Identification of Local versus Exotic Vertebrates by Mid-Atlantic based Adults

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Abstract

Studies comparing the identification of local versus exotic species have been done with school aged children, but not previously with adults. These studies have found that children are better able to identify non-local species than local species, independent of where they live in the world. Using an online survey, adults from the mid-Atlantic region were asked to identify pictures of local and exotic vertebrate species, broken into the five vertebrate taxa: mammals, birds, reptiles, amphibians, and freshwater fish. The data compared rates of correct identification across fifty local and exotic vertebrates which was analysed using a T-test for unpaired data. When all five vertebrate taxa were analyzed, no significant difference was noted between the local and exotic rates of correct identification; however, when the mammals taxa was removed, the difference between the rates of correct identification was significant, showing that people were better able to identify exotic species. Adult-oriented education will be implemented in an attempt to raise the general knowledge of local species for the mid-Atlantic region.

Keywords: Conservation, Biodiversity, Adults, Local Species, Exotic Species, Flagship Species, Media, Species Identification

Introduction

Many studies comparing the abilities of children to identify local versus exotic species have been done, but there is a dearth of similar research done with adults (Ballouard, 2011; Balmford, 2002; Genovart, 2013). These studies have found that children are significantly better at identifying exotic species, observed through media consumption such as television or magazines, than local species that they are likely to encounter in their daily lives (Ballouard, 2011; Balmford, 2002; Genovart, 2013). In the 2005 book *Last Child in the Woods*, author and journalist Richard Louv coined the term "nature-deficit disorder," which he defines as the lack of a connection with nature, especially related to children (p. 10). Nature, he argues, is key for healthy mental growth, and he points out that all communities are at risk of nature-deficit disorder and that it affected individuals, families, and communities (p. 36, & 100). Other studies, such as the one done by Baur, Gomez and Tynon (2013), corroborate the idea that health, especially social health, is positively correlated with spending time in green spaces. Problems arise, though, when media consumption outcompetes spending time outdoors and interacting with people and nature (Louv, 2008; Miller, 2005). With approximately 80% of the US population living in urban areas, this is an increasing problem (US Census Bureau, 2014). Miller (2005) explains that people are disconnected with nature in these settings and this leads to a collective indifference towards the natural world, a phenomenon known as "extinction of experience," which may be connected to children identifying exotic species better than local ones (Ballouard, 2011; Balmford, 2002; Genovart, 2013).

One method of re-acquainting people with the world is through the use of flagship species to garner attention to ecological issues (Knight, 2007; Schlegel, 2009). Flagship species are "popular, charismatic species that serve as symbols and rallying points to stimulate conservation awareness and action" (Heywood, 1995). One study looked at US conservation and nature magazines to determine the use of flagship species and found that larger birds and mammals were often used, probably due to their charismatic and recognizable nature (Clucas, 2008). Other vertebrates were also ranked above plants, invertebrates, people, and scenery as flagship species. The more aesthetically pleasing the species, the more likely that it was well received as a flagship species (Knight, 2007).

One of the dangers of flagship species is that they are so charismatic that people are more readily able to identify them over local species, as many studies have shown (Ballouard, 2011; Balmford, 2002; Genovart, 2013). The identification of local plant and animal species is a skill that has fallen by the wayside in recent years (Randler, 2008). This skill, it turns out, improves children's understanding of both biodiversity and ecology, which are foundationally important to conservation (Randler, 2008). Increasing knowledge of an issue does not necessarily lead to behavioral changes, but the addition of actual experiences can (Miller, 2005). Local species identification provides both knowledge and experience (Randler, 2008), thus making it a key component for successful conservation initiatives. Personal experience and interest increase local community concerns and actions (Clayton, 2009).

This study seeks to explore if adults in the Mid-Atlantic region are better at identifying common local vertebrates or exotic flagship vertebrates. Given the trends seen in children (Ballouard, 2011; Balmford, 2002; Genovart, 2013), it is realistic to expect that adults have the same inability to identify local species. This study will serve as a baseline for any adult oriented programming designed to address the disconnect between humans and the natural world, with hopes of increasing awareness of and involvement in local conservation efforts.

Methods

Data was gathered via an online survey consisting of three demographic questions and ten semi-randomized close-ended species identification questions. A minimum of 385 responses was needed given an unknown, large population size (roughly 32 million adults within four states) with a 5% margin of error and a 95% confidence level (Smith, 2013). The demographic questions (*Appendix A*) asked for age range, region (urban, suburban, or rural), and state (for mapping purposes). This study focuses on adults, defined as anyone over the age of 18, living within the Mid-Atlantic region (Pennsylvania, New Jersey, Delaware, and New York). Any surveys outside of these parameters were discluded from the analysis.

