an adequate potential prey base, including Formosan macaques (*Macaca cyclopis*), Reeves's muntjacs (*Muntiacus reevesi*), Formosan serow (*Capricornis swinhoei*), and sambar (*Rusa unicolor*), has been well documented on the island. Forest regeneration and the presence of expansive lands unsuitable for human cultivation and settlement permit for extensive suitable clouded leopard habitat. Under optimal environmental conditions, Taiwan might host 8,523 km² of suitable clouded leopard habitat and at least 500-600 clouded leopards (Chiang et al. 2014). Assuming additional habitat restoration efforts, the continued implementation and enforcement of hunting regulations, and the development of a new comprehensive landscape-level management plan, clouded leopard reintroduction and long-term population viability appear to be ecologically feasible. More importantly, due to the decreasing population trend of the species throughout its range (Grassman et al. 2016), Taiwan has the potential to become an important sanctuary for the species.

Despite the challenges to restoring large carnivore populations, several examples of successful large carnivore reintroductions exist, most incorporating the input and support of local communities. The Eastern Cape province of South Africa has recently experienced numerous successful reintroductions of carnivores, such as lion (*P. leo*), cheetah (*Acinonyx jubatus*), wild dog (*Lycaon pictus*), and spotted hyena (*Crocuta crocuta*), as defined by a 3-year breeding population with natural recruitment exceeding adult death rate (Hayward et al. 2007*b*). These predators were originally extirpated but reintroduced based on the socio-political support of local communities and land owners in the region, whose intentions were to restore ecological integrity and maximize tourism (Hayward et al. 2007*a*). In India from 2008-2010, 5 tigers (*P. tigris*) were reintroduced successfully to Sariska Tiger Reserve in Rajasthan (Sankar et al. 2010) and the population has increased since. A questionnaire surveying support for reintroduction efforts was supported by 98% of Indian residents living around the national park; 58% of inhabitants were readily willing to relocate from the area to further tiger conservation efforts (Sankar et al. 2008). Prior to the successful reintroduction effort of the Northern Rocky Mountains Grey Wolf (*Canis lupus*) to Yellowstone National Park, attitudes among locals were assessed to incorporate public input and concerns into sound management planning (Bath and Buchanan 1989, Kellert 1991). An evaluation of national and local public opinion among a diverse group of urban and rural Taiwanese citizens is thus an essential part of any clouded leopard reintroduction planning initiative and is critical to gauging the likelihood of success.

To date, however, there has been no effort to incorporate the attitudes of the Taiwanese public regarding the potential of this reintroduction. It is now standard practice to include local stakeholders and their interests in environmental planning (Smith and Clark 1994, Fiallo and Jacobson 1995, Brouwer et al. 1999). Perhaps the most essential component of any reintroduction effort is the socio-political support a project receives from communities most impacted by that effort (Nowell and Jackson 1996, Reading and Clark 1996), yet few studies have assessed the level of support or the willingness-to-pay (WTP) for a reintroduction of large felids prior to release (Loomis and White 1996, Lindsey et al. 2005, Richardson and Loomis 2009). Moreover, the extent of human dimensions literature devoted specifically to the attitudes of stakeholders towards a potential carnivore reintroduction candidate is nominal (Hayward and Somers 2009), and only one study has assessed urban and rural differences in support prior to a large felid reintroduction (Caruso and Pérez 2013). Past large carnivore reintroduction projects have insufficiently considered the inclusion of a human dimensions component, failing to account for one of the fundamental dynamics of conservation biology. Most of these projects were unsuccessful based on the composite published opinions of experts, even as reintroduction attempts have increased (Breitenmoser et al. 2001), with a success rate of only 10% (Schaller 1996). According to Breitenmoser et al. (2001), large felid reintroductions globally, including puma, cheetah, lion, and leopard (*P. pardus*), were successful only 4 out of 18 times (22%); though success criteria differed between projects. The lack of a methodical pre-assessment of human attitudes prior to large felid release may cripple otherwise valiant attempts to conserve threatened species (Reading and Clark 1996, Breitenmoser et al. 2001). Furthermore, the failure to include socio-economic elements into reintroduction models demonstrates a palpable disconnect between ecologists and human dimensions of wildlife practitioners.

The goal of my research was to assess the societal climate of Taiwan as related to the overall feasibility of reintroducing the clouded leopard. Specifically, my objectives were to assess 1) the attitudes of Taiwan's rural and urban residents towards clouded leopards, clouded leopard competitors, clouded leopard prey, and the Tawushan Nature Reserve; 2) the level of support of Taiwan's rural and urban residents for a potential clouded leopard reintroduction to Taiwan in general, and to the Tawushan Nature Reserve in particular; 3) the factors influencing the attitudes of Taiwan's rural and urban residents towards clouded leopards, clouded leopard competitors, clouded leopard prey, and the Tawushan Nature Reserve; 4) the factors influencing support for a potential clouded leopard reintroduction to Taiwan in general, and to the Tawushan Nature Reserve in particular; and 5) the value of clouded leopards to Taiwanese citizens and their annual WTP in order to support and sustain a successful reintroduction project.

I expected urban residents to hold more positive attitudes towards clouded leopards, clouded leopard competitors, clouded leopard prey, and the Tawushan Nature Reserve than rural residents. On a global scale, rural residents tend to have less positive attitudes towards large carnivores than urban residents (Kellert et al. 1996, Zimmermann et al. 2001, Williams et al. 2002). Moreover, urban and rural citizens usually have different levels of interaction and exposure with wildlife, which can result in opposing attitudes (Bandara and Tisdell 2003). For example, Best (2015) revealed that locals in Miaoli County, Taiwan were supportive of leopard cat (*Prionailurus bengalensis*) protection by a thin margin (53%), but support from the urban

Taiwanese public was particularly high (93%). I also hypothesized that urban residents would demonstrate greater support for a potential clouded leopard reintroduction to Taiwan and the Tawushan Nature Reserve than rural residents. In a survey of both local and national residents of the United States, the population of supporters for a wolf reintroduction to Yellowstone National Park was larger than those against it in both samples with a higher proportion of support stemming from the national pool of residents (Duffield and Neher 1996).

I expected that sociodemographic predictor variables associated with positive attitudes towards clouded leopards, clouded leopard competitors, clouded leopard prey, and the Tawushan Nature Reserve, as well as support for clouded leopard reintroduction, would derive from residents with increased knowledge of clouded leopard behavior (Bath et al. 2008, Parker et al. 2014). Moreover, younger respondents (Morzillo et al. 2007), males (Kleiven et al. 2004), residents with more formal education (Williams et al. 2002), residents without livestock or pets (Smith et al. 2014), non-hunters (Ericsson and Heberlein 2003), and members of environmental organizations (Williams et al. 2002, Morzillo et al. 2007) were predicted to be associated with positive attitudes in general as well as greater support for a reintroduction initiative.

I predicted that WTP averages would be higher for those that support clouded leopard reintroduction as compared to those who are against it. A contingent valuation method (CVM) survey measuring the value of reintroduced wolves to Yellowstone National Park using national and regional samples found that those who supported reintroduction were willing to pay more than those who were against it (Duffield and Neher 1996). At the same time, a composite review of human attitudes towards wolves demonstrated a majority of Americans held positive attitudes towards wolves (Williams et al. 2002) suggesting a positive relationship between value and attitudes for rare, threatened, or endangered species; therefore, the same sociodemographic predictors should influence WTP as attitudes towards clouded leopards. Prior studies utilizing CVM to estimate the value of rare, threatened, or endangered species have shown benefits to disproportionately outweigh costs of implementing a preservation effort (Loomis and White 1996).

CHAPTER 2

METHODS

Study Area

Two sets of questionnaires were developed to survey both rural and urban populations. For the rural sample, efforts were concentrated in indigenous Paiwan and Rukai villages surrounding the Tawu Mountain area of southern Taiwan. The Tawu Mountain area lies within the counties of Pingtung and Taitung, which have population densities of 301 and 63 people/ km^2, respectively (DHR 2016). This area includes the Tawushan Nature Reserve and Twin Ghost Lake Important Wildlife Area (Shuangkueihu) (Fig. 1), which may be the ideal location for a clouded leopard reintroduction site due to limited human presence and activity, adequate suitable habitat, and high prey availability (Chiang et al. 2014). Together these protected areas contain the largest swath of lowland primary forest and suitable clouded leopard habitat remaining on the island (Chiang et al. 2014). Forest cover is approximately 90% and consists largely of *Ficus-Machilus*, *Machilus-Castanopsis*, *Quercus*, and *Tsuga* vegetative cover types over an area of 922 km^2. Altitude ranges from 130 - 3,100 m above sea level. General access to the Tawushan Nature Reserve is restricted under the protection of the Cultural Heritage Conservation Law (Lai and Nepal 2006) and both sites experience minimal human disturbance (Chiang et al. 2014).

For the urban sample, residents living in the 3 major metropolitan areas of Taipei/ New Taipei, Taichung, and Kaohsiung, which represent northern, central, and southern geographic regions of the island, respectively, were asked to fill out questionnaires (Fig. 1). Taipei, New Taipei, Taichung, and Kaohsiung have population densities of 9,918, 1,939, 1,249, and 942 people/ km^2, respectively (DHR 2016).

Questionnaire Development

The questionnaire (Appendix A) was constructed to gauge the attitudes of Taiwanese residents towards clouded leopards and their support for a potential clouded leopard reintroduction and was based on similar surveys (Caruso and Pérez 2013, Smith et al. 2014, Yen et al. 2015). A rural paper-based survey and an identical urban internet version of the questionnaire were produced to allow for comparisons. Questionnaires were checked for clarity and revised based on suggestions made by students and faculty in the Cooperative Wildlife Research Laboratory at Southern Illinois University Carbondale, National Pingtung University of Science and Technology, and National Dong Hwa University. Survey methods and questions were approved by the Human Subjects Committee at Southern Illinois University Carbondale (protocol #17113). Only urban and rural residents 18 years of age or older were permitted to fill out a questionnaire. A pilot study with 10 samples was conducted in August 2017 and the questionnaire was subsequently refined to address 4 subject areas: 1) knowledge, experiences, and encounters with clouded leopards; 2) attitudes towards clouded leopards and support for their reintroduction; 3) contingent valuation and WTP; and 4) demographic questions.

The first section of the survey assessed the knowledge that individual respondents possessed regarding clouded leopard history on Taiwan by enquiring: "Does the clouded leopard currently live in Taiwan?" A follow up series of questions measured personal experiences with clouded leopards by asking respondents whether they have had encounters with clouded leopards, known someone who had, or read or heard about instances of encounters. Space was provided on the rural version of the survey to write down any personal experiences in detail. The next series of statements further evaluated respondent knowledge of typical large felid behavior in areas near humans and livestock, such as "clouded leopards typically avoid contact with people" and "clouded leopards do not damage the crops of farmers." Knowledge was measured using a 3-point Likert scale (3 = agree; 2 = neutral; 1 = disagree). Likert scales containing 5 categories were confusing to pilot study respondents and, therefore, reduced to 3 categories for all survey statements (Jacoby and Matell 1971).

The second section of the questionnaire was designed to assess the attitudes of residents towards clouded leopards and the Tawushan Nature Reserve. Additionally, this section assessed support for the potential reintroduction of the clouded leopard to Taiwan in general and to the Tawushan Nature Reserve in particular. Respondents were given statements addressing these constructs, such as "clouded leopards have the right to exist wherever they may occur" and "I support bringing clouded leopards back to Taiwan through reintroduction." Research has shown support for the theory of impact dependency in that anticipated impacts of carnivore reintroductions are important predictors of support (Lohr et al. 1996). Therefore, attitude statements were included gauging the potential financial losses and gains respondents linked to the presence of clouded leopards as well as the risks respondents perceived to the well-being of people, pets, and livestock. Furthermore, a series of statements evaluating respondent attitudes towards clouded leopard competitors (Asiatic black bear *Ursus thibetanus*) and potential clouded leopard prey (Reeves's muntjac, Formosan macaque, and Formosan serow) were included in this section, such as "I would support an increasing population of Formosan macaques." All attitudes and support statements were measured using a 3-point Likert scale (3 = agree; 2 = neutral; 1 = disagree) to indicate level of agreement.

The third section appraised the total economic value of a clouded leopard reintroduction to Taiwan through the CVM, which utilized hypothetical questions asking respondents their WTP in support of a reintroduction initiative (Mitchell and Carson 1989, Chambers and

Whitehead 2003, Richardson and Loomis 2009). CVM surveys permit respondents to opine about use and non-use values, or total economic value, by suggesting a monetary price for the conservation of a species (Pate and Loomis 1997). Respondents had to choose 1 of the following 2 questions to answer: “How much would you be willing to pay per year to help reintroduce and maintain a healthy population of clouded leopards in Taiwan?” or “If you do not support clouded leopards being reintroduced to Taiwan, how much would you be willing to pay per year to keep them from being reintroduced to Taiwan?” Annual WTP responses are preferable to lump-sum WTP submissions due to much of the prior literature using annual WTP-based questionnaires, which allows for more accurate comparisons (Richardson and Loomis 2009). Moreover, providing a WTP response for those that oppose reintroduction is essential due to the controversial nature of the project (Duffield and Neher 1996); in this case the reintroduction of a predator which could potentially cause or be perceived as a cause of conflict with people. Suggested hypothetical payments were in the form of charitable donations. Charitable donations are a conventional fund-raising conservation approach and, therefore, a realistic choice for CVM studies (MacMillan et al. 1999), especially for endangered and rare species (Richardson and Loomis 2009). Responses were recorded in a payment card approach, which exhibited a range of WTP values from $NT0 to $NT10,000 ($343.00 USD) and has been widely used in past CVM studies (Richardson and Loomis 2009, Neupane et al. 2017). A follow up question asked respondents regarding the degree of certainty they were willing to make the annual payment: (1) Definitely pay; (2) Probably pay; (3) Not sure; (4) Probably not pay; and (5) Definitely not pay.

The fourth section included questions regarding demographic variables, such as age, gender, household income, education level, occupation, number of household children (< 18 years of age), township of origin, village/ city of origin, and duration of residence. The rural version also included tribe affiliation. Additional questions determined whether the respondent identified as a livestock owner, pet owner, hunter, or environmental organization member. A space for additional comments was located at the end of the rural version of the questionnaire.

Sampling Design and Data Collection

Rural Surveys.—Similar in design to previous human dimensions surveys in Taiwan (Lai and Nepal 2006, Yen et al. 2015), semi-structured questionnaires were employed to interview randomly and/or conveniently selected indigenous people from among rural villages and communities living adjacent to Tawu Mountain wilderness areas suited to clouded leopard reintroduction. Questionnaires were distributed in traditional Chinese characters and interviews were conducted in Mandarin via Taiwanese collaborators. In a few cases, Paiwan and Rukai village elders were unable to speak fluent Mandarin or read traditional Chinese characters. These questionnaires were filled out with the help of a family member able to speak Mandarin as well as their own indigenous language, following procedures outlined by Lai and Nepal (2006). Mostly elder respondents occasionally required verbal explanations of questions they did not understand. Interviews were conducted throughout the day (0800-2000 hr) to account for the varied schedules of potential respondents. Individuals were approached directly and asked to fill out questionnaires without delay, or in some cases (n = 18), given questionnaires by relatives/ friends and then returned at a later date. Communities were visited during 08-23 August 2017, which coincided with annual tribal harvest festivals. Villages were visited specifically on festival dates as entire town's populations were centralized and accessible, giving interviewers access to a representative sample of that village.

Urban Surveys.—Internet surveys were utilized to gather data from urbanites. A randomly-selected sample of 500 residents living in Taipei/ New Taipei, Taichung, and

Kaohsiung was purchased from www.surveygizmo.com. Quotas were introduced based on age, gender, and location to ensure a representative sample of Taiwan residents. All internet surveys were conducted in Mandarin and distributed and collected in December 2017.

Data Analysis

I used R programming language to conduct all statistical analyses (R Core Team 2017). To account for sample selection bias in rural and urban samples, predictor variables collected by questionnaires on respondents, such as age, gender, and education, were compared to Taiwan's 2010 Population and Housing Census (NSRC 2010) and the Ministry of Interior's Department of Household Registration statistics (DHR 2016) utilizing a chi-square test of independence (Groves 2006, Smith et al. 2014). Statistical tests were considered significant at the $\alpha = 0.05$ level (Warner 2008).

An exploratory factor analysis was performed on Likert response scale datasets gauging respondent attitudes towards clouded leopards using the packages "psych," and "nFactors" (Raiche 2010, Revelle 2017) to inform the creation of an attitudes index score (AIS). I used principal factor extraction on a polychoric correlation matrix and applied the Kaiser-Guttman rule and parallel analysis to inform the extent of extractable factors on the 12-item index (Hayton et al. 2004). Cronbach's alpha was used to estimate the internal consistency of items related to attitudes toward clouded leopards and the additional 12-item index measuring attitudes towards clouded leopard competitors and prey (AISCP) (Vaske 2008). To assess collinearity among predictor variables, I used the package "polycor," which calculates a heterogenous correlation matrix consisting of Pearson's r, polychoric, and polyserial correlations between combinations of continuous and ordinal variables (Fox 2016). Strength of association between nominal variables was assessed using Cramer's V in the package "lsr" (Navarro 2015). No predictor variables were correlated above $r = 0.38$ in the rural sample or $r = 0.5$ in the urban sample except for pet and livestock ownership (rural: $r = 0.54$, urban: $r = 0.58$). Subsequently, these items were combined into one category: animal ownership. Additionally, the variable household income was removed from analyses due to the large percentage of respondents who opted out of answering the question in the rural (49%, n = 126) and urban (9%, n = 45) samples. Welch's Independent sample *t*-tests were used instead of Student's *t*-tests to compare responses between 2 groups (i.e. urban and rural, male and female) due to Welch's superior performance when groups have unequal variances or sample sizes (Delacre et al. 2017). Chi-square tests were used to compare responses between groups when dependent and predictor variables were categorical. Models predicting ordinal response items, such as support constructs, were fitted with cumulative link models in the package "ordinal" (Christensen 2015). Index score items were fit with general linear models.

Knowledge index scores (KIS) were computed by assigning a 1 to correct "agree" responses and a 0 to "neutral," "disagree," or missing responses among 4 knowledge Likert items (Bath et al. 2008). Additionally, as the clouded leopard was declared extinct in Taiwan (Chiang et al. 2014), responses indicating agreement with this were coded as 1 and disagreement as 0 for the first question of the survey. Coded knowledge responses were summed per respondent with a KIS maximum total for a 5 question knowledge section equaling 5 and a minimum total of 0. Therefore, respondents with a score of 5 demonstrated more knowledge than those with a lower score. AISCP, AIS, and all permutations of the AIS, were calculated by assigning integer values of between -1 and 1 to statements based on their level of agreement. Responses were coded so that agreement to statements reflected more positive attitudes or greater support (e.g. +1 for "agree," 0 for "neutral," -1 for "disagree"). Final AIS and AISCP values for each respondent were calculated based on the sum of scores for each of the 12 attitudes statements with a maximum value of 12 and a minimum of -12 (Zimmermann et al. 2005, Parker et al. 2014). Additional attitude indices assessing attitudes towards clouded leopards were produced based on the results of exploratory factor analyses, including an 8-item attitudes index score, with risk perception questions removed (AIS8), and a 4-item risk perception index score (RPIS). AIS8 and RPIS were calculated in the same manner as AIS with maximum and minimum scores of 8 and -8 for AIS8 and 4 and -4 for RPIS.

WTP data were summed and averaged for those that supported and opposed reintroduction for both rural and urban samples. Moreover, to account for uncertainty, raw figures were scaled by multiplying initial payment figures with their corresponding uncertainty decimal percentages. These percentages were selected by respondents in the WTP follow up question, which detailed their level of WTP uncertainty (e.g. "Definitely pay" = 1; "Probably pay" = 0.75; "Not sure" = 0.5; "Probably not pay" = 0.25; "Definitely not pay" = 0).

To determine which explanatory variables were most predictive of attitudes, support, and WTP constructs, candidate models were ranked using Akaike's Information Criterion (Burnham and Anderson 2002) corrected for small sample size (AIC_c). Additionally, AIC_c models were calculated comparing the full 12-item AIS with AIS8, RPIS, and AIS8 + RPIS indices to determine which attitude indices were the best predictors of support and WTP. Package "MuMIn" was used to calculate model weights (Bartoń 2017). Although sociodemographic factors are known to influence attitudes and support constructs towards large carnivores, the importance of any individual factor may vary according to sample location. All explanatory variables gauged by the survey were potentially important based on a human dimensions of wildlife literature review regarding attitudes towards large felids and support for large carnivore reintroductions (Caruso and Pérez 2013, Smith et al. 2014, Fort et al. 2018). Therefore, due to the exploratory nature of my research, all combinations of variables were calculated in an all-subset approach to calculate AIC_c values (Grueber et al. 2011, Symonds and Moussalli 2011). Additionally, AIC_c models containing one dependent and one independent variable were contrasted to aid in the determination of the best predictor variable using cumulative AIC_c weights (Parker et al. 2014). Due to the prominent influence of knowledge as a predictor of attitudes (see below), KIS were analyzed using the same AIC_c methods. WTP scores were restructured into 3 categories (support for reintroduction, not sure, and opposed to reintroduction) prior to undertaking WTP AIC_c analyses (Chambers and Whitehead 2003). Rural and urban global models included 12 and 11 total explanatory variables for attitudes constructs, 14 and 13 total variables for support constructs, 11 and 10 total variables for knowledge constructs, and 14 and 13 total variables for WTP constructs, respectively. A confidence set of top models with Δ_i values <6 were reported (Richards 2008) and the sum of AIC_c weights from all models were used to estimate the relative importance of individual predictor variables (Burnham and Anderson 2002). Complex models that add variables and exhibit equivalent AIC_c scores to simpler models can be overlooked in favor of models with less variables (Burnham and Anderson 2002, Grueber et al. 2011); therefore, best models were chosen based on AIC_c score as well as model complexity. In cases of high model selection uncertainty, model averaging was performed on the full model candidate set (Symonds and Moussalli 2011). Numeric explanatory variables were standardized by twice their SD allowing for directly comparable model averaged coefficients with untransformed categorical variables (Gelman 2008). Global models of attitudes constructs were assessed with goodness of fit (R^2) tests as high test values ensure best AIC_c models are also good fits (Symonds and Moussalli 2011). Similarly, Negelkerke pseudo R squared was used to determine goodness of fit for cumulative link models using the package "rcompanion" (Salvatore 2017).

CHAPTER 3

RESULTS

Sociodemographic Characteristics

I collected 263 questionnaires from rural respondents in Taiwan (Table 1). Eighteen townships and 43 villages were represented in my rural sample, with 95% (*n* = 251) of respondents originating from Pingtung County in the townships of Sandimen (*n* = 32), Majia (*n* = 51), Wutai (*n* = 41), Laiyi (*n* = 79), and Chunri (*n* = 41). Eighty-three percent (*n* = 212) of respondents had resided in their respective locations for ≥16 years. All rural respondents were indigenous and affiliated primarily with the Paiwan (73%; *n* = 193) and Rukai (20%; *n* = 53) tribes. Females made up 54% (*n* = 141) of the rural sample, the average age was between 36-45 years, and 40% (*n* = 103) held at least a Bachelor's degree. Education levels between males and females were not different ($\chi^2_5 = 3.76$, $P = 0.585$). Only 13% (n = 34) of rural respondents identified as a current or former hunter, 51% (n = 134) owned either livestock or pets, and 5% (*n* = 14) were members of an environmental organization.

Five hundred questionnaires were collected from urban respondents in Taipei/ New Taipei City, Taichung, and Kaohsiung (Table 1); all 3 metropolitan areas were equally represented in the urban sample. Seventy-three percent (*n* = 364) of respondents had resided in their area for ≥16 years. Females and males were equally represented in the urban sample, the average age was between 36-45, and 62% (*n* = 312) had a Bachelor's degree or higher. Although education levels between male and female urbanites did not differ ($\chi^2_4 = 5.82$, $P = 0.213$), a larger proportion ($\chi^2_5 = 46.41$, $P = < 0.001$) of urban respondents had received Bachelor's degrees or higher than rural residents (Fig. 2). A majority of urbanites lived in households with no children (52%; *n* = 261), 7% (*n* = 33) of respondents identified as hunters in the urban sample, 57% (n = 285) claimed to own either pets or livestock, and 8% (n = 41) of urban respondents were members of an environmental organization.

Sample Selection Bias

Both urban and rural samples were biased towards younger (rural: $\chi^2_6 = 68.56$, $P = < 0.001$; urban: $\chi^2_6 = 110$, $P = < 0.001$) and more educated individuals (rural: $\chi^2_3 = 130.11$, $P = < 0.001$; urban: ($\chi^2_3 = 191.64$, $P = < 0.001$). Additionally, a larger proportion of Rukai tribal member responses were collected in the rural sample relative to availability within Pingtung County's indigenous population ($\chi^2_2 = 20.69$, $P = < 0.001$) (Table 2).

Rural Sample

Experience with Clouded Leopards.—Most rural respondents had never seen a clouded leopard in Taiwan in the wild (96%, n = 251). Two respondents (1%) asserted they had seen a clouded leopard in Taiwan within the last 10 years and 9 respondents (3%) claimed they had seen a clouded leopard >10 years ago. When respondents were asked if they had known "someone who has seen or heard about someone who has seen a clouded leopard in Taiwan in the wild," 70% (n = 183) responded no, 8% (n = 21) responded yes and <10 years ago, and 22% (n = 56) responded yes and >10 years ago.

