


Article

A Study on the Perception of African Elephant (*Loxodonta africana*) Conservation by School Children in Africa and England (UK)

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Abstract: Environmental education (EE) applications can support wildlife conservation practices by improving school children's understanding of environmental issues, including endangered species conservation, such as the African savanna elephant (*Loxodonta africana*). This study aimed to identify and assess school children's perceptions of elephant conservation in three schools: South Africa, Kenya, and England. Questionnaires were completed by students at one school per location, with the age range of 10–16 ($n = 364$). The responses were then analysed independently and collectively using descriptive statistics ($n = 364$). School children feared elephants where elephants were native. The importance of elephants was not acknowledged by students in South Africa and England and included a lack of awareness of how elephants benefit other species. There was an unclear understanding of the threats to elephants. Collectively, a wildlife guide as a career choice was not highly valued. The results of this study have reflected key narratives of elephant conservation from selected countries; Kenya leading in anti-poaching and anti-trade campaigns, anti-poaching campaigns by various NGOs in the U.K., and elephant management around expanding populations in South Africa, which have given significant insights into areas of improvement for environmental education practices to support wildlife conservation globally. Furthermore, this new research has identified and compared school children's awareness of elephant conservation on a greater spatial scale than what is currently understood, compounding the importance of understanding effective wildlife conservation in education.

Keywords: wildlife education; anti-poaching; conservation management; environmental education



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1. Introduction

Conducting relevant scientific research on wildlife conservation and communicating findings to decision-makers is an essential method to enhance conservation practices in line with environmental threats, such as habitat fragmentation and land-use change [1,2]. However, this alone is not sufficient to solve complex conservation issues such as human–wildlife conflict (HWC) [3]. A complementary approach is environmental education (EE), which can benefit wildlife conservation research through participation and engagement with broader audiences and work simultaneously to enhance people's environmental attitudes and knowledge [4]. A key strategy that has been implemented is environmental programs aimed at school children, where they can learn and form positive attitudes about the environment [5] and the organisms that thrive in it, as they are most susceptible to educational influences from adults (parents and teachers) at an early age [6]. In addition to this, environmental education targeted at school pupils is important as they are not likely to have fully formed opinions or perceptions about the natural world [7], and positive views that are created in childhood are likely to remain once formed [8].

These positive perspectives are integral and must be encouraged on a broad scale to support long-term conservation methods [9,10]. This is especially important when

considering endangered animal species that need effective conservation, as these species would likely not survive without intervention strategies. African elephants (*Loxodonta africana*) are one such species, as they are faced with challenges such as poaching and habitat destruction, causing population numbers to decline in areas where these issues are prevalent, confounded by land fragmentation due to human encroachment resulting in HWC [11,12]. People's perceptions of elephants and elephant conservation can depend greatly on location. In countries with elephant presence, there can often be direct conflict in rural areas where people share the same habitat as elephants, widely known as human–elephant conflict (HEC) [13]. In general, within countries that do not experience HEC, elephants are seen as charismatic and intelligent animals [14]. A study by Kwamboka [15] surveyed school children's attitudes toward elephants in and around the Samburu National Reserve (Kenya), an area where elephants are in regular contact with humans, finding that there were both positive attitudes associated with tourism and ivory but fear of elephants. Understanding children's perception of elephant conservation on a broader scale could improve conservation education delivery and engagement, enhancing children's connection to elephants, which is crucial for their long-term conservation [4].

Therefore, identifying school children's perception of elephants and elephant conservation is important to develop methods of conservation education delivery. Studies to date have focused on localised community perceptions of elephants and those living within proximity to protected areas [16]. However, there has been little focus on assessing elephant conservation education programmes both in situ and ex situ [17], which are needed on this scale to raise awareness and encourage positive global elephant conservation practices, as well as identify areas that require attention within education systems. This paper aims to assess how school children in England (UK), South Africa, and Kenya perceive elephants and their importance in order to gain insights on how to improve environmental education practices and ultimately support wildlife conservation.

2. Materials and Methods

2.1. Study Sites

Three countries were selected as study sites to provide a comparative approach: England (UK), Kenya, and South Africa. England was chosen to assess the perceptions that school children have of elephants in a country where elephants are not indigenous, and both Kenya and South Africa as they represented areas where elephants are native. Elephants are predominantly in the wild, but there are captive elephants within South Africa (e.g., zoos). We acknowledge that it is unlikely that students who participated in this study would have been exposed to captive elephants. These selected countries were also accessible to conduct research. The age group of 10–16-year-olds was selected (Table 1). This demographic was chosen as children of this age will not only have been taught some environmental education practices but are likely to be able to make their own decisions determined by their opinions on elephant conservation, especially the older children. At the school in South Africa, there is a community engagement aspect of the research station, where volunteers participate in an outreach programme by giving lessons about environmental awareness. There is also community engagement at the school in Kenya, but there is no focus on environmental awareness issues. School children in England at this age will have been exposed to environmental awareness as part of their curriculum. Using questionnaires, the aim of our study was to compare school children's attitudes towards elephants in England, where elephants are found in zoos, with Kenya and South Africa, where elephants are found in the wild. In the latter two, the location of the school was used as an indicator of exposure to elephants and how that affects participant views of elephants and elephant conservation. (Table 1 near here)

Table 1. Study site locations.