The ten semi-randomized questions pulled from a list of fifty pictures with five multiple choice options with each picture (*Appendix B*). This randomization decreases the probability of identical surveys, a method used by similar studies (Ballouard, 2011; Genovart, 2013). The

pictures are broken into ten categories: local mammals, local birds, local reptiles, local amphibians, local fish, exotic mammals, exotic birds, exotic reptiles, exotic amphibians, and exotic fish. Each category has five pictures, and a picture was randomly selected from each category to generate the survey. The pictures were chosen because they displayed field markings and features for identifying the represented species.

In this case, "local vertebrate" is used to describe any wildlife found within the Mid-Atlantic region, and "exotic vertebrate" is any wildlife not within the Mid-Atlantic region. Local vertebrates were selected based on their ubiquitous nature within the Mid-Atlantic region. Exotic vertebrates were chosen based on their status as flagship species, popularized by their use in media such as nature magazines and documentaries (Clucas, 2008; Schlegel, 2009). To further separate local from exotic vertebrates, no North American flagship species were used in the local or exotic species categories.

This study only looks at identification of vertebrate species, broken down into the five main vertebrate taxa: mammals, birds, reptiles, amphibians, and fishes. Reptiles and amphibians were separate categories in this study to see if there was an observable difference in the rates of identification, while most studies tend to lump them together under the combined category herptiles (Genovart, 2012; Ballouard 2011; Clucas 2008). None of these studies included fishes; however, fishes were included here for much the same reason that reptiles and amphibians were separated, to determine if there is a difference in the rates of identification of local and exotic fishes and to determine if future studies should include fishes in the research. Freshwater fishes are specifically considered, due to the landlocked nature of much of the Mid-Atlantic region, and for equivocal comparison to exotic fishes.

The data was analysed using a T-test for unpaired data (Statistical Consulting Group, 2016).

Results

717 adults within the Mid-Atlantic region were surveyed, with 73% from Pennsylvania, 15% from New Jersey, 4% from Delaware, and 8% from New York (*Appendix C*). 56% of respondents reported living in a suburban community, 28% of respondents in an urban

community, and 16% of respondents in a rural community (*Appendix C*). Participant ages ranged from 18 to over 74, with 49% of participants falling into the 25-34 years old category (*Appendix C*). The next largest age categories were 35-44 year olds, 45-54 year olds, and 18-24 year olds, with 17%, 14%, and 12% respectively (*Appendix C*). The remaining 8% were 55 and older (*Appendix C*).

Using an unpaired, equal T-Test, there is no statistical difference between the rates of correct local vertebrate identification versus the rates of correct exotic flagship vertebrate identification at a confidence level of 95% given a p-value of 0.17. Removing comparative data for mammals in both the local and exotic categories caused the p-value to drop to 0.04, a statistically significant difference, where exotic flagship vertebrates had higher rates of correct identification than their local counterparts (*Figure 1*). Removing each of the other represented taxa from the data set as a whole did not cause the same change in statistical significance.