Knowledge About Clouded Leopards.—Knowledge scores on clouded leopard ecology and behavior were low in general. The mean KIS was 2.4 ± 1.34 (SD throughout) on a scale of 0-5 indicating that at least half of the questions were answered incorrectly. Most rural respondents (69%, n = 179) were correct in knowing that clouded leopards were extinct in Taiwan; however, respondents were incorrect to assume that clouded leopards damaged crops and generally would attack people with 33% (n = 83) and 25% (n = 64) of respondents answering these questions correctly, respectively. A higher percentage of rural respondents (57%; $n = 145$) correctly answered that clouded leopards generally avoided people (Table 3).

Gender was the best individual predictor of KIS ($w_i = 0.54$) followed by animal ownership ($w_i = 0.24$). Although the top all-subset model included both these variables, a simpler second ranked model ($\Delta_i = 0.55$) did not include animal ownership (Table 4). Gender exhibited the highest relative importance weight (0.79) with males scoring higher KIS than females (Table 5). The global regression model including 11 explanatory variables explained almost none of the variation concerning rural knowledge of clouded leopard behavior ($R^2_{adj} = 0.01$) and the best model result was similar, which included only gender ($R^2_{adj} = 0.02$).

Attitudes Towards Clouded Leopards.—The 12-item AIS instrument assessing general attitudes towards clouded leopards produced a high internal consistency score (Cronbach's α = 0.77) suggesting the index was accurately reflective of overall attitudes (Zimmermann et al. 2005). However, an exploratory factor analysis revealed that items 4-7, which assessed risk perception and fear, loaded onto a distinct factor resulting in the creation of AIS8 and RPIS. Both additional indices produced factor loadings of 1 and high internal consistency scores (AIS8: Cronbach's α = 0.7; RPIS: Cronbach's α = 0.77).

AIS indicated positive overall attitudes towards clouded leopards with a mean score of 4.13 ± 4.34. When normalized as a percent, rural AIS was 67% positive. Attitude statements that generated highly positive responses included "I like clouded leopards" (71% agree), "clouded leopards have the right to exist wherever they may occur" (73% agree), "the presence of clouded leopards is a sign of a healthy environment" (73% agree), "I would be happy if I saw a clouded leopard in the wild" (70% agree), "clouded leopard conservation and management is important to me" (81% agree), and "I support a hunting ban on clouded leopards in Taiwan" (73% agree). All these statements and 2 others were included in the AIS8, which generated a mean of 4.46 ± 2.85 (78% positive). RPIS produced a mean score of -0.33 ± 2.35 (46% positive) demonstrating a narrowly negative outlook towards clouded leopards regarding fear and potential risks to people, livestock, and pets. However, individual items in the RPIS that assessed the potential threats to people, livestock and pets exhibited a majority of neutral responses (Table 6). Females expressed more fear towards clouded leopards ($\chi^2_2 = 12.83$, $P = 0.002$) and perceived higher risks towards people ($\chi^2_2 = 15.433$, $P < 0.001$), livestock ($\chi^2_2 = 6.52$, $P = 0.038$), and pets ($\chi^2_2 = 17.97$, $P < 0.001$). Males and females were equally supportive of a clouded leopard hunting ban ($\chi^2_2 = 1.69$, $P = 0.43$).

Among explanatory variables, KIS was the best individual predictor of AIS ($w_i = 0.87$). The top all-subset model included KIS, gender, and age for explaining rural attitudes towards clouded leopards (Table 7) and the relative importance of these 3 variables were high in comparison to all other variables (Table 8). Males and higher KIS were positively associated with an increase in rural AIS while age was negatively correlated with AIS (Table 8). Township of residence and occupation variables were not included in the top model candidate set ($\Delta_i < 6$). A global model including all 12 explanatory variables explained 15% of the variation concerning rural attitudes towards clouded leopards ($R^2_{adj} = 0.15$), and the top model produced a roughly equivalent score ($R^2_{adj} = 0.17$).

Attitudes Towards Clouded Leopard Competitors and Prey.—An internal consistency assessment of the 12-item attitudes index gauging general attitudes of rural residents towards clouded leopard competitors and prey demonstrated that the index was reflective of overall attitudes (Cronbach's α = 0.79). AISCP revealed positive attitudes towards all 4 species assessed with a mean score of 4.05 ± 4.37 (67% positive). However, when the AISCP was separated by species, significantly more negative attitudes were directed towards Formosan macaques than the other 3 species with a mean score of -0.22 ± 0.36 (39% positive). Reeve's muntjacs received the highest attitude scores (0.56 ± 0.22; 78% positive) followed by Formosan serows (0.55 ± 0.24; 78% positive) and Formosan black bears (0.46 ± 0.45; 73% positive). Questions that received the lowest attitude scores involved wildlife as they relate to human-wildlife conflict and economic loss through competition for food or the direct killing of livestock (Table 9). A majority of respondents either were unsure or disagreed that all 4 species do not compete with livestock for food or damage the crops of farmers. However, most respondents supported a hunting ban on black bears (77% agree) and an increasing population of serows (65% agree) and muntjacs (68% agree) while few respondents supported an increasing population of macaques (20% agree) (Table 9).

The best individual predictor of rural AISCP was gender (w_i = 0.32); however, KIS (w_i = 0.27) and age (w_i = 0.26) garnered competitive relative importance weights. The top all-subset model included age, gender, KIS, and environmental organization member, though a competing model (Δ_i = 0.56) did not include environmental organization member and retained the 3 other top model variables (Table 10). Age (w_i = 0.94), gender (w_i = 0.88), and KIS (w_i = 0.85) had considerably higher relative importance weights than other modeled predictors (Table 11). Males and higher KIS were positively associated with AISCP while age was negatively correlated with AISCP (Table 11). The global model failed to explain much of the variation in rural attitudes towards clouded leopard competitors and prey (R^2_{adj} = 0.09) and the best model, including age, gender, and KIS, produced a similar result (R^2_{adj} = 0.07).

Support for Reintroduction.—Rural support for a clouded leopard reintroduction to Taiwan in general was 41% (n = 106) positive, 35% (n = 91) neutral, and 24% (n = 61) opposed.

However, support increased slightly when respondents were asked if they backed a reintroduction initiative specifically in the Tawushan Nature Reserve to 48% (n = 124) positive, 31% (n = 81) neutral, and 21% (n = 54) opposed (Table 12). Additionally, locals exhibited 86% (n = 221) positive attitudes towards the continued existence and legal protection of the Tawushan Nature Reserve with 12% (n = 31) of respondents indicating neutrality and only 2% (n = 6) possessing negative attitudes.

In all rural models, AIS8 and AIS8 + RPIS models significantly outperformed AIS models as predictors of support for a clouded leopard reintroduction (Table 13). Therefore, AIS8 and RPIS variables were added separately to all AIC_c support models to determine the influence and importance of these factors. Out of 14 explanatory variables, AIS8 was the best individual predictor of support for a reintroduction to Taiwan in general (w_i = 0.98). The top all-subset model included the predictor variables of AIS8, KIS, environmental organization member, and education. However, this model demonstrated an almost equivalent AIC_c score to the next best model (Δ_i = 0.10), which did not include education (Table 14). Furthermore, the relative importance of each variable demonstrated that education was less important than the 3 variables included in both top 2 models (Table 15). Higher AIS8 and being a member of an environmental organization were positively correlated with greater support for reintroduction to Taiwan. Greater knowledge of clouded leopards was negatively associated with support for reintroduction to Taiwan (Table 15). Occupation was not included in the top model candidate set ($\Delta_i \leq 6$). The global cumulative link model including all 14 explanatory variables produced a higher goodness of fit (R^2 = 0.33) than the top model (R^2 = 0.17).

The best individual predictor variable of support for a clouded leopard reintroduction specifically to the Tawushan Nature Reserve was AIS8 (w_i = 1). AIS8, KIS, environmental organization member, education, and township were included in the top all-subset model (Table 16), all of which had high relative importance weights (>0.62) (Table 17). Higher AIS8 and environmental organization members demonstrated more support for a reintroduction initiative to the Tawushan Nature Reserve while higher KIS was negatively associated with support. Of the townships surveyed, Sandimen township exhibited the most support while Chunri township revealed the least support (Table 17). Level of education, although included in the top model, demonstrated no discernable pattern; therefore, it was removed from top model analyses. The global model produced a higher goodness of fit value ($R^2 = 0.41$) than the best model ($R^2 = 0.21$). Occupation and number of household children were not included in the top model candidate set ($\Delta_i \leq 6$).

Willingness-To-Pay.—Rural respondents had difficulty answering WTP questions correctly with 34% ($n = 90$) giving payment estimates for both being supportive and opposed to a clouded leopard reintroduction or leaving the question blank. Of those respondents that filled in the survey correctly, 53% ($n = 90$) indicated that they were unsure how much they were willing to pay per year to help reintroduce and maintain a healthy population of clouded leopards in Taiwan. For both supporters of and those in opposition to reintroduction, unsure payment responses were in the majority (Fig. 3). Additionally, 37% ($n = 63$) were willing to pay to support a reintroduction initiative while 11% ($n = 18$) were willing to pay to keep clouded leopards from being reintroduced (Table 18). No rural respondent indicated that they were willing to pay >NT$1000 (US$34.14) to keep clouded leopards from being reintroduced, while 4% (n = 5) of supporters were willing to pay >NT$1000 to aid a reintroduction initiative (Fig. 3). The mean unscaled donation for those that supported a reintroduction ($\bar{x}$ = NT$1079.37 [US$36.82]) was over 3 times more than those who were against it ($\bar{x}$ = NT$338.89 [US$11.56]).

Hypothetical supporter donations totaled NT$67850 (US$2314.36), which was over 11 times more than those opposed to reintroduction (NT$6100 [US$208.07]. When donations were scaled to account for uncertainty, average pro-reintroduction donations were $NT870.64 (US$29.70) totaling NT$54850 (US$1870.93), while average donations for those against reintroduction were $NT202.08 (US$6.89) totaling $NT3637.5 (US$124.08).

In rural WTP models, AIS, AIS8, and AIS8 + RPIS models were highly competitive ($\leq \Delta_i = 1.72$; Table 19). As AIS8 and RPIS variables were added separately in all other support and WTP models, these same predictors were added into rural WTP models to determine their influence and to allow for comparisons between rural and urban models. Out of 14 explanatory variables, the best individual predictor of WTP was AIS8 ($w_i = 0.34$) followed by township of residence ($w_i = 0.24$). The all-subset model with the lowest AIC_c result included AIS8, KIS, township of residence, and gender, but a competitive model ($\Delta_i = 5.77$) only included AIS8 (Table 20). AIS8 had a high relative importance weight (0.87) and positive attitudes were correlated with higher WTP (Table 21). A global cumulative link model produced a higher goodness of fit ($R^2 = 0.31$) than the top model ($R^2 = 0.04$).

Urban Sample

Experience with Clouded Leopards.—Four percent ($n = 19$) of urban residents claimed to have seen a clouded leopard in the wild in Taiwan within the last 10 years. Additionally, 5% ($n = 26$) of residents claimed to have seen a clouded leopard >10 years ago and 91% ($n = 455$) replied they had never seen one. Fourteen percent ($n = 68$) of respondents knew someone or heard about someone who had seen a clouded leopard in Taiwan in the wild <10 years ago, while 13% ($n = 64$) knew or heard about someone who had seen a clouded leopard >10 years ago, and 74% ($n = 368$) claimed they did not know or had never heard of anyone who had seen a clouded leopard.

Knowledge About Clouded Leopards.—Approximately half of the knowledge questions were answered correctly ($\bar{x} = 2.58 \pm 1.33$). Only 27% ($n = 137$) of respondents correctly answered that the clouded leopard was now extinct in Taiwan; though 72% ($n = 360$) correctly knew that clouded leopards typically avoided people and 77% ($n = 385$) knew that clouded leopards helped to regulate prey populations. Few respondents (37%; $n = 185$) thought that clouded leopards generally do not attack people and only 44% ($n = 220$) recognized that clouded leopards do not damage farmer's crops (Table 3).

The best individual predictor of KIS was animal ownership ($w_i = 0.65$). The top all-subset model included animal ownership, education, gender, and number of household children; however, the third-ranked model ($\Delta_i = 1.23$) was highly competitive and less complex as it did not include gender (Table 22). Animal ownership, education, and number of household children demonstrated relative importance weights of 0.94, 0.82, and 0.76, respectively (Table 23). Male respondents and individuals owning pets and livestock were positively associated with greater knowledge of clouded leopards. Furthermore, as the number of household children and level of education increased for respondents, knowledge of clouded leopards increased (Table 23). The model including all 10 explanatory variables explained little of the variation ($r^2_{adj} = 0.05$), which was the same result generated by the best model.

Attitudes Towards Clouded Leopards.—The urban AIS instrument generated a high internal consistency score (Cronbach's $\alpha = 0.82$) indicating the index was additive and reflective of overall attitudes (Zimmermann et al. 2005). Similar to the rural sample, factor analysis revealed that risk perception questions loaded onto a distinct factor and, therefore, the full index was broken down into separate indices. AIS8 and RPIS also demonstrated high internal consistency scores (AIS8: Cronbach's $\alpha = 0.76$; RPIS: Cronbach's $\alpha = 0.82$). Additional factor analyses on these separate indices indicated factor loadings of 1 with no need to further break down the attitudes construct.

AIS were 76% positive ($\bar{x}$ = 6.11 ± 4.36), AIS8 were 87% positive ($\bar{x}$ = 5.9 ± 2.56), and RPIS were 53% positive ($\bar{x}$ = 0.21 ± 2.57). The only items generating a majority of neutral responses were those that assessed threats towards livestock and pets (Table 6). Females expressed significantly more fear towards clouded leopards than males (χ^2_2 = 12.63, P = 0.002), but perceived a similar amount of risk to people (χ^2_2 = 3.13, P = 0.21), livestock (χ^2_2 = 2.8, P = 0.247), and pets (χ^2_2 = 2.37, P = 0.305). Additionally, females and males were similarly supportive of a clouded leopard hunting ban (χ^2_2 = 1.49, P = 0.474). Attitude statements that demonstrated highly positive responses included “clouded leopards have the right to exist wherever they may occur” (85% agree), “the presence of clouded leopards is a sign of a healthy environment” (83% agree), “clouded leopard conservation and management is important to me” (83% agree), and “I support a hunting ban on clouded leopards in Taiwan” (89% agree).

Among explanatory variables, KIS was the top individual predictor of AIS (w_i = 1). There were competing top all-subset models; however, of the top models ($\Delta_i \leq 6$), KIS, number of household children, and gender had substantially higher relative importance weights of 1, 0.75, and 0.69, respectively, compared to other predictor variables. KIS, males, and respondents with more children were all positively correlated with AIS (Table 24). Also included in the top 2 models were level of education or occupation (Table 25); however, top candidate set model 4 (Δ_i = 0.77) did not include either of these variables indicating that the addition of education and occupation did not improve the overall fit. Occupation and level of education had relative importance weights of 0.47 and 0.35, respectively (Table 24), further diminishing their significance as predictor variables. The global model, including all 11 predictor variables, explained 28% of the variation in AIS (r^2_{adj} = 0.28) while the top model, including KIS, gender, and number of household children, produced a similar result (r^2_{adj} = 0.27).

Attitudes Towards Clouded Leopard Competitors and Prey.—An internal consistency assessment of the urban AISCP suggests the index was representative of overall attitudes (Cronbach's α = 0.82). AISCP revealed a mean score of 4.92 ± 4.40 (71% positive) demonstrating generally positive attitudes towards clouded leopard competitors and prey. When analyzing the AISCP via species, urbanites exhibited marginally negative attitudes towards Formosan macaques (-0.05 ± 0.47; 48% positive) while revealing strongly positive attitudes towards Formosan serows (0.61 ± 0.23; 81% positive), Formosan black bears (0.55 ± 0.47; 78% positive), and Reeve's muntjacs (0.53 ± 0.22; 77% positive). Respondents indicated support for an increase in the population of serows (73% agree) and muntjacs (62% agree), but not macaques (23% agree). Again, questions with the lowest scores gauged attitudes towards potential human-wildlife conflict and economic loss. The only statement that produced a majority of neutral responses was "Formosan black bears do not damage the crops of farmers or kill livestock." (Table 9).

The top individual predictor of AISCP was KIS (w_i = 1). The top all-subset model included KIS, environmental organization member, gender, number of household children, and level of education. All 5 variables had high relative importance weights (≥0.67); however, KIS, number of household children, and environmental organization member had very high importance weights (≥0.97) and were included in every model in the top candidate set. Additionally, a competitive model (Δ_i = 4.64) included only these 3 variables (Table 26). Higher KIS, more household children, males, and being a member of an environmental organization resulted in more positive AISCP. More formal education resulted in higher AISCP, although urban respondents with an elementary school education demonstrated similar patterns as those with Bachelor's degrees or higher (Table 27). The global AISCP model, including all 11 predictors, explained a similar amount of variation in the model (r^2_{adj} = 0.19) as the top AISCP model (r^2_{adj} = 0.18).

Support for Reintroduction.—Urban support for a clouded leopard reintroduction to Taiwan in general was 63% (*n* = 313) positive, 26% (*n* = 128) neutral, and 12% (*n* = 59) opposed. Support increased for a reintroduction specifically in the Tawushan Nature Reserve and was 71% (*n* = 354) positive, 22% (*n* = 109) neutral, and 7% (*n* = 37) opposed (Table 12). The urban sample also demonstrated substantially positive attitudes (91%; *n* = 455) towards the continued existence and legal protection of the Tawushan Nature Reserve with 8% (*n* = 40) of respondents indicating neutrality and 1% (*n* = 5) displaying negative attitudes.

In urban models, AIS8 and AIS8 + RPIS models outperformed AIS models as predictors of support for a clouded leopard reintroduction (Table 13). Consequently, AIS8 and RPIS variables were added separately to all AIC_c support models to determine the influence of these predictors. Of all 13 explanatory variables, AIS8 was the top individual predictor of urban support for a clouded leopard reintroduction to Taiwan in general (w_i = 1). AIS8, age, environmental organization member, education, and RPIS were all included in the top all-subset model (Table 28) and their relative importance weights were 1, 0.74, 0.7, 0.6, and 0.57, respectively (Table 29). Education level, AIS8, older respondents, and environmental organization members were positively associated with greater support. Moreover, respondents with a higher RPIS (less risk perception) were more likely to support a reintroduction (Table 29). However, a less complex top model (Δ_i = 2.22) omitted RPIS and education while retaining AIS8, environmental organization member, and age indicating this was the best model (Table

28). A global model including 13 explanatory variables produced a higher goodness of fit (R^2 = 0.37) than the top model (R^2 = 0.23), which included AIS8, age, and environmental organization member. Occupation was not included in the top model candidate set ($\Delta_i \leq 6$).

AIS8 was the best individual predictor of support for a clouded leopard reintroduction specifically to the Tawushan Nature Reserve (w_i = 1). The top all-subset model included AIS8 and environmental organization member variables (Table 30). Higher AIS8 and members of environmental organizations were positively associated with greater support for a clouded leopard reintroduction to the Tawushan Nature Reserve and exhibited relative importance weights of 1 and 0.67, respectively (Table 31). An even simpler model, including only AIS8 (Δ_i = 1.77), was included in the top model candidate set ($\Delta_i \leq 6$) (Table 30) indicating this was the best model. The global model yielded a higher goodness of fit (R^2 = 0.33) than the best model (0.19), which only included AIS8. Occupation was the only explanatory variable not present in the top model candidate set.

Willingness-to-Pay.—As the internet version of the questionnaire that was distributed to the urban sample included skip logic (the automatic skipping of questions based on past answers), there were no issues associated with the answering of WTP questions. Twenty-seven percent (n = 134) of total urban respondents indicated they were unsure how much they were willing to pay per year to aid or negate a reintroduction initiative. Furthermore, 64% (n = 322) were willing to pay to support a clouded leopard reintroduction and 9% (n = 44) were willing to pay to keep clouded leopards from being reintroduced (Table 18). No respondent was willing to pay >NT$1000 to keep clouded leopards from being reintroduced; however, 7% (n = 33) of respondents were willing to pay >NT$1000 in support of a clouded leopard reintroduction (Fig. 3). Unscaled total urban donations were 21 times higher for those that supported a reintroduction

(NT$282,800 [US$9651.96]) than those who were against it (NT$13,300 [US$453.93]). Unscaled mean pro-reintroduction donations were NT$878.26 (US$29.98) while mean donations for those against a reintroduction were NT$302.27 (US$10.32). Scaling donations to account for uncertainty resulted in mean pro-reintroduction donations of NT$695.34 (US$23.73) totaling NT$223,900 (US$7641.71), while mean scaled donations for those against reintroduction were $NT198.58 (US$6.78) totaling $NT8737.5 (US$298.21). Scaled totals were 25 times higher for those who supported reintroduction versus those who were against it.

For urban models, AIS8 and AIS8 + RPIS models outperformed AIS models as predictors of WTP for or to prevent a clouded leopard reintroduction (Table 19). Therefore, AIS8 and RPIS variables were added separately to all AIC_c WTP models to determine the influence of these predictors. Out of 13 explanatory variables, the top individual predictor of WTP was AIS8 ($w_i = 0.4$) followed by occupation ($w_i = 0.38$). The top all-subset model with the lowest AIC_c value included AIS8, hunter status, environmental organization member, level of education, and KIS. A less-complex competitive model ($\Delta_i = 1.82$) included only AIS8, level of education, and hunter status (Table 32), which exhibited high relative importance weights of 0.98, 0.72, and 0.69, respectively (Table 33). Respondents with an elementary education, hunters, and those with more positive attitudes were willing to pay more than other urbanites to support a clouded leopard reintroduction. The global model had a higher goodness of fit ($R^2 = 0.16$) than the top model ($R^2 = 0.08$).

Urban versus Rural Comparisons

Experience with Clouded Leopards.—Direct personal urban and rural experiences with clouded leopards differed from one another ($\chi^2_2 = 7.35$, $P = 0.025$). A higher percentage of urban residents (4%; $n = 19$) claimed to have seen a clouded leopard in the wild in Taiwan within the last 10 years than rural respondents (1%; $n = 2$). Likewise, more urban respondents (5%: $n = 26$) claimed to have seen a clouded leopard >10 years ago than rural respondents (3%; $n = 9$). A large majority of both urban (91%; $n = 455$) and rural (96%; $n = 251$) respondents had never seen a clouded leopard in the wild. Indirect urban and rural experiences with clouded leopards also were different ($\chi^2_2 = 12.97$, $P = 0.002$). A higher percentage of urban respondents (14%; $n = 68$) knew someone or heard about someone who had seen a clouded leopard in Taiwan in the wild <10 years ago than rural respondents (8%; $n = 21$), though a higher proportion of rural residents (22%; $n = 56$) knew someone or heard about someone who had seen a clouded leopard >10 years ago compared to the urban sample (13%; $n = 64$). Seventy-four percent ($n = 368$) of urbanites did not know or had never heard of anyone who had seen a clouded leopard compared to 70% ($n = 183$) of rural respondents.

Knowledge About Clouded Leopards.—Mean urban KIS ($\bar{x} = 2.58 \pm 1.33$) was higher than rural KIS ($\bar{x} = 2.4 \pm 1.34$) and approached statistical significance ($t_{510.42} = -1.77$, $P = 0.078$; Fig 4). A higher percentage of urban respondents answered all knowledge questions correctly compared to the rural sample apart from the question regarding the clouded leopard's current extinction status on Taiwan (Table 3), which garnered significantly more correct rural responses ($\chi^2_1 = 121.66$, $P < 0.001$). The statements, "clouded leopards typically avoid contact with people" ($\chi^2_2 = 18.35$, $P < 0.001$), "clouded leopards generally do not attack people" ($\chi^2_2 = 12.83$, $P = 0.002$), "clouded leopards do not damage the crops of farmers" ($\chi^2_2 = 9.59$, $P = 0.008$), and "clouded leopards help maintain prey populations in balance with their natural environment" ($\chi^2_2 = 32.97$, $P < 0.001$) all received significantly more correct responses from urban respondents.

Attitudes Towards Clouded Leopards.—In all attitudes indices, urban mean scores were significantly higher than rural scores (AIS: $t_{526.52} = -5.94$, $P < 0.001$; AIS8: $t_{478.07} = -6.84$, $P <$

0.001; RPIS: $t_{567.28} = -2.94$, $P = 0.003$; Fig. 4). Additionally, all 12 AIS items produced more positive attitudes among urban respondents than rural respondents (Table 6). The only items that did not yield significantly higher urban attitudes included "I like clouded leopards" ($\chi^2_2 = 5.15$, $P = 0.076$), "clouded leopards are not a threat to livestock" ($\chi^2_2 = 4.42$, $P = 0.11$), "I would be happy if I saw a clouded leopard in the wild" ($\chi^2_2 = 0.77$, $P = 0.68$), and "clouded leopard conservation and management is important to me" ($\chi^2_2 = 2.98$, $P = 0.226$).

Attitudes Towards Clouded Leopard Competitors and Prey.—Urban AISCP were significantly higher than rural AISCP ($t_{512.22} = -2.58$, $P = 0.01$; Fig. 4). Urban attitudinal patterns were comparable to the rural sample with support for an increase in the population of serows and muntjacs, but not macaques. In general, urbanites held more positive attitudes towards black bears, serows, and macaques, while rural respondents exhibited marginally higher attitudes towards Reeve's muntjacs (Table 9). A significantly higher percentage of urban respondents agreed with the statements "I support a hunting ban on Formosan black bears in Taiwan" ($\chi^2_2 = 25.55$, $P < 0.001$) and "I like Formosan macaques" ($\chi^2_2 = 26.37$, $P < 0.001$). Alternatively, rural respondents were significantly more positive than urbanites regarding the statement "I like Reeve's muntjacs" ($\chi^2_2 = 6.46$, $P = 0.04$). No other urban and rural responses were significantly different when compared.