Study Location of the Schools	Age Group	Sample Size	Potential Elephant Exposure	Land Use
England: Wellingborough	10–16	172	In captivity	Urban environment
Kenya: Mathare North, Nairobi	10–16	95	Predominantly unfenced reserves	Rural and urban environment
South Africa: Hodespruit, Limpopo	11–16	97	Fenced reserves only	Mostly rural environment

2.2. Questionnaire Development

Firstly, a pilot questionnaire was developed with 13 questions based on a binomial response (Yes/No). The pilot study was run at a school in England, but the questions proved inadequate because they were leading, closed, and ambiguous in some cases. The questionnaire was updated, and a final version was used to collect data (Table 2). Questions were unambiguous by making sure multiple aspects were not asked at once. Some of the questions were not open-ended or unstructured, so it was crucial that the options were fine-grained enough to collect appropriate data to answer the research questions. (Table 2).

Table 2. Amended questionnaire used as the final version for dissemination across study sites.



Questionnaire				
<i>Please fill out this questionnaire to the best of your ability. Please circle any Yes/No answers.</i>				
Question	Response			
1. What is your age?				
2. Which country do you live in?				
3. What gender are you?	Male	Female	Other	Prefer not to say
4. What are your hobbies: Please give three:	 <input style="float: right; margin-right: 5px;" type="checkbox"/>		 <input style="float: right; margin-right: 5px;" type="checkbox"/>	
5. Which of the images is an elephant?				
6. Are elephants important?	Yes			No
7. If yes to question 6, why do you think elephants are important?				
8. Do you think that elephants help other plants and animals?	Yes			No
9. If yes to question 8, how do you think elephants help other plants and animals?				
10. Are you afraid of elephants?	Yes			No
11. If yes to question 10, why are you afraid of elephants?				

Table 2. *Cont.*

Questionnaire			
<i>Please fill out this questionnaire to the best of your ability. Please circle any Yes/No answers.</i>			
Question	Response		
12. Would you like to see elephants in the wild?	Yes	No	
13. Would you like to learn more about elephants?	Yes	No	
14. Do you think elephants should be kept in fenced areas?	Yes	No	
15. Elephant numbers all over the world are under threat. Rank the most important (1) to the least important (4) reason why you think this is:	Loss of habitat from cutting down trees		
	Killing elephants to sell their tusks		
	Humans and elephants not being able to live together		
	Too many different animal species in the same area		
	Teacher		
16. Please rank the following careers from your most favourite (1) to least favourite (8)	Doctor		
	Veterinarian		
	Artist		
	Musician		
	Athlete		
	Wildlife Guide		
	Business manager		
17. What do you think elephants eat? (Choose one)	Trees		
	Grasses		
	Both trees and grasses		
	Other small animals		
18. Do you think elephants can damage trees?	Yes	No	
19. What do you think a wildlife guide does?			
<i>End of questionnaire</i>			

For Question 15, we phrased a reason as to why participants might think that elephants are under threat due to a ‘loss of habitat from cutting down trees’. Habitat loss is a huge driver in the reduction of elephants, but not the direct cutting down of trees [2]. We wanted to understand whether participants did think that cutting down trees was an important driver of the reduction in elephants and whether education practices have ingrained that habitat loss is related to cutting down trees.

2.3. Data Analysis

Data were collected from each school and then analysed both independently and collectively. We carried out the following five types of data analysis. Descriptive statistics were used, followed by data visualization. A Likert scale was selected for analysis, and data responses were categorised based on keywords. Neutral responses are distributed across the vertical axis at 0. The negative responses are then stacked to the left of the vertical axis, and positive answers are to the right. The less important the career choice is, the more it is skewed to the left. The link between children’s reasons for fear and desire to see elephants in the wild as well as their perception of elephant importance within ecosystems, was examined. To better examine relationships between fear and desire, responses were categorised based on keywords. Each category was compared with association to fear. All responses tested were binary: ‘Yes’, ‘No’.

Chi-squared tests were applied. All statistical analyses were performed using R [18].

3. Results

There were 364 respondents in total. Most participants were aged 12 or 13 ($n = 118$ and $n = 109$, respectively). In total, 60% of school children were girls, 39% were boys, and 1% preferred not to say.

