

## HUMAN-BABOON INTERACTION IN KNYSNA, SOUTH AFRICA

### **Abstract**

Humans and primates are coming into increasing contact within urban landscapes. Few studies have investigated how the impacts of living alongside urban primates affect residents' perceptions of primates. Perceptions have been shown to play a role in conservation interest and management of other urban wildlife species. A survey of suburban residents in Knysna, South Africa was used to explore the relationships between attitudes, level of perceived threat and extent to which baboons were considered a problem, support for local baboon conservation and preferred baboon management strategies. Results indicated that perceived threat was associated with less positive attitudes towards baboons, a greater perceived problem, decreased concern for baboon conservation, and increased advocacy for their lethal removal. This article illustrates the link between respondent perceptions and acceptance of urban primates and the need for further investigation for the wellbeing of both humans and primates.

*Keywords:* ethnoprimateology, human-primate conflict, human-primate interactions, urban wildlife, wildlife risk perception

## **Introduction**

Despite the rate of conversion of land for human uses, many generalist primate species, which exhibit both dietary and behavioral flexibility, are able to thrive in human dominated landscapes (Strum, 2010). Consequently, many primates come into increasing competition with humans over space and other resources where land has been transformed for agricultural, urban or suburban uses (Lee & Priston, 2005). The agricultural interface dominates the current body of literature on interactions between humans and primates. Crops play an important role in the ecology of primates, particularly in the face of habitat destruction, subsequent decrease in natural foods and the location of agricultural land at the forest-edge (Naughton-Treves, 1998). Within the last century, however, the human population has experienced unrivaled growth and more than half of the world's population now lives in urban settings (United Nations, 2014). With increasing human populations and associated urban development, humans and primates are coming into increasing contact within urban landscapes, yet relatively few studies have focused on this interface. Certain species are known to coexist with humans in urban areas, including rhesus macaques and hanuman langurs in India (Chauhan & Pirta, 2010), hamadryas baboons in Saudi Arabia (Biquand, Boug, Biquand-Guyot, & Gautier, 1994) and chacma baboons in the Cape Peninsula of South Africa (Hoffman & O'Riain, 2010). In these situations these animals commonly feed on human foods such as from restaurants, market stalls, backyards, and garbage. The availability of these highly palatable, high-energy foods within urban spaces creates continued incentive for primates to coexist with people (Strum, 1994), particularly as natural habitat is further degraded or removed through development. This sympatric urban living often presents challenges for both primates and people.

Primates utilizing urban spaces are subject to injury or mortality from automobile

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collisions (Pragatheesh, 2011), high voltage power lines (Lokschin, Rodrigo, Hallal Cabral & Buss, 2007), anthroozoonotic diseases (Ott-Joslin, 1993), retaliation from people (Beamish, 2010; 2013) and lethal management of individuals or entire populations (Jones-Engel, Engel, Gumert, & Fuentes, 2011). The risks of human-primate interaction are not limited to the primates themselves. Primates that have access to anthropogenic foods often become aggressive towards people in their attempts to obtain food (Brennan, Else & Altmann, 1985; Southwick, Malik & Siddiqi, 2005). Additionally, primates using urban areas can enter and damage property (Southwick et al., 2005; Yeo & Neo, 2010), and are hosts of zoonotic diseases (Jones-Engel et al., 2006). The management of urban human-primate interfaces is therefore essential for both human and primate wellbeing, the need for which will only increase as land transformation and urban expansion continues throughout primate ranges.

An understanding of community attitudes and perceptions towards living with urban wildlife is now considered a prerequisite to designing and implementing effective multi-pronged management schemes (Decker, Riley & Siemer, 2012). Studies of other species of urban wildlife have shown that psychological impacts, either positive (e.g., enjoying wildlife viewing) or negative (e.g., risk perceptions), may influence stakeholder attitudes towards these species (Hill, Carbery & Deane, 2007; Soulsbury & White, 2015). These perceptions may also predict the type of wildlife management preferred by stakeholders, as well as their interest in wildlife conservation (Gore, Knuth, Curtis & Shanahan, 2006a; Riley & Decker, 2000). Despite the increasing prevalence of urban human-primate interfaces, there is a lack of similar research that explores how people's attitudes and perceptions of risk over sharing space with urban primates may affect their interest in local primate conservation and their preference for the management of urban primates. We explored the relationship between a sample of residents and chacma baboons (*Papio ursinus*) in an emerging suburban area in South Africa where

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problematic encounters between the two have recently arisen. We investigated level of perceived threat, respondent attitude toward baboons, and the extent to which they considered baboon presence problematic. We then examined the interplay between these factors and their relationships with support for local baboon conservation and preferred baboon management strategies.

