



ELSEVIER



# Cognitive research in zoos

Lydia M Hopper

Many zoos are committed to conservation efforts and answering applied questions about veterinary care and welfare. It is less common, however, for basic science to be conducted in zoos. Comparative cognitive research run in zoos is gaining momentum, with more zoos becoming involved and a greater diversity of species being studied. The majority of cognitive research in zoos is conducted with primates, bears, and elephants. There is less cognitive research run with other species, in particular birds, reptiles and insects, or with zoo visitors. Given the number and variety of animals they house, zoos offer a unique forum to expand the taxonomic focus of cognitive research, especially via multi-institutional collaborations, whilst creating an opportunity to foster public engagement with research.

## Address

Lester E. Fisher Center for the Study and Conservation of Apes, Lincoln Park Zoo, Chicago, IL 60614, USA

Corresponding author: Hopper, Lydia M ([lhopper@lpzoo.org](mailto:lhopper@lpzoo.org))

**Current Opinion in Behavioral Sciences** 2017, **16**:100–110

This review comes from a themed issue on **Comparative cognition**

Edited by **Ben Hayden** and **Jessica F Cantlon**

For a complete overview see the [Issue](#) and the [Editorial](#)

Available online 15th May 2017

<http://dx.doi.org/10.1016/j.cobeha.2017.04.006>

2352-1546/© 2017 Elsevier Ltd. All rights reserved.

## Introduction

“I think it is impossible to emphasize too strongly that one can accomplish more by the study of biology in a properly-run zoological garden than in the best of museums, for the simple reason that one is dealing with an unlimited canvas, presented to you by live animals . . . yet it is a sad fact that only a handful of zoological gardens have been utilized in this way for proper scientific research”, so wrote Gerald Durrel in 1976 in *The Stationary Ark*. However, much has changed in the past 30 years and many zoos are now deeply involved with conservation and research efforts, studying animal welfare, biology and behavior both *in situ* and *ex situ*. But what about cognitive research?

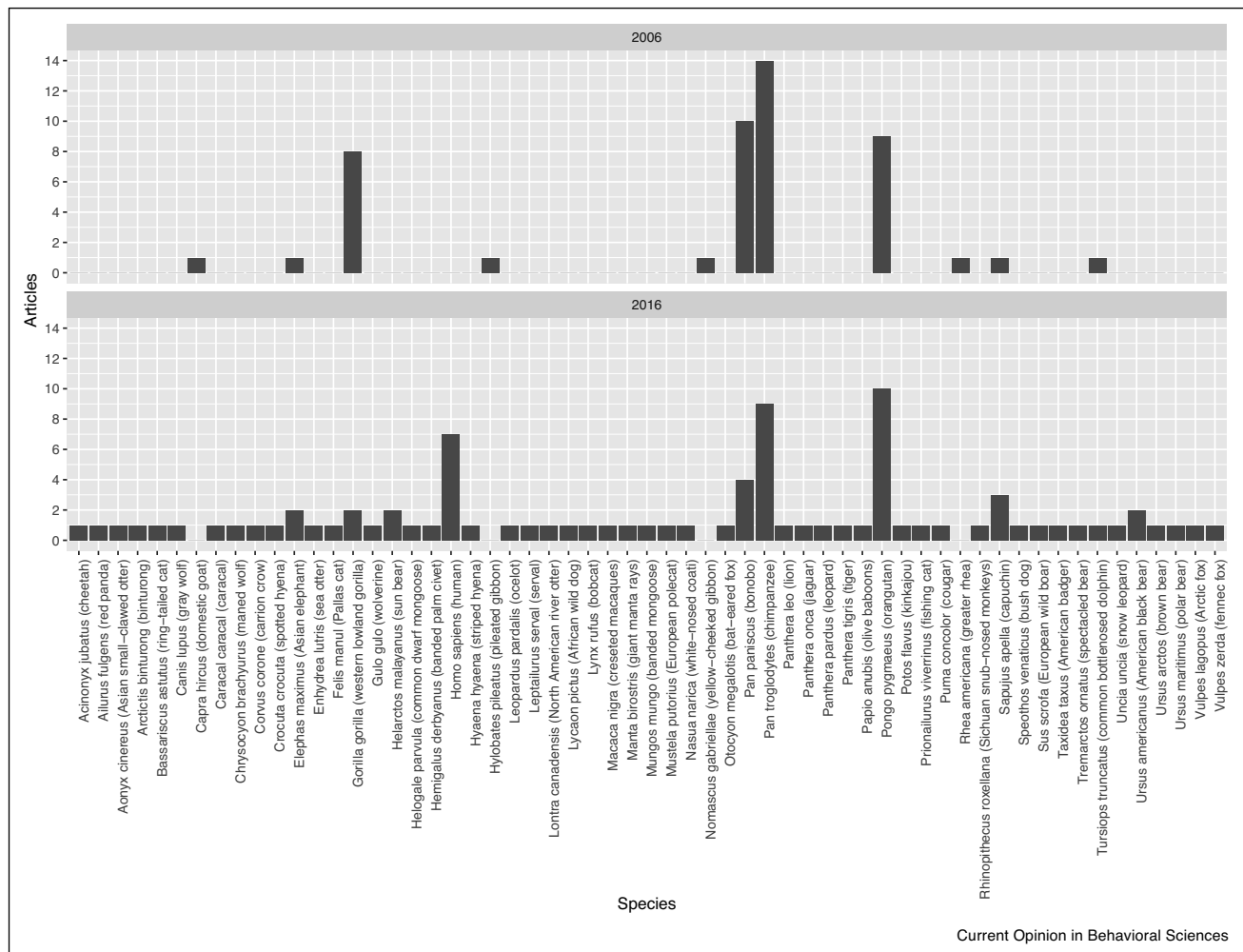
Comparative cognition is increasingly being studied outside of the laboratory [1]. A systematic Google Scholar search for peer-reviewed articles using the search terms ‘zoo AND research AND cognition’ and ‘zoo AND experiment’ revealed 40 zoo-based basic cognition studies published in 2016 alone, with 55 species represented (Figure 1). This search demonstrated that such research efforts are occurring worldwide; the 2016 studies reported data collected at 40 zoos located in 15 countries (Figure 2). Repeating the search using the same parameters but for the year 2006 highlighted how the range and scope of zoo-based cognitive research has increased over the years; the 2006 search revealed only 25 articles, which covered 11 species tested in 11 zoos across six countries (Figures 1 and 2).