We asked participants whether they could identify an elephant from two pictures: an elephant and a rhino. Three students from England and one from Kenya incorrectly identified an elephant as a rhino ($n = 4$).

A total of 90% of all participants thought that elephants were important in general. Five categories were identified as reasons for why the respondents justified their importance: 'Tourism', 'Tusks', 'Educational', 'Biodiversity', and 'Future generations'; the most important factor varied significantly depending on the schools' location (Figure 1). Collectively, the largest category was 'Biodiversity' (42%).

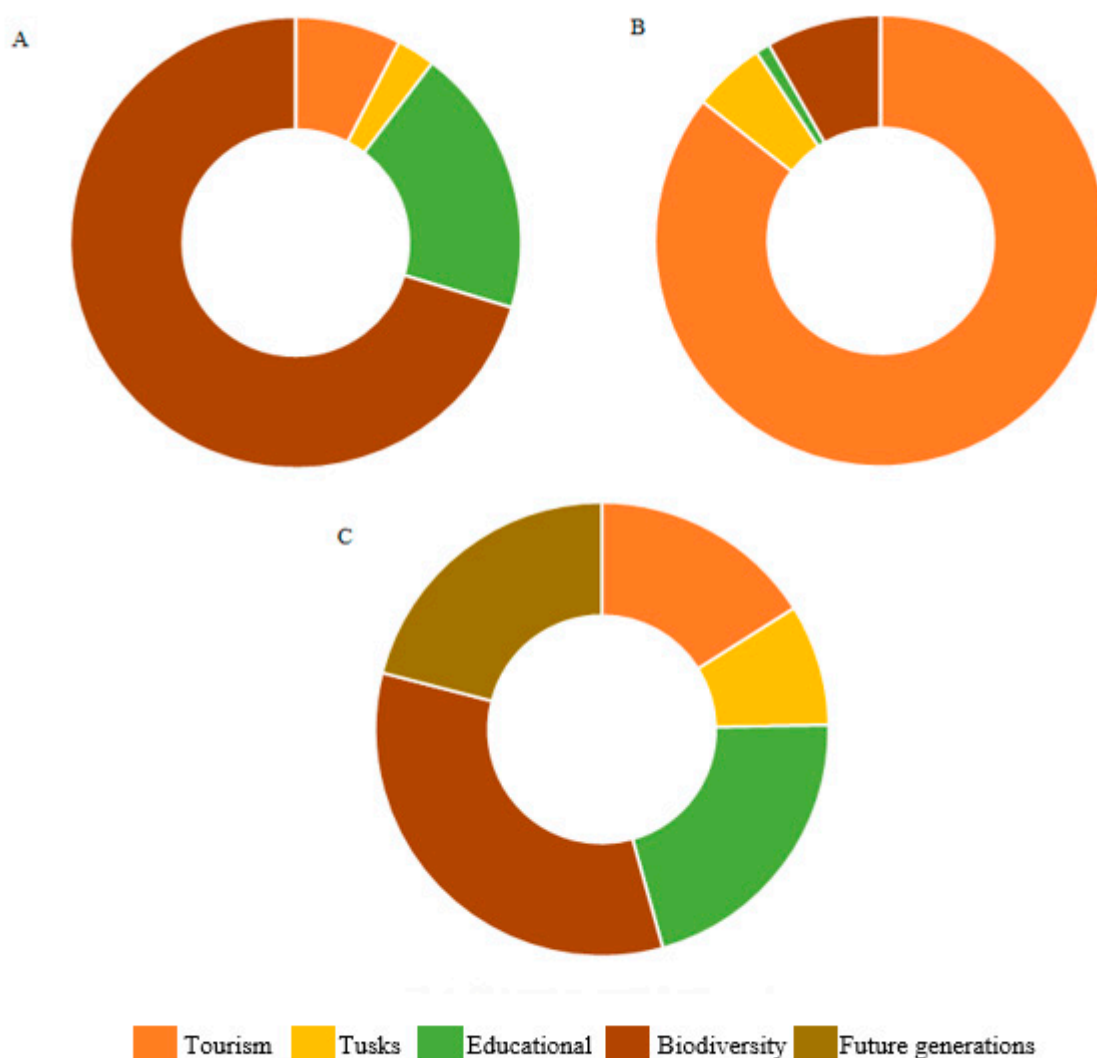


Figure 1. Responses of why school children think elephants are important in each country. (A) = England, (B) = Kenya, (C) = South Africa.