### **Methods**

#### **Study Site**

The research was conducted in Knysna, Western Cape Province, South Africa. The Knysna municipality, part of the larger Eden Municipal District, covers a total of 1,059 square kilometers. The Knysna municipality consists of 593 square kilometers of natural habitat and 466 square kilometers of peri-urban landscape (Municipal Biodiversity Summary Project, 2014). The Knysna municipality has approximately 70,000 people and lies 500km east of Cape Town (Statistics South Africa, 2014). Most of the population, approximately 51,000, lives within the town of Knysna (Statistics South Africa, 2014), which is surrounded entirely by the Garden Route National Park (GRNP). The GRNP is part of the Cape Floristic Region, an internationally acclaimed biodiversity hotspot (Vromans, Maree, Holness, Job & Brown, 2010). Knysna is a coastal settlement bordered by the Outeniqua Mountains in the north and the Indian Ocean in the south (Statistics South Africa, 2014). Development occurs around the Knysna Estuary, a body of water that ranks first among South Africa's estuaries for overall conservation importance (SANParks, 2014; Turpie et al., 2002). In addition to the estuary, Knysna is well known for its forests, namely Diepvalle and Gouna (SANParks, 2014). The suburbs of Knysna branch out from the town center and border nature reserves and other undeveloped natural areas. The suburban interface is poorly demarcated and the forest has become fragmented as a consequence of housing developments.

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### **Study Species**

Chacma baboons in the Western Cape Province of South Africa are protected wild animals according to the Nature Conservation Ordinance, Ordinance 19 of 1974 (Nature Conservation, 1974). They are listed under the Convention on International Trade in Protected Species of Wild Fauna and Flora (CITES II) and are listed as “Least Concern” by the IUCN guidelines (CITES, 1977; IUCN, 2008). Baboon group size varies depending on habitat quality and level of predation risk, ranging from 22 to 80 animals on average (Barrett & Henzi, 2008). Male body size ranges from 17-30 kg and the smaller females range from 10-15 kg on average (Barrett & Henzi, 2008). Baboons are highly intelligent, opportunistic, terrestrial, omnivorous primates that maintain a complex social organization (Else, 1991; Swedell, 2011). These characteristics make them highly adaptable and able to thrive in various human dominated landscapes.

There are no data available on the spatial ecology of Knysna’s baboon population and all land transformation to date has proceeded without considering the potential effects on either the baboons or human residents (R. Thorpe & S. Langlands, personal communication, June 2014). There are two specific locations with an existing human-baboon interface that lie within the suburbs of the north-western and south-eastern areas of Knysna and are believed to be home to approximately seven groups of baboons, ranging from 15-40 individuals per group that traverse the coastal mountains and lowlands surrounding the suburban development (L. McLean & T. Davidson, personal communication, June 2014). An extensive drought in the area between 2009 and 2011 (Holloway et al., 2012) decreased the quality of available natural resources, precipitating an increase in baboon presence within suburban areas (R. Thorpe, personal communication, June 2014). This, coupled with abundantly available, calorie-dense human foods (e.g., exotic fruit trees, garbage within the suburbs), generated continued

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incentive for the baboons to utilize suburban areas (Lee & Priston, 2005; Lyons, 2005).

### **Data Collection**

#### **Questionnaire Development**

A questionnaire was used to gather information about Knysna residents' views on living alongside baboons. Semi-structured interviews were conducted with residents of Knysna's suburban areas to identify common themes regarding living with baboons in Knysna. This bottom-up approach was utilized to ensure that the questionnaire addressed accurate concerns and perspectives from individuals living in this location. Written informed consent was obtained from the individuals that agreed to participate in these interviews and participant identities were anonymized.