Support for Reintroduction.—Urban support for a clouded leopard reintroduction initiative to Taiwan in general was significantly higher than rural support ($\chi^2_2 = 34.84$, $P < 0.001$). Likewise, urban support for a reintroduction specifically to the Tawushan Nature Reserve was significantly greater than rural support ($\chi^2_2 = 44.53$, $P < 0.001$). However, urban support was only marginally greater towards the continued existence and legal protection of the Tawushan Nature Reserve ($\chi^2_2 = 5.54$, $P = 0.063$) with both samples exhibiting very strong support.

Willingness-to-Pay.—There was far less uncertainty in the urban sample regarding WTP estimates (27%; n = 134) compared to the rural sample (53%; n = 90). Sixty-four percent of urban (n = 322) and 37% (n = 63) of rural respondents were willing to pay to support a reintroduction initiative while 9% (n = 44) and 11% (n = 18) of urban and rural residents, respectively, were willing to pay to keep clouded leopards from being reintroduced (Table 18). For respondents who supported a reintroduction effort, mean unscaled rural donations were NT$201.11 higher than urban donations, but not significantly higher ($t_{81.13}$ = 0.71, P = 0.479), and a similar pattern emerged for those who were against reintroduction ($t_{32.61}$ = 0.34, P = 0.738). When scaling donations to account for uncertainty, rural respondents provided non-significant mean donations NT$175.30 higher than urbanites for supporting a reintroduction ($t_{74.68}$ = 0.63, P = 0.627) and NT$3.50 higher for opposing it ($t_{40.17}$ = 0.05, P = 0.96). Although the urban sample was 1.9 times larger than the rural sample, total urban unscaled donations were 4.17 times greater than rural totals for those who supported reintroduction. Similarly, urban totals were 4.08 times larger than rural totals when accounting for uncertainty. For those who were opposed to reintroduction, unscaled urban totals were only 2.18 times higher than rural totals. Scaled urban totals were 2.4 times greater than rural totals.

CHAPTER 4

DISCUSSION

My study is the first to assess attitudes towards clouded leopards in any part of their range and one of the only assessments of attitudes towards any large felid prior to a reintroduction initiative. Taiwanese attitudes towards clouded leopards and support for a potential reintroduction were largely positive; though my rural and urban samples were biased towards younger and more educated individuals. The attitudes of Taiwan's population may not be representative of people's attitudes towards clouded leopards in other parts of their range. Clouded leopards are extinct in Taiwan and most rural and urban respondents had no prior experience with this species. Future human dimensions studies will likely take place in areas where the human population deals directly with the impacts of living alongside clouded leopards and this may have profound effects on attitudes towards these carnivores (Davenport et al. 2010, Mkonyi et al. 2017). However, the degree of conflict between humans and clouded leopards is considered low throughout their range (Inskip and Zimmermann 2009). The clouded leopard may benefit from its particularly shy nature compared to other large felids that are known to occasionally instigate conflict, such as tigers and pumas.

Experience with Clouded Leopards

Rural and urban respondents largely indicated they had no personal experience with wild clouded leopards in Taiwan. Those who reported seeing them recently are likely mistaken as no direct records of occurrence have existed since 1983 (Chiang et al. 2014). Additionally, most respondents knew of no other individuals who had seen a clouded leopard, even among the rural sample who had lived in close proximity to wilderness areas known to have contained clouded leopards in the past (Rabinowitz 1988). When interviewed, younger indigenous respondents consistently pointed interviewers to village elders regarding experiences with clouded leopards. These findings are consistent with interviews conducted >30 years ago, with most reported sightings having occurred before the mid-1960s and frequently from before the end to Japanese rule in 1945 (Rabinowitz 1988). Few respondents from my sample would have been alive from this time, especially as our rural and urban samples were biased towards younger individuals. This lack of personal experience, particularly among the indigenous locals, reinforces past findings that found no evidence of clouded leopard occupancy and the subsequent declaration of extirpation (Chiang et al. 2014). It remains highly likely that no viable population of clouded leopards persists, at least in my study area.

Knowledge About Clouded Leopards

Low knowledge scores from urban and rural samples may derive from a lack of experience with large felid behavior in general. People residing in areas that accommodate large carnivores commonly possess more knowledge about those species than people who are isolated from large carnivores (Zimmermann et al. 2001). As the clouded leopard is now extinct in Taiwan, and it is likely there has not been a viable population of clouded leopards on the island within the last 50 years, few Taiwanese residents would have had any direct experience with these cats. The only extant felid in Taiwan is the leopard cat, which is considerably smaller than the clouded leopard. Moreover, the leopard cat's distribution is restricted to fragmented forests of northern Taiwan, which is far removed from our rural and urban samples (Chen et al. 2016). This lack of familiarity may have resulted in the high number of neutral knowledge responses observed in the data, especially among the rural sample.

Indigenous locals were much more likely to know that the clouded leopard was extinct in Taiwan than urbanites. This may be a result of the sacred status awarded to clouded leopards by

Rukai and Paiwan communities living near the potential reintroduction site. High ranking chiefs still possess family heirlooms that are comprised of clouded leopard teeth, skins, and skulls that demonstrate their status (E. Greenspan, Southern Illinois University, personal observation). Moreover, clouded leopard paintings and sculptures are displayed throughout indigenous villages signifying their significance in Paiwan and Rukai culture. Even young children are acutely aware of the local word for clouded leopard. In other parts of the clouded leopard's extant range, the species goes largely unnoticed and unidentified, even among locals who live adjacent to their habitat. Only 9% of locals surrounding national parks in eastern Thailand known to harbor clouded leopards were able to correctly identify a picture of the species (Jenks et al. 2013). The largely Han ethnic majority that lives in Taiwan's urban centers (Executive Yuan 2014) may not feel as connected to the clouded leopard as indigenous locals from the Tawu Mountain area who have assigned an iconic cultural status to the species. Accordingly, urbanites may have been less aware of the clouded leopard's extinction on the island. Other human dimensions of wildlife studies have demonstrated that people who live sympatrically with large carnivores better understand their actual population status than people who reside in areas lacking large carnivores (Kleiven et al. 2004, Dos Santos et al. 2008).

Results from my study are analogous to other findings regarding knowledge of wildlife. Higher knowledge scores tend to be associated with males and higher levels of formal education (Nyhus and Tilson 2003, Bath et al. 2008, Caruso and Pérez 2013). Moreover, in the urban sample, animal owners had higher KIS. Pet ownership is known to positively affect engagement in animal-related activities (Shuttlewood et al. 2016) and it may be that urbanities who own domesticated animals are generally more interested in wildlife. Additionally, urban respondents living in households with more children had more knowledge of clouded leopards, which may stem from parental exposure to environmental lessons through their children's education. Students are becoming more environmentally literate (Ballantyne et al. 2001) and intergenerational influences are capable of enhancing adults' knowledge of environmental issues (Ballantyne et al. 1998).

Attitudes Towards Clouded Leopards

Consistent with my hypothesis and the results of most attitudes assessments (Williams et al. 2002, Bandara and Tisdell 2003), Taiwanese urban attitudes were more positive and less neutral than rural attitudes towards clouded leopards. In particular, indigenous locals were more concerned regarding the impact of a clouded leopard reintroduction on hunting opportunities, regardless of its illegality. Although only 13% of the rural sample claimed to be active or past hunters, hunting remains an important cultural attribute to Taiwanese indigenous tribes, particularly among males (Pei 1999). Moreover, locals were less convinced that a return of clouded leopards would foster growth in the tourism industry. This skepticism may be warranted as clouded leopards are notoriously elusive (Brodie and Giordano 2012). However, rural residents indicated that clouded leopard conservation and management was important to them and both samples produced convincingly positive attitudes towards clouded leopards.

Although attitudes were positive in general, residents from both samples were not without concern regarding fear and risk perception of clouded leopards to people, livestock, and pets. While indigenous females were more likely than males to perceive higher risks and more fear towards clouded leopards, a large percentage of rural and urban respondents were unsure of the risks associated with clouded leopards, perhaps due to their low levels of knowledge on the subject. Risk perception and fear of carnivores tend to be higher among females (Kleiven et al. 2004, Bath et al. 2008, Smith et al. 2014); however, indigenous females were equally likely as males to support a clouded leopard hunting ban. Fear is potentially a secondary factor driving wildlife acceptance (Bruskotter and Wilson 2014) as sorrow for jaguar and puma extirpation was found to be more important than fear in Brazil (Dos Santos et al. 2008, Engel et al. 2016). Although urban females demonstrated more fear than males, they did not perceive higher risks to people, livestock, or pets. Urbanities were more educated and more knowledgeable than rural residents, which may have influenced their responses. Furthermore, urbanites tend to exhibit mutualist value orientations (Kleiven et al. 2004, Gamborg and Jensen 2016) and are well removed from authentic personal risk due to the lack of suitable clouded leopard habitat within urban centers. Fear of clouded leopards may not be the primary driver of risk perception, which may instead be a lack of species-specific ecological knowledge.

Gender was a significant predictor of attitudes towards clouded leopards, particularly in the rural sample. As hypothesized, males were more positive towards clouded leopards than females. Many studies have shown males to hold more positive attitudes towards large carnivores (Kleiven et al. 2004, Morzillo et al. 2007, Mkonyi et al. 2017, Fort et al. 2018). Rural females were more negative due to their aforementioned sensitivity to risk perception and fear, which may be explained through their inherent protective instinct (Zimmermann et al. 2001). Moreover, hunting traditions are particularly important to aboriginal men. Hunters have their own hunting territories and these territories are passed down within families to male descendants. Successful hunters are respected by other tribal members and potentially given authoritative positions in the community (Pei 1999). The pivotal role of hunting in aboriginal male culture has likely led to an increase in wilderness and wildlife experience for males compared to females. Experience with large carnivores is known to increase attitudinal positivity over time

(Zimmermann et al. 2001) and wilderness experience in general may lead to more realistic perceptions of risk among indigenous males.

Knowledge was the most important predictor of attitudes towards clouded leopards in both rural and urban samples. Past studies have shown knowledge to be an important predictor of attitudes (Ericsson and Heberlein 2003, Bath et al. 2008, Parker et al. 2014); however, discrepancies between attitudes and knowledge levels are common due to low levels of factual knowledge regarding wildlife (Kellert et al. 1996, Tarrant et al. 1997, Caruso and Pérez 2013, Smith et al. 2014). A majority of South African attitudes towards wild dogs were positive, but knowledge of wild dog biology was low and this was attributed to a lack of experience with these uncommon animals (Parker et al. 2014). Similarly, due to the extinction of clouded leopards in Taiwan, residents have garnered few experiences with this species. Generally, more knowledgeable respondents are more positive about carnivores (Caruso and Pérez 2013, Parker et al. 2014, Fort et al. 2018), and my results supported this expectation.

Likewise, higher levels of formal education are known to positively influence attitudes towards carnivores (Gusset et al. 2008, Parker et al. 2014), but education was of minimal importance in both samples. Comprehensive environmental education was not instituted in Taiwanese elementary and middle schools until 2011 (Liu et al. 2015). Moreover, clouded leopards are a prominent cultural symbol to the tribes of my study area and it is plausible that children are establishing their attitudes towards clouded leopards prior to adulthood. Values towards wildlife that are established in childhood are resistant to change (Dickman et al. 2013); therefore, an increase in formal education would not necessarily influence attitudes (Bruskotter et al. 2007). However, clouded leopards play no prominent cultural role to urban Taiwanese and increases in formal education are certainly capable of altering the attitudes of children and parents alike (Ballantyne et al. 1998).

Number of household children was a significant predictor of both knowledge and attitudes in urban Taiwan and its impact is likely related to education. Educating Brazilian children regarding jaguars improved their attitude scores from 2.82 to 4.52 and made them more opposed to the killing of jaguars (-0.5 to -1.66). Additionally, educating children led to an increase in their father's positivity towards jaguars from 1.43 to 2.57 (Marchini and Macdonald 2012). More children in a household can equate to an increase in knowledge exposure for the entire household. These intergenerational influences may explain why the number household children was a more important factor in predicting attitudes than an individual's educational level (Ballantyne et al. 1998). In Taiwan's urban centers, an adult's attitudes towards wildlife may be largely static regardless of educational achievement unless exposed to new ideas through a younger generation's educational experiences. Environmental education is a recent phenomenon in Taiwan and older respondents would have had little exposure to the pro-environmental lessons now being infused in urban curriculums (Lin 1980). Elementary teachers in Taiwan are more environmentally literate and have more environment-based training than secondary education teachers. Until 2011, the focus of Taiwan's environmental curriculum was predominantly in elementary school (Liu et al. 2015). Therefore, residents with more education would not necessarily be exposed to additional environmental knowledge, unless they were exposed to it through their children. This would be especially true for older residents.

Indigenous older residents had more negative attitudes towards clouded leopards than younger respondents. Prior studies have shown a negative correlation between age and attitudes towards large carnivores (Williams et al. 2002, Morzillo et al. 2007, Smith et al. 2014) due to the entrenched value systems of older respondents (Zimmermann et al. 2005). However, age had no effect on attitudes among urban respondents, which is similar to the results of Viennese urbanites who expressed no substantive differences between age groups when gauging attitudes towards lynx (*Lynx lynx*) and brown bears (*Ursus arctos*) (Zeiler et al. 1999). This may be because knowledge of clouded leopards, the most significant predictor of attitudes, was consistent across urban age groups.

Livestock losses, either real or perceived, can negatively influence attitudes towards large felids (Gusset et al. 2008). For instance, 87% of Nepalese herders supported the complete eradication of snow leopards over a compensation program for livestock losses (Oli et al. 1994). However, even in areas where large felids are known to depredate livestock, livestock owners can still harbor mostly positive attitudes, such as in Iguazu National Park, Brazil, where 64% of local livestock owners held positive perceptions towards jaguar presence (Conforti and Cascelli de Azevedo 2003). Counter to my hypothesis, rural animal owners held marginally more positive attitudes towards clouded leopards. If a reintroduction attempt was made, animal owner attitudes could potentially become more negative over time depending on the perceived degree of conflict between clouded leopards and rural livestock and pet owners. Risk perception for novel, unfamiliar, and unknown carnivore species is known to increase perceived risks (Gehrt et al. 2010). However, past studies have shown that attitudes are most negative with the arrival of large carnivores and increase in positivity over time (Zimmermann et al. 2001) indicating that an attitudinal decline could be short-lived.

Attitudes Towards Clouded Leopard Competitors and Prey

Attitudes towards potential prey species in general were strongly positive, apart from the Formosan macaque, which garnered roughly neutral opinions. Rural and urban respondents imparted an attitude score to the macaque 39% and 33% lower than the serow, respectively. Macaques are successful at exploiting urbanized and natural environments and are known to instigate conflict with tourists and farmers alike (Linkie et al. 2007, Priston and McLennan 2013). However, my results were similar to a study from Singapore that perceived neither strongly positive nor negative sentiments towards macaques (Sha et al. 2009). The extent to which macaques and other primates contribute to the clouded leopard's diet is unknown (Nowell and Jackson 1996, Giordano and Rustam 2016); however, there was little support for an increasing population of macaques in Taiwan. Conversely, few respondents from both urban and rural populations did not support an increase in the population of serows and muntjacs.

Residents offered their lowest attitudes towards items gauging risk perception for all 4 competitor and prey species. Less than 50% of residents agreed that serows and muntjacs do not compete with livestock for food, ≤16% agreed that macaques do not damage crops, and ≤31% agreed that black bears do not damage crops or kill livestock. I found no research that has been published in Taiwan estimating crop damages or that which insinuated heavy competition with livestock from these species. Crop damage and livestock competition is geographically variable, but muntjacs and serows are not known to instigate much conflict. The red muntjac (*M. muntjak*), a close relative to the Reeve's muntjac, was implicated in only 7% of all mammalian crop raids in Sumatra (Linkie et al. 2007). The Himalayan serow (*C. sumatraensis*) garnered extremely positive attitudes (92%) from local people in Nepal but has suffered competitive exclusion from certain habitats due to livestock competition within this low productivity area (Aryal 2009). In interviews with Taiwanese black bear hunters, there was no mention of crop damage by bears. Similar to the attitudes of the Taiwanese population towards clouded leopards from this study, hunters possessed largely positive attitudes towards bears while fearing them and perceiving risks towards people and property (Hwang 2003).

Formosan black bears are potential competitors for reintroduced clouded leopards as they are the largest predator endemic to Taiwan (Hwang et al. 2010). They are known to opportunistically predate upon muntjac and serow, likely preferred prey items for the clouded leopard, especially in years when acorns are less abundant (Hwang et al. 2002). Black bears (*U. americanus*) and grizzly bears (*U. arctos*) are known to displace pumas from carcasses in the United States, which leads to a loss of 17-26% of daily energy requirements for displaced pumas (Murphy et al. 1998). However, in Taiwan, much of a bear's diet is heavily dependent on hard mast (Hwang et al. 2002). Moreover, black bears have large home ranges and they are uncommon in the Tawu Mountain area, where they likely live at low densities (Wang 1990, Hwang et al. 2010). It is unlikely that black bears in this area would competitively exclude clouded leopards post-release.

Important rural predictors for attitudes towards competitors and prey were equivalent to those predicting attitudes towards clouded leopards. Older respondents retained more negative attitudes while males and those with more clouded leopard knowledge were more positive. Although KIS did not measure direct knowledge of black bears, macaques, serows, or muntjacs, knowledge regarding clouded leopards may have acted as a proxy for wildlife knowledge in general, which is known to positively influence attitudes (Bath et al. 2008, Parker et al. 2014). Similarly, urban predictors assessing attitudes towards clouded leopards were influential in assessing attitudes towards competitors and prey. Respondents with more clouded leopard knowledge, males, and those with more children were more positive towards competitors and prey. Members of environmental organizations also possessed more positive attitudes towards competitors and prey and was the only additional influential variable compared to those that assessed attitudes towards clouded leopards. Past studies have found a correlation between environmental organization members and positive attitudes in general as well as positive attitudes specifically towards an increase in wildlife populations (Williams et al. 2002, Morzillo et al. 2007).

Support for Reintroduction

As hypothesized, urban Taiwanese support for a clouded leopard reintroduction was greater than rural support. Caruso and Pérez (2013), in the only study to assess rural and urban differences in support prior to a large felid reintroduction, found urban and rural residents were equally supportive of jaguar reintroduction in Corrientes, Argentina. However, the majority of literature assessing differences in rural and urban attitudes towards large carnivores has found that urban attitudes tend to be more positive (Williams et al. 2002, Ericsson and Heberlein 2003). In Taiwan, findings were similar, with urban residents possessing significantly more positive attitudes than rural residents towards clouded leopards.

Resident attitudes towards clouded leopards was the most influential predictor of support for reintroduction to Taiwan in general and to the Tawushan Nature Reserve in particular for both urban and rural samples. Therefore, with attitudes being the foremost driver of support, support for reintroduction was relatively greater among urbanites due to their higher positivity towards clouded leopards compared to rural respondents. This finding is supported by the cognitive hierarchy framework, as general attitudes are known to precede and influence more specific attitudes and behaviors, such as support for a species' reintroduction (Vaske and Manfredo 2012). A quantitative summary of worldwide support for wolf restoration demonstrated that support was greater and attitudes more positive in urban areas. Rural respondents, with a higher potential for direct experience with wolves, were more negative towards wolves and their reintroduction. Moreover, important predictors of positive attitudes towards wolves corresponded to those predicting support for wolf reintroduction, such as age, environmental organization membership, and education level (Williams et al. 2002), which further suggests a strong positive relationship between attitudes and support constructs. In Corrientes, Argentina, 95% of respondents were supportive of jaguar reintroduction (Caruso and Pérez 2013), and in the neighboring province of Misiones, 88% of respondents held positive attitudes towards jaguar conservation (Paviolo 2010). This suggests that positive attitudes towards any large carnivore reintroduction candidate is likely a strong indicator of support for its reintroduction (Bright and Manfredo 1996). However, attitudes towards large carnivores can be conflicting due to the risks associated with living among them (Fort et al. 2018). High levels of risk perception may produce negative effects on the public's support for a reintroduction initiative, even if attitudes are generally positive.

In Taiwan, risk perception and fear were not overtly important predictors in gauging support for a clouded leopard reintroduction, although these variables may have contributed to the discrepancy between overwhelmingly positive attitudes towards clouded leopards and the relatively lesser support they received for a reintroduction. Other studies have shown that people justify their anti-reintroduction position with the fear of attacks by large felids on people and livestock (Caruso and Pérez 2013). Similarly, the most significant predictor of attitudes towards lynx in Poland and jaguars and pumas in Brazil was fear (Bath et al. 2008, Engel et al. 2016). However, people that report high levels of fear do not necessarily have negative attitudes towards carnivores and fear is not a direct measure of carnivore acceptance or support for reintroduction (Zimmermann et al. 2001, Engel et al. 2016). As exemplified in my study, respondents expressed concerns regarding the safety of people, livestock, and pets while simultaneously supporting a future reintroduction initiative.

Hunting status did not significantly affect support for a reintroduction effort. Commercial hunting is currently illegal in Taiwan (Lee and Lin 1992) and it is possible that some individuals did not feel comfortable admitting to that they were hunters, even under the cover of anonymity. However, the Rukai consider the hunting of clouded leopards to be taboo due to their distinguished status in Rukai mythology. Clouded leopards are said to have accompanied Rukai ancestors to their current homeland and their killing is believed to bring about disaster to the hunter and their fellow tribesmen (Pei 1999). Therefore, it is unlikely that Rukai locals would deliberately poach clouded leopards. Paiwan hunters would likely consider it a privilege to have clouded leopards back after so many years of extirpation and are unlikely to poach clouded leopards if they were to be reintroduced (K. J. C. Pei, National Dong Hwa University, personal communication). Moreover, hunting pressure from indigenous groups in the Tawu Mountain area is considered sustainable for potential clouded leopard prey species, such as Formosan serow and Reeve's muntjac. An increase in illegal hunting is unlikely to occur after a clouded leopard reintroduction given the strict rules, limited entry, and scattered distribution of hunting territories in my study area (Pei 1999).

Many other predictors that are known to influence the public's attitudes, such as age, gender, and animal ownership, were not influential in gauging reintroduction support. Similarly, support for jaguar restoration in Corrientes, Argentina was unaffected by most predictors, such as age or gender. However, Argentinians with less education were less supportive of a jaguar reintroduction (Caruso and Pérez 2013), which was the same result obtained from the urban sample in this study and in line with the results of past reintroduction projects (Williams et al.

2002). Additionally, urban and rural members of environmental organizations were more likely to support a reintroduction initiative and these findings are concurrent with past projects. Members of environmental organizations were more supportive of an increasing black bear population in Texas (Morzillo et al. 2007) and held more positive attitudes towards wolves than any other social group throughout the wolf's range (Williams et al. 2002).

Knowledge of clouded leopards was one of the few important predictors of support for reintroduction in the rural sample. Counter to my hypothesis, indigenous locals with more knowledge demonstrated lower support for a clouded leopard reintroduction. This was surprising as knowledge was the most important predictor of attitudes towards clouded leopards and more knowledgeable residents exhibited more positive attitudes. Yet, these same individuals expressed relatively lesser support for reintroduction. Caruso and Pérez (2013) found no relationship between knowledge and support for a jaguar reintroduction in Argentina. Respondents demonstrating more knowledge may be able to use that expertise to rationalize less support and may be more informed regarding potential negative reintroduction impacts (Kaczensky et al. 2004). In my rural sample, as knowledge increased, risk perception decreased indicating that more knowledgeable locals may understand the minimal risks associated with a reintroduction effort while still choosing to avoid those risks by preventing a reintroduction. Similarly, knowledge of brown bears in Norway was negatively correlated with attitudes towards bears from respondents living near the bears as well as in bear-free areas (Zimmermann et al. 2001); although, many studies have found increases in knowledge to have a positive effect on carnivore acceptance (Bath et al. 2008, Parker et al. 2014).

Support for clouded leopard reintroduction to Taiwan in general did not provoke particularly polarizing responses from indigenous locals. Although 24% of respondents were opposed to reintroduction, 35% were neutral, and 41% were directly supportive of a reintroduction initiative. Neutral attitudes are susceptible to quick changes, as seen in rural New York, where support for wolf restoration dropped from 76% to 42% in just 3 years (Enck and Brown 2000, Williams et al. 2002). Rural support for a reintroduction specifically to the Tawushan Nature Reserve was less ambivalent with almost half of respondents indicating support and only 21% of respondents opposing reintroduction. Still, considering that rural attitudes towards clouded leopards were 67% positive, support for its reintroduction was considerably less.

Urbanites were more receptive to a clouded leopard reintroduction with only 7% of respondents indicating that they did not support a clouded leopard reintroduction to the Tawushan Nature Reserve. Additionally, urban support was less neutral (22-26%) than rural support indicating that urbanities are likely to remain positive towards a reintroduction in the future. Urban residents throughout the wolf's range have historically been supportive of wolf restoration efforts, even with attitudes that are generally less positive than those gleaned from Taiwanese urbanites towards clouded leopards (Williams et al. 2002, Ericsson and Heberlein 2003).

A reintroduction specifically to the Tawushan Nature Reserve received more support among urbanites and locals alike than a general reintroduction to Taiwan without specifying the location. There are no settlements in the Tawushan Nature Reserve as it is protected under the Cultural Heritage Conservation Law, which restricts entry without special permission (Lai and Nepal 2006). Respondents may perceive a reintroduction effort to a nature reserve as inherently less risky due a lack of inhabitants and a lower potential for human-wildlife conflict.