When asked whether elephants help other plants and animals, the majority of pupils ($n = 237$) thought that they did. When respondents were asked why, the most common response was 'elephants protect other animals' (Figure 2). School children in England who thought elephants were important also thought that they helped other plants and animals

($X^2(1) = 10.7, p < 0.05$) and wanted to learn more about elephants ($X^2(1) = 3.97, p < 0.05$). Children in England who thought elephants were not important did have a fear of seeing them in the wild ($X^2(1) = 7.95, p < 0.05$). The only association found with school children in Kenya was between importance and learning: children who thought elephants were important wanted to learn more about elephants ($X^2(1) = 0.04, p < 0.05$). There were no associations between importance and whether elephants should be kept in fenced areas and if they could damage trees across all countries ($p > 0.05$). When considering all responses, most school children were aware that elephants eat both trees and grasses (59%).

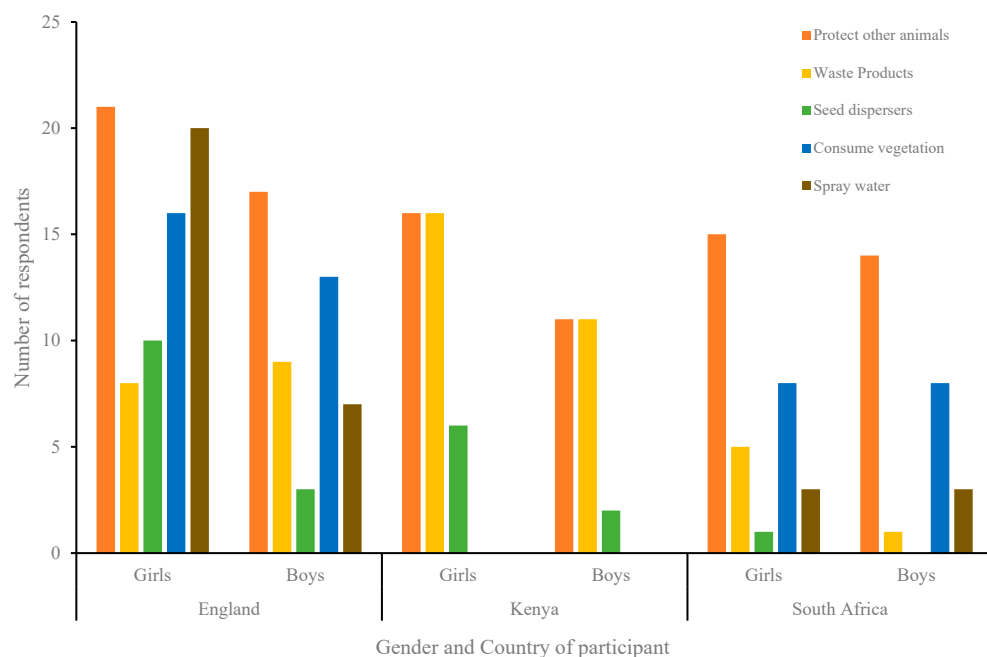


Figure 2. Explanations for the importance of elephants across all countries.

Collectively, 186 respondents were afraid of elephants, and of these, 11% thought that elephants were important ($n = 22$). Across all schools and countries sampled, girls were more afraid of elephants than boys (33% and 18%, respectively). Children in England were less afraid of elephants than children in Kenya and South Africa (73%, 17%, and 35%, respectively). Fear responses were categorised by keywords, and most respondents were afraid of elephants as they can “Harm people” (75%) (Figure 3).

It was then determined whether the children’s fear influenced the likelihood of wanting to see an elephant in the wild. Of the 186 who responded with ‘Yes’ to being afraid of elephants, 168 wanted to see an elephant in the wild even with this fear. Pupils in England who fear elephants less wanted to see elephants in the wild more ($X^2(1) = 20.6, p < 0.001$). Fear of elephants was not found to influence the desire to see elephants in the wild in South Africa and Kenya ($X^2(1) = 0.4, p = 0.8$ and $X^2(1) = 0.6, p = 0.4$, respectively).

There were mixed distributions of responses across all countries when students were asked why they thought elephant numbers were under threat, from the most important (1) to the least important (4) (Figure 4). Students in Kenya and England thought that elephants were under threat due to the poaching industry; however, students in South Africa mainly thought that they were under threat due to humans and elephants not being able to live together (Figure 4).