The questionnaire was based on the recurrent themes and attitudes identified during the interviews (Newing, 2011). The questionnaire was pretested with 10 suburban residents of Knysna prior to distribution. The questionnaire was in English, the working language of Knysna (Cilliers, 2001), and was directed at any residents 18 years of age or older, living within urban or suburban areas of Knysna. Residents were encouraged to complete the questionnaire irrespective of whether baboons visit their property.

The questionnaire comprised 22 open-ended and closed questions. The question formats asked respondents to select from a predetermined set of options, circle all applicable answer options or describe their answers in an open-ended format. Questions addressed the type and level of threat respondents believed baboons pose within Knysna's suburbs, respondent attitude towards baboon presence, degree to which respondents considered baboons in suburban areas a problem, level of concern for the conservation of baboons living in Knysna's suburbs and which solution(s) respondents believed were appropriate to address the presence of baboons. Attitude towards baboons was assessed by the question "Which of the following best describes

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how you feel about baboons visiting your property?” Respondents could select one of the following responses; (a) pleased, enjoy their presence, (b) neutral, no positive or negative feelings, (c) combination of annoyed and pleased, (d) annoyed or frustrated, but not angry, or (e) angry and frustrated.

### **Questionnaire Distribution**

The data collection period spanned 10 weeks from May to July 2014. Participation was by self-selection in one of two ways. On two separate dates, tables with signs that stated “Baboon Questionnaire” were posted in front of two grocery stores in the Knysna city center with permission from property management. Additionally, an invitation to residents requesting completion of questionnaires was published in the local newspaper, both in print form and online, accompanying an article about the research and a website link to the online questionnaire. Residents were asked to review information about how their responses would be used prior to participating and all questionnaires were self-completed. Participation was voluntary. Agreement to participate was accepted as informed consent and questionnaires were anonymous.

### **Data Analysis**

Due to the categorical nature of the data, the variables were not normally distributed and non-parametric statistical tests were used (Field, 2013; Newing, 2011). Responses involving the presence or absence of baboons on respondent property, attitude towards baboons and preferred management solutions were treated as nominal data and were analyzed using the Chi-square (Hill, Carbery & Deane, 2007; Newing, 2011). The crosstabulation of ‘attitude’ and threat’ variables produced cells with expected values less than 5 so a Monte Carlo simulation was run at 10,000 permutations to verify significance (Field, 2013). Responses to multiple-choice questions that involved scale-like responses including the degree of perceived threat (no threat,

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small threat, moderate threat, extreme threat), problem associated with baboon presence (not a problem, a problem, a major problem) and level of concern for baboon conservation (not concerned, concerned, highly concerned) were treated as ordinal and were analyzed using Spearman's rank correlations (Newing, 2011; Zinn & Andelt, 1999). Relationships between variables were assessed for statistical significance at  $p < .05$ .

### **Results**

Two hundred and thirty one questionnaires were returned, but 201 were used in the final analysis because 30 were either too incomplete or completed by individuals living outside of the target study location, including respondents from rural Knysna. Urban and suburban respondents were grouped for analysis. Since some questions allowed for multiple answers, sample sizes for individual questions vary slightly. Questions that required respondents to circle all applicable answers were split apart and each option treated as its own variable with 'present' or 'not present' marked for each participant's response (Newing, 2011).

#### **Presence of Baboons in Knysna's Suburban Areas**

The majority of respondents reported that baboons visit their properties (79%,  $N = 201$ ) and have been visiting for less than 2 years (42%,  $N = 149$ ). Respondents most commonly reported that the presence of baboons within the Knysna's suburbs was either a 'problem' (47%) or a 'major problem' (37%), while only 16% reported that they are 'not a problem' ( $N = 188$ ). Respondents with baboons on their properties were not significantly more likely to report baboon presence as a problem than were respondents without baboons on their properties. In response to experiencing baboons visiting their property, respondents described their attitude towards baboons as 'angry and frustrated' (28%), followed by 'combination of annoyed and pleased' (23%), 'annoyed or frustrated, but not angry' (22%), 'neutral, no positive or negative feelings' (17%), and 'pleased, enjoy their presence' (10%) ( $N = 143$ ).