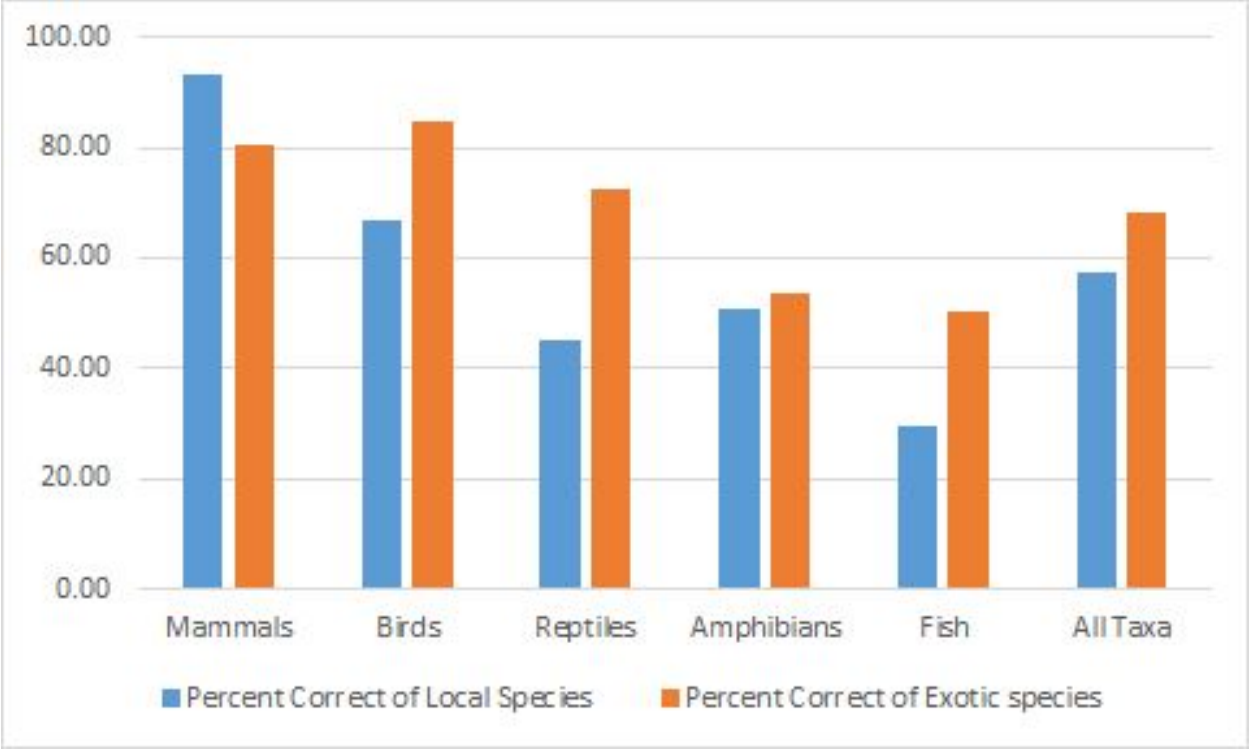

Figure 1. Average rates of correct local vertebrate identification (blue bar) versus the average rates of correct exotic flagship vertebrate identification (orange bar) by taxa.

A summary of response rates to individual species are found in *Appendix B*. For a more detailed breakdown of responses to individual species, see *Appendix C*, attached.

Discussion

Given that children are significantly more likely to recognize exotic or fictitious species than local species (Balmford, 2002; Ballouard, 2011; Genovart, 2012), a similar trend was expected in adults; however, this was not necessarily the case. According to this study, adults may be more able to identify local mammals than exotic mammals, although this may change depending on which local and exotic mammals are used in the study. For all other taxa, adults were also not able to identify local species at the same level as non-local species.

Studies have shown that attitudes and perceptions about animals can greatly impact the emotional responses of humans elicited by these animals (Clayton, 2009; Knight, 2007; Schlegel, 2009). Animals perceived as "aesthetically" attractive, often mammals and birds, tend to receive more attention than other animals, even if those other animals are more ecologically important or endangered (Knight, 2007; Schlegel, 2009). This may explain the difference in statistical significance, when the p-value dropped from 0.17 down to 0.04, when the mammal taxa was removed from this data set, but a similar trend was not noted when other taxa were removed (Clucas, 2008; Knight, 2007; Schlegel, 2009). Additionally, the greater media attention, such as use in nature magazines and documentaries, for these more attractive or noticeable animals may play a part in higher rates of recognition in both local and exotic mammals (*Figure 1*; Clucas, 2008; Schlegel, 2009). The noted difference favoring the identification of exotic flagship species suggests that exposure to wildlife is primarily through digital means, not personal experience (Clucas, 2008; Miller, 2005). It is important to note that without media attention, exposure to exotic species would drop significantly, and their rates of identification would most likely drop (Clucas, 2008).

The lack of understanding and knowledge of local environments plays a major role in the disassociation between people and nature (Clayton, 2009; Louv, 2008; Miller, 2005). Using wildlife can help develop a more inclusive sense of place that includes natural elements of the built environment (Kudryavtsev, 2011). Randler's suggestion that species identification be used

to bridge this concept by providing hands on experience and learning for both children and adults is key to conservation efforts (2008). This creates hands-on learning opportunities that increase positive attitudes towards local environments (Miller, 2005; Randler, 2008). Miller warns that increasing knowledge alone is not enough; the personal connections to local environments are what truly drives community conservation efforts (2005).

A baseline of both basic knowledge and attitudes towards local environments must be created as a tool to develop meaningful conservation efforts. For a more comprehensive understanding of adult knowledge basis, future studies will include freshwater fishes, invertebrate identification, and more survey questions to better align with similar research (Ballouard, 2011). Due to differing rates of reptile and amphibian identification, they will continue to be separated taxa (*Figure 1*).