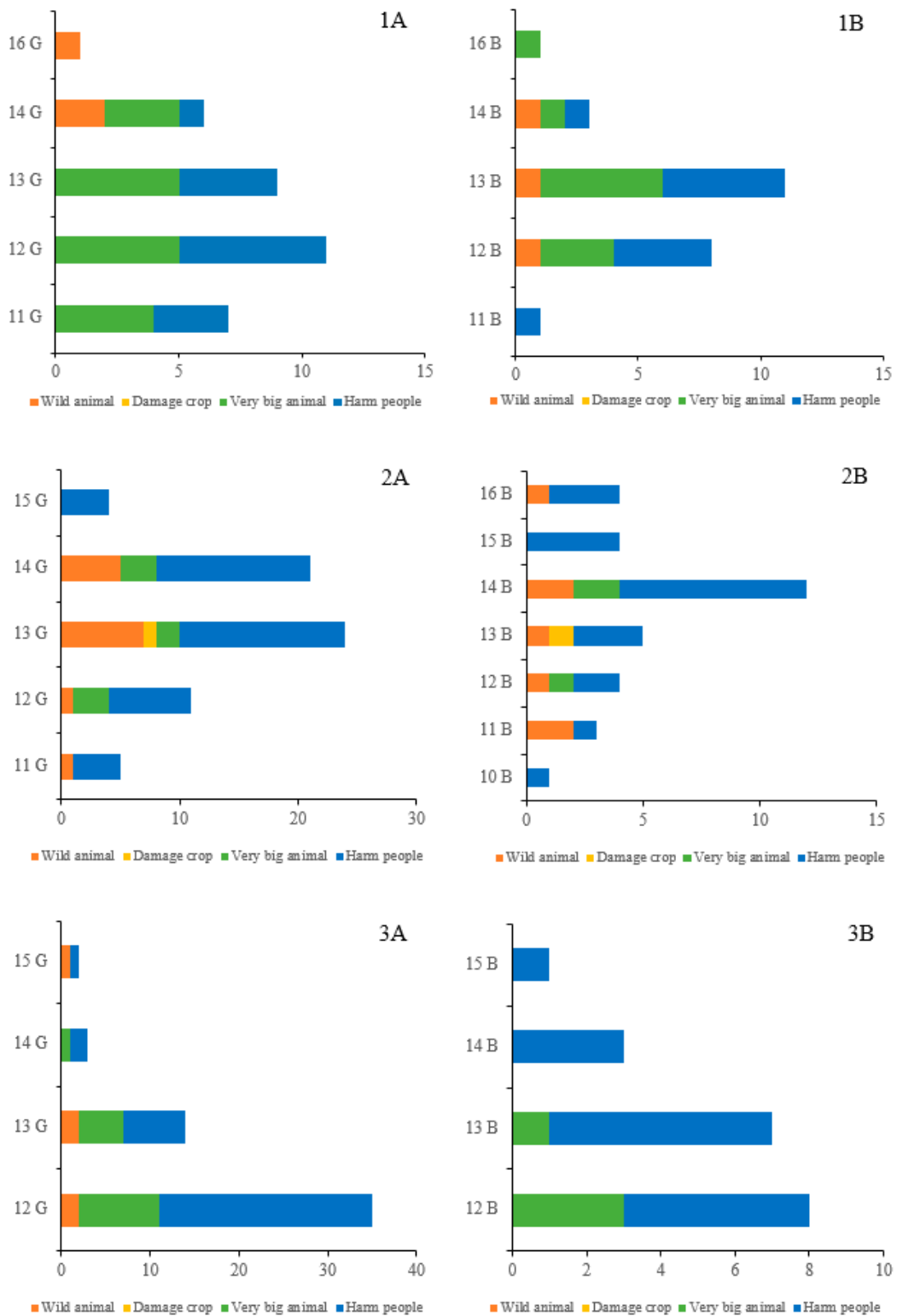


Figure 3. Categorical responses of fear of elephants for each gender and age group. Each graph represents a different country and gender: (1A,1B) = England, (2A,2B) = Kenya, (3A,3B) = South Africa; G = Girls, B = Boys.