### **Perception of Threat**

Respondents felt some degree of threat associated with the presence of baboons on their properties. Respondents believed that the baboons pose a ‘moderate threat’ (35%), followed by ‘small threat’ (26%), ‘extreme threat’ (24%) and ‘no threat’ (15%) ( $N = 152$ ). When asked to define the threat(s) they associate with baboons, the most common responses were: risk to household pets ( $N = 66$ ), threat to personal safety, ( $N = 60$ ) and damage to material items ( $N = 47$ ), where respondents could give more than one response.

### **Perception of Threat and its Effect on Attitude and Degree of a Problem**

There was a positive correlation between level of perceived threat and the degree to which respondents considered the baboons in Knysna’s suburbs to be a problem ( $r(145) = .621, p < .001$ ). As the perceived level of threat increased, respondents were more likely to consider the baboons ‘a problem’ or ‘a major problem’ (Figure 1a). Perception of threat associated with baboons was significantly associated with respondent attitude towards baboons ( $\chi^2(12, N=143) = 101.095, p < .001$ ). Respondents who perceived a higher degree of threat from baboons held less positive attitudes towards baboon visits whereas those who perceive little to no threat from baboons expressed a positive attitude towards baboon visits (Figure. 1b).

### **Concern for Local Baboon Conservation**

Respondents expressed concern about the conservation of baboons in Knysna; 44% of respondents were ‘concerned’ about local baboon conservation, 26% were ‘highly concerned’, and 30% were ‘not concerned’ ( $N = 188$ ). There was a negative correlation between perceived threats from baboons and respondents’ concern about baboon conservation in Knysna’s suburbs ( $r(145) = -.265, p < .001$ ). Respondents who believed baboons pose a threat were less concerned about local baboon conservation (Figure 2b). This lack of concern for conservation was also significantly related to attitude towards baboons ( $\chi^2(8, N = 140) = 55.702, p < .001$ ). At one end

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of the spectrum the majority of ‘angry’ individuals indicated they were ‘not concerned about baboon conservation’ and ‘pleased’ individuals reported they were ‘highly concerned about baboon conservation’ (Figure 2c). Lack of concern for local baboon conservation was also significantly correlated with perceptions of problems caused by baboons ( $r(186) = -.298, p < .001$ ). As perceived problems increased, concern for local baboon conservation decreased (Figure 2a).

### **Baboon Management Strategies**

Most respondents supported nonlethal methods of managing baboons, most notably ‘baboon monitors that keep baboons out of human areas’ (57%,  $N = 187$ ). There was no significant difference in a preference for this method between respondents with baboons on their properties and those without. ‘Baboon proof bins’ were the next most commonly selected management technique (51%) followed by ‘move them to a different area’ (36%), ‘breeding controls to reduce the population’ (34%) and ‘residents reducing attractants on their properties’ (25%). ‘Other solution’ was selected by 11% of respondents, 6% were ‘unsure’ of their preferred solution(s) and 3% selected ‘no solution is needed’. A small percentage of respondents, however, selected ‘permission to lethally remove them from your property’ to manage the occurrence of baboons in the suburbs (12%). There was a significant association between respondents’ lack of concern for local baboon conservation and support for lethal removal of baboons ( $\chi^2 (2, N = 187) = 34.736, p < .001$ ). Significant relationships were found between support for lethal removal and perceived threats from baboons ( $\chi^2 (3, N = 146) = 20.573, p < .001$ ), extent of a problem baboons are perceived to cause ( $\chi^2 (2, N = 187) = 28.466, p < .001$ ) and less positive attitudes towards baboons ( $\chi^2 (4, N = 139) = 43.379, p < .001$ ) (Table 1).

### **Discussion**

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People living alongside primates typically perceive them as a threat to their personal safety and livelihoods (Hill, 2004). The majority of respondents in this article described the presence of baboons within Knysna's suburbs as a problem, regardless of whether or not baboons visit their personal properties. For respondents with baboons on their properties, the perceptions of problems increased as perceived threats increased. In an open-ended question respondents defined threats from baboons as risks to household pets and personal safety, as well as damage to personal material belongings:

“They trash the property, climbing trees and breaking off large branches, destroying gardens, ripping down gutters, overturning furniture and defecating everywhere.”

