Socio-economic factors influencing attitudes of landowners towards free-roaming cheetahs

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The largest area of the South African cheetah (*Acinonyx jubatus*) distribution occurs outside formally protected areas, making cheetahs vulnerable to conflict-related killings. This conflict is assumed to be related to negative attitudes of landowners towards predators. Our study assessed the socio-economic factors influencing landowner attitudes towards cheetahs on private properties adjacent to the Kruger National Park (Kruger), South Africa. We used structured questionnaires to interview 199 landowners. Attitudes of landowners towards cheetahs were generally positive; 58% of landowners had attitude index scores between eight and 11. However, 11% had fairly negative or low scores (scores between –2 and 4). First language, land use and respondent knowledge of cheetahs were key drivers of attitude. English speaking landowners (49.8%) were more likely to display positive attitudes towards cheetahs than Afrikaans first-language speakers (46.8%). In addition, the likelihood of having a more positive attitude increased significantly as respondent knowledge of cheetahs increased. Attitudes were also influenced by land use, with wildlife ranchers or ecotourism ventures having a significantly higher probability of having more positive attitudes than livestock farmers. With the Kruger being a stronghold for cheetah conservation in Africa, and large carnivores being vulnerable to edge effects in protected areas, it is important to understand the factors driving conflict so that mitigation efforts can be targeted for maximum impact.

Key words: *Acinonyx jubatus*, attitude index, human–wildlife conflict, Kruger National Park.

INTRODUCTION

Human–wildlife conflict related killing is a world-wide threat to carnivores, contributing to population declines in many species (Weber & Rabinowitz 1996). Conflict between humans and carnivores is often driven by socio-economic factors because the resources involved (*e.g.* livestock/game) have high monetary, nutritional or recreational value (Graham, Beckerman & Thirgood, 2005; Thavarajah, 2008). Often, landowners kill carni- vores preemptively in an attempt to protect their stock and to avoid the perceived negative economic impact caused by predators (Macdonald & Sillero-Zubiri, 2002; Dickman, 2010). The severity of persecution can vary from *ad hoc* poisoning (Kissui, 2008), to government-sponsored eradication programmes (Ripple & Beschta, 2012).

As human populations continue to encroach on protected areas, people will inevitably play a significant role in either the conservation or demise of locally occurring predators (Woodroffe, Lindsey, Romañach, Stein, Symon & Ranah, 2005). For example, in South Africa, anecdotal information points to an increase in cheetah (*Acinonyx jubatus*) distribution over the past three decades

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(Marnewick, Beckhelling, Cilliers, Lane, Mills *et al.*, 2007), which has been attributed to the transformation of domestic livestock ranching properties to more profitable game ranching (Lindsey, du Toit & Mills, 2005; Marnewick *et al.*, 2007). Game ranching properties may be more favourable for cheetahs due to increased natural prey and a lack of competing predators (*e.g.* lions, *Panthera leo*). However, due to most game ranching properties stocking high value game, it is likely that this may also increase persecution. For example, in the Thabazimbi District of Limpopo, 44% of collared cheetahs were shot by landowners (Marnewick & Somers 2015) while in Botswana, 55% of collared cheetahs were shot on private land (Houser *et al.* 2009). The survival of cheetahs outside protected areas is thus dependent on people's attitudes towards them; people with negative attitudes are more likely to persecute cheetahs, while positive and more tolerant behaviour will promote cheetah conservation.

Approximately 1000 cheetahs reside in South Africa, of which >300 are found in fenced reserves (Endangered Wildlife Trust, unpubl. data), between 329 and 495 in the Kruger National Park (Marnewick *et al.* 2014), about 80 in the Kgalagadi Transfrontier Park (M.G.L. Mills pers. comm.) and an estimated 500 are free-roaming outside of protected areas (Marnewick *et al.*, 2007). The free-roaming cheetah population is distributed in the northern parts of the Northern Cape and North West provinces and the northern, western and eastern parts of Limpopo, down to the southern border of the Kruger National Park (hereafter referred to as Kruger; Marnewick *et al.* 2007). While Kruger is a conservation stronghold for cheetahs in South Africa, cheetahs can move through the generally porous western and southern boundaries of the park and traverse adjoining private land, often coming into conflict with landowners (Watermeyer, Beverley & Marnewick, 2011).

The long-term survival of the free-roaming cheetah population on private land depends on the attitudes and tolerance of landowners towards cheetahs on their properties (Lindsey *et al.*, 2005). Therefore, an understanding of the drivers of landowner attitudes is vital for guiding conservation action (Thorn *et al.*, 2014), especially for the design of more effective conflict-mitigation techniques. Gaining such an understanding can be achieved by assessing the socio-economic variables which may influence landowner attitudes

(Nilsen *et al.*, 2007; Romañach *et al.*, 2007). These variables can include a person's education level (Lagendijk & Gusset, 2008), land use (Romañach *et al.* 2007; Selebatso, Moe & Swenson, 2007), and culture (Selebatso *et al.*, 2007). For example, multiple studies (Selebatso *et al.*, 2007; Romañach, Lindsey & Woodroffe, 2010) have found that educated individuals are more supportive of carnivores and their conservation compared with individuals who have limited or no education, as educated individuals generally understand the important ecological role predators play. By contrast, older individuals are generally less tolerant and have more negative attitudes towards carnivores (Zimmerman *et al.*, 2005). Further, cultural upbringing has been linked to attitudes (Swanepoel, 2009; Page, Parker, Peinke & Davies-Mostert, 2015). For example, Swanepoel (2009) found that older Afrikaans respondents in the Waterberg (Limpopo province) were significantly more negative about leopards (*Panthera pardus*) than English respondents. A possible explanation could be that attitudes are formed early in life and Afrikaans households in South Africa often grow up with stronger anti-predator sentiments than those of English households (Swanepoel, 2009).