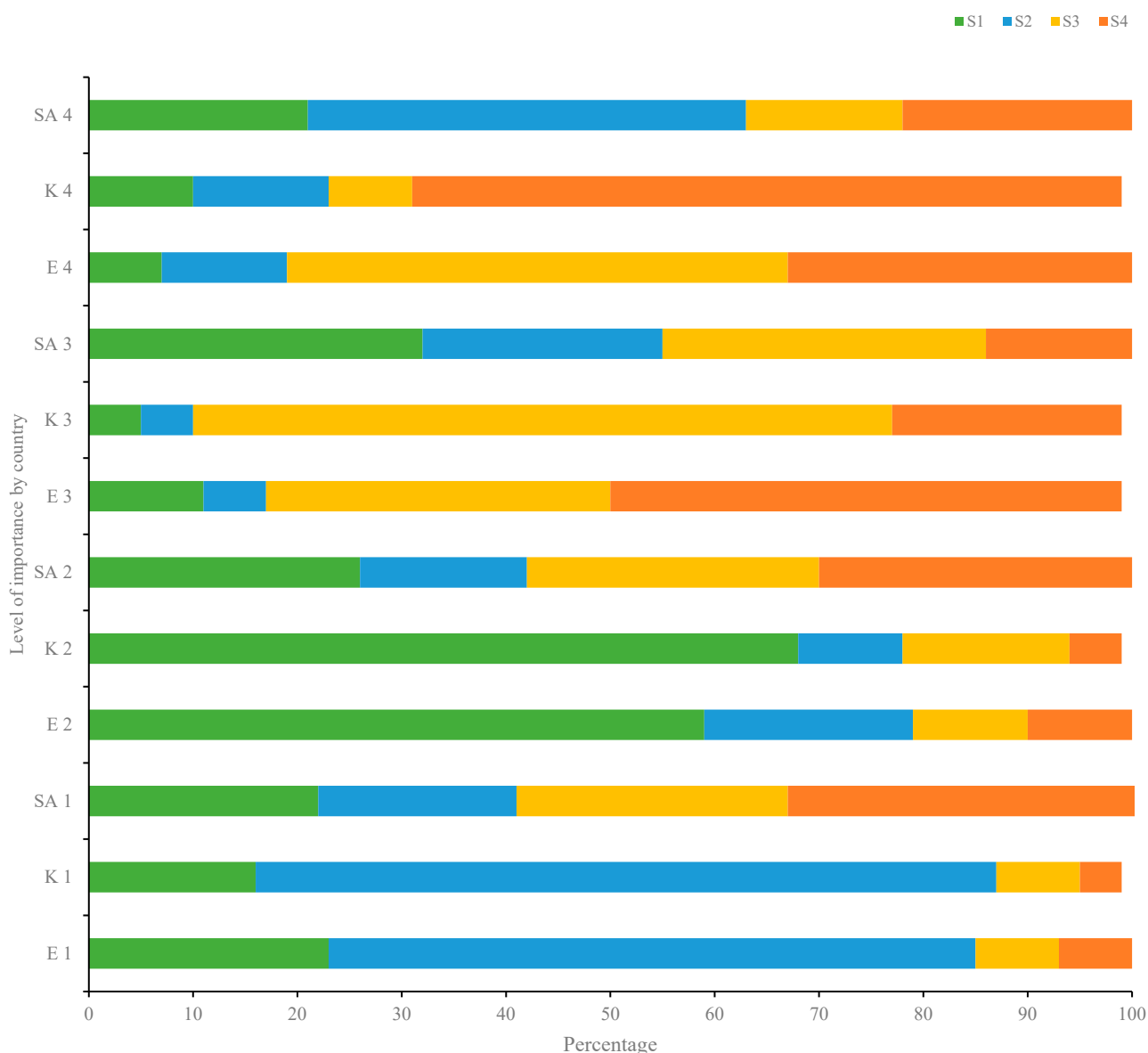


Figure 4. The percentage split of the reasons why participants thought elephants were under threat out of the four selections (S) that were provided: S1: Loss of habitat from cutting down trees; S2: Killing elephants to sell their tusks; S3: Humans and elephants not being able to live together; S4: Too many different animal species in the same area. The level of importance is ranked from 1 to 4, where 1 is least important, and 4 is most important, which are split by country: E = England, K = Kenya, SA = South Africa.

Finally, we asked all participants what their favourite career choice was to determine whether ‘Wildlife Guide’ was a valued career choice. In all countries, school children’s favourite career choice was a Doctor (A = 29%, B = 34%, C = 41%; Figure 5). Across all countries and genders (Figure 5), ‘Wildlife Guide’ was not considered by the school children asked as the most important career choice. Most students thought that a wildlife guide’s role was to guide and teach tourists and people ($n = 288$), but some did not know: 12 students in England (6 girls and 6 boys) and 2 in South Africa (2 girls), responded with ‘I don’t know’. A total of 10/30 girls in Kenya and 6/29 girls in South Africa responded with ‘He guides and teaches the tourists’. None of the remaining responses were gender specific.