*(Respondent A)*

“We are concerned they may attack our two dogs in the garden, or us when they come into our home.”*(Respondent B)*

“They are destructive, wild and dangerous.” *(Respondent C)*

This suggests that perceptions of baboons as a problem stem from a fear of these animals or the expectation that they are likely to cause issues when in close association with people. Similar results were found in a survey of residents in the Cape Peninsula, where risks to personal safety and to pets, and damage to property were identified as issues urban residents experience with baboons (Kansky, Kidd & Knight, 2016).

Perception of risk is a cognitive process influenced by interconnected features (Slovic, 1987). A better understanding of the factors that contribute to high threat perception associated with baboons is important for effective management and education schemes. As perceived threats increased, less positive attitudes towards baboons were observed here. Studies of other species of wildlife have come to the same conclusion; perceived threats are related to negative attitude and to overall lower tolerance of the wildlife species (Decker, Lauber & Siemer, 2002;

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Gehrt et al., 2010; Kleiven, Bjerke & Kaltenborn, 2004). Our article shows that interest in local baboon conservation is closely associated with perceived threats and attitudes towards baboons. Respondents were less concerned with local baboon conservation if they perceived baboons as threatening, considered them a problem and identified as being 'angry and frustrated' about their presence. Conversely, concern for local baboon conservation increased when people did not consider them to be a threat or a problem and held any attitude aside from 'angry and frustrated'. Concern for local baboon conservation was strongest for participants who described themselves as 'pleased' by baboon visits. These results corroborate findings from other wildlife acceptance studies whereby stakeholders with positive interests in a species often exhibit tolerance for the issues associated with them, whereas stakeholders who believe wildlife costs outweigh their benefits are more likely to consider these species 'pests' (Decker et al., 2002; DeStefano & Deblinger, 2005).

Respondents who perceived baboons as threatening, considered them a problem and identified as being 'angry and frustrated' were also more likely to support the lethal removal of baboons as a management solution. When wildlife costs outweigh benefits, people are more likely to support the lethal removal of that wildlife species (Decker et al., 2002), suggesting that support for lethal removal is dependent upon the perceived severity of the situation (Treves & Naughton-Treves 2005; Wittman, Vaske, Manfredo & Zinn, 1998). Although most respondents perceived baboons as threatening, considered them a problem and identified as being 'angry and frustrated', the majority still expressed concern about local baboon conservation and did not advocate for their lethal removal. This is positive and suggests that a management plan which aims to promote coexistence may be possible. The most preferred baboon management tactic among respondents was 'baboon monitors that keep baboons out of human areas', which would reduce the extent of contact between residents and baboons. This management technique, which

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has been used successfully in other urban areas of South Africa (Hoffman & O’Riain, 2010), could aid in reducing and preventing high perceptions of threat and negative attitudes that may stem from negative interactions with urban-dwelling baboons (Kansky et al., 2016).

Further investigation into the relationship between the factors discussed in this study is urgently needed for the wellbeing of both parties as the adaptability and ubiquitous nature of baboons paired with perpetual urbanization throughout baboon range states predicts ever-increasing interaction with humans.

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Table 1  
*Attitudes towards Baboons and Their Conservation Among Respondents who Support Lethal Removal*