Public support for large felid reintroductions tends to be positive. In Sariska, India, 98% and 81% of the national park and sanctuary respondents supported a tiger reintroduction initiative, respectively (Sankar et al. 2008). In Corrientes, Argentina, people were overtly supportive of a jaguar (*P. onca*) reintroduction with 95% of the sample positively supporting a future project (Caruso and Pérez 2013). Although not characterized as a large felid, in Austria, 70% of urban respondents from Vienna supported a lynx reintroduction (Zeiler et al. 1999). Similar to these studies, support for a clouded leopard reintroduction to Taiwan was greater than opposition to it. Compared to prior studies that gauged support for the reintroduction of non-felid carnivores, support appears to be relatively higher for felid species in general. Approximately 40% of respondents were against wolf reintroduction efforts across their global range according to a comprehensive review (Williams et al. 2002). Moreover, 34% of stakeholders were against wild dog reintroductions to Hluhluwe Imfolozi Park in South Africa in 2003 (Gusset et al. 2008) while only 21% and 7% of rural and urban respondents, respectively, were opposed to a clouded leopard reintroduction initiative in the Tawushan Nature Reserve.

Urban and rural respondents in Taiwan were overwhelmingly supportive towards the continued existence and legal protection of the Tawushan Nature Reserve. Urbanites tend to value nature conservation in general (Bandara and Tisdell 2003), but rural residents' attitudes towards protected areas are multifaceted and have the potential to be negative (Fiallo and Jacobson 1995, Allendorf 2007). Locals surrounding protected areas may rely on these areas as a source of natural resources, recreation, cultural heritage, and environmental preservation (Allendorf 2007, Caruso and Pérez 2013, Fort et al. 2018). Much of the proposed reintroduction site itself (Tawushan Nature Reserve and Twin Ghost Lake Important Wildlife Area) is traditional territory for the surrounding indigenous communities and afforded a sacred like status

(Lai and Nepal 2006), which may increase local investment in and appreciation of the Tauwshan Nature Reserve.

Overall, urban support for a clouded leopard reintroduction was decidedly positive and higher than rural support, although rural respondents demonstrated considerably more support towards a reintroduction initiative than those who were against it. Yen et al. (2015) assessed the attitudes of residents toward reintroduced sika deer (*Cervus nippon*) around Kenting National Park in southern Taiwan and found that the majority of locals (>75%) supported the restoration program and perceived it as important to furthering the development of tourism. If a clouded leopard reintroduction effort is successful, rural residents may become more supportive as risk perception decreases with greater exposure to and knowledge of carnivores over time (Gehrt et al. 2010). For example, people from Austrian provinces that were historically inhabited by lynx were more positive towards these carnivores than respondents from lynx-free areas (Zeiler et al. 1999).

Willingness-to-Pay for Reintroduction

My WTP findings matched my direct support line of questioning in that a significantly higher proportion of urban residents were supportive of a clouded leopard reintroduction initiative than rural residents. The only directly comparable studies in the literature used a CVM to assess the total economic value of wolf reintroduction to Yellowstone National Park prior to release. Though these studies did not break respondents into urban and rural categories, residents living closer to Yellowstone were less likely to support wolf reintroduction than out of region visitors (Duffield 1992, USDOI 1994). Similarly, my rural sample resided close to the proposed reintroduction site while my urban sample was far afield. Though not dealing directly with carnivores, a CVM study in Sri Lanka demonstrated urban respondents were more supportive of elephant conservation than rural residents (Bandara and Tisdell 2003) and tourists were willing to pay significantly more for a yellow-cheeked gibbon (*Nomascus gabriellae*) conservation program in Vietnam than local residents (Thanh An et al. 2018).

Respondents were more likely to pay to support a clouded leopard reintroduction than to pay to prevent it, a similar result to a study completed in Yellowstone National Park where visitors were >2 times more likely to support wolf reintroduction than those willing to pay to prevent wolves from returning (Duffield 1992). Moreover, proponents of wolf reintroduction were willing to pay 11.5 times more than those who were against it (Duffield 1992), which was a comparable result to our rural and urban samples, who were willing to pay 11.1 and 21.3 times more, respectively, to successfully reintroduce clouded leopards than respondents who were against it.

Rural and urban respondents with more positive attitudes towards clouded leopards were more likely to pay to support a clouded leopard reintroduction. Attitudes were the most influential predictor of WTP matching our findings from Likert scale questions measuring support directly. Previous CVM studies have generally not included the public's attitudes towards a focal species as a potential predictor of WTP (MacMillan et al. 2006, Neupane et al. 2017, Schutgens et al. 2018) though our results indicate that measuring and including attitudes as a variable may help to clarify the outcome of future CVM studies. Past studies that included attitudes as a predictor, derived from use values, non-use values, or both, found them to be important factors in explaining WTP (Bandara and Tisdell 2003, Chambers and Whitehead 2003).

CVM results were analogous to the findings of Likert scale questions that directly assessed support, though rural respondents were even more supportive of a reintroduction initiative when questions were framed within a contingent valuation context. While direct questioning led to ~2 times more rural support for a clouded leopard reintroduction than those who were against it, WTP responses favored reintroduction >3 times more than those who opposed it. Urban respondents were equally as likely to support a reintroduction regardless of assessment method. WTP questions are more complex than 3-category Likert scale questions, which may have inadvertently led to the abundance of unsure WTP responses from rural respondents. Many indigenous respondents appeared to have difficulty understanding the CVM concept as explained on the questionnaire. CVM surveys may not be appropriate for unfamiliar topics, such as for rare or extirpated species, without the opportunity to deliberate (Macmillan et al. 2002, MacMillan et al. 2006).

Respondent WTP values reflect the total economic value of a clouded leopard reintroduction; however, as clouded leopards no longer exist in Taiwan, they exhibit no current use values. It is likely respondents, in choosing WTP rates, were considering potential clouded leopard use values in the future, such as through hunting or tourism opportunities. However, existence values may have been the primary driver of WTP choice in this survey as in other large carnivore CVM assessments (Han and Lee 2008, Schutgens et al. 2018).

CHAPTER 5

MANAGEMENT IMPLICATIONS

Attitudes Towards Clouded Leopards

I found largely positive attitudes towards clouded leopards from both rural and urban samples signifying that a reintroduction attempt may be supported by the general public. Carefully prepared knowledge-based education campaigns that target specific interest groups are known to produce more positive attitudes in the public (Ericsson and Heberlein 2003, Morzillo et al. 2010). An education campaign in the Tawu Mountain area would be most effective by targeting females and older and lesser-educated locals with less clouded leopard knowledge living adjacent to the potential reintroduction site. Any rural educational campaign enacted prior to release should aim to alleviate stakeholder concerns surrounding risk perception and fear (Riley and Decker 2000). Although hunting is illegal, it remains an integral aspect of indigenous culture, especially among older men (Pei 1999). The education campaign would be most effective by explaining the low densities that clouded leopards naturally live in (Brodie and Giordano 2012, Borah et al. 2014, Mohamad et al. 2015) and the low impact they would have on potential prey species and livestock (Inskip and Zimmermann 2009). Imparting additional ecological information should increase attitudinal positivity towards clouded leopard competitors and prey as well due to the consistency of influential predictors on resident attitudes towards all species evaluated in this survey.

Attitudes towards large carnivores are contextually dependent upon cultural, geographical, ecological, and economic forces as they change over time (Davenport et al. 2010, Smith et al. 2014, Mkonyi et al. 2017). In Brazil, attitudes and perceptions regarding jaguars varied by survey site and biome (Dos Santos et al. 2008). Similar disparate attitudinal patterns towards jaguars were observed in Panama (Fort et al. 2018). Attitudes towards lynx in Austria were the second lowest of all 15 species surveyed and significantly negative (Zeiler et al. 1999); though attitudes surveys from Poland have shown generally positive attitudes towards lynx (Bath et al. 2008). To ensure attitudes remain positive following a clouded leopard reintroduction attempt, additional attitudinal surveys should be disseminated to monitor the human population, especially those surrounding the active distribution of released clouded leopards (Reading and Clark 1996, MacDonald 2009).

Support for Reintroduction

My findings are complemented by a large swath of intact clouded leopard habitat, including suitable prey availability and minimal human disturbance (Chiang et al. 2014). Therefore, many of the prerequisites have been met for a potential successful reintroduction (Reading and Clark 1996, Hayward and Somers 2009). Prior to release, an educational campaign designed to increase support and inform Taiwanese residents regarding clouded leopards and their reintroduction should be enacted (MacDonald 2009). This education campaign can likely be limited to the rural population living adjacent to the proposed reintroduction site. Urban support for a clouded leopard reintroduction was significantly positive and support from urbanites is likely to continue beyond a felid release due to their positive attitudes towards clouded leopards, high levels of formal education, and geographic removal from potential negative reintroduction impacts (Williams et al. 2002). Due to the pronounced influence of attitudes as an influential predictor of support, an education campaign should focus on fostering positivity towards clouded leopards by alleviating stakeholder concerns surrounding fear and risk perception (Riley and Decker 2000). Specifically, a campaign should target females and older and lesser-educated locals with less clouded leopard knowledge living adjacent to the reintroduction site. This campaign should be sustained even after release to continuously engage communities, ensure transparency, and provide pertinent information to stakeholder groups that are invested in the reintroduction outcome (Sillero-Zubiri and Laurenson 2001, Marker et al. 2003). Moreover, local environmental organizations should aid in educational efforts to build trust between these organizations and indigenous groups regarding conservation efforts. Few indigenous locals are currently members of environmental groups and bolstering membership may aid in the dissemination of knowledge and increase interest in environmental issues.

The educational campaign also can promote the possibility of additional revenue to be made in local communities through increased tourism if a viable population of clouded leopards were to thrive in the Tawu Mountain area. If ecotourism operators were successful, economic gains are known to increase tolerance for large carnivores (Lindsey et al. 2013) and would provide an additional incentive to protect clouded leopards, their prey, and their habitat post-release. Residents surrounding the proposed reintroduction site hold generally positive attitudes towards ecotourism development in the area (Lai and Nepal 2006, Yen et al. 2015) and may be inclined to protect clouded leopards if they were seen as an important component to the local economy. Clouded leopard-based tourism models already exist at various locales, such as Deramakot Forest Reserve in Borneo. In Laos' Nam Et-Phou Louey National Protected Area, a direct payment approach was used to great effect by generating ecotourism incentives to villagers to increase wildlife populations and reduce hunting (Eshoo et al. 2018). This financial potential would be a distant goal and best communicated with the understanding that it was contingent upon a successful reintroduction and a no-conflict environment.

Given the low densities in which clouded leopards naturally occur, direct poaching of these felids by those that do not support a reintroduction initiative has the potential to spoil any effort. Even a minority faction can threaten a small population of large felids and disrupt a reintroduction effort (Engel et al. 2016). This has occurred in the United States as ranchers have vehemently opposed the expansion of wolves since their initial reintroduction to Yellowstone National Park in 1995 (Smith and Bangs 2009). Therefore, if a reintroduction attempt is made, additional surveys that gauge Taiwanese attitudes and intentions towards clouded leopards, especially among locals living sympatrically with clouded leopards, will be necessary to inform an effective management strategy that preemptively prevents indiscriminate killings.

The monetary costs associated with a clouded leopard reintroduction initiative have not yet been calculated; however, results from WTP estimates garnered in this study can be used to illustrate the potential economic loss or gains to be made in Taiwan by reintroducing clouded leopards. Cost-benefit analyses of wolf reintroduction in Yellowstone National Park have shown reintroduction benefits to significantly outweigh costs (Duffield 1992). Moreover, wolf population management and damage plans in Minnesota have likewise shown benefits to exceed annual costs based on WTP surveys (Chambers and Whitehead 2003). In South Africa, CVM results indicated that tourism revenue would likely offset the cost of future wild dog reintroductions (Lindsey et al. 2005). Future CVM surveys in Taiwan may obtain fewer neutral responses if individuals were given detailed contextual information and were encouraged to engage in discussion prior to appraising goods (Macmillan et al. 2002, MacMillan et al. 2006).

While the clouded leopard remains culturally important, it is currently absent from the landscape. Public attitudes and support towards maintaining a viable population of clouded leopards may change from the initial results obtained in this study. Real or imagined conflict could quickly provoke negative opinions, just as an increase in tourism could potentially induce more positive attitudes. Public opinion is dynamic and can fluctuate quickly; therefore, it must continually be monitored to inform a relevant management plan for the species post-release. If a reintroduction attempt is made, local support for this initiative should ultimately increase from the initial perceptions ascertained in this study assuming minimal human-wildlife conflict (Zimmermann et al. 2001). The scale of conflict between clouded leopards and humans is currently considered low and livestock depredation would likely be infrequent, with no risk to human safety; however, further research is required on this issue (Inskip and Zimmermann 2009). Additionally, future human dimensions studies should also attempt to gather respondent explanations as they relate to support or opposition to a reintroduction effort. For example, are respondents supporting a reintroduction effort due to their cultural heritage or because of the potential monetary gains that are associated with an increase in ecotourism?

EXHIBITS

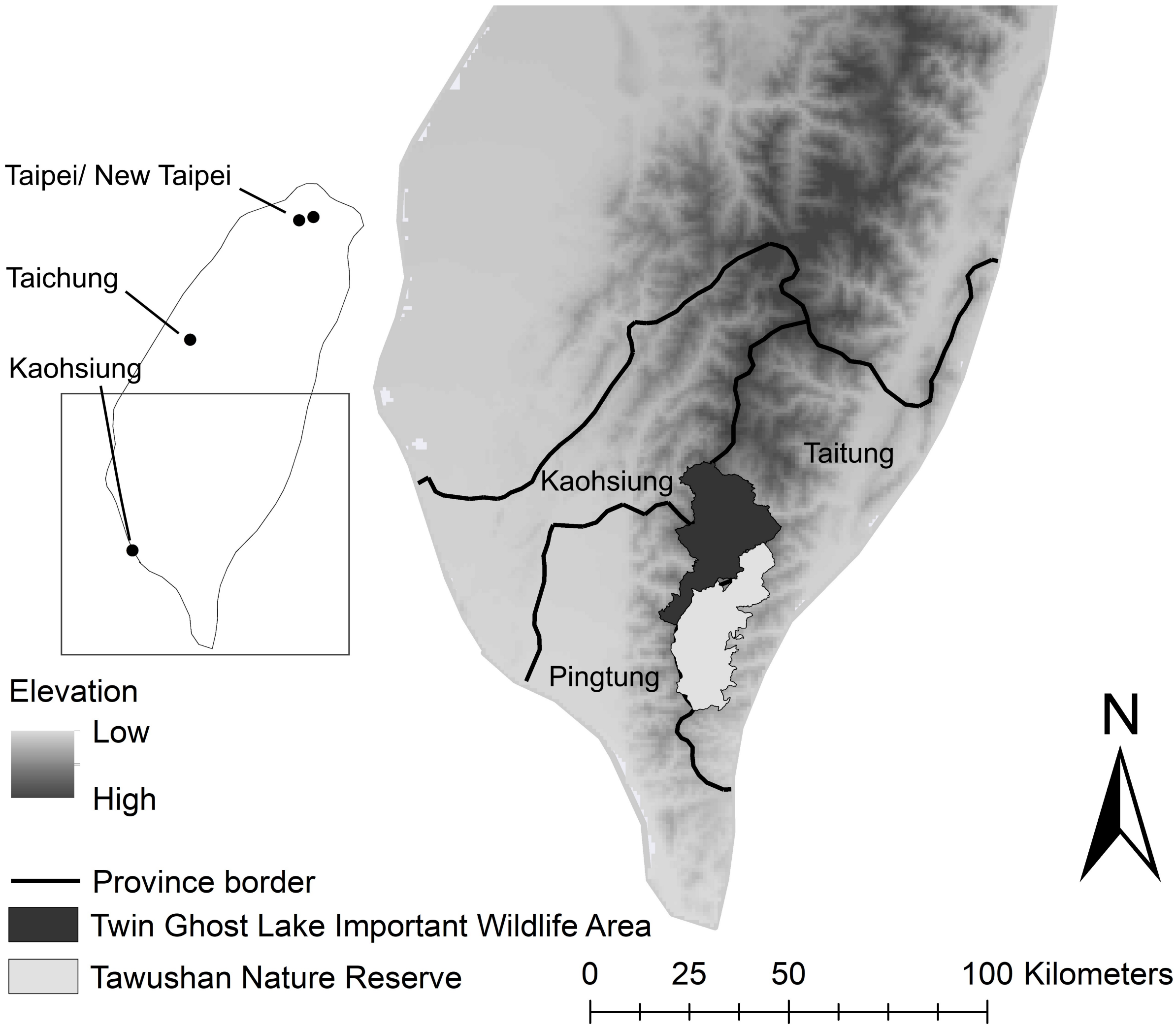

Figure 1. Study area, showing urban locations, represented by black dots, and rural locations, which were in indigenous villages adjacent to Tawushan Nature Reserve and Twin Ghost Lake Important Wildlife Area within Pingtung County, Taiwan, 2017.

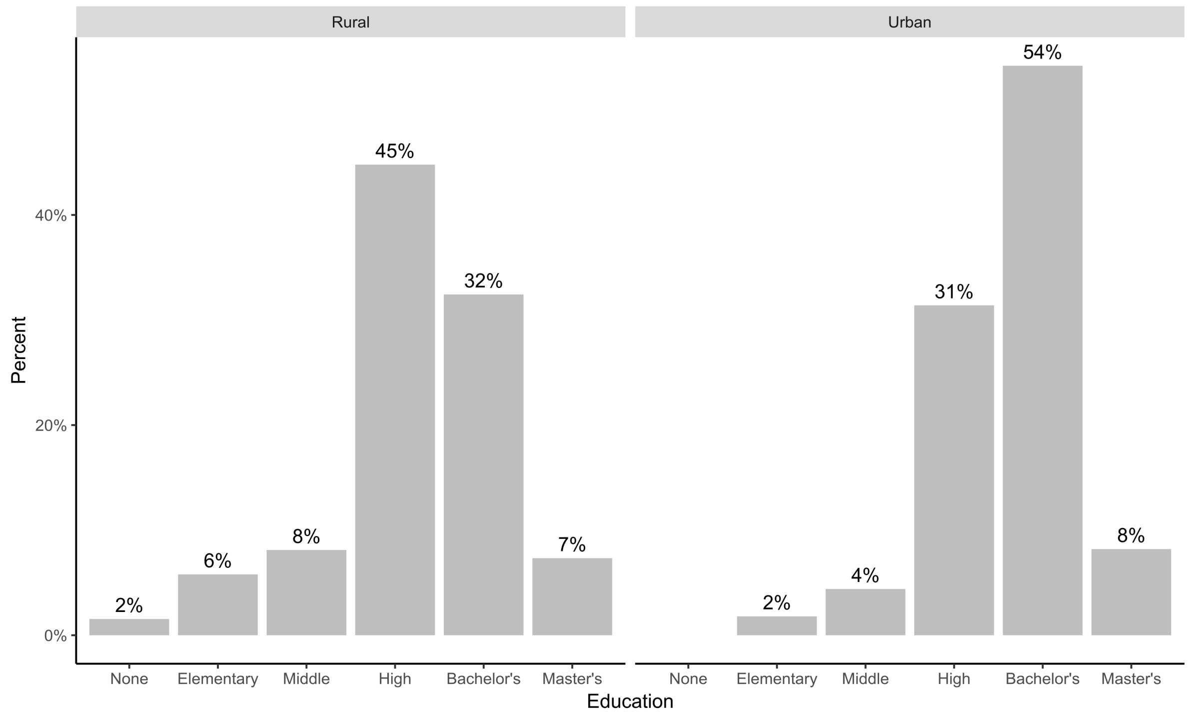

Figure 2. Percentage of urban (n = 500) and rural (n = 263) sample respondents in Taiwan, 2017, categorized by their terminal formal education level. Master's degree category assumes Master's degree or higher.

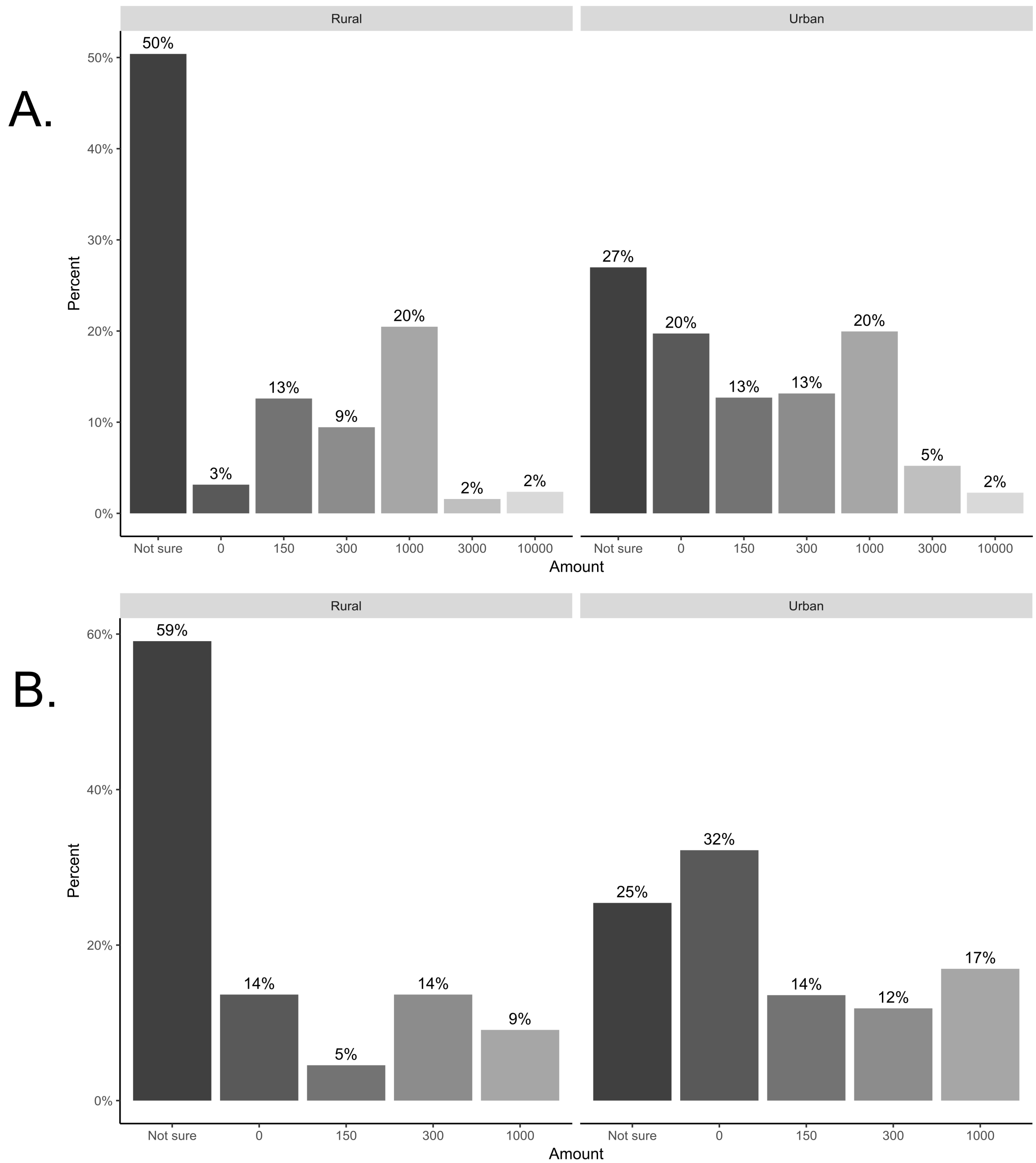

Figure 3. Amount of money (NT$) by percentage that rural and urban respondents were (A) willing to pay in support of a clouded leopard (*Neofelis nebulosa*) reintroduction initiative in Taiwan and (B) were willing to pay to prevent a clouded leopard reintroduction initiative in Taiwan, 2017.

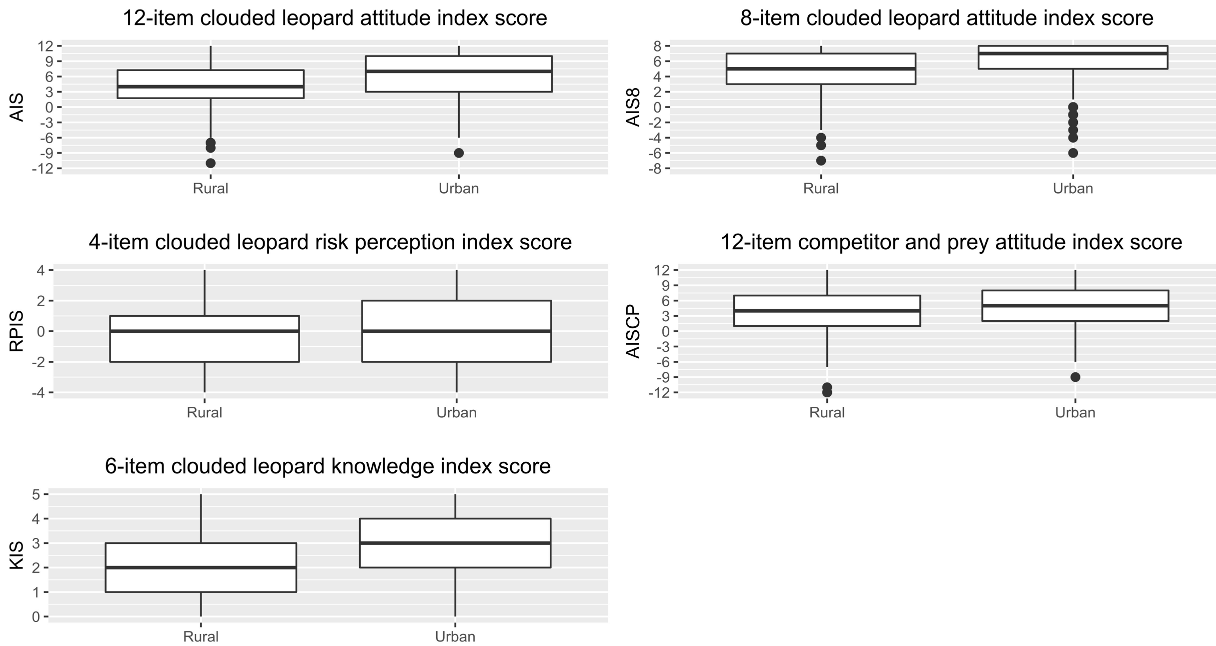

Figure 4. Box plots comparing the data distributions of Taiwanese rural and urban sample 12-item clouded leopard attitude index scores (AIS), 8-item clouded leopard attitude index scores (AIS8), 4-item clouded leopard risk perception index scores (RPIS), 12-item clouded leopard competitor and prey attitude index scores (AISCP), and 6-item clouded leopard knowledge index scores (KIS) from 2017. Black dots represent outliers in the data.