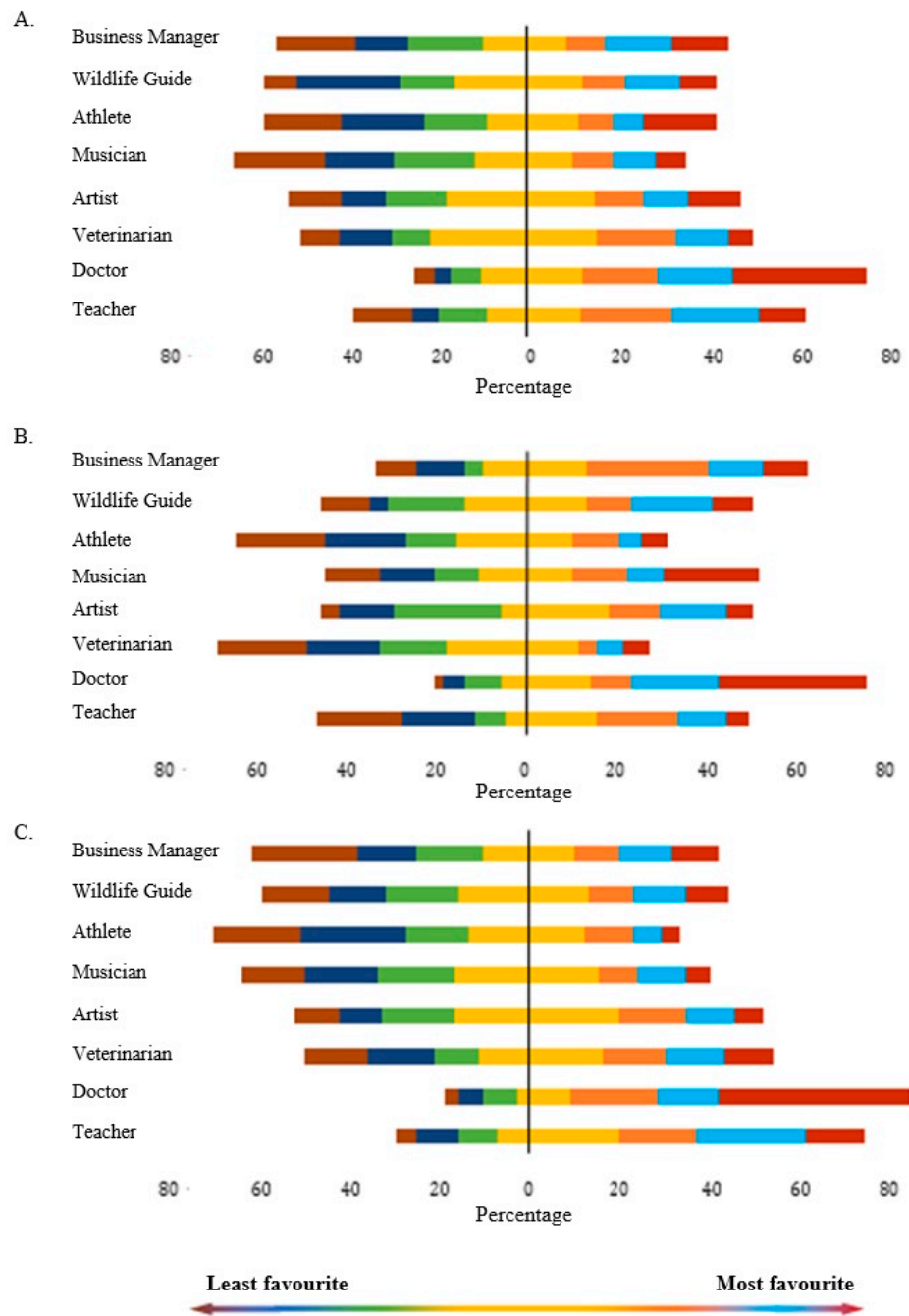


Figure 5. Response values on a Likert-scale showing the importance of career choices per country: (A) = England, (B) = Kenya, (C) = South Africa.

4. Discussion

Overall, this study shows that across the selected countries and students questioned, there was a significant difference in responses to how school children perceived elephant conservation. When considering fear responses, school children feared elephants where elephants were native, and students who feared elephants in an area where they were not present were less likely to want to see elephants in the wild. The importance of elephants to the ecosystems they inhabit was only recognized by one school (Kenya). This study showed that there was a distinct lack of awareness of how elephants benefit other species as well as what their feeding behaviours are. Most school children from all levels of exposure were able to identify an elephant correctly. The perception that elephants were in decline

due to too many species in one place was prevalent among school children in South Africa. It was also determined that a wildlife guide as a career choice was not valued as highly compared to other career choices. The emergent insights and issues are summed up as follows, with suggestive measures of improvement of awareness of elephant conservation for each concept.

The level at which school children from different levels of exposure feared elephants and whether that impacted their desire to see elephants in the wild was identified. The study site in South Africa represented an area where human–elephant conflict (HEC) is present due to the proximity of a wildlife reserve (Karongwe Private Game Reserve) to the school. Even though the issue of HEC was prevalent in South Africa, only a small proportion of respondents recognised that elephants could damage crops in this respect. Attitudes of fear of elephants were predominantly due to their ability to harm people and owing to their size across all countries. The perception that elephants can harm people could be largely driven by anecdotal evidence from family members in countries where elephants are indigenous [19,20]. In our study, in locations where elephants were indigenous, there were no associations with their desire of wanting to see elephants in the wild. However, school children in England who feared elephants were also less likely to want to see them in the wild. Therefore, according to the results, environmental education practices on elephant conservation across all sites should target fear responses in children, as the perception that elephants can harm people could be a motivating factor for not wanting to conserve this species.