The aim of our study was to assess the socio-economic variables which best predicted landowner attitudes towards cheetahs outside and adjacent to the Kruger. In addition, we aimed to use these variables to provide meaningful conservation recommendations for cheetahs.

STUDY AREA

Our study was carried out along the southern and western boundaries of the Kruger, South Africa (Fig. 1). The southern boundary of Kruger is bordered by the Mpumalanga province and Swaziland while the western boundary borders the Limpopo province. Both of the boundaries of Kruger span a total of 750 km from north to south, encompassing an area of approximately 6200 km^2 (Watermeyer, 2012). The western portion of the study area (628 km) is dominated by private nature reserves, lodges and private wildlife ranching farms. The southern boundary fence stretches 122 km and is dominated by commercial sugar cane (*Saccharum* spp.) and fruit (citrus *Citrus* spp. and bananas *Musa* spp.) farmers (Watermeyer, 2012). The study area was limited to private land within a 35 km buffer of the southern and western boundary of Kruger (Watermeyer *et al.*, 2011).
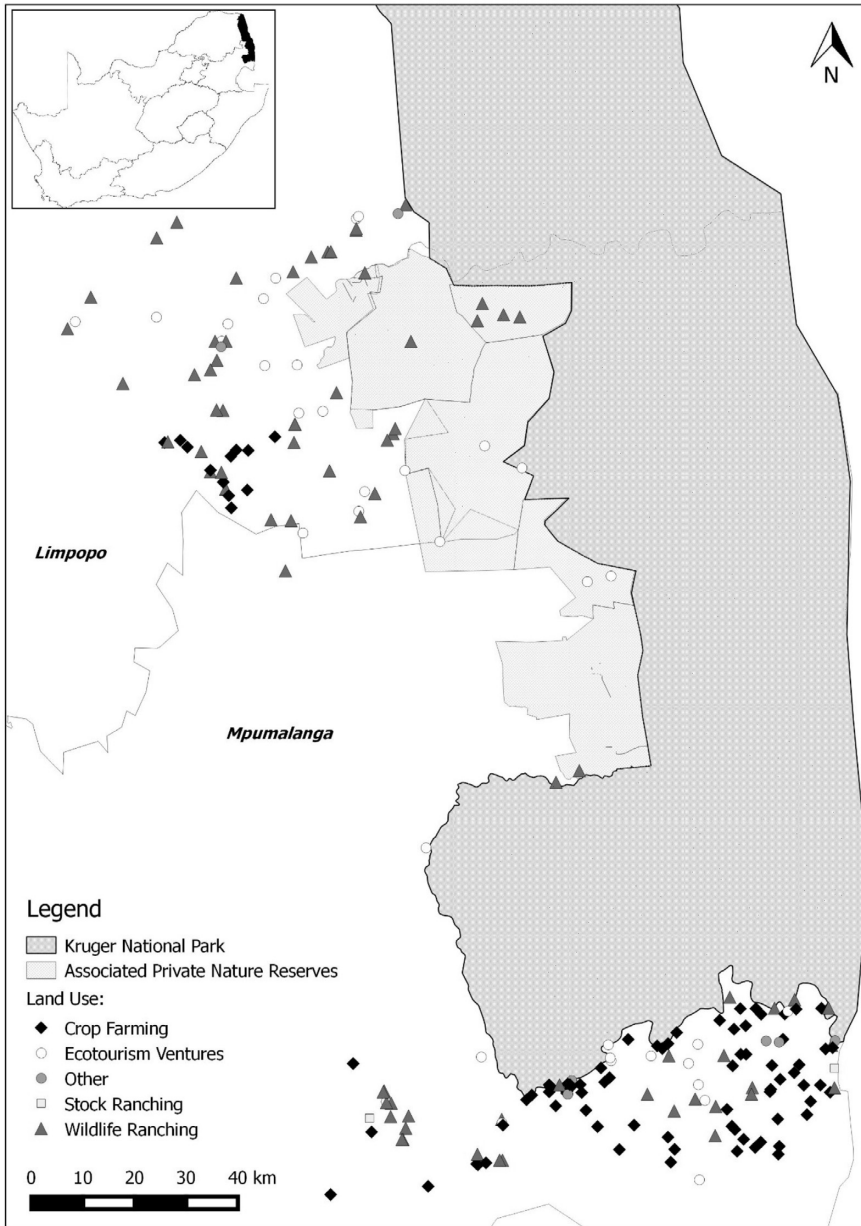
Fig. 1. The land use and property locations of respondents (*n* = 199) around the Kruger National Park (South Africa) who participated in the study

This buffer was based on the largest known home range size of cheetahs (700 km^2; Estes, 1993) in the Kruger. Given the expanse of the area around Kruger, the various land-use types, and the mixture of private and communal land, we limited our study to privately owned properties on the western and southern boundary of the Kruger. This was done to serve as a preliminary step for under-standing the study area, and the extent and drivers of conflict (see Watermeyer *et al.* 2011).