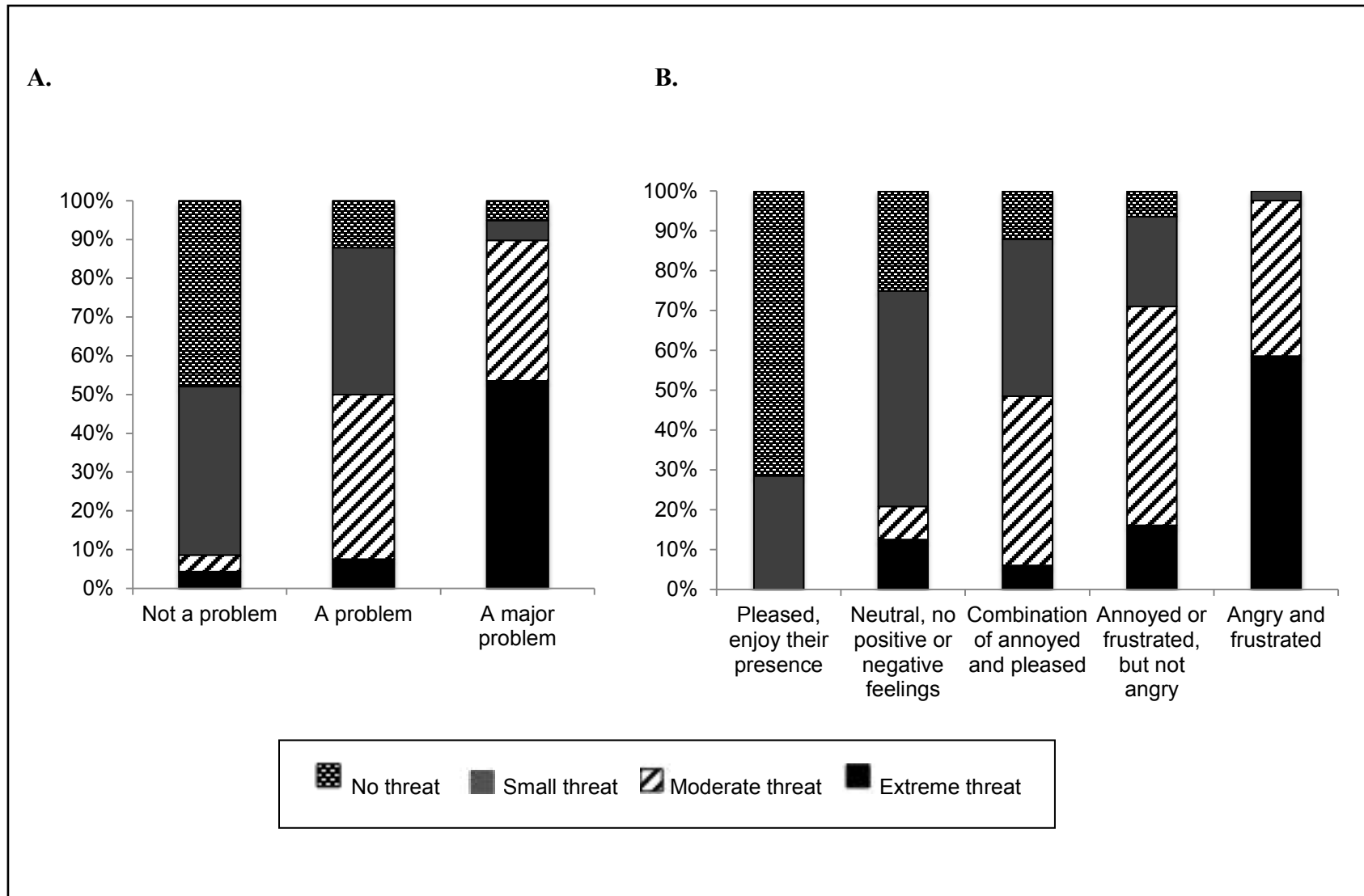
	Which of the following best describes how you feel about baboons visiting your property? (N=139) <sup>P+</sup>	Do you consider baboons on your property to be a threat? (N=146) <sup>P+</sup>	How concerned are you about the conservation of baboons in Knysna? (N=187) <sup>+</sup>	Do you consider the presence of baboons in Knysna's suburbs to be a problem? (N=187) <sup>+</sup>
Respondents that supported lethal removal of baboons  (12.3% of total respondents, N=187)	Pleased, enjoy their presence: 0%	No threat: 0%	<b>Not concerned: 82.6%</b>	Not a problem: 0%
	Neutral, no positive or negative feelings: 0%	Small threat: 0%	Concerned: 13%	A problem: 13%
	Combination of annoyed and pleased: 10%	Moderate threat: 40%	Highly concerned: 4.4%	<b>A major problem: 87%</b>
	Annoyed or frustrated, but not angry: 0%	<b>Extreme threat: 60%</b>		
	<b>Angry and frustrated: 90%</b>			

Note. Majorities are shown in bold.