Elephants are crucial for wildlife tourism as they are key species that tourists want to see, which promotes wildlife tourism in areas with elephants' presence and provides revenue and career opportunities in this sector [21]. Children living in a country where elephants are indigenous (Kenya) value elephants' potential for tourism greater than school children who live next to a protected area (South Africa), and only a small percentage of school children in England value the tourism potential of elephants. This is concerning as some of the key challenges facing wildlife protection are the proximity of people living next to protected areas and the lack of understanding of conservation, which can be addressed through job creation [22]. In addition, proportionately more Kenyans are employed or dependent on income from wildlife tourists than in South Africa, which is reflected in the results from this study and could suggest the need for increased conservation revenues to be invested in wildlife tourism in South Africa [23]. It was also identified that a proportion of students living near a wildlife reserve believed that elephants were important because of their tusks [16]. A potential way forward to improve the current situation could be enhancing environmental education practices to highlight the connection between people's livelihoods and wildlife [15], especially in targeted areas where elephants are indigenous. Furthermore, the local communities next to conservation areas should be the key source of future experts on wildlife conservation.

Collectively, there is a need to improve views on animals' roles in the ecosystem across all countries. In this study, we have found that education practices may need to be tailored according to age groups in locations where elephants are indigenous so that the role of elephants or any other animal within ecosystems is understood, as well as their significance as a species, which will result in improved wildlife conservation [22]. In addition, school children in Kenya and England identified that the ivory industry was the most important reason why elephants were under threat. However, school children in South Africa believed that the main reason elephants were under threat was due to too many animal species sharing the same area. This opinion could be due to the location of this school, in a small village with limited access to surrounding areas, including a fenced wildlife reserve within proximity. Additionally, Kenya is world-leading in efforts against international ivory trading [24], and anti-poaching campaigns are prevalent throughout the UK through NGOs, charity campaigns, etc. [25]. However, the key issue in South Africa is elephant management, where space for wildlife has typically been limited to fenced reserves that range in spatial scale and species densities [26]. Reintroducing elephants into fenced and

protected areas has proved successful in sustaining elephant numbers across South Africa, but this method of management has caused concerns for decades over the suitability of land and vegetation sustainment [2]. Interestingly, our results here have reflected these narratives, and this study has highlighted how education practices are needed to continue to raise awareness of all the threats facing elephants on a broader scale so that strategies can be tailored to enhance and foster conservation practices internationally.

Compared to other options of career choices, a wildlife guide was not valued highly. When asked what participants thought a wildlife guide does, some girls from Kenya and South Africa responded with, 'He guides and teaches the tourists'. This shows that there is a slight bias toward school children believing that wildlife guides are male, which could prevent them from valuing this as a career choice. A large proportion of students from all levels of exposure were aware of what wildlife guides do; however, a large number of students thought they directly cared for the animals. This career choice should also be valued and encouraged among the local younger demographic, particularly girls, where working as a wildlife guide is a viable career choice.

There are limitations to this study as only three schools and three countries were sampled, which were accessible at the time, but this could be enhanced by repeating the questionnaire across different schools and age groups and a broader spatial scale. Attitudes toward animals will vary depending on factors such as the characteristics of the animals concerned [27–33]. In addition, religious, socio-economic, and cultural differences can influence people's attitudes toward animals [34]. There has been substantial research to understand public attitudes toward the conservation of wild [35]. Therefore, future studies could also incorporate attitudes toward the cultural importance of elephants and other threatened animals. In addition, educational workshops based on this study's findings could be designed to improve the understanding of perceptions towards elephant conservation. A similar questionnaire could then be distributed after the workshop takes place to determine perceptions before and after and gauge any changes in response. In addition, the questionnaire could be enhanced by asking whether students had seen an elephant and where. This question would add value to the study and could be used not only to give insights into their point of reference but also as a 'blocking variable', which could enhance the statistical analysis.

A recurring theme in this study's findings is that better education practices are required to increase knowledge across young demographics, both living near and those living without elephants. Key concepts such as HEC should be disseminated to groups directly impacted by these conflicts but also be delivered across groups without HEC to improve understanding of the broader issues surrounding elephant behaviour and conservation. The perception of elephant conservation through questionnaires determined in this study has provided pertinent data about the comprehension of significant themes such as fear of elephants as they can cause harm, understanding elephant importance within ecosystems, and the value of a wildlife guide as a career choice. The participants revealed a varied level of understanding of elephants in general, their behaviours towards elephants, and human–elephant wildlife conflict. Understanding conservation issues and fostering positive attitudes by individuals toward wildlife are crucial and can provide key information for stakeholders [36]. To promote sustainable human–elephant interactions, enlarging the base of stakeholders to include children, who are a key group of influence, as this study has shown, should be encouraged [37].

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