METHODS

Survey methods and questionnaire design

We used structured questionnaire interviews, comprising five sections, to gather data to deter-

mine the attitudes of respondents towards cheetahs between March 2010 and December 2011 (Appendix 1). Ethical clearance for the study was granted by the Rhodes University Ethical Standards Committee (clearance number: ZOOL-06-10). We aimed to survey all landowners within the study area. Surveys were completed opportunistically when landowners were available and there were no participants who refused to take part in the study (Watermeyer, 2012). Interviews were conducted at people's homes/farms or place of business. Where necessary we conducted interviews over the phone in order to accommodate as many landowners as possible in the survey area.

The first section of the questionnaire required respondents to comment on the structural elements of their properties and provide livestock and/or game information (providing numbers and listing the species occurring on their properties). We also asked respondents to indicate their land-use type. In instances where the respondent indicated multiple land uses, their most important economic activity defined the overall land use. We categorized land-use types into five general groups: crop farming, wildlife ranching (which included live game sale properties, trophy hunting, and biltong hunting), ecotourism ventures (wildlife estates, lodges and photographic tourism), domestic livestock farming and other (which included land that was involved in mining, or had no commercial use). The second section collected cheetah sightings

and frequency data and information on other predators, which occurred on the property. The third section was designed to gather data on the respondents' attitude towards cheetahs and other predators and was made up of a series of questions, which were used to generate an attitude index for each respondent (Table 1; Zimmerman *et al.*, 2005). The fourth section recorded respondents' personal information (*e.g.* age, gender, highest level of education, etc.). To generate a measure of respondent knowledge of cheetahs (the knowledge index), the fifth section consisted of four statements about cheetah biology and their conservation status upon which the respondent was asked to agree or disagree (*e.g.* 'Are cheetahs dangerous to humans?').

We used trichotomous questions (yes/no/maybe) to assign values to responses to generate attitude index scores (Cronbach's $\alpha = 0.51$; Anthony, 2007; Page *et al.* 2015), which we calculated by allocating values to the questions according to a positive (1), neutral (0) or negative (–1) response towards cheetahs (Table 1; Zimmerman *et al.*, 2005). For example, a response to the statement 'Cheetahs negatively impact your business/livelihood/profit' was awarded a score of +1 if the respondent answered no (indicating a positive attitude), 0 if they were unsure and –1 if they answered yes (indicating a negative attitude). We calculated the index for each respondent as the sum of the scores of all 11 attitude questions (Zimmermann *et al.*, 2005). The maximum value of the attitude index

Table 1. Questions and statements used to develop the attitude and knowledge indices in our study along the western and southern boundaries of the Kruger National Park, South Africa.

Attitude index

What is your feeling towards the presence of cheetahs on your property?
What is your general feeling towards cheetahs in the area?
You are more tolerant of cheetahs than your neighbours
Cheetahs negatively impact your business/livelihood
Cheetahs form an important part of the environment
You would be happier if cheetahs were completely absent from your property
Cheetahs should be protected
Cheetahs could produce tourism benefits for your business/community
You would like to see cheetahs in the bush
Cheetahs are culturally important to you
You would like to learn more about cheetahs

Knowledge index

Respondent could identify a cheetah
Cheetahs are dangerous to humans
Cheetahs are more common than lions
Cheetahs kill more than they require

was 11 (indicating positive attitudes) and the lowest value was –11 (indicating negative attitudes). We used the same method to construct the knowledge index (Cronbach's α = 0.27) which consisted of four statements, with a maximum score of 4 and a minimum of –4. We treated the knowledge index as a demographic variable in our analyses as it was a measure of the respondent's personal knowledge of the species.

Data analysis

We removed six respondents from the statistical analysis based on incomplete questionnaire information, leaving a total of 199 useable questionnaires. We conducted a multi-model analysis using Akaike's Information Criterion adjusted for small sample sizes (AICc; Burnham & Anderson, 2002). This was done to determine the effects of demographic [age, gender, education (primary, secondary, tertiary or unknown), language (English, Afrikaans or other)] and property variables [land use (wildlife ranching, ecotourism ventures, crop farming, livestock ranching, other), fencing (yes or no), belonging to a conservancy, position to Kruger (west or south), cheetah movement through property, and size] on the attitude index. We excluded two categorical variables (position in relation to Kruger and belonging to a conservancy) prior to analysis as they had similar means among their categories (Burnham & Anderson, 2002). Fencing type was also removed from the analysis as it was found to be co-linear with property size. Property size was then also removed as it was co-linear with land use (Makkonen *et al.*, 2012). We further removed stock/game losses from the analysis as not all respondents recorded this information and it is particularly challenging to accurately record on game ranches.

We used a generalized linear model (GLM; Codron *et al.*, 2007; Rowe, 2009; Motulsky, 2010; Symonds & Moussalli, 2010) to assess the effect of the individual and all possible combinations of the eight remaining variables on the attitude index. We identified 10 candidate models by using the *dredge* function in the MUMiN package of R (Bartoń, 2009). We re-ran the GLM on the highest-ranking model (Schoepf & Schradin, 2012) and tested for significant differences in the likelihood of respondent attitudes based on the tested variables (Schoepf & Schradin, 2012). We set statistical significance at 0.05 and analysed all data using R 3.0.2 Software (R Foundation for Statistical Computing, 2013).