+ Indicates significant Chi-square relationship at  $p < .001$

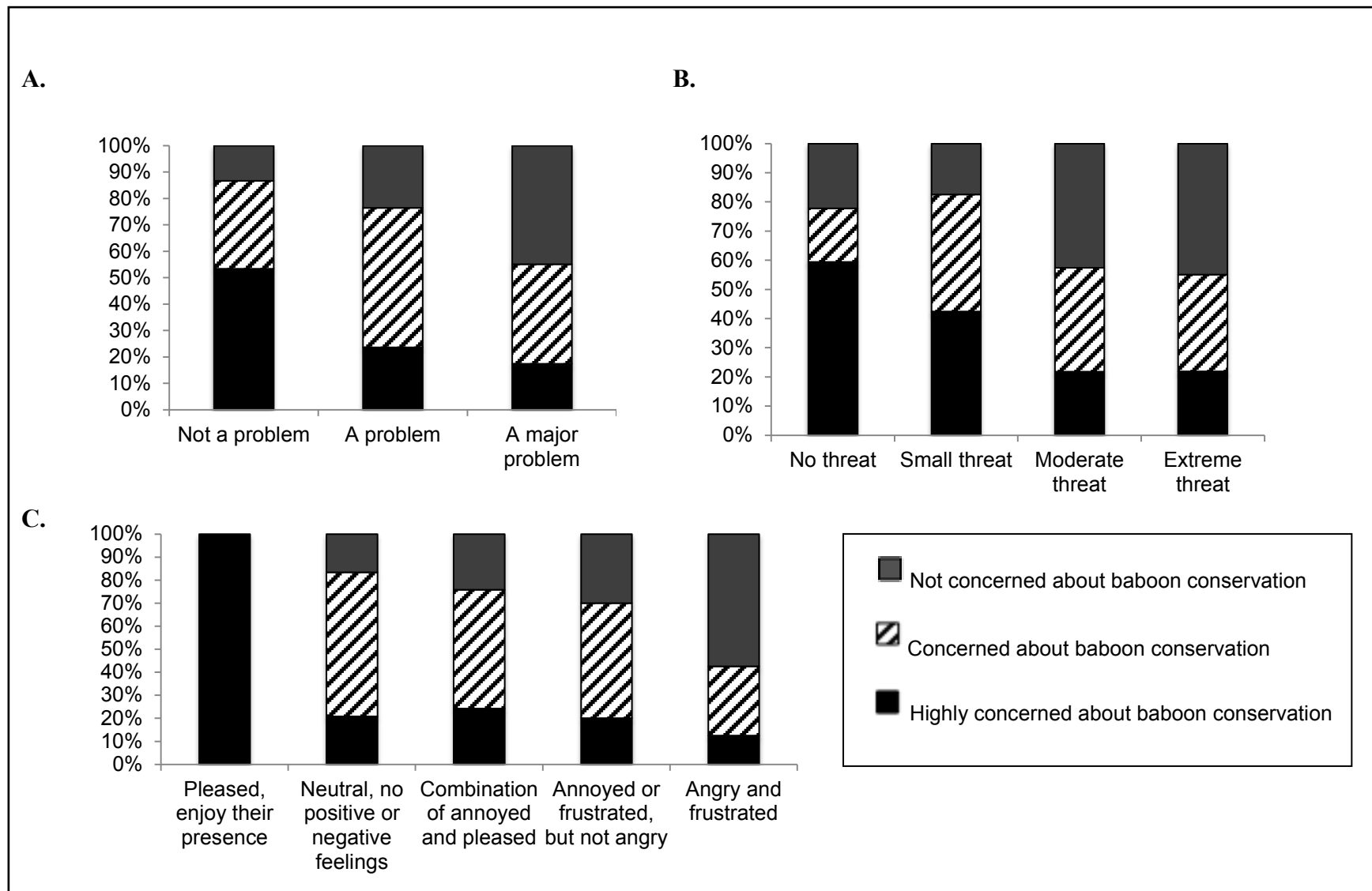
<sup>P</sup> Indicates questions that were completed only by respondents with baboons on their properties.

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**Figure 1.** Respondent perceived threat compared to degree of a problem baboon presence poses ( $N= 147$ ) and attitude towards baboons ( $N= 143$ ).

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**Figure 2.** Respondent concern for local baboon conservation compared to degree of a problem baboon presence poses ( $N=188$ ), degree of perceived threat associated with baboons ( $N=147$ ) and attitude towards baboons ( $N=140$ ).