Table 1. Rural (*n* = 263) and urban (*n* = 500) sample sociodemographic results, Taiwan, 2017.

Variable	Category	Rural sample	*n*	Urban sample	*n*
Gender	Male	46%	118	51%	257
	Female	54%	141	49%	243
Age	18-25	21%	54	10%	51
	26-35	26%	67	32%	160
	36-45	23%	60	24%	120
	46-55	16%	41	26%	128
	56-65	11%	28	7%	35
	66-75	4%	10	1%	5
	76+	<1%	1	<1%	1
Education	No school	2%	4	0%	0
	Elementary school	6%	15	2%	9
	Middle school	8%	21	4%	22
	High school	45%	116	31%	157
	Bachelor's degree	32%	84	54%	271
	Master's degree+	7%	19	8%	41
Duration of residence	0-5 years	7%	19	8%	41
	6-10 years	6%	16	9%	45
	11-15 years	4%	9	10%	50
	≥16 years	83%	212	73%	364
Number of Children	0	41%	105	52%	261
	1	16%	42	25%	126
	2	20%	52	19%	94
	≥3	22%	56	4%	19
Occupation	Agriculture	11%	28	3%	15
	Tourism	4%	10	2%	12
	Education	7%	18	6%	32
	Business	2%	6	21%	103
	Retail/ service	8%	21	16%	81
	Medicine	4%	9	4%	20
	Government	14%	36	6%	29
	Student	12%	31	6%	30
	Self employed	3%	8	8%	40
	Unemployed/	9%	22	10%	49
	retired	26%	68	18%	89
	Other				
Indigenous group	Paiwan	73%	193		
	Rukai	20%	53	NA	NA
	Other	7%	17		
Hunter	Yes	13%	34	7%	33
Animal Ownership	Yes	51%	134	57%	285
Organization member	Yes	5%	14	8%	41

Table 2. A comparison of sample and population demographics among rural and urban samples, Taiwan, 2017.

Demographic	**Rural sample (*n* = 263)**	**Pingtung County population**	**Urban sample (*n* = 500)**	**Taiwan population**
Gender				
Male	46%	50%	51%	50%
Female	54%	50%	49%	50%
Age				
18-25	21%	7%[a]	10%	8%[a]
26-35	26%	19%	32%	23%
36-45	23%	19%	24%	21%
46-55	16%	21%	26%	20%
56-65	11%	16%	7%	14%
66-75	4%	10%	1%	8%
76+	<1%	8%	<1%	6%
Education				
Elementary school	7%	21%[b]	2%	17%
Middle school	8%	22%	4%	14%
High school	45%	38%	31%	32%
Bachelor's degree+	40%	20%	62%	37%
Indigenous group				
Paiwan	73%	83%	NA	NA
Rukai	20%	12%		
Other	7%	5%		

[a] Percentages include only 18+ years old individuals in the population to allow for direct comparison to samples
[b] Percentages are derived from the educational achievement of indigenous people within Pingtung County only

Table 3. Descriptive statistics, including number of respondents (*n*), answer percentages (%), mean score ($\bar{x}$), and standard deviation (SD), of rural and urban responses to survey questions assessing general knowledge of clouded leopards (*Neofelis nebulosa*) in Taiwan, 2017.

	Rural						Urban					
Knowledge Question	***n***	**Yes %**	**No %**		$\bar{x}^a$	**SD**	***n***	**Yes %**	**No %**		$\bar{x}^a$	**SD**
Does the clouded leopard currently live in Taiwan?	258	31	69		0.69	0.46	500	73	27		0.27	0.45
Knowledge Statement	***n***	**Agree %**	**Neutral %**	**Disagree %**	$\bar{x}^b$	**SD**	***n***	**Agree %**	**Neutral %**	**Disagree %**	$\bar{x}^b$	**SD**
Clouded leopards typically avoid contact with people.	255	57	33	10	0.46	0.67	500	72	21	7	0.65	0.6
Clouded leopards generally do not attack people.	254	25	40	35	-0.1	0.77	500	37	37	26	0.12	0.78
Clouded leopards do not damage the crops of farmers.	253	33	44	23	0.1	0.74	500	44	39	17	0.28	0.73
Clouded leopards help maintain prey populations in balance with their natural environment.	256	58	34	8	0.5	0.64	500	77	21	2	0.74	0.48

[a] Mean score is calculated on a scale between 0 and 1 with 1 being correct and 0 being incorrect

[b] Mean scores were calculated on a scale between -1 and 1 with 1 being correct and -1 being incorrect

Table 4. Summary of AIC_c, AIC_c delta (Δ_i), AIC_c weight (w_i), cumulative Akaike weight (*acc* w_i), evidence ratio (ER), and parameter number (k) results for best-ranked regression models ($\Delta_i \leq 6$; here showing top 12) relating predictor variables to rural resident knowledge about clouded leopards (*Neofelis nebulosa*) in Taiwan, 2017. These were the only models with a lower AIC_c than the intercept only model.

Model	**Candidate models**[a]	k	**AIC_c**	Δ_i	w_i	*acc* w_i	**ER**
1	AN + GE	4	790.56	0.00	0.12	0.12	
2	GE	3	791.11	0.55	0.09	0.22	1.32
3	AN + HU + GE	5	791.95	1.39	0.06	0.28	2.00
4	HU + GE	4	792.58	2.02	0.05	0.33	2.74
5	AN + GE + AG	5	792.61	2.04	0.04	0.37	2.78
6	AN + OR + GE	5	792.61	2.04	0.04	0.42	2.78
7	AN	3	792.77	2.21	0.04	0.46	3.01
8	OR + GE	4	793.16	2.60	0.03	0.49	3.66
9	GE + AG	4	793.18	2.62	0.03	0.53	3.70
10	AN + GE + ED	9	793.59	3.03	0.03	0.55	4.54
11	GE + ED	8	793.64	3.08	0.03	0.58	4.66
12	INTERCEPT	2	793.78	3.22	0.02	0.61	5.00

[a] AG age, AN animal ownership, CH number of household children, DU duration of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OR environmental organization member, TR tribe affiliation

Table 5. Summary results of full model averaging, including coefficients (β), adjusted standard errors (SE), 95% confidence intervals (CI), *z* values, *p* values, and relative importance weights, for parameters from candidate models regarding rural resident knowledge about clouded leopards (*Neofelis nebulosa*) in Taiwan, 2017.

Parameter[a]	Estimate (β)[b]	SE	CI	*z* value	*p* value	Importance w_i
GE - Male[c]	0.31	0.23	(-0.14, 0.75)	1.35	.176	0.79
AN	0.18	0.20	(-0.22, 0.57)	0.87	.383	0.59
HU	-0.06	0.18	(-0.41, 0.29)	0.34	.737	0.31
AG	0.01	0.10	(-0.18, 0.20)	0.10	.919	0.26
OR	-0.01	0.25	(-0.50, 0.48)	0.04	.967	0.26
ED – Elementary school[d]	-0.01	0.33	(-0.66, 0.64)	0.04	.970	0.18
ED – Middle school	0.01	0.33	(-0.63, 0.65)	0.03	.976	"
ED – High school	-0.04	0.31	(-0.65, 0.56)	0.14	.892	"
ED – Bachelor’s degree	0.06	0.33	(-0.58, 0.70)	0.19	.853	"
ED – Master’s degree	-0.03	0.33	(-0.67, 0.62)	0.08	.935	"
TR – Paiwan[e]	0.00	0.15	(-0.31, 0.30)	0.01	.990	0.15
TR – Rukai	0.03	0.18	(-0.33, 0.39)	0.15	.877	"
DU – 2[f]	0.02	0.15	(-0.28, 0.31)	0.11	.909	0.09
DU – 3	-0.04	0.22	(-0.46, 0.39)	0.18	.857	"
DU – 4	0.02	0.11	(-0.21, 0.24)	0.13	.893	"
CH – 1[g]	0.02	0.09	(-0.17, 0.20)	0.19	.853	0.07
CH – 2	0.00	0.06	(-0.13, 0.13)	0.02	.984	"
CH – 3	0.00	0.06	(-0.12, 0.13)	0.07	.947	"
TO – Laiyi[h]	-0.01	0.06	(-0.13, 0.12)	0.11	.912	0.03
TO – Majia	-0.01	0.08	(-0.16, 0.14)	0.13	.899	"
TO – Other	-0.01	0.10	(-0.21, 0.19)	0.11	.914	"
TO – Sandimen	0.00	0.06	(-0.12, 0.12)	0.07	.945	"
TO – Wutai	0.00	0.06	(-0.11, 0.12)	0.04	.965	"
OC – Business[i]	0.00	0.08	(-0.15, 0.16)	0.06	.954	0.01
OC – Education	0.01	0.08	(-0.14, 0.15)	0.07	.943	"
OC – Government	0.00	0.05	(-0.09, 0.09)	0.06	.952	"
OC – Medicine	0.00	0.05	(-0.10, 0.09)	0.02	.988	"
OC – Other	0.00	0.03	(-0.06, 0.06)	0.01	.994	"
OC – Retail/ service	0.00	0.04	(-0.09, 0.09)	0.05	.961	"
OC – Self employed	0.00	0.06	(-0.12, 0.13)	0.04	.966	"
OC – Student	0.00	0.04	(-0.08, 0.08)	0.04	.968	"
OC – Tourism	0.00	0.05	(-0.09, 0.09)	0.02	.985	"
OC – Unemployed	0.00	0.03	(-0.07, 0.07)	0.02	.986	"

[a] AG age, AN animal ownership, CH number of household children, DU duration of residence, ED level of education, GE gender, HU hunter status, OC occupation, OR environmental organization member, TO township of residence, TR tribe affiliation

[b] Effect sizes have been standardized by 2 standard deviations.

[c] Female was reference category

[d] Other tribe affiliation was reference category

[e] Duration of residence 1 (0-5 years) was reference category

[f] No household children was reference category

[g] No formal education was reference category

[h] Chunri township was reference category

[i] Agriculture was reference category

Table 6. Descriptive statistics, including number of respondents (*n*), answer percentages (%), mean score ($\bar{x}$), and standard deviation (SD), of rural and urban responses to survey questions assessing attitudes towards clouded leopards (*Neofelis nebulosa*) in Taiwan, 2017

	Rural						Urban					
Attitude Statement	***n***	**Agree %**	**Neutral %**	**Disagree %**	**$\bar{x}$[a]**	**SD**	***n***	**Agree %**	**Neutral %**	**Disagree %**	**$\bar{x}$[a]**	**SD**
I like clouded leopards.	259	71	27	2	0.69	0.50	500	76	21	3	0.73	0.51
Clouded leopards have the right to exist wherever they may occur.	258	73	19	8	0.64	0.63	500	85	10	5	0.81	0.50
The presence of clouded leopards is a sign of a healthy environment.	255	73	21	6	0.68	0.57	500	83	15	2	0.82	0.43
Clouded leopards are not a threat to people.	251	30	39	31	-0.01	0.78	500	44	37	20	0.24	0.76
Clouded leopards are not a threat to livestock.	258	19	43	38	-0.19	0.73	500	24	36	40	-0.16	0.79
Clouded leopards are not a threat to pets.	256	20	44	37	-0.17	0.73	500	29	34	37	-0.07	0.81
I am not afraid of clouded leopards.	255	38	27	35	0.04	0.85	500	48	24	28	0.20	0.85
I would be happy if I saw a clouded leopard in the wild.	258	70	18	12	0.58	0.70	500	72	18	10	0.62	0.66
The presence of clouded leopards will not have a significant impact on hunting opportunities for people.	257	48	37	15	0.33	0.72	500	70	24	6	0.64	0.60
Clouded leopard conservation and management is important to me.	259	81	17	2	0.79	0.45	500	83	16	1	0.82	0.40
The presence of clouded leopards in Taiwan would increase tourism and create jobs.	260	37	40	23	0.14	0.76	500	66	27	7	0.58	0.62
I support a hunting ban on clouded leopards in Taiwan.	258	73	19	8	0.65	0.63	500	89	10	1	0.88	0.37

[a] Mean scores were calculated on a scale between -1 and 1 with 1 demonstrating positive attitudes and -1 negative attitudes

Table 7. Summary of AIC_c, AIC_c delta (Δ_i), AIC_c weight (w_i), cumulative Akaike weight (*acc* w_i), evidence ratio (ER), and parameter number (*k*) results for 24 best-ranked regression models ($\Delta_i \leq 6$) relating predictor variables to rural resident attitudes towards clouded leopards (*Neofelis nebuolsa*) in Taiwan, 2017.

Model	Candidate models[a]	*k*	AIC_c	Δ_i	w_i	*acc* w_i	ER
1	AG + KI + GE	5	1288.56	0.00	0.19	0.19	
2	AG + AN + KI + GE	6	1289.89	1.33	0.10	0.29	1.94
3	AG + KI + GE + TR	7	1290.14	1.58	0.09	0.37	2.21
4	AG + HU + KI + GE	6	1290.17	1.61	0.08	0.46	2.24
5	AG + KI + GE + OR	6	1290.63	2.07	0.07	0.53	2.81
6	AG + DU + KI + GE	8	1291.00	2.44	0.06	0.58	3.39
7	AG + AN + HU + KI + GE	7	1291.44	2.88	0.04	0.63	4.23
8	AG + AN + KI + GE + TR	8	1291.77	3.21	0.04	0.66	4.99
9	AG + HU + KI + GE + TR	8	1291.86	3.31	0.04	0.70	5.22
10	AG + AN + KI + OR + GE	7	1291.99	3.43	0.03	0.74	5.55
11	AG + HU + KI + OR + GE	7	1292.18	3.62	0.03	0.77	6.11
12	AG + KI + OR + GE + TR	8	1292.27	3.71	0.03	0.80	6.40
13	AG + AN + DU + KI + GE	9	1292.51	3.95	0.03	0.82	7.21
14	AG + DU + HU + KI + GE	9	1292.87	4.31	0.02	0.84	8.64
15	AG + CH + KI + GE	8	1292.95	4.39	0.02	0.87	8.97
16	AG + DU + KI + GE + TR	10	1292.97	4.41	0.02	0.89	9.08
17	AG + DU + KI + OR + GE	9	1293.06	4.51	0.02	0.91	9.51
18	AG + AN + HU + KI + GE + TR	9	1293.45	4.90	0.02	0.92	11.56
19	AG + AN + HU + KI + OR + GE	8	1293.48	4.92	0.02	0.94	11.71
20	AG + ED + KI + GE	10	1293.78	5.22	0.01	0.95	13.60
21	AG + AN + KI + OR + GE + TR	9	1293.92	5.37	0.01	0.97	14.63
22	AG + HU + KI + OR + GE + TR	9	1293.96	5.40	0.01	0.98	14.87
23	AG + AN + CH + KI + GE	9	1294.26	5.71	0.01	0.99	17.34
24	AG + AN + DU + HU + KI + GE	10	1294.38	5.82	0.01	1.00	18.35

[a] AG age, AN animal ownership, CH number of household children, DU duration of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OR environmental organization member, TR tribe affiliation

Table 8. Summary results of full model averaging, including coefficients (β), adjusted standard errors (SE), 95% confidence intervals (CI), *z* values, *p* values, and relative importance weights, for parameters from candidate models of rural resident attitudes towards clouded leopards (*Neofelis nebulosa*) in Taiwan, 2017.

Parameter[a]	Estimate (β)[b]	SE	CI	*z* value	*p* value	Importance w_i
AG	-2.15	0.55	(-3.23, -1.07)	3.91	< .001	1.00
KI	2.10	0.53	(1.07, 3.14)	3.97	< .001	1.00
GE - Male[c]	1.77	0.56	(0.67, 2.86)	3.17	.002	0.99
AN	0.14	0.37	(-0.58, 0.87)	0.39	.696	0.33
HU	-0.16	0.51	(-1.16, 0.83)	0.32	.751	0.30
TR – Paiwan[d]	0.51	1.01	(-1.46, 2.49)	0.51	.611	0.29
TR – Rukai	0.53	1.07	(-1.57, 2.63)	0.50	.619	"
OR	0.09	0.75	(-1.38, 1.56)	0.12	.904	0.26
DU – 2[e]	-0.48	1.13	(-2.70, 1.74)	0.43	.671	0.20
DU – 3	-0.36	1.05	(-2.41, 1.70)	0.34	.734	"
DU – 4	-0.35	0.83	(-1.97, 1.27)	0.42	.672	"
CH – 1[f]	-0.08	0.35	(-0.77, 0.60)	0.24	.811	0.09
CH – 2	0.02	0.23	(-0.43, 0.46)	0.08	.933	"
CH – 3	-0.02	0.22	(-0.46, 0.41)	0.11	.912	"
ED – Elementary school[g]	-0.15	0.82	(-1.75, 1.45)	0.18	.854	0.08
ED – Middle school	-0.16	0.84	(-1.82, 1.50)	0.19	.850	"
ED – High school	-0.01	0.59	(-1.16, 1.14)	0.02	.983	"
ED – Bachelor's degree	-0.06	0.63	(-1.29, 1.17)	0.10	.923	"
ED – Master's degree	0.03	0.64	(-1.22, 1.28)	0.04	.966	"
TO – Laiyi[h]	-0.02	0.16	(-0.34, 0.31)	0.10	.923	0.02
TO – Majia	-0.01	0.12	(-0.24, 0.23)	0.05	.957	"
TO – Other	-0.01	0.20	(-0.39, 0.38)	0.03	.975	"
TO – Sandimen	-0.02	0.19	(-0.39, 0.36)	0.09	.925	"
TO – Wutai	-0.01	0.20	(-0.40, 0.37)	0.07	.941	"
OC – Business[i]	0.01	0.15	(-0.29, 0.30)	0.04	.971	<0.01
OC – Education	0.00	0.08	(-0.15, 0.15)	0.02	.984	"
OC – Government	0.00	0.07	(-0.14, 0.13)	0.02	.985	"
OC – Medicine	0.00	0.10	(-0.19, 0.19)	0.02	.984	"
OC – Other	0.00	0.06	(-0.11, 0.11)	0.01	.989	"
OC – Retail/ service	0.00	0.08	(-0.16, 0.16)	0.03	.977	"
OC – Self employed	0.00	0.12	(-0.24, 0.23)	0.03	.978	"
OC – Student	0.00	0.11	(-0.22, 0.21)	0.04	.971	"
OC – Tourism	0.00	0.13	(-0.25, 0.26)	0.04	.969	"
OC – Unemployed	0.00	0.06	(-0.12, 0.12)	0.01	.996	"

[a] AG age, AN animal ownership, CH number of household children, DU duration of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OC occupation, OR environmental organization member, TO township of residence, TR tribe affiliation
[b] Effect sizes have been standardized by 2 standard deviations.
[c] Female was reference category
[d] Other tribe affiliation was reference category
[e] Duration of residence 1 (0-5 years) was reference category
[f] No household children was reference category
[g] No formal education was reference category
[h] Chunri township was reference category
[i] Agriculture was reference category

Table 9. Descriptive statistics, including number of respondents (*n*), answer percentages (%), mean score ($\bar{x}$), and standard deviation (SD), of rural and urban responses to survey questions assessing attitudes towards clouded leopard (*Neofelis nebulosa*) competitors and prey in Taiwan, 2017

	Rural						Urban					
Attitude Statement	***n***	**Agree %**	**Neutral %**	**Disagree %**	$\bar{x}$[a]	**SD**	***n***	**Agree %**	**Neutral %**	**Disagree %**	$\bar{x}$[a]	**SD**
I like Formosan black bears.	254	78	17	5	0.73	0.54	500	79	18	3	0.76	0.49
I support a hunting ban on Formosan black bears in Taiwan.	253	77	15	8	0.70	0.60	500	89	9	2	0.88	0.37
Formosan black bears do not damage the crops of farmers or kill livestock.	253	30	34	36	-0.06	0.81	500	31	39	30	0.01	0.78
I like Formosan serows.	254	79	18	3	0.76	0.49	500	79	19	2	0.77	0.47
Formosan serows do not compete with livestock for food.	252	47	35	18	0.29	0.76	500	50	35	15	0.35	0.73
I would support an increasing population of Formosan serows.	253	65	30	5	0.60	0.58	500	73	24	3	0.70	0.51
I like Formosan macaques.	254	44	30	27	0.17	0.82	500	60	27	13	0.47	0.72
Formosan macaques do not damage the crops of farmers.	254	11	24	65	-0.54	0.68	500	16	23	62	-0.46	0.75
I would support an increasing population of Formosan macaques.	251	20	33	47	-0.27	0.77	500	23	39	39	-0.16	0.77
I like Reeve's muntjacs.	252	78	19	4	0.74	0.51	500	74	24	2	0.73	0.48
Reeve's muntjacs do not compete with livestock for food.	252	49	35	17	0.32	0.74	500	45	39	15	0.30	0.72
I would support an increasing population of Reeve's muntjacs.	254	68	27	5	0.63	0.58	500	62	33	5	0.57	0.59

[a] Mean scores were calculated on a scale between -1 and 1 with 1 demonstrating positive attitudes and -1 negative attitudes

Table 10. Summary of AIC_c, AIC_c delta (Δ_i), AIC_c weight (w_i), cumulative Akaike weight (*acc* w_i), evidence ratio (ER), and parameter number (*k*) results for best-ranked regression models ($\Delta_i \leq 6$; here showing top 20) relating predictor variables to rural resident attitudes towards clouded leopard (*Neofelis nebulosa*) competitors and prey in Taiwan, 2017.

Model	Candidate models[a]	*k*	AIC_c	Δ_i	w_i	*acc* w_i	ER
1	AG + GE + KI + OR	6	1287.80	0.00	0.11	0.11	
2	AG + GE + KI	5	1288.35	0.56	0.08	0.19	1.32
3	AG + GE + KI + OR + AN	7	1288.86	1.07	0.06	0.26	1.71
4	AG + GE + KI + ED	10	1289.22	1.42	0.05	0.31	2.04
5	AG + GE + KI + AN	6	1289.31	1.51	0.05	0.36	2.13
6	AG + GE + KI + OR + ED	11	1289.45	1.66	0.05	0.41	2.29
7	AG + GE + KI + AN + ED	11	1289.81	2.01	0.04	0.45	2.73
8	AG + GE + KI + OR + HU	7	1289.85	2.05	0.04	0.49	2.79
9	AG + GE + KI + OR + AN + ED	12	1290.17	2.38	0.03	0.52	3.28
10	AG + GE + KI + HU	6	1290.46	2.66	0.03	0.55	3.79
11	AG + GE + KI + OR + AN + HU	8	1290.91	3.12	0.02	0.58	4.75
12	AG + GE + OR	5	1291.05	3.25	0.02	0.60	5.08
13	AG + GE + KI + OR + HU + ED	12	1291.18	3.38	0.02	0.62	5.42
14	AG + GE + KI + HU + ED	11	1291.24	3.45	0.02	0.64	5.60
15	AG + GE + KI + AN + HU	7	1291.44	3.64	0.02	0.66	6.17
16	AG + GE	4	1291.46	3.66	0.02	0.67	6.24
17	AG + GE + OR + AN	6	1291.60	3.80	0.02	0.69	6.68
18	AG + GE + KI + CH	8	1291.63	3.84	0.02	0.71	6.81
19	AG + GE + KI + OR + CH	9	1291.69	3.90	0.02	0.72	7.02
20	AG + GE + KI + CH + ED	13	1291.74	3.94	0.02	0.74	7.17

[a] AG age, AN animal ownership, CH number of household children, ED level of education, GE gender, HU hunter status, KI knowledge index score, OR environmental organization member

Table 11. Summary results of full model averaging, including coefficients (β), adjusted standard errors (SE), 95% confidence intervals (CI), *z* values, *p* values, and relative importance weights, for parameters from candidate models regarding rural resident attitudes towards clouded leopard (*Neofelis nebulosa*) competitors and prey in Taiwan, 2017.