RESULTS

Respondent characteristics

Of the 199 respondents, 95% were males. English was spoken by 50% of respondents, 47% spoke Afrikaans and the remaining 3% spoke other languages such as Tsonga, Portuguese or German. Most respondents (57%) had tertiary education, 16% had a secondary school education and 27% did not provide their education level. Average property size was 3616.33 ha (± S.D. 10721.59; range: 2.66 to 11 500 ha). Most properties (77%) did not form part of a conservancy. Most (86%) respondents owned either domestic livestock or game. Crop farming was the dominant land use in the survey area with 41% of properties under this land use. Wildlife ranching was the second most important land use (37%), followed by ecotourism ventures (19%). Domestic stock ranching activities made up the lowest percentage of land use (1%) and the remaining 2% of properties were considered as other land use.

Attitude and knowledge index

Attitudes of landowners were generally positive. The average attitude index score was 7.51 ± S.D. 2.65 (range: –2 to 11). Fifty-eight per cent of landowners had scores between eight and 11 while 11% had low-negative scores (scores between –2 and 4). Respondents with tertiary education had the most positive attitude indices (7.78 ± 2.67; Fig. 2). Males were slightly more positive (7.56 ± 2.60) towards cheetahs than females (6.54 ± 3.39). However, this is likely to be an artefact of the small sample size of females (*n* = 7). Respondents who had experienced cheetah movement through their property had a more positive attitude index than those without any movement (8.02 ± 2.44 and 7.21 ± 2.72, respectively; Fig. 2). The overall knowledge of landowners was fairly good; with an average score of 2.94 ± 1.36 (range: –1 to 4). Respondents with poorer knowledge scores were generally randomly distributed throughout the study area (Fig. 3). Most respondents (61%) had a score of four and only 22% of respondents had a knowledge score of 2 or less. These lower scores for attitude and knowledge are illustrated by the larger points on Fig. 3.

In the global model, the highest ranked model (AICc of 932.4) included knowledge, language and the land use of the respondent (Table 2). The GLM revealed that respondents with greater knowledge of cheetahs were significantly more
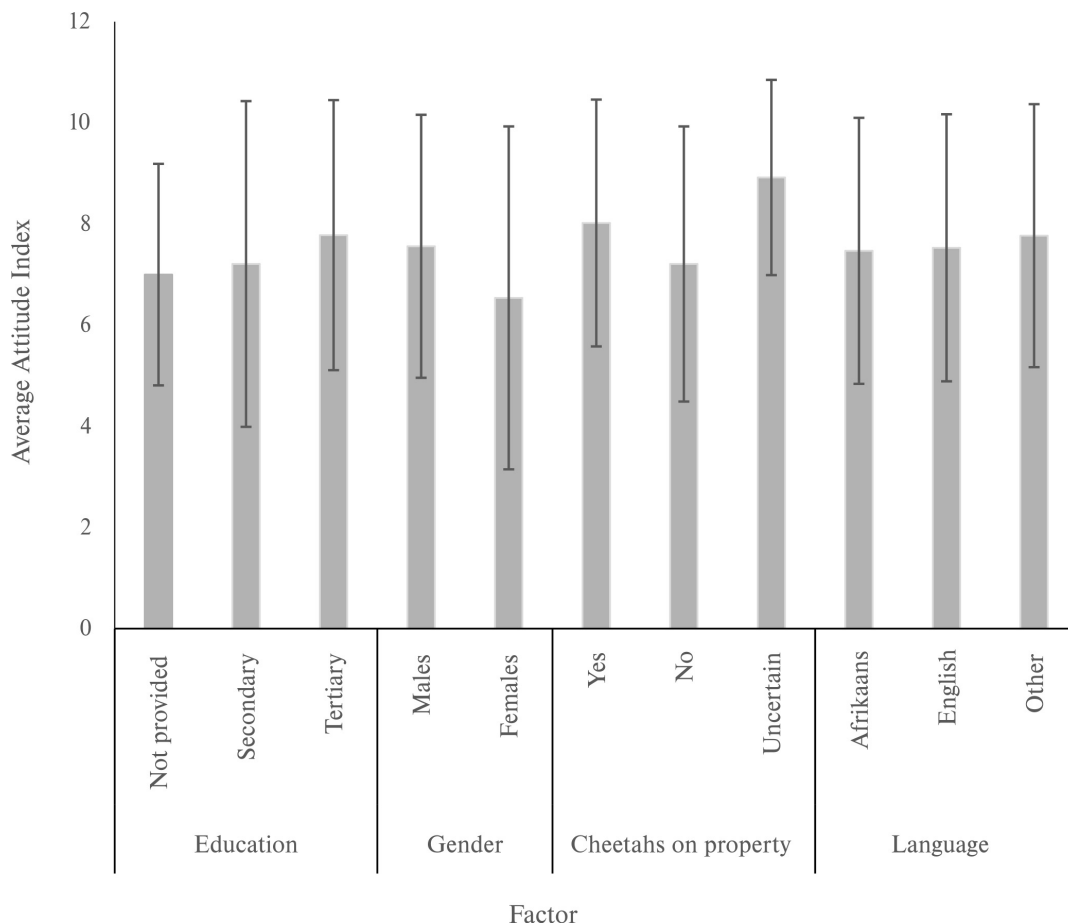
Fig. 2. The average (± S.D.) attitude index of respondents (*n* = 199) within four socio-economic factors on properties adjacent to the Kruger National Park, South Africa.

likely to have more positive attitudes (Table 3). For example, respondents who scored the highest possible attitude score (11), received the highest average knowledge index (3.40 ± 0.98), while respondents who had an attitude score of 0 had an average knowledge score of 0 (± 0).