Action

To combat poor knowledge of local species, I have begun putting together WTH Wildlife, an online amalgam of videos, blogs, and social media that will cover any and all wildlife topics using adult oriented/themed humor. WTH Wildlife will focus primarily on understanding urban ecosystems and promoting environmentally responsible behaviors with the idea that education does not stop with learning. It will encourage people to take action and find new ways of reconnecting with nature.

Your Niche in your Neighborhood will be an ongoing series of blog posts that discuss human and wildlife interactions in increasingly artificial environments, and focus on ways in which people can change their built environment to be more accommodating to wildlife. Stay tuned for more information.

What the Hell is That? A Guide to Urban Wildlife will be a YouTube series about urban wildlife designed to foster environmental stewardship through wildlife education for adults. The goal of the show is to give people the knowledge to interact differently with their environments by teaching them how to identify animals, their behaviors, and potential habitats. We will accomplish this goal by using a mix of science and humor to create short (7-10 minute), documentary-style episodes focusing on a single species or group of species for each episode.

The WTH Wildlife team, currently consisting of myself and a two person film crew and video editing team, will be filming the episodes around Philadelphia.

This show will provide an opportunity for people to meet or re-acquaint themselves with common critters that are often overlooked. What's cool about pigeons, snails, or opossums? Plenty, but they're so common that most people ignore them, or worse, consider them pests. Our goal is to get people interested in interacting with the world around them.

Conclusion

Adults, as important decision making entities, deserve more of our time and efforts as educators and conservationists. While preparing children to grow into environmentally responsible adults promises a better future, the conservation problems we face are too severe to risk waiting for a new generation to take over. Adults must be engaged and encouraged to learn and connect with their surroundings if we have any hopes of achieving conservation goals. Randler suggests that species identification is an important tool in guiding people's understanding of biodiversity and ecology (2008), which in turn informs how they interact with their surroundings (Miller, 2005). Future studies will seek to look at attitudes surrounding both local and exotic species, their conservation, and an individual's role in conservation.

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Appendix A

Demographic questions on survey

What is your age?
Below 18 18-24 25-34 35-44 45-54 55-64 65-74 75+

What state do you live in? [Drop-down menu]

How would you describe where you live?
Urban Suburban Rural

Appendix B

Rates of correct local vertebrate identification versus the rates of correct exotic flagship vertebrate identification by taxa and species.

Category	Local Species	Percent Correct	Exotic Flagship Species	Percent Correct
Mammals	White Tailed Deer	97.50	African Elephant	80.38
	Opossum	100.00	Orangutan	96.60
	Chipmunk	93.55	Jaguar	30.92
	Red Fox	97.45	Panda	97.81
	Field Mouse	75.76	Kangaroo	100.00
TOTAL Mammals		**93.47**		**80.38**
Birds	Turkey Vulture	88.32	Flamingo	99.40
	Cardinal	97.22	Kiwi	80.85
	Downy Woodpecker	31.76	Emperor Penguin	95.77
	Wood Duck	50.30	Andean Condor	54.35
	Mourning Dove	70.92	Blue & Gold Macaw	90.41
TOTAL Birds		**66.80**		**84.88**
Reptiles	Corn Snake	20.71	Tuatara	12.80
	Snapping Turtle	52.03	Komodo Dragon	86.16
	Five Lined Skink	41.01	Emerald Tree Boa	87.41
	Box Turtle	60.27	Nile Crocodile	79.07
	Eastern Rat Snake	50.31	Galapagos Tortoise	86.71
TOTAL Reptiles		**45.22**		**72.34**
Amphibians	Bull Frog	87.25	Poison Dart Frog	80.77
	Red Spotted Newt	39.86	Japanese Giant Salamander	27.89
	American Toad	70.00	Chinese Fire Belly Newt	57.62
	Long Tailed Salamander	34.07	Red Eyed Tree Frog	72.56
	Spring Peeper	22.29	Axolotl	29.08

TOTAL Amphibians		**50.89**		**53.62**
Freshwater Fish	Brown Trout	26.52	Piranha	71.94
	Atlantic Sturgeon	47.14	Betta Fish	45.99
	American Eel	51.39	Electric Eel	28.21
	Shiner	21.62	Angelfish	75.57
	Madtom	2.58	Archer Fish	37.65
TOTAL Fish		**29.35**		**50.48**
TOTAL All Taxa		**57.29**		**68.35**

Appendix C

Attached as a separate document due to file size.