Parameter[a]	Estimate (β)[b]	SE	CI	*z* value	*p* value	Importance w_i
AG	-1.52	0.72	(-2.93, -0.11)	2.12	0.034	0.94
GE - Male[c]	1.21	0.70	(-0.16, 2.57)	1.74	0.082	0.88
KI	1.12	0.70	(-0.25, 2.49)	1.61	0.109	0.85
OR	1.18	1.57	(-1.90, 4.25)	0.75	0.453	0.52
AN	0.28	0.50	(-0.69, 1.26)	0.57	0.568	0.42
ED – Elementary school[d]	0.55	1.61	(-2.61, 3.71)	0.34	0.734	0.37
ED – Middle school	-0.54	1.61	(-3.70, 2.63)	0.33	0.739	"
ED – High school	0.08	1.34	(-2.55, 2.72)	0.06	0.952	"
ED – Bachelor's degree	-0.19	1.39	(-2.90, 2.53)	0.13	0.893	"
ED – Master's degree	0.86	1.83	(-2.72, 4.44)	0.47	0.639	"
HU	-0.06	0.48	(-1.01, 0.89)	0.12	0.903	0.27
CH – 1[e]	-0.12	0.43	(-0.95, 0.72)	0.27	0.785	0.15
CH – 2	0.12	0.42	(-0.69, 0.94)	0.30	0.767	"
CH – 3	0.00	0.27	(-0.54, 0.54)	0.00	0.999	"
TR – Paiwan[f]	0.04	0.43	(-0.80, 0.87)	0.09	0.932	0.11
TR – Rukai	0.04	0.54	(-1.01, 1.09)	0.08	0.937	"
DU – 2[g]	-0.03	0.38	(-0.77, 0.72)	0.07	0.944	0.07
DU – 3	-0.13	0.70	(-1.50, 1.25)	0.18	0.857	"
DU – 4	-0.01	0.28	(-0.55, 0.53)	0.03	0.973	"
TO – Laiyi[h]	-0.03	0.24	(-0.49, 0.43)	0.13	0.895	0.04
TO – Majia	-0.06	0.35	(-0.74, 0.62)	0.17	0.864	"
TO – Other	0.01	0.30	(-0.58, 0.59)	0.02	0.985	"
TO – Sandimen	-0.05	0.32	(-0.68, 0.58)	0.15	0.881	"
TO – Wutai	-0.08	0.49	(-1.03, 0.87)	0.16	0.874	"
OC – Business[i]	0.00	0.18	(-0.35, 0.35)	0.01	0.992	0.02
OC – Education	0.02	0.21	(-0.39, 0.43)	0.09	0.932	"
OC – Government	-0.01	0.24	(-0.49, 0.46)	0.06	0.952	"
OC – Medicine	0.02	0.23	(-0.43, 0.46)	0.07	0.945	"
OC – Other	-0.03	0.29	(-0.60, 0.55)	0.09	0.930	"
OC – Retail/ service	0.02	0.33	(-0.62, 0.66)	0.07	0.948	"
OC – Self employed	0.00	0.18	(-0.36, 0.36)	0.01	0.996	"
OC – Student	0.02	0.32	(-0.61, 0.65)	0.07	0.944	"
OC – Tourism	0.00	0.26	(-0.50, 0.50)	0.01	0.996	"
OC – Unemployed	-0.02	0.22	(-0.45, 0.41)	0.08	0.934	"

[a] AG age, AN animal ownership, CH number of household children, DU duration of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OC occupation, OR environmental organization member, TO township of residence, TR tribe affiliation

[b] Effect sizes have been standardized by 2 standard deviations.

[c] Female was reference category

[d] No formal education was reference category

[e] No household children was reference category

[f] Other tribe affiliation was reference category

[g] Duration of residence 1 (0-5 years) was reference category

[h] Chunri township was reference category

[i] Agriculture was reference category

Table 12. Descriptive statistics, including number of respondents (*n*), answer percentages (%), mean score ($\bar{x}$), and standard deviation (SD), of rural and urban responses to survey questions assessing support for a potential clouded leopard (*Neofelis nebulosa*) reintroduction in Taiwan, 2017.

	Rural						Urban					
Support Statement	***n***	**Agree %**	**Neutral %**	**Disagree %**	**$\bar{x}$[a]**	**SD**	***n***	**Agree %**	**Neutral %**	**Disagree %**	**$\bar{x}$[a]**	**SD**
I support bringing clouded leopards back to Taiwan through reintroduction.	258	41	35	24	0.17	0.79	500	63	26	12	0.51	0.70
I support bringing clouded leopards back to Taiwan specifically in the Tawushan Nature Reserve through reintroduction.	259	48	31	21	0.27	0.79	500	71	22	7	0.63	0.62

[a] Mean scores were calculated on a scale between -1 and 1 with 1 demonstrating positive support and -1 negative support

Table 13. Summary of AIC_c, AIC_c delta (Δ_i), AICc weight (w_i), and evidence ratio (ER) results for models determining the predictive value of a 12-item attitudes index score (AIS), an 8-item attitudes index score with risk perception questions removed (AIS8), and a 4-item risk perception index score (RPIS) in gauging rural and urban support for a clouded leopard (*Neofelis nebulosa*) reintroduction in Taiwan, 2017.

	Rural							**Urban**						
Support Statement	**Model #**	**Variables**	***k***	**AIC_c**	**Δ_i**	**w_i**	**ER**	**Model #**	**Variables**	***k***	**AIC_c**	**Δ_i**	**w_i**	**ER**
1[a]	1	AIS8	3	537.60	0.00	0.61		1	AIS8 + RPIS	4	830.68	0.00	0.57	
	2	AIS8 + RPIS	4	538.50	0.90	0.39	1.57	2	AIS8	3	831.39	0.71	0.40	1.42
	3	AIS	3	547.51	9.92	0.00	142.59	3	AIS	3	836.25	5.57	0.03	16.20
	4	RPIS	3	559.55	21.95	0.00	>9999	4	RPIS	3	874.59	43.92	0.00	>9999
2[b]	1	AIS8	3	517.79	0.00	0.65		1	AIS8	3	714.30	0.00	0.64	
	2	AIS8 + RPIS	4	519.00	1.20	0.35	1.82	2	AIS8 + RPIS	4	715.50	1.20	0.35	1.82
	3	AIS	3	529.24	11.45	0.00	306.43	3	AIS	3	723.08	8.78	0.01	80.64
	4	RPIS	3	544.93	27.14	0.00	>9999	4	RPIS	3	757.44	43.15	0.00	>9999

[a] "I support bringing clouded leopards back to Taiwan through reintroduction."
[b] "I support bringing clouded leopards back to Taiwan specifically in the Tawushan Nature Reserve through reintroduction."

Table 14. Summary of AIC_c, AIC_c delta (Δ_i), AIC_c weight (w_i), cumulative Akaike weight (*acc* w_i), evidence ratio (ER), and parameter number (*k*) results for best-ranked regression models ($\Delta_i \leq 6$; here showing top 20) relating predictor variables to rural support for a clouded leopard (*Neofelis nebulosa*) reintroduction to Taiwan, 2017.

Model	**Candidate models**[a]	***k***	**AIC_c**	**Δ_i**	**w_i**	***acc* w_i**	**ER**
1	AIS8 + KI + OR +ED	10	472.74	0.00	0.05	0.05	
2	AIS8 + KI + OR	5	472.84	0.10	0.05	0.10	1.05
3	AIS8 + KI + OR + AG	6	473.45	0.71	0.04	0.14	1.43
4	AIS8 + KI + OR + RPIS	6	473.80	1.06	0.03	0.17	1.70
5	AIS8 + KI + AN + OR	6	474.35	1.61	0.02	0.20	2.24
6	AIS8 + KI + OR + ED + RPIS	11	474.42	1.69	0.02	0.22	2.32
7	AIS8 + KI + OR + GE	6	474.42	1.69	0.02	0.24	2.33
8	AIS8 + KI + OR + GE + ED	11	474.45	1.72	0.02	0.26	2.36
9	AIS8 + KI + ED	9	474.55	1.81	0.02	0.29	2.48
10	AIS8 + KI + AN + OR + ED	11	474.63	1.90	0.02	0.31	2.58
11	AIS8 + KI + OR + AG + RPIS	7	474.64	1.90	0.02	0.33	2.59
12	AIS8 + KI + HU + OR + ED	11	474.80	2.06	0.02	0.35	2.80
13	AIS8 + KI + OR + GE + RPIS	7	474.88	2.14	0.02	0.36	2.92
14	AIS8 + KI + OR + ED + AG	11	474.88	2.14	0.02	0.38	2.92
15	AIS8 + KI + HU + OR	6	474.90	2.16	0.02	0.40	2.95
16	AIS8 + KI + OR + ED + TR	12	474.91	2.17	0.02	0.42	2.96
17	AIS8 + KI + OR + GE + AG	7	475.15	2.42	0.02	0.43	3.35
18	AIS8 + KI + OR + TR	7	475.16	2.43	0.02	0.45	3.37
19	AIS8 + KI + AN + OR + AG	7	475.20	2.47	0.02	0.47	3.43
20	AIS8 + KI + HU + OR + AG	7	475.42	2.68	0.01	0.48	3.82

[a] AG age, AIS8 attitudes index score, AN animal ownership, ED level of education, GE gender, HU hunter status, KI knowledge index score, OR environmental organization member, RPIS risk perception index score, TR tribe affiliation

Table 15. Summary results of full model averaging, including coefficients (β), adjusted standard errors (SE), 95% confidence intervals (CI), *z* values, *p* values, and relative importance weights, for parameters from candidate models regarding rural support for a clouded leopard (*Neofelis nebulosa*) reintroduction to Taiwan, 2017.

Parameter[a]	Estimate (β)[b]	SE	CI	*z* value	*p* value	Importance w_i
AIS8	1.37	0.31	(0.77, 1.97)	4.47	< .001	1.00
KI	-0.89	0.30	(-1.48, -0.29)	2.92	< .001	0.98
OR	1.43	1.05	(-0.62, 3.48)	1.37	.170	0.81
ED – Elementary school[c]	-0.07	0.74	(-1.52, 1.38)	0.10	.920	0.44
ED – Middle school	0.10	0.73	(-1.33, 1.52)	0.14	.893	"
ED – High school	-0.31	0.73	(-1.75, 1.12)	0.43	.671	"
ED – Bachelor’s degree	-0.54	0.89	(-2.30, 1.21)	0.61	.542	"
ED – Master’s degree	-0.11	0.73	(-1.54, 1.31)	0.15	.878	"
RPIS	-0.09	0.22	(-0.52, 0.34)	0.42	.671	0.34
AG	0.08	0.22	(-0.34, 0.51)	0.39	.698	0.34
GE - Male[d]	0.08	0.20	(-0.30, 0.47)	0.41	.683	0.33
AN	-0.04	0.16	(-0.35, 0.26)	0.27	.789	0.28
HU	-0.03	0.22	(-0.47, 0.40)	0.15	.877	0.26
TR – Paiwan[e]	-0.15	0.38	(-0.90, 0.61)	0.38	.702	0.22
TR – Rukai	-0.09	0.34	(-0.76, 0.58)	0.26	.795	"
TO – Laiyi[f]	0.05	0.21	(-0.35, 0.45)	0.25	.804	0.09
TO – Majia	0.01	0.13	(-0.25, 0.26)	0.05	.960	"
TO – Other	0.06	0.29	(-0.50, 0.63)	0.22	.827	"
TO – Sandimen	0.09	0.32	(-0.54, 0.72)	0.27	.786	"
TO – Wutai	0.06	0.25	(-0.43, 0.55)	0.23	.815	"
CH – 1[g]	0.03	0.16	(-0.28, 0.35)	0.22	.830	0.07
CH – 2	0.01	0.10	(-0.19, 0.20)	0.05	.958	"
CH – 3	0.00	0.09	(-0.18, 0.19)	0.04	.965	"
DU – 2[h]	0.01	0.17	(-0.32, 0.35)	0.08	.935	0.05
DU – 3	0.03	0.25	(-0.46, 0.52)	0.12	.907	"
DU – 4	0.00	0.12	(-0.24, 0.24)	0.00	.999	"
OC – Business[i]	0.00	0.01	(-0.02, 0.02)	0.00	.999	< 0.01
OC – Education	0.00	0.01	(-0.01, 0.01)	0.00	.999	"
OC – Government	0.00	0.01	(-0.01, 0.01)	0.01	.996	"
OC – Medicine	0.00	0.01	(-0.02, 0.02)	0.00	.997	"
OC – Other	0.00	0.01	(-0.01, 0.01)	0.00	.998	"
OC – Retail/ service	0.00	0.01	(-0.02, 0.02)	0.01	.995	"
OC – Self employed	0.00	0.01	(-0.02, 0.02)	0.00	.997	"
OC – Student	0.00	0.01	(-0.01, 0.01)	0.00	.998	"
OC – Tourism	0.00	0.01	(-0.02, 0.02)	0.00	.998	"
OC – Unemployed	0.00	0.01	(-0.01, 0.01)	0.01	.996	"

[a] AG age, AIS8 attitudes index score, AN animal ownership, CH number of household children, DU duration of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OC occupation, OR environmental organization member, RPIS risk perception index score, TO township of residence, TR tribe affiliation

[b] Effect sizes have been standardized by 2 standard deviations.

[c] No formal education was reference category

[d] Female was reference category

[e] Other tribe affiliation was reference category

[f] Township Chunri was reference category
[g] No household children was reference category
[h] Duration of residence 1 (0-5 years) was reference category
[i] Agriculture was reference category

Table 16. Summary of AIC_c, AIC_c delta (Δ_i), AIC_c weight (w_i), cumulative Akaike weight ($acc\ w_i$), evidence ratio (ER), and parameter number (k) results for best-ranked regression models ($\Delta_i \leq 6$; here showing top 20) relating predictor variables to rural support for a clouded leopard (*Neofelis nebulosa*) reintroduction to the Tawushan Nature Reserve, Taiwan, 2017.

Model	**Candidate models[a]**	***k***	**AIC_c**	**Δ_i**	**w_i**	**$acc\ w_i$**	**ER**
1	AIS8 + OR + KI + TO + ED	15	457.83	0.00	0.03	0.03	
2	AIS8 + OR + KI + TO + GE + ED	16	458.27	0.44	0.03	0.06	1.25
3	AIS8 + OR + KI + TO + ED + TR	17	458.40	0.57	0.03	0.09	1.33
4	AIS8 + OR + KI + TO + GE + ED + TR	18	458.76	0.93	0.02	0.11	1.59
5	AIS8 + OR + KI + TO + AN + ED	16	459.16	1.33	0.02	0.13	1.95
6	AIS8 + OR + KI + TO + TR	12	459.19	1.36	0.02	0.14	1.98
7	AIS8 + OR + KI + ED	10	459.33	1.50	0.02	0.16	2.12
8	AIS8 + OR + KI + TO	10	459.35	1.52	0.02	0.17	2.14
9	AIS8 + OR + KI + TO + AN + GE + ED	17	459.48	1.65	0.01	0.19	2.28
10	AIS8 + OR + KI + TO + GE +ED + RPIS	17	459.63	1.80	0.01	0.20	2.46
11	AIS8 + OR + TO + ED	14	459.70	1.87	0.01	0.22	2.55
12	AIS8 + OR + KI + TO + GE + TR	13	459.72	1.89	0.01	0.23	2.57
13	AIS8 + OR + KI + TO + ED + RPIS	16	459.76	1.93	0.01	0.24	2.63
14	AIS8 + OR + KI + TO + AN + ED + TR	18	459.82	2.00	0.01	0.26	2.71
15	AIS8 + OR + KI + TO + AN + TR	13	459.99	2.16	0.01	0.27	2.94
16	AIS8 + OR + KI + TO + AN	11	459.99	2.17	0.01	0.28	2.95
17	AIS8 + OR + KI + TO + GE	11	460.05	2.22	0.01	0.29	3.04
18	AIS8 + OR + KI + TO + HU + ED	16	460.07	2.24	0.01	0.30	3.06
19	AIS8 + OR + KI + TO + AN + GE + ED + TR	19	460.07	2.24	0.01	0.31	3.06
20	AIS8 + OR + KI + TO + ED + AG	16	460.09	2.26	0.01	0.32	3.09

[a] AG age, AIS8 attitudes index score, AN animal ownership, ED level of education, GE gender, HU hunter status, KI knowledge index score, OR environmental organization member, RPIS risk perception index score, TR tribe affiliation

Table 17. Summary results of full model averaging, including coefficients (β), adjusted standard errors (SE), 95% confidence intervals (CI), *z* values, *p* values, and relative importance weights, for parameters from candidate models regarding rural support for a clouded leopard (*Neofelis nebulosa*) reintroduction to the Tawushan Nature Reserve, Taiwan, 2017.

Parameter[a]	Estimate (β)[b]	SE	CI	*z* value	*p* value	Importance w_i
AIS8	1.59	0.33	(0.94, 2.25)	4.76	< .001	1.00
OR	2.29	1.35	(-0.36, 4.94)	1.69	.090	0.91
KI	-0.50	0.37	(-1.22, 0.22)	1.35	.176	0.78
TO – Laiyi[c]	0.79	0.57	(-0.33, 1.90)	1.38	.168	0.78
TO – Majia	0.54	0.49	(-0.43, 1.50)	1.09	.275	"
TO – Other	0.76	0.76	(-0.72, 2.25)	1.01	.313	"
TO – Sandimen	1.55	0.97	(-0.36, 3.46)	1.59	.112	"
TO – Wutai	1.18	1.05	(-0.89, 3.25)	1.12	.263	"
ED – Elementary school[d]	-0.23	0.90	(-2.01, 1.54)	0.26	.798	0.62
ED – Middle school	0.37	0.93	(-1.46, 2.19)	0.39	.695	"
ED – High school	-0.34	0.81	(-1.93, 1.25)	0.42	.677	"
ED – Bachelor's degree	-0.72	0.96	(-2.61, 1.17)	0.75	.456	"
ED – Master's degree	0.09	0.88	(-1.63, 1.81)	0.10	.917	"
GE – Male[e]	0.15	0.27	(-0.37, 0.67)	0.57	.569	0.42
TR – Paiwan[f]	-0.10	0.40	(-0.89, 0.69)	0.25	.802	0.37
TR – Rukai	-0.56	0.94	(-2.41, 1.28)	0.60	.549	"
AN	-0.11	0.22	(-0.54, 0.32)	0.49	.627	0.36
RPIS	-0.10	0.23	(-0.54, 0.35)	0.42	.678	0.33
AG	0.00	0.17	(-0.34, 0.34)	0.02	.984	0.26
HU	-0.04	0.24	(-0.51, 0.43)	0.18	.858	0.26
DU – 2[g]	0.02	0.20	(-0.37, 0.42)	0.12	.903	0.05
DU – 3	0.02	0.25	(-0.47, 0.50)	0.07	.948	"
DU – 4	0.03	0.18	(-0.32, 0.37)	0.15	.882	"
CH – 1[h]	0.00	0.08	(-0.15, 0.15)	0.05	.962	0.04
CH – 2	0.00	0.07	(-0.14, 0.14)	0.01	.994	"
CH – 3	0.00	0.07	(-0.14, 0.14)	0.06	.950	"
OC – Business[i]	0.00	0.02	(-0.03, 0.03)	0.01	.995	< 0.01
OC – Education	0.00	0.01	(-0.02, 0.02)	0.00	.999	"
OC – Government	0.00	0.01	(-0.01, 0.01)	0.00	.998	"
OC – Medicine	0.00	0.01	(-0.02, 0.02)	0.00	.997	"
OC – Other	0.00	0.01	(-0.01, 0.01)	0.00	.997	"
OC – Retail/ service	0.00	0.01	(-0.02, 0.02)	0.01	.996	"
OC – Self employed	0.00	0.03	(-0.05, 0.05)	0.01	.993	"
OC – Student	0.00	0.01	(-0.02, 0.02)	0.00	.999	"
OC – Tourism	0.00	0.01	(-0.02, 0.02)	0.00	.998	"
OC – Unemployed	0.00	0.01	(-0.02, 0.02)	0.01	.996	"

[a] AG age, AIS8 attitudes index score, AN animal ownership, CH number of household children, DU duration of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OC occupation, OR environmental organization member, RPIS risk perception index score, TO township of residence, TR tribe affiliation

[b] Effect sizes have been standardized by 2 standard deviations.

[c] Township Chunri was reference category

[d] No formal education was reference category

[e] Female was reference category
[f] Other tribe affiliation was reference category
[g] Duration of residence 1 (0-5 years) was reference category
[h] No household children was reference category
[i] Agriculture was reference category

Table 18. Descriptive statistics, including number of respondents (*n*) and answer percentages (%), of rural and urban willingness-to-pay for a potential clouded leopard (*Neofelis nebulosa*) reintroduction initiative in Taiwan, 2017.

	Rural[a]		**Urban**	
Response	***n***	**%**	***n***	**%**
Support for reintroduction	63	37	322	64
Not sure	90	53	134	27
Opposed to reintroduction	18	11	44	9

[a] Rural statistics do not include the 90 respondents who filled out the WTP section of the questionnaire incorrectly

Table 19. Summary of AIC_c, AIC_c delta (Δ_i), AICc weight (w_i), and evidence ratio (ER) results for models determining predictive value of a 12-item attitudes index score (AIS), an 8-item attitudes index score with risk perception questions removed (AIS8), and a 4-item risk perception index score (RPIS) in gauging rural and urban willingness-to-pay for a clouded leopard (*Neofelis nebulosa*) reintroduction in Taiwan, 2017.

Rural							**Urban**						
Model #	**Variables**	***k***	**AIC_c**	**Δ_i**	**w_i**	**ER**	**Model #**	**Variable 1**	***k***	**AIC_c**	**Δ_i**	**w_i**	**ER**
1	AIS	3	322.07	0	0.43		1	AIS8	3	840.36	0.00	0.61	
2	AIS8	3	322.58	0.51	0.33	1.29	2	AIS8 + RPIS	4	842.37	2.01	0.22	2.73
3	AIS8 + RPIS	4	323.79	1.72	0.18	2.36	3	AIS	3	842.98	2.62	0.16	3.71
4	RPIS	3	326.39	4.32	0.05	8.66	4	RPIS	3	849.32	8.96	0.01	88.24

Table 20. Summary of AIC_c, AIC_c delta (Δ_i), AIC_c weight (w_i), cumulative Akaike weight ($acc\ w_i$), evidence ratio (ER), and parameter number (k) results for best-ranked regression models ($\Delta_i \leq 6$; here showing top 20) relating predictor variables to rural respondents' willingness-to-pay to reintroduce and maintain a healthy population of clouded leopards (*Neofelis nebulosa*) in Taiwan, 2017.

Model	**Candidate models**[a]	***k***	**AIC_c**	**Δ_i**	**w_i**	**$acc\ w_i$**	**ER**
1	AIS8 + TO + KI + GE	10	291.71	0.00	0.06	0.06	
2	AIS8 + TO + KI	9	292.13	0.42	0.05	0.11	1.23
3	AIS8 + TO + KI + RPIS	10	292.38	0.68	0.04	0.15	1.40
4	AIS8 + TO + KI + GE + RPIS	11	292.79	1.08	0.03	0.19	1.72
5	AIS8 + TO	8	292.95	1.25	0.03	0.22	1.86
6	AIS8 + TO + GE	9	293.19	1.48	0.03	0.25	2.10
7	AIS8 + TO + RPIS	9	293.61	1.90	0.02	0.27	2.59
8	AIS8 + TO + KI + GE + AG	11	293.91	2.20	0.02	0.29	3.01
9	AIS8 + TO + KI + GE + OR	11	293.99	2.28	0.02	0.31	3.13
10	AIS8 + TO + KI + GE + AN	11	294.03	2.32	0.02	0.33	3.19
11	AIS8 + TO + KI + GE + HU	11	294.03	2.32	0.02	0.35	3.19
12	AIS8 + TO + KI + HU	10	294.30	2.59	0.02	0.36	3.66
13	AIS8 + TO + KI + AG	10	294.37	2.66	0.02	0.38	3.79
14	AIS8 + TO + KI + OR	10	294.38	2.67	0.02	0.39	3.81
15	AIS8 + TO + KI + AN	10	294.40	2.69	0.02	0.41	3.84
16	AIS8 + KI + TR	6	294.46	2.75	0.02	0.42	3.95
17	AIS8 + TO + GE + RPIS	10	294.49	2.78	0.01	0.44	4.02
18	AIS8 + TO + KI + RPIS + HU	11	294.60	2.90	0.01	0.45	4.25
19	AIS8 + TO + KI + RPIS + AN	11	294.66	2.95	0.01	0.47	4.38
20	AIS8 + TO + KI + RPIS + OR	11	294.70	2.99	0.01	0.48	4.47

[a] AG age, AIS8 attitudes index score, AN animal ownership, GE gender, HU hunter status, KI knowledge index score, OR environmental organization member, RPIS risk perception index score, TO township of residence, TR tribe affiliation

Table 21. Summary results of full model averaging, including coefficients (β), adjusted standard errors (SE), 95% confidence intervals (CI), *z* values, *p* values, and relative importance weights, for parameters from candidate models regarding rural respondents' willingness-to-pay to reintroduce and maintain a healthy population of clouded leopards (*Neofelis nebulosa*) in Taiwan, 2017.