Wildlife ranching properties had the most positive attitude indices (8.01 ± 2.93), followed by ecotourism properties (7.83 ± 2.32). Domestic livestock ranching and crop farming had the poorest attitude scores (4.33 ± 3.51 and 6.99 ± 2.40, respectively). The GLM revealed that domestic livestock ranching respondents had a significantly higher probability of having poorer attitudes than crop farmers (Table 3). If landowners practiced livestock ranching, it was likely that their attitude index would decrease by a factor of 3.4 (Table 3). By contrast, practicing ecotourism activities, attitude index scores were likely to

increase by 0.98. In addition, English speakers were significantly more likely to have more positive attitude scores than Afrikaans speakers (Table 3). If a respondent spoke languages other than Afrikaans (*e.g.* Tsonga, German), it was likely that their attitude index would increase by a factor of 1.84 (Table 3). Interestingly, respondents speaking other languages achieved the most positive attitude score (8.71 ± 2.75).

DISCUSSION

Our study revealed that first language, land use and knowledge of cheetahs are key drivers of attitude. The attitudes of landowners within the study area were positive (average index of 7.51). Fifty-eight per cent of respondents had index scores between 8 and 11 while only 11% of respondents had considerably negative or low scores (between –2 and 4).
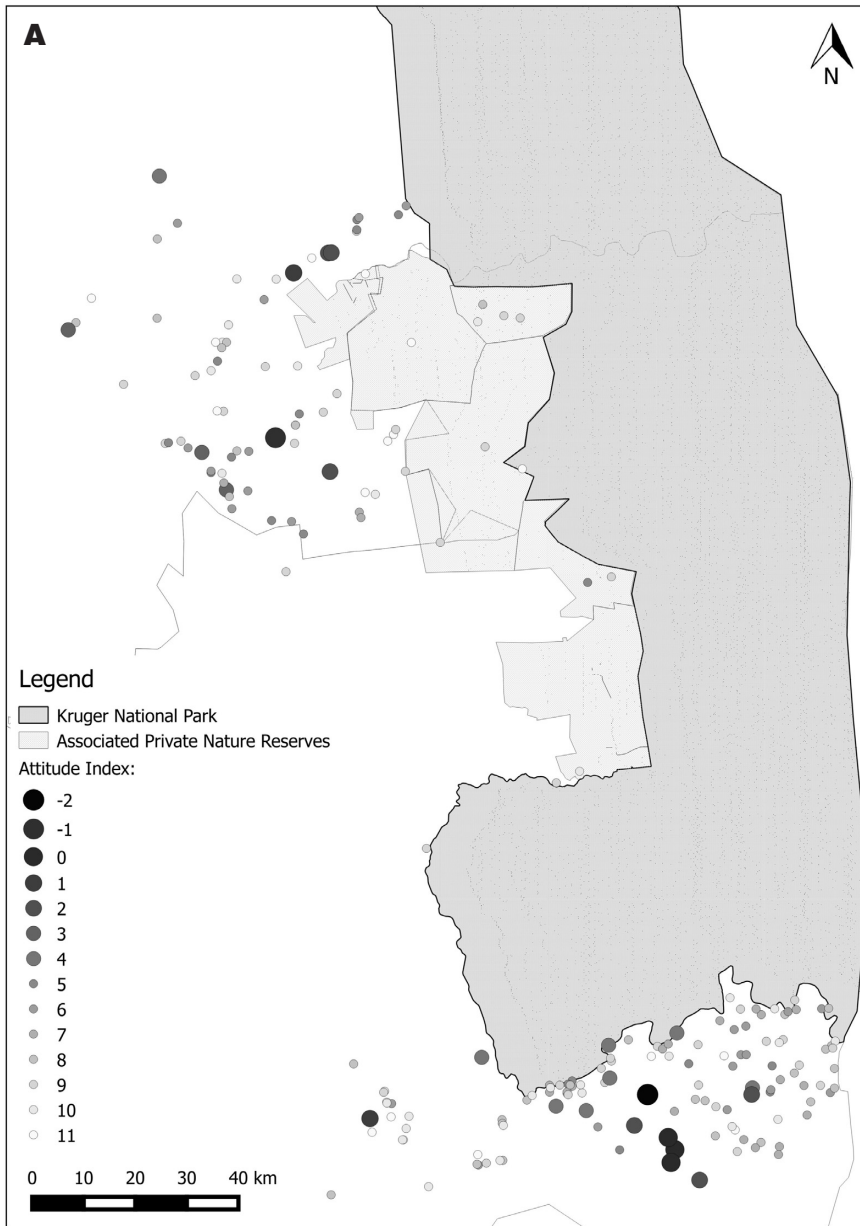
Fig. 3. **A**, The attitudes of respondents (*n* = 199) towards free-roaming cheetahs; **B**, knowledge scores of cheetahs based on findings from the study along the southern and western boundary of the Kruger National Park Park, South Africa. (Continued on p. 121.)

