

# WILD MINDS

What Animals Really Think

## What People Think About Animal Thinking

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### Abstract

The question of how nonhuman animals think is pervasive in the scientific and popular media, yet there is a lack of concordance between animal cognition research and how this information emerges in popular discourse. This study investigated how people conceive of animal thinking, in order to inform the development of an exhibit on animal minds. The study used qualitative interviews of visitors to the New York Hall of Science and Staten Island Zoo followed by a quantitative, online consumer survey of American museum visitors.

Results demonstrated that visitors varied in their perceptions of animal thinking, but appear to be open to new ideas about how animals might think. Most recognized survival strategies as thinking in wild animals, but had reservations about discussions of empathy, deception, and awareness. Pets were commonly attributed to have higher cognitive capacities for thinking than food or other domestic animals.

Participants' were more likely to focus on an overall concept of animal thinking rather than different cognitive dimensions.

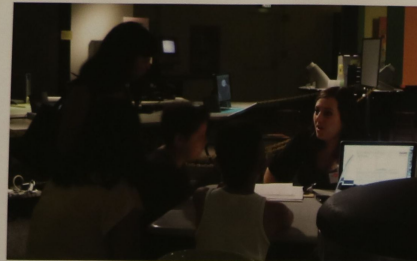
### Introduction

Studying cognitive abilities of nonhuman animals helps advance understanding the evolution of cognition and may have implications for human-animal relations.

Animal cognitive research tends to be geared towards specialist research audiences, and is generally difficult for the public to understand.

Social science research into belief in animal mind tends to suggest the public has only a general concept of intelligence (e.g., Nakajima, Aritmitsu & Lattal 2002), but Knight and colleagues found that "Belief in Animal Mind" (BAM) was a predictor of people's attitudes towards animals and animal use (e.g. Knight et al. 2003; 2004; 2009).

In general, popular science discourses have not attempted to represent the diversity and complexity of animal thinking discussed in the scientific literature.



### Stage I: Qualitative Interviews

#### Method

#### Participants

- Adult visitors ( $N = 68$ ) were interviewed at the New York hall of Science and Staten island Zoo in December 2009.

#### Procedure

- Literature review on animal cognition to develop a consolidated list of general cognitive abilities found across a range of animals.
- Parallel 8 open-ended questions to assess visitor knowledge of learning, memory, communication, & awareness.

### Stage II: Quantitative Online Museum Consumer Survey

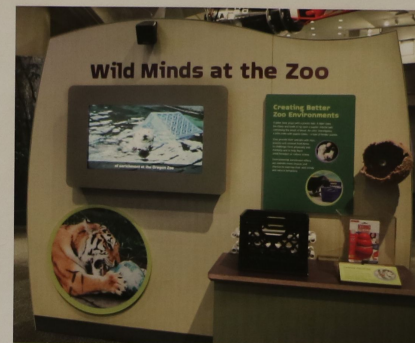
#### Method

#### Participants

- Random sample of American adult consumers ( $N = 525$ ) recruited through MarketTools, Inc. an online consumer survey panel service.

#### Procedure

- An online consumer survey was developed based on results from Stage I:
- 39 statements using a 6-point Likert scale (1 = strongly disagree, 6 = strongly agree), representing 6 categories of animal cognition (learning, memory, communication, problem solving, numerosity, and awareness) to evaluate how likely participants were to attribute these cognitive abilities to different species.



### Results

- Reliability (Cronbach's  $\alpha = 0.863$ );
- Mean response tended toward neutral;
- Factor analysis identified nine factors that differed from the initial six constructs.
- Three combined constructs were all reliable: Learning, problem solving, numerosity (Cronbach's  $\alpha = 0.745$ ); Memory (Cronbach's  $\alpha = 0.615$ ); Awareness and communication (Cronbach's  $\alpha = 0.738$ ).
- Not surprisingly, people think animals think but can't operationalize that result beyond a single factor (the Animal thinking construct).
- Participants who had dogs and/or cats, a college education, or watched nature shows were more likely to support the belief that animals can think (see Table 1).

Table 1: Significant results from multivariate analysis of variance tests for the demographic questions

Constructs	Demographic groups	N	Mean	SD	F	df	sig.
Animal thinking	Dogs & cats	492	4.11	0.524	9.856	1, 523	0.002
	None	33	3.82	0.517			
	Nature shows	446	4.12	0.527	5.000	1, 523	0.026
	None	79	3.97	0.517			
Learning, problem solving and numerosity	Dogs & cats	492	3.95	0.594	7.783	1, 523	0.005
	None	33	3.65	0.563			
	Children at home	196	3.83	0.538	8.884	1, 523	0.003
	None	323	3.99	0.626			
Memory	College	262	3.99	0.600	6.203	1, 523	0.013
	None	263	3.86	0.586			
	Dogs & cats	492	4.32	0.690	6.682	1, 523	0.010
	None	33	3.99	0.803			
Awareness and communication	Dogs & cats	492	4.18	0.603	6.677	1, 523	0.010
	None	33	3.90	0.533			
	Nature shows	446	4.19	0.602	4.661	1, 523	0.031
	None	79	4.03	0.589			

### Discussion and Conclusions

Results suggest that American museum visitors do believe animals think, but they did not have strong opinions about how animals think or the ways different animals may think. The generally neutral responses in the results suggest that visitors to science museums and nature-based learning environments are open to considering evidence that animals display complex thinking abilities.

Participants had an overall concept of animal thinking that was not differentiated into the categories represented in scientific studies of animal cognition.

Pet ownership is related to acceptance of cognitive abilities.

Participants were more likely to attribute cognitive abilities to wild animals, dogs and cats, but not to food animals or insects.

Emphasis on continuity in cognitive abilities across wild, captive and companion animals is likely to receive positive results.

*Zoo and museum exhibitions focused on animal thinking are likely to promote a more detailed understanding of scientific findings about how other species think which in turn appears to correlate to increased concern for animal welfare across all species.*

### References

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