Parameter[a]	**Estimate (β)**[b]	**SE**	**CI**	***z* value**	***p* value**	**Importance w_i**
AIS8	0.81	0.47	(-0.13, 1.74)	1.70	0.090	0.87
TO – Laiyi[c]	0.98	0.71	(-0.41, 2.37)	1.38	0.167	0.78
TO – Majia	0.31	0.53	(-0.72, 1.35)	0.59	0.556	"
TO – Other	1.97	1.36	(-0.69, 4.63)	1.45	0.147	"
TO – Sandimen	1.15	0.87	(-0.56, 2.85)	1.32	0.188	"
TO – Wutai	1.07	0.86	(-0.62, 2.77)	1.24	0.214	"
KI	-0.40	0.42	(-1.22, 0.42)	0.95	0.341	0.63
GE – Male[d]	0.20	0.34	(-0.46, 0.87)	0.60	0.548	0.43
RPIS	0.21	0.35	(-0.48, 0.90)	0.60	0.547	0.43
AG	-0.03	0.19	(-0.40, 0.34)	0.16	0.871	0.25
HU	0.05	0.30	(-0.54, 0.64)	0.15	0.878	0.25
OR	0.04	0.60	(-1.14, 1.22)	0.07	0.947	0.25
AN	-0.02	0.17	(-0.36, 0.32)	0.11	0.913	0.25
TR – Paiwan[e]	-0.26	0.64	(-1.52, 0.99)	0.41	0.680	0.25
TR – Rukai	-0.10	0.57	(-1.22, 1.02)	0.18	0.858	"
DU – 2[f]	0.02	0.25	(-0.48, 0.52)	0.09	0.925	0.08
DU – 3	-0.06	0.40	(-0.84, 0.71)	0.16	0.871	"
DU – 4	-0.03	0.22	(-0.46, 0.39)	0.15	0.878	"
CH – 1[g]	0.03	0.16	(-0.28, 0.33)	0.17	0.863	0.07
CH – 2	0.01	0.13	(-0.24, 0.26)	0.08	0.934	"
CH – 3	0.04	0.19	(-0.34, 0.42)	0.21	0.833	"
ED – Elementary school[h]	0.00	0.11	(-0.22, 0.21)	0.03	0.980	<0.01
ED – Middle school	0.00	0.12	(-0.23, 0.24)	0.03	0.974	"
ED – High school	0.00	0.09	(-0.18, 0.18)	0.00	0.999	"
ED – Bachelor's degree	0.00	0.09	(-0.18, 0.18)	0.00	0.999	"
ED – Master's degree	0.00	0.11	(-0.21, 0.22)	0.02	0.982	"
OC – Business[i]	0.00	0.02	(-0.04, 0.04)	0.01	0.990	<0.01
OC – Education	0.00	0.02	(-0.04, 0.04)	0.01	0.989	"
OC – Government	0.00	0.04	(-0.07, 0.07)	0.02	0.988	"
OC – Medicine	0.00	0.03	(-0.06, 0.06)	0.02	0.987	"
OC – Other	0.00	0.02	(-0.05, 0.05)	0.01	0.989	"
OC – Retail/ service	0.00	0.04	(-0.08, 0.08)	0.01	0.990	"
OC – Self employed	0.00	0.02	(-0.04, 0.04)	0.01	0.990	"
OC – Student	0.00	0.03	(-0.06, 0.06)	0.01	0.995	"
OC – Tourism	0.00	0.04	(-0.09, 0.09)	0.02	0.986	"
OC – Unemployed	0.00	0.02	(-0.05, 0.04)	0.01	0.989	"

[a] AG age, AIS8 attitudes index score, AN animal ownership, CH number of household children, DU duration of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OC occupation, OR environmental organization member, RPIS risk perception index score, TO township of residence, TR tribe affiliation

[b] Effect sizes have been standardized by 2 standard deviations.

[c] Township Chunri was reference category

[d] Female was reference category
[e] Other tribe affiliation was reference category
[f] Duration of residence 1 (0-5 years) was reference category
[g] No household children was reference category
[h] No formal education was reference category
[i] Agriculture was reference category

Table 22. Summary of AIC_c, AIC_c delta (Δ_i), AIC_c weight (w_i), cumulative Akaike weight (*acc* w_i), evidence ratio (ER), and parameter number (k) results for best-ranked regression models ($\Delta_i \leq 6$; here showing top 20) relating predictor variables to urbanite knowledge about clouded leopards (*Neofelis nebulosa*) in Taiwan, 2017.

Model	Candidate models[a]	k	AIC_c	Δ_i	w_i	*acc* w_i	ER
1	AN + ED + CH + GE	11	1689.02	0.00	0.13	0.13	
2	AN + ED + CH + GE + AG	12	1689.97	0.95	0.08	0.21	1.61
3	AN + ED + CH	10	1690.25	1.23	0.07	0.27	1.85
4	AN + ED + CH + GE + HU	12	1690.94	1.92	0.05	0.32	2.61
5	AN + ED + CH + GE + OR	12	1690.95	1.94	0.05	0.37	2.63
6	AN + ED + CH + AG	11	1691.39	2.37	0.04	0.41	3.27
7	AN + ED + CH + GE + AG + HU	13	1691.73	2.71	0.03	0.44	3.88
8	AN + ED + CH + GE + AG + OR	13	1691.89	2.87	0.03	0.47	4.20
9	AN + ED + CH + HU	11	1691.94	2.92	0.03	0.50	4.31
10	AN + ED + GE	8	1691.99	2.97	0.03	0.53	4.42
11	AN + ED + CH + GE + CI	13	1692.06	3.04	0.03	0.56	4.57
12	AN + ED + CH + OR	11	1692.21	3.20	0.03	0.58	4.94
13	AN + ED + CH + GE + AG + CI	14	1692.43	3.41	0.02	0.61	5.51
14	AN + ED + GE + AG	9	1692.83	3.81	0.02	0.63	6.73
15	AN + ED + CH + AG + HU	12	1692.86	3.84	0.02	0.65	6.83
16	AN + ED + CH + GE + HU + OR	13	1692.98	3.97	0.02	0.66	7.27
17	AN + ED + CH + OC	20	1693.12	4.10	0.02	0.68	7.77
18	AN + CH + GE + AG	8	1693.15	4.13	0.02	0.69	7.90
19	AN + ED + CH + GE + OC	21	1693.23	4.21	0.02	0.71	8.23
20	AN + ED + CH + CI	12	1693.32	4.31	0.01	0.73	8.61

[a] AG age, AN animal ownership, CH number of household children, CI city of residence, ED level of education, GE gender, HU hunter status, OC occupation, OR environmental organization member

Table 23. Summary results of full model averaging, including coefficients (β), adjusted standard errors (SE), 95% confidence intervals (CI), *z* values, *p* values, and relative importance weights, for parameters from candidate models regarding urbanite knowledge about clouded leopards (*Neofelis nebulosa*) in Taiwan, 2017.

Parameter[a]	Estimate (β)[b]	SE	CI	*z* value	*p* value	Importance w_i
AN	0.32	0.14	(0.04, 0.59)	2.25	.024	0.94
ED – Middle school[c]	-0.49	0.54	(-1.56, 0.57)	0.91	.364	0.82
ED – High school	0.12	0.44	(-0.73, 0.98)	0.28	.780	"
ED – Bachelor’s degree	0.26	0.45	(-0.61, 1.14)	0.59	.554	"
ED – Master’s degree	0.32	0.49	(-0.64, 1.28)	0.66	.510	"
CH – 1[d]	-0.08	0.13	(-0.35, 0.18)	0.64	.525	0.76
CH – 2	0.27	0.21	(-0.14, 0.68)	1.30	.194	"
CH – 3	0.28	0.32	(-0.36, 0.91)	0.86	.390	"
GE – Male[e]	0.13	0.14	(-0.14, 0.41)	0.95	.340	0.63
AG	-0.06	0.11	(-0.28, 0.15)	0.56	.577	0.42
HU	0.04	0.15	(-0.25, 0.32)	0.24	.808	0.29
OR	0.02	0.12	(-0.22, 0.27)	0.19	.852	0.27
OC – Business[f]	0.08	0.24	(-0.39, 0.55)	0.34	.732	0.21
OC – Education	0.10	0.28	(-0.45, 0.65)	0.36	.723	"
OC – Government	0.16	0.38	(-0.57, 0.90)	0.43	.665	"
OC – Medicine	0.08	0.28	(-0.45, 0.62)	0.31	.758	"
OC – Other	0.03	0.19	(-0.35, 0.41)	0.18	.860	"
OC – Retail/ service	0.11	0.28	(-0.44, 0.66)	0.40	.691	"
OC – Self employed	0.18	0.39	(-0.58, 0.94)	0.45	.651	"
OC – Student	0.06	0.23	(-0.39, 0.51)	0.26	.796	"
OC – Tourism	0.26	0.56	(-0.84, 1.36)	0.47	.641	"
OC – Unemployed	0.03	0.19	(-0.34, 0.40)	0.16	.871	"
CI – Taichung[g]	-0.01	0.06	(-0.13, 0.12)	0.11	.912	0.18
CI – Taipei/ New Taipei	-0.03	0.09	(-0.20, 0.14)	0.33	.745	"
DU – 2[h]	-0.01	0.08	(-0.17, 0.15)	0.13	.896	0.06
DU – 3	0.00	0.07	(-0.14, 0.14)	0.04	.969	"
DU – 4	0.00	0.06	(-0.11, 0.11)	0.00	.997	"

[a] AG age, AN animal ownership, CH number of household children, CI city of residence, DU duration of residence, ED level of education, GE gender, HU hunter status, OC occupation, OR environmental organization member

[b] Effect sizes have been standardized by 2 standard deviations.

[c] No formal education was reference category

[d] No household children was reference category

[e] Female was reference category

[f] Agriculture was reference category

[g] Kaohsiung city was reference category

[h] Duration of residence 1 (0-5 years) was reference category

Table 24. Summary results of full model averaging, including coefficients (β), adjusted standard errors (SE), 95% confidence intervals (CI), *z* values, *p* values, and relative importance weights, for parameters from candidate models regarding urbanite attitudes towards clouded leopards (*Neofelis nebulosa*) in Taiwan, 2017.

Parameter[a]	Estimate (β)[b]	SE	CI	*z* value	*p* value	Importance w_i
KI	4.21	0.35	(3.52, 4.90)	11.94	< 0.001	1.00
CH – 1[c]	0.39	0.42	(-0.43, 1.22)	0.94	0.349298	0.75
CH – 2	0.26	0.43	(-0.58, 1.11)	0.61	0.541289	"
CH – 3	1.88	1.33	(-0.73, 4.48)	1.41	0.157995	"
GE – Male[d]	0.46	0.43	(-0.38, 1.29)	1.08	0.281169	0.69
OC – Business[e]	1.04	1.32	(-1.54, 3.63)	0.79	0.428897	0.47
OC – Education	1.40	1.70	(-1.92, 4.72)	0.83	0.408233	"
OC – Government	1.18	1.51	(-1.77, 4.13)	0.79	0.432318	"
OC – Medicine	0.47	1.02	(-1.54, 2.47)	0.46	0.648546	"
OC – Other	0.88	1.18	(-1.44, 3.20)	0.74	0.457245	"
OC – Retail/ service	1.37	1.63	(-1.82, 4.56)	0.84	0.400023	"
OC – Self employed	0.94	1.27	(-1.56, 3.44)	0.74	0.460653	"
OC – Student	0.40	0.92	(-1.40, 2.19)	0.43	0.666874	"
OC – Tourism	1.19	1.62	(-1.98, 4.36)	0.74	0.461228	"
OC – Unemployed	0.37	0.85	(-1.30, 2.05)	0.44	0.661463	"
ED – Middle school[f]	-0.61	1.25	(-3.06, 1.84)	0.49	0.624599	0.35
ED – High school	-0.11	0.84	(-1.76, 1.54)	0.13	0.898505	"
ED – Bachelor's degree	0.13	0.84	(-1.53, 1.78)	0.15	0.879633	"
ED – Master's degree	-0.01	0.90	(-1.76, 1.75)	0.01	0.993726	"
OR	0.21	0.47	(-0.72, 1.14)	0.44	0.661634	0.35
HU	-0.10	0.42	(-0.93, 0.73)	0.23	0.816398	0.29
AN	0.05	0.20	(-0.35, 0.45)	0.25	0.801285	0.28
AG	0.01	0.19	(-0.36, 0.37)	0.04	0.967388	0.26
CI – Taichung[g]	0.09	0.26	(-0.42, 0.59)	0.34	0.735071	0.19
CI – Taipei/ New Taipei	0.04	0.20	(-0.36, 0.44)	0.21	0.836584	"
DU – 2[h]	0.02	0.21	(-0.39, 0.43)	0.10	0.920426	0.05
DU – 3	0.00	0.19	(-0.37, 0.36)	0.01	0.990459	"
DU – 4	0.01	0.15	(-0.29, 0.30)	0.05	0.964403	"

[a] AG age, AN animal ownership, CH number of household children, CI city of residence, DU duration of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OC occupation, OR environmental organization member.
[b] Effect sizes have been standardized by 2 standard deviations.
[c] No household children was reference category
[d] Female was reference category
[e] Agriculture was reference category
[f] Elementary school level of education was reference category
[g] Kaohsiung city was reference category
[h] Duration of residence 1 (0-5 years) was reference category

Table 25. Summary of AIC_c, AIC_c delta (Δ_i), AIC_c weight (w_i), cumulative Akaike weight (*acc* w_i), evidence ratio (ER), and parameter number (*k*) results for best-ranked regression models ($\Delta_i \leq 6$; here showing top 20) relating predictor variables to urbanite attitudes towards clouded leopards (*Neofelis nebulosa*) in Taiwan, 2017.

Model	**Candidate models**[a]	***k***	**AIC_c**	**Δ_i**	**w_i**	***acc* w_i**	**ER**
1	KIS + GE + CH + ED	11	2739.90	0.00	0.05	0.05	
2	KIS + GE + CH + OC	17	2740.13	0.23	0.05	0.10	1.12
3	KIS + CH + OC	16	2740.65	0.75	0.03	0.13	1.46
4	KIS + GE + CH	7	2740.66	0.77	0.03	0.17	1.47
5	KIS + OR + GE + CH + ED	12	2741.18	1.29	0.03	0.19	1.90
6	KIS + OR + GE + CH + OC	18	2741.56	1.67	0.02	0.21	2.30
7	KIS + AN + GE + CH + ED	12	2741.74	1.84	0.02	0.23	2.51
8	KIS + OR + GE + CH	8	2741.83	1.93	0.02	0.25	2.63
9	KIS + GE + CH + ED + AG	12	2741.93	2.04	0.02	0.27	2.77
10	KIS + HU + GE + CH + ED	12	2741.95	2.06	0.02	0.29	2.79
11	KIS + AN + GE + CH + OC	18	2742.00	2.10	0.02	0.31	2.86
12	KIS + HU + GE + CH + OC	18	2742.06	2.17	0.02	0.32	2.96
13	KIS + OR + CH + OC	17	2742.13	2.23	0.02	0.34	3.05
14	KIS + GE + CH + OC + AG	18	2742.24	2.34	0.02	0.36	3.22
15	KIS + AN + GE + CH	8	2742.35	2.45	0.01	0.37	3.40
16	KIS + GE + ED	8	2742.36	2.46	0.01	0.39	3.42
17	KIS + GE + OC	14	2742.44	2.54	0.01	0.40	3.56
18	KIS + AN + CH + OC	17	2742.47	2.57	0.01	0.41	3.62
19	KIS + GE + CH + CI + OC	19	2742.61	2.71	0.01	0.43	3.89
20	KIS + CH + ED	10	2742.66	2.77	0.01	0.44	3.99

[a] AG age, AN animal ownership, CH number of household children, CI city of residence, DU duration of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OR environmental organization member, TR tribe affiliation

Table 26. Summary of AIC_c, AIC_c delta (Δ_i), AIC_c weight (w_i), cumulative Akaike weight (*acc* w_i), evidence ratio (ER), and parameter number (k) results for best-ranked regression models ($\Delta_i \leq 6$; here showing top 20) relating predictor variables to urbanite attitudes towards clouded leopard (*Neofelis nebulosa*) competitors and prey in Taiwan, 2017.

Model	**Candidate models**[a]	***k***	**AIC_c**	**Δ_i**	**w_i**	***acc* w_i**	**ER**
1	KIS + CH + OR + GE + ED	12	2808.14	0.00	0.15	0.15	
2	KIS + CH + OR + GE + ED + AG	13	2808.65	0.50	0.11	0.26	1.29
3	KIS + CH + OR + GE + ED + AN	13	2809.97	1.83	0.06	0.32	2.50
4	KIS + CH + OR + GE + ED + HU	13	2810.11	1.97	0.05	0.37	2.68
5	KIS + CH + OR + GE + AG	9	2810.35	2.21	0.05	0.42	3.02
6	KIS + CH + OR + ED	11	2810.66	2.51	0.04	0.46	3.51
7	KIS + CH + OR + GE + ED + AG + AN	14	2810.66	2.52	0.04	0.50	3.53
8	KIS + CH + OR + GE	8	2810.72	2.58	0.04	0.54	3.63
9	KIS + CH + OR + GE + ED + AG + HU	14	2810.73	2.58	0.04	0.58	3.64
10	KIS + CH + OR + GE + ED + CI	14	2811.02	2.87	0.03	0.62	4.21
11	KIS + CH + OR + GE + ED + AG + CI	15	2811.35	3.20	0.03	0.65	4.96
12	KIS + CH + OR + ED + AG	12	2811.41	3.27	0.03	0.67	5.12
13	KIS + CH + OR + GE + ED + AN + HU	14	2811.94	3.80	0.02	0.70	6.67
14	KIS + CH + OR + GE + AG + AN	10	2812.27	4.13	0.02	0.71	7.89
15	KIS + CH + OR + ED + AN	12	2812.36	4.22	0.02	0.73	8.25
16	KIS + CH + OR + GE + AN	9	2812.36	4.22	0.02	0.75	8.26
17	KIS + CH + OR + GE + AG + HU	10	2812.37	4.23	0.02	0.77	8.27
18	KIS + CH + OR + GE + HU	9	2812.56	4.42	0.02	0.78	9.11
19	KIS + CH + OR + AG	8	2812.67	4.53	0.02	0.80	9.62
20	KIS + CH + OR + GE + ED + AG + AN + HU	15	2812.75	4.60	0.01	0.81	9.99

[a] AG age, AN animal ownership, CH number of household children, CI city of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OR environmental organization member

Table 27. Summary results of full model averaging, including coefficients (β), adjusted standard errors (SE), 95% confidence intervals (CI), *z* values, *p* values, and relative importance weights, for parameters from candidate models regarding urbanite attitudes towards clouded leopard (*Neofelis nebulosa*) competitors and prey in Taiwan, 2017.

Parameter[a]	Estimate (β)[b]	SE	CI	*z* value	*p* value	Importance w_i
KI	2.89	0.38	(2.15, 3.62)	7.69	< 0.001	1.00
CH – 1[c]	0.92	0.45	(0.03, 1.80)	2.03	0.042	0.98
CH – 2	1.44	0.52	(0.41, 2.46)	2.74	0.006	"
CH – 3	2.36	1.04	(0.33, 4.39)	2.28	0.023	"
OR	1.96	0.75	(0.50, 3.43)	2.62	0.009	0.97
GE – Male[d]	0.56	0.46	(-0.33, 1.45)	1.23	0.221	0.75
ED – Middle school[e]	-1.48	1.70	(-4.80, 1.85)	0.87	0.384	0.67
ED – High school	-0.57	1.26	(-3.04, 1.89)	0.46	0.648	"
ED – Bachelor’s degree	0.03	1.19	(-2.29, 2.36)	0.03	0.978	"
ED – Master’s degree	0.01	1.29	(-2.51, 2.53)	0.01	0.994	"
AG	-0.20	0.34	(-0.87, 0.46)	0.60	0.549	0.44
AN	0.06	0.22	(-0.38, 0.49)	0.25	0.801	0.29
HU	-0.05	0.44	(-0.92, 0.82)	0.12	0.908	0.27
CI – Taichung[f]	0.10	0.28	(-0.45, 0.65)	0.35	0.725	0.21
CI – Taipei/ New Taipei	0.00	0.21	(-0.42, 0.42)	0.02	0.985	"
OC – Business[g]	0.22	0.70	(-1.15, 1.59)	0.31	0.753	0.13
OC – Education	0.33	0.96	(-1.55, 2.20)	0.34	0.734	"
OC – Government	0.39	1.10	(-1.77, 2.54)	0.35	0.725	"
OC – Medicine	0.16	0.65	(-1.13, 1.44)	0.24	0.812	"
OC – Other	0.32	0.92	(-1.48, 2.11)	0.35	0.729	"
OC – Retail/ service	0.35	0.98	(-1.58, 2.27)	0.35	0.724	"
OC – Self employed	0.35	1.00	(-1.61, 2.31)	0.35	0.727	"
OC – Student	0.25	0.78	(-1.29, 1.78)	0.31	0.754	"
OC – Tourism	0.18	0.74	(-1.27, 1.62)	0.24	0.811	"
OC – Unemployed	0.06	0.46	(-0.84, 0.97)	0.14	0.892	"
DU – 2[h]	-0.03	0.24	(-0.51, 0.45)	0.12	0.905	0.06
DU – 3	-0.01	0.21	(-0.42, 0.41)	0.04	0.972	"
DU – 4	-0.02	0.19	(-0.39, 0.34)	0.13	0.901	"

[a] AG age, AN animal ownership, CH number of household children, CI city of residence, DU duration of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OC occupation, OR environmental organization member.
[b] Effect sizes have been standardized by 2 standard deviations.
[c] No household children was reference category
[d] Female was reference category
[e] Elementary school level of education was reference category
[f] Kaohsiung city was reference category
[g] Agriculture was reference category
[h] Duration of residence 1 (0-5 years) was reference category

Table 28. Summary of AIC_c, AIC_c delta (Δ_i), AIC_c weight (w_i), cumulative Akaike weight (*acc* w_i), evidence ratio (ER), and parameter number (k) results for best-ranked regression models ($\Delta_i \leq 6$; here showing top 20) relating predictor variables to urban support for a clouded leopard (*Neofelis nebulosa*) reintroduction to Taiwan, 2017.

Model	**Candidate models**[a]	***k***	**AIC_c**	**Δ_i**	**w_i**	***acc*** **w_i**	**ER**
1	AIS8 + AG + OR + ED + RPIS	10	824.83	0.00	0.07	0.07	
2	AIS8 + AG + OR + ED	9	825.87	1.04	0.04	0.10	1.68
3	AIS8 + AG + OR + RPIS	6	826.47	1.64	0.03	0.13	2.27
4	AIS8 + AG + OR + ED + RPIS + KI	11	826.52	1.69	0.03	0.16	2.33
5	AIS8 + AG + OR + ED + RPIS + AN	11	826.62	1.79	0.03	0.19	2.45
6	AIS8 + AG + OR + ED + RPIS + HU	11	826.66	1.83	0.03	0.21	2.50
7	AIS8 + AG + OR + ED + RPIS	11	826.89	2.06	0.02	0.24	2.80
8	AIS8 + AG + OR + GE	5	827.05	2.22	0.02	0.26	3.03
9	AIS8 + AG + OR + ED + KI	10	827.23	2.39	0.02	0.28	3.31
10	AIS8 + AG + ED + RPIS	9	827.25	2.42	0.02	0.30	3.35
11	AIS8 + AG + ED + RPIS + HU	10	827.28	2.44	0.02	0.32	3.39
12	AIS8 + AG + OR + ED + HU	10	827.57	2.74	0.02	0.33	3.94
13	AIS8 + OR + RPIS	5	827.61	2.77	0.02	0.35	4.00
14	AIS8 + AG + OR + ED + AN	10	827.62	2.79	0.02	0.36	4.04
15	AIS8 + AG + OR + ED + GE	10	827.89	3.06	0.01	0.38	4.61
16	AIS8 + AG + OR + RPIS + KI	7	827.99	3.16	0.01	0.39	4.86
17	AIS8 + OR	4	828.09	3.25	0.01	0.41	5.09
18	AIS8 + AG + ED + HU	9	828.18	3.34	0.01	0.42	5.32
19	AIS8 + AG + OR + KI	6	828.22	3.39	0.01	0.43	5.45
20	AIS8 + AG + OR + RPIS + AN	7	828.27	3.43	0.01	0.44	5.57

[a] AG age, AIS8 attitudes index score, AN animal ownership, ED level of education, GE gender, HU hunter status, KI knowledge index score, OR environmental organization member, RPIS risk perception index score

Table 29. Summary results of full model averaging, including coefficients (β), adjusted standard errors (SE), 95% confidence intervals (CI), *z* values, *p* values, and relative importance weights, for parameters from candidate models regarding urban support for a clouded leopard (*Neofelis nebulosa*) reintroduction to Taiwan, 2017.

Parameter[a]	**Estimate (β)**[b]	**SE**	**CI**	***z* value**	***p* value**	**Importance w_i**
AIS8	1.29	0.22	(0.86, 1.72)	5.91	< .001	1.00
AG	0.30	0.25	(-0.19, 0.80)	1.20	.229	0.74
OR	0.58	0.53	(-0.47, 1.62)	1.08	.279	0.70
ED – Middle school[c]	0.29	0.63	(-0.94, 1.52)	0.46	.646	0.60
ED – High school	0.31	0.57	(-0.81, 1.43)	0.54	.588	"
ED – Bachelor's degree	0.60	0.72	(-0.80, 2.01)	0.84	.399	"
ED – Master's degree	0.80	0.88	(-0.92, 2.53)	0.91	.362	"
RPIS	0.21	0.25	(-0.27, 0.69)	0.84	.399	0.57
HU	0.16	0.37	(-0.56, 0.88)	0.44	.661	0.37
KI	0.05	0.15	(-0.23, 0.33)	0.34	.732	0.31
AN	0.03	0.12	(-0.20, 0.26)	0.25	.804	0.29
GE - Male[d]	0.01	0.10	(-0.19, 0.21)	0.08	.941	0.26
CI – Taichung[e]	0.02	0.11	(-0.18, 0.23)	0.21	.836	0.14
CI – Taipei/ New Taipei	0.01	0.09	(-0.18, 0.19)	0.07	.948	"
CH – 1[f]	0.04	0.13	(-0.21, 0.28)	0.29	.773	0.13
CH – 2	0.03	0.13	(-0.22, 0.28)	0.24	.812	"
CH – 3	0.07	0.28	(-0.48, 0.62)	0.25	.801	"
DU – 2[g]	0.02	0.14	(-0.25, 0.29)	0.14	.890	0.06
DU – 3	0.01	0.12	(-0.22, 0.24)	0.08	.938	"
DU – 4	0.01	0.10	(-0.19, 0.21)	0.14	.892	"
OC – Business[h]	0.03	0.20	(-0.36, 0.42)	0.17	.864	0.04
OC – Education	0.07	0.38	(-0.67, 0.81)	0.19	.849	"
OC – Government	0.04	0.25	(-0.44, 0.53)	0.17	.863	"
OC – Medicine	0.05	0.27	(-0.49, 0.58)	0.17	.862	"
OC – Other	0.03	0.20	(-0.35, 0.42)	0.17	.865	"
OC – Retail/ service	0.03	0.19	(-0.33, 0.39)	0.16	.871	"
OC – Self employed	0.04	0.24	(-0.42, 0.51)	0.17	.862	"
OC – Student	0.01	0.13	(-0.25, 0.27)	0.06	.953	"
OC – Tourism	-0.01	0.17	(-0.34, 0.32)	0.04	.969	"
OC – Unemployed	0.02	0.13	(-0.25, 0.28)	0.11	.911	"

[a] AG age, AIS8 attitudes index score, AN animal ownership, CH number of household children, CI city of residence, DU duration of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OC occupation, OR environmental organization member, RPIS risk perception index score
[b] Effect sizes have been standardized by 2 standard deviations.
[c] Elementary school level of education was reference category
[d] Female was reference category
[e] Kaohsiung city was reference category
[f] No household children was reference category
[g] Duration of residence 1 (0-5 years) was reference category
[h] Agriculture was reference category

Table 30. Summary of AIC_c, AIC_c delta (Δ_i), AIC_c weight (w_i), cumulative Akaike weight (*acc* w_i), evidence ratio (ER), and parameter number (*k*) results for best-ranked regression models ($\Delta_i \leq 6$; here showing top 20) relating predictor variables to urban support for a clouded leopard (*Neofelis nebulosa*) reintroduction to the Tawushan Nature Reserve, Taiwan, 2017.