Our study detected a tendency for English first-language speakers to have more positive attitudes than Afrikaans speakers. As language can be used as a proxy for culture and upbringing (Lindsey *et al*., 2005; Schumann *et al*., 2012; Page *et al*., 2015), it can be stated that cultural beliefs may therefore have influenced attitudes and a respondent's feelings and opinions towards predators (Lindsey *et al*., 2005; Thorn *et al*., 2012). Afrikaans individuals tend to be less tolerant of predators on their properties and are thus more negative towards them. This result concurs with the findings of Zimmerman *et al*. (2005), Swanepoel (2009), Thorn *et al*. (2013) and Page *et al*. (2015),
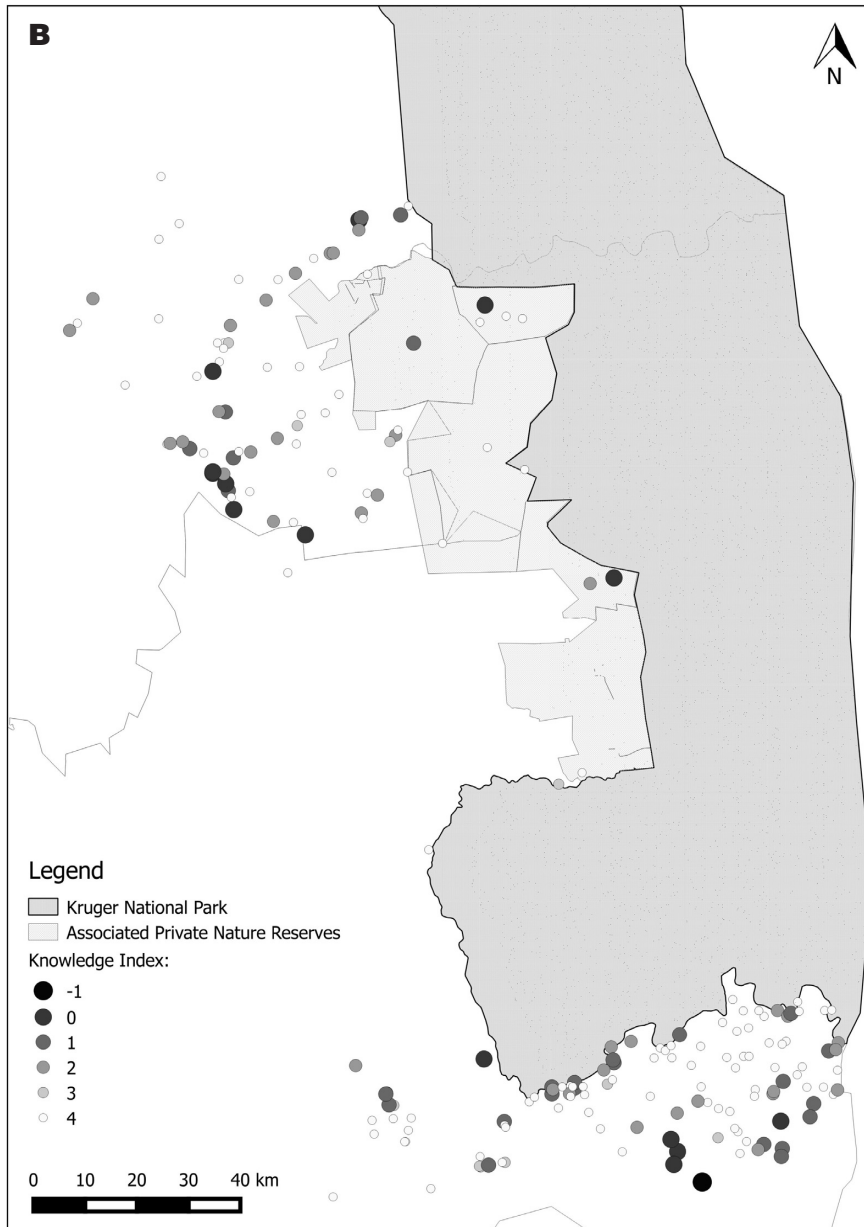
Fig. 3 (continued).

who also found a tendency for Afrikaans respondents to be more negative towards predators.

The respondent's knowledge, which represented their understanding of cheetah behaviour and the ecological role cheetahs play, significantly influenced attitudes towards cheetahs. Most negative attitudes stem from the fear that the animal will endanger human life and will attack if given the opportunity (Kaltenborn, Bjerke & Nyahongo,

2007). However, greater knowledge about the species reduces the levels of fear, may dispel myths/untruths (for example, that cheetahs are dangerous to humans) and may promote more positive attitudes (Orford, 2002; Kaltenborn *et al.*, 2007). It is positive to note that 98% of respondents stated that they would be interested in learning more about cheetahs. Although higher education does not always lead to increased

Table 2. The top 10 models generated from the Generalized Linear Model (GLM) using eight demographic and property variables.

	Variable 1	Variable 2	Variable 3	Variable 4	Variable 5	AICc	Delta AICc	Weight
1	Knowledge	Land Use	Language			932.4	0	0.261
2	Knowledge	Land Use	Language	Gender		934.2	0.82	0.105
3	Knowledge	Land Use	Language	Education		934.7	2.38	0.08
4	Knowledge	Land Use				935.4	3.04	0.057
5	Knowledge	Land Use	Language	Cheetah movement		936.2	3.84	0.038
6	Knowledge	Land Use	Language	Education	Gender	936.4	4.1	0.034
7	Knowledge	Land Use	Language	Land tenure		936.6	4.27	0.031
8	Knowledge	Language				936.9	4.57	0.027
9	Knowledge	Land Use	Language	Age		937.2	4.88	0.023
10	Knowledge	Land Use	Gender			937.3	4.9	0.022

Table 3. Results from the Generalized Linear Model (GLM) using three key variables to determine their effect on the attitude index. Significant results are presented in bold. (Number of respondents used in GLM = 199.)