Typically, cognitive research conducted in zoos is highly representative of the field of comparative cognition more broadly, reflecting research run in university and laboratory settings, including topics such as memory [2], problem solving [3••], tool use [4], metacognition [5], and social cognition [6]. Given this, and because there are some excellent overviews of comparative cognition research already published [7], as well as numerous journals dedicated to the topic (*e.g.*, *Journal of Comparative Psychology* and *Animal Cognition*), in this review I focus on describing the species that are studied in zoos, and what methods researchers apply in a zoo setting, rather than providing an exhaustive list of the topics that have been studied. Furthermore, it is worth noting that by ‘cognitive research’, I am referring specifically to basic science, not studies focusing on husbandry, training or veterinary practices.

## Why conduct research in zoos?

Zoos are renowned for their conservation efforts and for conducting applied studies, including welfare, veterinary and nutritional research, but have not traditionally been seen as a forum for basic cognitive research. The lack of cognitive research run in zoos, compared to in laboratories, may arise from a perception that zoos are places of education or entertainment, or applied research, not basic science [8], or because such research is not a priority for a zoo’s mission. Researchers may also presume that zoos can only offer small sample sizes of animals or reduced control over how subjects can be accessed and tested, especially in relation to a laboratory setting. Although in many cases this perception is valid, and conducting research in zoos might call for modified methods or

Figure 1



The range of species tested in zoo-based cognitive studies in 2006 and 2016 revealed by the systematic Google Scholar search (see text for details). The search revealed 25 articles for 2006, representing 11 species, but 40 articles for 2016, representing 55 species (although many of these species were tested only once in a as part of a single cross-species and multi-institutional study published in 2016, [3\*\*]). Note, this search excluded observational or opportunistic studies (e.g., [88,89]), measures of personality using rating scales (e.g., [90]), investigations of laterality [91]), or welfare-related evaluations of environmental enrichment use (e.g., [92]).

analytical techniques [9], there is great variance across zoos in their receptivity to research and their involvement in the scientific process. More research in zoo settings should be pursued because, not only do zoos offer unique populations of subjects in terms of species diversity, but through the use of multi-institutional protocols researchers can test large numbers of subjects. For example, in their study of the relation between brain size and problem-solving skill, Benson-Amram *et al.* [3\*\*] tested 140 animals that represented 39 carnivore species tested in eight zoos and one research center. Furthermore, studying zoo-housed animals may reduce or negate the need for academics to house animals at their home institution for research purposes, which is a considerable

investment. Additionally, collaborating with zoos also means academics can profit from the expertise of zoo employees [8]. Finally, zoos offer a unique research opportunity for developmental and social psychologists who can test human participants in a naturalistic setting if recruiting and testing zoo visitors [10,11].

Beyond the diversity and number of animals that can be tested, conducting cognitive research in a zoo setting can also serve to foster public understanding of science [12,13\*]. Millions of people visit zoos annually [14], and for many zoos conservation and science education is at the core of their mission [15]. To promote public engagement with research, certain zoos have designed

Download English Version:

<https://daneshyari.com/en/article/5735851>

Download Persian Version:

<https://daneshyari.com/article/5735851>

[Daneshyari.com](https://daneshyari.com)