Model	Candidate models[a]	*k*	AIC_c	Δ_i	w_i	*acc* w_i	ER
1	AIS8 + OR	4	712.52	0.00	0.02	0.02	
2	AIS8 + OR + AG	5	712.56	0.04	0.02	0.05	1.02
3	AIS8 + OR + CH	7	713.31	0.79	0.02	0.07	1.49
4	AIS8 + OR + AG + ED	9	713.35	0.83	0.02	0.08	1.51
5	AIS8 + OR + AG + CH	8	713.36	0.84	0.02	0.10	1.52
6	AIS8 + OR + AG + RPIS	6	713.82	1.29	0.01	0.11	1.91
7	AIS8 + OR + RPIS	5	713.83	1.31	0.01	0.12	1.92
8	AIS8 + OR + AG + CH + ED	12	714.04	1.52	0.01	0.14	2.14
9	AIS8 + OR	5	714.14	1.62	0.01	0.15	2.25
10	AIS8 + AG + AN	4	714.18	1.66	0.01	0.16	2.29
11	AIS8 + OR + AG + KI	6	714.27	1.75	0.01	0.17	2.40
12	AIS8 + OR + AG + HU	6	714.29	1.77	0.01	0.18	2.42
13	AIS8	3	714.30	1.77	0.01	0.19	2.43
14	AIS8 + OR + KI	5	714.31	1.78	0.01	0.20	2.44
15	AIS8 + OR + ED	8	714.32	1.80	0.01	0.21	2.46
16	AIS8 + OR + AG + ED + RPIS	10	714.39	1.87	0.01	0.22	2.54
17	AIS8 + OR + AG + AN	6	714.42	1.90	0.01	0.23	2.59
18	AIS8 + AG + AG + ED	8	714.46	1.94	0.01	0.24	2.63
19	AIS8 + OR + HU	5	714.48	1.96	0.01	0.25	2.66
20	AIS8 + OR + GE	5	714.56	2.04	0.01	0.26	2.77

[a] AG age, AIS8 attitudes index score, AN animal ownership, CH number of household children, ED level of education, GE gender, HU hunter status, KI knowledge index score, OR environmental organization member, RPIS risk perception index score

Table 31. Summary results of full model averaging, including coefficients (β), adjusted standard errors (SE), 95% confidence intervals (CI), *z* values, *p* values, and relative importance weights, for parameters from candidate models regarding urban support for a clouded leopard (*Neofelis nebulosa*) reintroduction to the Tawushan Nature Reserve, Taiwan, 2017.

Parameter[a]	Estimate (β)[b]	SE	CI	*z* value	*p* value	Importance w_i
AIS8	1.34	0.22	(0.91, 1.76)	6.14	< .001	1.00
OR	0.58	0.58	(-0.55, 1.71)	1.00	.317	0.67
AG	0.17	0.22	(-0.26, 0.61)	0.78	.437	0.54
CH – 1[c]	0.21	0.30	(-0.38, 0.79)	0.69	.489	0.41
CH – 2	0.16	0.27	(-0.37, 0.70)	0.59	.555	"
CH – 3	0.31	0.57	(-0.81, 1.43)	0.54	.591	"
ED – Middle school[d]	-0.12	0.53	(-1.17, 0.92)	0.23	.817	0.37
ED – High school	0.11	0.49	(-0.85, 1.08)	0.23	.817	"
ED – Bachelor's degree	0.21	0.55	(-0.86, 1.28)	0.39	.694	"
ED – Master's degree	0.37	0.72	(-1.03, 1.78)	0.52	.601	"
RPIS	0.07	0.17	(-0.27, 0.41)	0.43	.668	0.35
AN	-0.03	0.13	(-0.27, 0.22)	0.23	.817	0.29
KI	0.03	0.14	(-0.24, 0.31)	0.24	.807	0.29
HU	-0.02	0.27	(-0.55, 0.52)	0.06	.952	0.28
GE – Male[e]	0.00	0.11	(-0.21, 0.21)	0.03	.978	0.26
CI – Taichung[f]	-0.01	0.10	(-0.20, 0.19)	0.06	.949	0.14
CI – Taipei/ New Taipei	-0.03	0.12	(-0.26, 0.21)	0.22	.825	"
DU – 2[g]	-0.01	0.13	(-0.25, 0.24)	0.05	.963	0.06
DU – 3	0.00	0.12	(-0.24, 0.23)	0.02	.984	"
DU – 4	0.01	0.10	(-0.18, 0.20)	0.09	.929	"
OC – Business[h]	0.01	0.12	(-0.23, 0.25)	0.09	.926	0.01
OC – Education	0.02	0.20	(-0.37, 0.41)	0.10	.921	"
OC – Government	0.01	0.14	(-0.27, 0.29)	0.09	.928	"
OC – Medicine	0.02	0.18	(-0.33, 0.36)	0.09	.925	"
OC – Other	0.01	0.13	(-0.24, 0.26)	0.09	.926	"
OC – Retail/ service	0.01	0.12	(-0.22, 0.24)	0.09	.929	"
OC – Self employed	0.01	0.12	(-0.23, 0.25)	0.09	.929	"
OC – Student	0.00	0.08	(-0.16, 0.17)	0.05	.959	"
OC – Tourism	0.01	0.13	(-0.25, 0.27)	0.07	.941	"
OC – Unemployed	0.00	0.07	(-0.14, 0.15)	0.05	.959	"

[a] AG age, AIS8 attitudes index score, AN animal ownership, CH number of household children, CI city of residence, DU duration of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OC occupation, OR environmental organization member, RPIS risk perception index score
[b] Effect sizes have been standardized by 2 standard deviations
[c] No household children was reference category
[d] Elementary school level of education was reference category
[e] Female was reference category
[f] Kaohsiung city was reference category
[g] Duration of residence 1 (0-5 years) was reference category
[h] Agriculture was reference category

Table 32. Summary of AIC_c, AIC_c delta (Δ_i), AIC_c weight (w_i), cumulative Akaike weight (*acc* w_i), evidence ratio (ER), and parameter number (*k*) results for best-ranked regression models ($\Delta_i \leq 6$; here showing top 20) relating predictor variables to urban respondents' willingness-to-pay to reintroduce and maintain a healthy population of clouded leopards (*Neofelis nebulosa*) in Taiwan, 2017.

Model	Candidate models[a]	*k*	AIC_c	Δ_i	w_i	*acc* w_i	ER
1	AIS8 + ED + HU + OR + KI	10	827.12	0.00	0.02	0.02	
2	AIS8 + ED + HU + OC + KI	19	827.53	0.41	0.01	0.03	1.23
3	AIS8 + ED + HU + KI	9	827.56	0.43	0.01	0.04	1.24
4	AIS8 + ED + HU + OC + OR + KI	20	827.79	0.67	0.01	0.05	1.40
5	AIS8 + ED + HU + OC + KI + CI	21	827.79	0.67	0.01	0.07	1.40
6	AIS8 + HU + OC + OR + KI + CI	18	827.93	0.81	0.01	0.08	1.50
7	AIS8 + OC + OR + KI + CI	17	828.00	0.88	0.01	0.09	1.55
8	AIS8 + HU + OC + KI + CI	17	828.06	0.94	0.01	0.10	1.60
9	AIS8 + ED + HU + OC + OR + KI + CI	22	828.18	1.05	0.01	0.11	1.69
10	AIS8 + ED + HU + OR + KI + GE	11	828.28	1.16	0.01	0.12	1.79
11	AIS8 + ED + HU + OR	9	828.34	1.22	0.01	0.13	1.84
12	AIS8 + ED + OC + OR + KI	19	828.43	1.31	0.01	0.13	1.92
13	AIS8 + ED + HU + OR + KI + CI	12	828.51	1.39	0.01	0.14	2.00
14	AIS8 + ED + HU + OR + KI + AN	11	828.71	1.58	0.01	0.15	2.21
15	AIS8 + ED + OR + KI	9	828.80	1.67	0.01	0.16	2.31
16	AIS8 + ED + HU + KI + AN	10	828.83	1.70	0.01	0.16	2.35
17	AIS8 + ED + OC + OR + KI + CI	21	828.83	1.71	0.01	0.17	2.35
18	AIS8 + ED + HU + OC	18	828.84	1.72	0.01	0.18	2.36
19	AIS8 + ED + HU + KI + GE	10	828.85	1.73	0.01	0.19	2.37
20	AIS8 + ED + HU + KI + CI	11	828.87	1.75	0.01	0.19	2.40

[a] AIS8 attitudes index score, AN animal ownership, CI city of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OC occupation, OR environmental organization member

Table 33. Summary results of full model averaging, including coefficients (β), adjusted standard errors (SE), 95% confidence intervals (CI), *z* values, *p* values, and relative importance weights, for parameters from candidate models regarding urban respondents' willingness-to-pay to reintroduce and maintain a healthy population of clouded leopards (*Neofelis nebulosa*) in Taiwan, 2017.

Parameter[a]	**Estimate (β)**[b]	**SE**	**CI**	***z* value**	***p* value**	**Importance w_i**
AIS8	0.69	0.25	(0.19, 1.19)	2.70	0.007	0.98
ED – Middle school[c]	-1.11	1.21	(-3.49, 1.27)	0.91	0.362	0.72
ED – High school	-1.39	1.28	(-3.90, 1.12)	1.08	0.279	"
ED – Bachelor's degree	-1.15	1.19	(-3.47, 1.18)	0.97	0.334	"
ED – Master's degree	-0.57	1.09	(-2.70, 1.56)	0.53	0.600	"
HU	0.68	0.64	(-0.57, 1.92)	1.07	0.285	0.69
OC – Business[d]	0.40	0.57	(-0.72, 1.52)	0.69	0.489	0.62
OC – Education	0.74	0.83	(-0.88, 2.35)	0.89	0.372	"
OC – Government	0.56	0.72	(-0.86, 1.98)	0.77	0.441	"
OC – Medicine	0.38	0.68	(-0.96, 1.72)	0.55	0.580	"
OC – Other	-0.18	0.49	(-1.14, 0.79)	0.36	0.722	"
OC – Retail/ service	0.17	0.51	(-0.82, 1.17)	0.34	0.736	"
OC – Self employed	0.00	0.52	(-1.01, 1.01)	0.01	0.996	"
OC – Student	-0.14	0.55	(-1.22, 0.94)	0.25	0.803	"
OC – Tourism	-0.51	0.79	(-2.05, 1.03)	0.65	0.515	"
OC – Unemployed	-0.16	0.50	(-1.14, 0.82)	0.32	0.752	"
OR	0.50	0.55	(-0.58, 1.57)	0.91	0.365	0.62
KI	-0.24	0.26	(-0.76, 0.27)	0.92	0.357	0.61
CI – Taichung[e]	0.12	0.21	(-0.29, 0.53)	0.57	0.567	0.48
CI – Taipei/ New Taipei	0.25	0.31	(-0.36, 0.85)	0.79	0.427	"
GE – Male[f]	0.05	0.14	(-0.22, 0.32)	0.39	0.698	0.33
AN	0.04	0.12	(-0.20, 0.28)	0.29	0.770	0.29
AG	-0.01	0.12	(-0.24, 0.22)	0.08	0.940	0.27
RPIS	-0.01	0.12	(-0.25, 0.23)	0.10	0.924	0.27
CH – 1[g]	0.06	0.16	(-0.26, 0.37)	0.35	0.727	0.17
CH – 2	-0.03	0.12	(-0.27, 0.22)	0.21	0.832	"
CH – 3	-0.01	0.22	(-0.44, 0.41)	0.07	0.948	"
DU – 2[h]	-0.01	0.14	(-0.29, 0.27)	0.06	0.953	0.08
DU – 3	-0.02	0.17	(-0.35, 0.30)	0.15	0.880	"
DU – 4	-0.03	0.15	(-0.33, 0.27)	0.20	0.845	"

[a] AG age, AIS8 attitudes index score, AN animal ownership, CI city of residence, CH number of household children, DU duration of residence, ED level of education, GE gender, HU hunter status, KI knowledge index score, OC occupation, OR environmental organization member, RPIS risk perception index score

[b] Effect sizes have been standardized by 2 standard deviations.

[c] Elementary school level of education was reference category

[d] Agriculture was reference category

[e] Kaohsiung city was reference category
[f] Female was reference category
[g] No household children was reference category
[h] Duration of residence 1 (0-5 years) was reference category

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APPENDICES

APPENDIX A

RURAL SURVEY INSTRUMENT

您對台灣雲豹的看法

本問卷想要知道您對台灣雲豹和生態的看法。

您被邀請填寫問卷是因為您居住鄰近於大武山區。本問卷為自願性填寫，您的回覆與意見非常重要，本問卷將只用於學術研究，希望提供適合大武地區民眾對於生態和生態旅遊的需求。

本問卷將花大約 10 分鐘的時間填寫。大多數的問題有選項可以勾選，請勾選其中一個選項。本問卷之答案沒有對與錯，請提供您的個人看法。我們感謝您的協助以及願意提供您寶貴的看法。如果有任何疑問請聯絡野生生態研究室：03-8635178。

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本問卷為美國南伊利諾大學 Carbondale 校區（SIUC）的野生生態研究室設計。不需要提供個人姓名，您所提供的資料將受到保護。您填寫本問卷為自願的。若您有任何意見與看法，請填寫於本問卷之末端。本問卷經由 SIUC 人類研究委員會審查與核准。若您對本問卷或是您的權益有任何疑問，請聯絡委員會的主席，聯絡方式: Office of Sponsored Projects Administration, Southern Illinois University, Carbondale, IL 62901-4709. 電話:+1 (618) 453-4533. E-mail: siuhsc@siu.edu。

您在參與此問卷的過程中，可能將被問是否願意被錄音，若您願意的話，我們將利用手機錄音來紀錄您的答覆，本錄音將用於研究用，目的為精確的紀錄您的意見與看法。在錄音的過程中您不需要提供您的姓名，本錄音將於資料收集完成以後銷毀。我們不會複製任何錄音檔，只有專業的翻譯人員以及研究團隊能使用。若您同意錄音，請將於下方簽名。

我了解我的回答將被全程錄音：

簽名:____________________________

第一部分:知識、態度以及看法
SECTION 1: KNOWLEDGE AND ATTITUDES

1) 台灣現在有雲豹嗎？
   Does the clouded leopard currently live in Taiwan?

   ☐有 Yes ☐否 No

2) 您有親眼在野外看過雲豹嗎？
   Have you ever seen a clouded leopard in Taiwan in the wild?

   ☐有，10年以內 (1-10年) Yes, within the last 10 years

   ☐有， 超過10年 (>10年) Yes, 10 years ago or more

   ☐沒有 No, never

3) 您有認識親眼在野外見過雲豹的人？或者聽說過有人親眼在野外見過雲豹？
   Have you known someone who has seen or heard about someone who has seen a clouded leopard in Taiwan in the wild?

   ☐有，10年以內 (1-10年) Yes, within the last 10 years

   ☐有， 超過10年 (>10年) Yes, 10 years ago or more

   ☐沒有 No, never

若您在第 2)、3) 的問題中回答有，請在下方提供細節（地點／時間）。
If you answered yes to questions 2 or 3, please provide details (where/ when) in the box below.

- -

請閱讀下列問題並從下列 3 個選項中勾選一個（無意見包括：不知道）

INSTRUCTIONS: Please indicate your level of agreement with each statement regarding your knowledge of clouded leopard behavior.

	同意 **Agree** **3.**	無意見 **Neutral** **2.**	不同意 **Disagree** **1.**
一般來說，雲豹會避免與人類接觸 Clouded leopards typically avoid contact with people.	☐	☐	☐
雲豹不會攻擊人類 Clouded leopards will not attack people.	☐	☐	☐
雲豹不會破壞農作物 Clouded leopards do not damage the crops of farmers.	☐	☐	☐
雲豹會在自然生態中幫助維持獵物族群的平衡 Clouded leopards help maintain prey populations in balance with their natural environment.	☐	☐	☐

- -

請閱讀下列問題並從下列 3 個選項中勾選一個

INSTRUCTIONS: Please indicate your level of agreement with each statement regarding your attitudes towards clouded leopards.

	同意 **Agree** **3.**	無意見 **Neutral** **2.**	不同意 **Disagree** **1.**
我喜歡雲豹 I like clouded leopards.	☐	☐	☐
雲豹在任何地方都有生存的權利 Clouded leopards have the right to exist wherever they may occur.	☐	☐	☐
有雲豹存在代表生態環境很健康 The presence of clouded leopards is a sign of a healthy environment.	☐	☐	☐
雲豹對於人類沒有任何威脅 Clouded leopards are not a threat to people.	☐	☐	☐
雲豹對於家畜沒有任何威脅（例如牛、羊、豬、雞、鴨等） Clouded leopards are not a threat to livestock.	☐	☐	☐
雲豹對於寵物沒有任何威脅 Clouded leopards are not a threat to pets.	☐	☐	☐
我不害怕雲豹 I am not afraid of clouded leopards.	☐	☐	☐
如果在野外能看到雲豹，我會很高興 I would be happy if I saw a clouded leopard in the wild.	☐	☐	☐
有雲豹存在並不會明顯的減少人類狩獵的機會 The presence of clouded leopards will not have a significant impact on hunting opportunities for people.	☐	☐	☐
雲豹的保育對我來說很重要 Clouded leopard conservation and management is important to me.	☐	☐	☐
有雲豹存在會增加旅遊和工作機會 The presence of clouded leopards in Taiwan would increase tourism and create jobs.	☐	☐	☐

- -

雲豹在東南亞還有野生的族群
The clouded leopard that occurred in Taiwan still occurs elsewhere in other parts of Asia.

請閱讀下列問題並從 3 個選項中勾選一個
INSTRUCTIONS: Please indicate your level of agreement with each statement regarding a possible reintroduction of clouded leopards in Taiwan.

	同意 **Agree** **3.**	無意見 **Neutral** **2.**	不同意 **Disagree** **1.**
我支持引進雲豹在台灣重建雲豹野生族群 I support bringing clouded leopards back to Taiwan through reintroduction.	☐	☐	☐
我支持引進雲豹在大武山自然保留區重建雲豹野生族群 I support bringing clouded leopards back to Taiwan specifically in the Tawushan Nature Reserve through reintroduction.	☐	☐	☐
我支持禁獵雲豹 I support a hunting ban on clouded leopards in Taiwan.	☐	☐	☐
我支持持續保存大武山自然保留區 I support the continued existence and legal protection of the Tawushan Nature Reserve.	☐	☐	☐

- -

請只選擇以下三個問題中的一個回答
You must choose only one of the following three questions to answer

- 若您支持在台灣引入並重建雲豹的野生族群，您每年願意捐出多少錢來做這件事？
  How much would you be willing to pay per year to help reintroduce and maintain a healthy population of clouded leopards in Taiwan? Payment would be given in the form of a charitable donation.

  ☐0 元 ☐150 元 ☐300 元 ☐1 千元 ☐3 千元 ☐1 萬元

- 若您不支持在台灣引入並重建雲豹的野生族群，您每年願意捐出多少錢來阻止牠們被重新引入台灣？
  If you do not support clouded leopards being reintroduced to Taiwan, how much would you be willing to pay per year to keep them from being reintroduced to Taiwan? Payment would be given in the form of a charitable donation.

  ☐0 元 ☐150 元 ☐300 元 ☐1 千元 ☐3 千元 ☐1 萬元

- ☐不知道／無法回答以上的問題
  Not sure

你有幾成把握會每年捐這個金額：

With what degree of certainty are you willing to make this annual payment?

絕對會 **Definitely**	可能會 **Probably**	不確定 **Not Sure**	可能不會 **Probably Not**	絕對不會 **Definitely Not**
☐	☐	☐	☐	☐

- -

請閱讀下列問題並從 3 個選項中勾選一個
INSTRUCTIONS: Please indicate your level of agreement with each statement regarding wildlife living in Taiwan.

	同意 **Agree** **3.**	無意見 **Neutral** **2.**	不同意 **Disagree** **1.**
我喜歡台灣黑熊 I like Formosan black bears?	☐	☐	☐
我支持禁獵台灣黑熊 I support a hunting ban on Formosan black bears in Taiwan.	☐	☐	☐
台灣黑熊不會破壞農作物或殺害家畜 Formosan black bears do not damage the crops of farmers or kill livestock.	☐	☐	☐
我喜歡台灣長鬃山羊 I like Formosan serows.	☐	☐	☐
台灣長鬃山羊不會跟家畜競爭食物 Formosan serows do not compete with livestock for food.	☐	☐	☐
我希望台灣長鬃山羊的族群數量增加 I would support an increasing population of Formosan serows.	☐	☐	☐
我喜歡台灣獼猴 I like Formosan macaques.	☐	☐	☐
台灣獼猴不會破壞農作物 Formosan macaques do not damage the crops of farmers.	☐	☐	☐
我希望台灣獼猴的族群數量增加 I would support an increasing population of Formosan macaques.	☐	☐	☐
我喜歡山羌 I like Reeve’s muntjacs.	☐	☐	☐
山羌不會與家畜競爭食物 Reeve’s muntjacs do not compete with livestock for food.	☐	☐	☐
我希望山羌的族群數量增加 I would support an increasing population of Reeve’s muntjacs.	☐	☐	☐

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性別 Sex: ☐男性 Male ☐女性 Female

年齡 Age: ☐18-25 ☐26-35 ☐36-45 ☐46-55 ☐56-65 ☐66-75 ☐76+

教育 Education:

☐未受教育 No school ☐小學畢業 Elementary school graduate

☐國中畢業 Junior high school graduate ☐高中畢業 High school graduate

☐大學四年畢業 University 4 year degree ☐研究所以上 Master's degree or higher

職業 Occupation:

☐農業/農民 Agriculture/ farmer ☐旅遊業 Tourism ☐教育/老師 Education/ teacher

☐學生 Student ☐商業 Business/ commerce ☐零售/服務 Retail/ service

☐自顧/老闆 Self employed/ owner ☐醫學 Medicine ☐無業/退休 Unemployed/ retired

☐軍/警/公 Government official/ worker (military, police, etc) ☐其他 Other

您的家庭年收入 Household income per year:

☐無回答 Prefer not to answer ☐≤ 40 萬 ☐40-80 萬 ☐80-120 萬 ☐120-160 萬 ☐160-200 萬 ☐> 200 萬

家中有未滿 18 歲的小孩 Children <18 years old in household: ☐0 ☐1 ☐2 ☐≥3

您有養家禽家畜嗎？Do you own livestock? ☐是 Yes ☐否 No

您有養寵物嗎？Do you own a pet? ☐是 Yes ☐否 No

您經常打獵或曾經經常打獵嗎? Are you a hunter or used to be a hunter? ☐是 Yes ☐否 No
若勾選是，請選擇打獵的原因（可多選）If yes, please indicate for what reason you hunt by checking the appropriate boxes below. You may check more than one：

☐休閒運動 Sport ☐食用 Food ☐保護家畜 Protecting livestock ☐販賣 Selling

您是環保組織的會員嗎? Are you a member of an environmental organization? ☐是 Yes ☐否 No

您是：Are you a: ☐魯凱族 Rukai Tribe member ☐排灣族 Paiwan Tribe member ☐_____________族 Tribe member ☐漢族 Han ☐其他 Other _____________

如果您是原住民，祖居地是：If you are an indigenous member, where are your ancestors from: _____________市 City _____________鎮／鄉 Township ________________村 Village。

您在祖居地居住多久? How long have/had you lived in the above location ☐0-5 年 years ☐6-10 年 years ☐11-15 年 years ☐16 年以上 more than 16 years

您在本地區居住多久? How long have you lived in the present location? ☐0-5 年 years

☐6-10 年 years ☐11-15 年 years ☐16 年以上 more than 16 years.

社區名稱：The place where you are living now: ____________市 City ____________鎮／鄉 Township _______________村 Village。

其他意見: Additional comments:

VITA

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University of Massachusetts, Amherst
Bachelor of Arts, Communications, May 2006
Master of Education, Secondary History Education, May 2008

Thesis Paper Title:
Planning the Reintroduction of the Clouded Leopard (*Neofelis nebulosa*) to Taiwan: An Assessment of Attitudes and Potential Support

Major Professor: Clayton K. Nielsen

Publications:

- Nielsen, C. K., C. R. Bottom, R. G. Tebo, and E. Greenspan. 2018. Habitat overlap among bobcats (Lynx rufus), coyotes (Canis latrans), and Wild Turkeys (Meleagris gallopavo) in an agricultural landscape. Canadian Journal of Zoology 96:486–496.
- Greenspan, E., C. K. Nielsen, K. W. Cassel. 2018. Potential distribution of coyotes (Canis latrans), Virginia opossums (Didelphis virginiana), striped skunks (Mephitis mephitis), and raccoons (Procyon lotor) in the Chicago Metropolitan Area. Urban Ecosystems 21:983-997.