Variable	Estimate	t-value	P-value
(Intercept)	5.123	10.858	**<0.000001**
Land Use – Ecotourism	0.98	1.886	0.06
Land Use – Livestock Ranching	−3.403	−2.347	**0.02**
Land Use – Other	1.049	1.087	0.28
Land Use – Wildlife Ranching	0.767	1.924	0.06
Knowledge	0.519	3.933	**<0.0001**
Language – English	0.808	2.249	**0.03**
Language – Other	1.844	1.855	0.07

knowledge about a specific matter, it may lead to an increased understanding of the ecological role of carnivores and with that, an increased acceptance of predators (Zimmermann *et al.*, 2001). This will potentially result in the shift from lethal to non-lethal predator control as landowners may become less willing to kill predators.

The extent to which predators impose costs to landowners is affected by land use (Lindsey *et al.*, 2005), and this could directly affects attitudes towards predators as some land uses can gain financially (*e.g.* ecotourism properties) while other properties suffer financial costs from predators (*e.g.* wildlife ranching or livestock farming). Our study revealed that attitudes towards cheetahs varied across the four land-use categories, with ecotourism ventures and wildlife ranches having more positive attitudes towards cheetahs. Ecotourism properties generally promote conservation and these types of ventures tend to benefit financially from having species such as cheetahs on their land. Most ecotourism ventures are involved in photographic tourism and having cheetahs on the property is appealing for many tourists

(Di Minin, Fraser, Slotow & Macmillian, 2012). The assumption that stock ranchers would have the lowest attitude score holds true (a score of 4 ± 3.51) and this can be linked to the fact that there can be no financial gain by having such predators on the property (Graham *et al,* 2005; Thavarajah, 2008). Predators are often viewed negatively because if they were to kill livestock or game then the landowner would experience monetary loss. However, it is important to note that attitudes based on stock loss may often be unsubstantiated (Distefano, 2005). It is also important to note that when natural prey is available, predators will show a preference for wild species (especially cheetahs and wild dogs, *Lycaon pictus*) rather than domestic stock (Thavarajah, 2008). Using scat analysis, Marker *et al.* (2003a,b) found that cheetahs rarely prey on domestic stock as they have an apparent natural game selection.

Our study concurs with the findings of Thorn *et al.* (2013) that land use and cultural upbringing are often the most influential variables when predicting attitudes. This further reveals that demographic attributes often contribute more to the

attitudes of people than economic factors alone.

Two of the key factors which have been identified (language and knowledge) suggest that education about predators can be used as a way to increase and promote positive attitudes towards carnivores. Implementing a well-constructed conservation education campaign (directed at local landowners and schools) to improve landowner attitudes is encouraged in areas with predators (Lagendijk & Gusset, 2008). Implementing this will help foster human–carnivore coexistence. For example, after a conservation education programme was carried out around Hluhluwe-iMfolozi Park (KwaZulu-Natal), there was a significant increase in the attitudes of respondents towards predators and more favourable perceptions about predators (Gusset *et al.*, 2008). Therefore, it is assumed that such programmes have the potential to decrease the number of carnivores persecuted in the area. Our study revealed that land use is also a key driver influencing attitudes. It would also be beneficial to create awareness among livestock ranchers and wildlife ranchers who have intensive breeding operations that there are non-lethal methods available to protect their animals. Such measures include using livestock guarding dogs, which have been known to significantly reduce domestic livestock depredation (Marker, Dickman & Schumann, 2005). Other non-lethal predator control measures include animal husbandry and kraaling (which includes keeping domestic stock in camps at night, having a herder present during the day), well-maintained fences and the use of deterrent devices like lights and sounds (Leijenaar, Cilliers & Whitehouse, 2015).

Our research has highlighted areas of poorer attitudes of landowners to free-roaming cheetahs. Resources could either be focused on one of two possible areas: 1) where attitudes are more negative and the risk of persecution of predators is high or uncertain, or 2) on areas which are positive and can be used to create conservation corridors. The study revealed that of the approximate 6260 km^2 land surveyed, 4562 km^2 can be termed 'cheetah friendly' as the respondents for these areas scored above 8 for their attitude indices. Approximately 85 km^2 can be potentially identified as 'cheetah unfriendly' as respondents scored below 0. Expanding cheetah distribution through conservation corridors onto adjacent farmland will allow for an increase in population of this predator and promote the ecosystem integrity of the region. Using these 'cheetah friendly' zones to start identi-

fying potential conservation corridors would not only benefit cheetahs but also a suite of other species. It is vital to promote land uses, such as wildlife for ecotourism purposes, which are positive to carnivore conservation. This will increase the land available that is conflict-free between predators and humans.

The long-term survival of free-roaming carnivore populations on private land in South Africa relies on the positive attitudes and behaviour of the landowners. Negative attitudes towards predators can potentially limit the survival of carnivores on private land, while positive attitudes can contribute to their conservation (Lindsey *et al.*, 2005). Therefore, there is still a need for continued carnivore conservation projects in the area that focus on conflict mitigation and awareness. With the expanding human population, it is likely that interactions between wildlife and people will increase. Our research provides insight for managing these interactions and promoting positive interactions between people and predators, cheetahs in particular.

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Appendix 1. Questionnaire.

Questionnaire #:

KRUGER WESTERN BOUNDARY PROJECT

1) Date:	5) Property/farm name and #:
2) Time:	6) Position (landowner, manager etc.)
3) Location of interview:	7) Interviewer:
4) GPS coordinates of area/property:	

Property characteristics and livestock/game information

8) Land tenure:

State protected area	Provincial area	Private area	Communal area

9) Land use:

Stock ranching	Crop farming	Wildlife ranching
Small stock		Live game sales
		Trophy hunting
Cattle ranching		Biltong hunting
		Photographic tourism

10) Please circle the activity most important to you.

11) Size of the property (hectares)? _____

12) Does this property form part of a conservancy? Yes_____ No_____ Don't know_____

13) Is this property perimeter fenced? Yes_____ No_____ Don't know_____

14) If yes, please specify:

Cattle fencing	Game fencing (18-22 strand)	Electrified with trip wire inside / outside / both	Bonnox	Meshed with buried apron	Other

15) Have you had wild dogs and cheetahs moving in or out of your property?

	In	Out	Don't know
Wild dog			
Cheetah			

16) Please specify what kinds of livestock and/or game are on this area and how many? If numbers are unknown than just tick.

Stock	Cattle	Sheep	Goats	Pigs	Poultry	Donkeys	Horses	Other	Don't know	None
Quantity										
Game	Impala	Kudu	Nyala	Bushbuck	Ostrich	Warthog	Wildebeest	Other	Don't know	None
Quantity										

Questionnaire #:

17) Please indicate how frequently the following predators are seen on this area. Please tick the appropriate box (es).

	Never	< Once/year	Every few months	Once/month	> Once/month	Don't know
Lion						
Leopard						
Cheetah						
Wild dog						
Spotted hyaena						
Caracal						
Jackal						

18) Have you had wild dogs denning on your property? Yes_____ No_____ Don't know_____
If yes, when was the last year? _____
What did you do? _____

Wild dog and cheetah distribution

19) If you have any GPS/photo data and/or details of any sightings of wild dogs and/or cheetahs on this reserve/property/communal land please fill out the sightings record attached or, if possible, provide data and photographs on a CD or memory stick.

Attitudes towards wild dogs and cheetahs

20) How do you feel about the presence of the following predators on your property? (tick applicable)

	Positive	Neutral	Negative	Not applicable	
Lion					
Leopard					
Cheetah					
Wild dog					
Spotted hyaena					
Caracal					
Jackal					

21) What is the general feeling towards the following predators in the district? (tick applicable)

	Positive	Neutral	Negative	Not applicable	
Lion					
Leopard					
Cheetah					
Wild dog					
Spotted hyaena					
Caracal					
Jackal					

22) Do you know if any of your neighbours have ever successfully removed predators from their property? If yes, please specify the preferred method of removal.

	Yes	No	Don't know	Method of removal (select from the list below; if other please specify)
Lion				
Leopard				
Cheetah				
Wild dog				
Spotted hyaena				
Caracal				
Jackal				

Firearm	Snare	Poison	Spear	Dogs	Gin traps	Cage traps	Other

23) Please indicate your disagreement/agreement with each of the following statements.

	Wild dogs			Cheetahs		
24) You are more tolerant of wild dogs/cheetahs than your neighbours	Yes	No	Unsure	Yes	No	Unsure
25) Wild dogs/cheetahs negatively impact your business/livelihood/profit	Yes	No	Unsure	Yes	No	Unsure
26) Wild dogs/cheetahs form an important part of the environment	Yes	No	Unsure	Yes	No	Unsure
27) You would be happier if wild dogs/cheetahs were completely absent from your reserve/property/communal land	Yes	No	Unsure	Yes	No	Unsure
28) Please explain your responses to question 27 above:						
29) Wild dogs /cheetahs should be protected	Yes	No	Unsure	Yes	No	Unsure
30) You would tolerate a pack of wild dogs denning on your reserve/property/communal land	Yes	No	Unsure			
31) Wild dogs/cheetahs could produce tourism benefits for you/your business/your community	Yes	No	Unsure	Yes	No	Unsure
32) You would like to see wild dogs/cheetahs in the bush	Yes	No	Unsure	Yes	No	Unsure
33) Wild dogs/cheetahs are culturally important to you	Yes	No	Unsure	Yes	No	Unsure
34) You would like to learn more about wild dogs/cheetahs	Yes	No	Unsure	Yes	No	Unsure

Personal information about respondent

35) Name: _____

36) Age (tick applicable)

< 21	21-30	31-40	41-50	> 50

37) Gender: _____

38) Contact number: _____

39) Level of education (tick applicable)

None	Primary school level	Junior school level	School leavers certificate	Senior leavers certificate/Matric certificate	Tertiary education (Please specify)	Not applicable

40) First language: _____

Knowledge of both species

41) Respondent could correctly identify wild dog and cheetah? Yes_____ No_____

42) Wild dogs and cheetahs are dangerous to humans? Yes_____ No_____

43) Are cheetahs and wild dogs more common than lions? Yes_____ No_____

44) Cheetahs kill more than they require? Yes_____ No_____

45) Wild dogs are social animals? Yes_____ No_____

Snaring on the property

46) Please state whether snaring and/or poaching with dogs is a problem on the property or not?

_____

47) Please indicate the number of snares cleared monthly:

_____

Sightings record

Species	Date*	General location	GPS coordinates	# seen	Pups /cubs present	Time of day seen	# of photos submitted	Additional Information
* Insert 1/2/3 etc. as coded below, but if specifics are known please state. **(1)** < 6 months ago; **(2)** 6 months - < 1 year; **(3)** 1 year - < 2 years; **(4)** 2 years- 5 years; **(5)** > 5 years								