



Wild Minds

Front-End Evaluation

Interviews at the New York Hall of Science and Staten Island Zoo

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Understanding, fostering, and promoting lifelong learning



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Introduction

In recent years, scientists in the field of animal cognition have made numerous exciting discoveries about the cognitive abilities of animals. The topic of animal thinking is also a popular subject in the media as it is discussed in many television shows, movies, and magazine articles. Though the scientific findings are often presented as fact in these sources, there appears to be a disconnect between these results and what the general public actually knows and/or thinks about in terms of the cognitive capacity of animals. The purpose of this project is to evaluate what people think about animal thinking order to develop an exhibit about animal minds.

By surveying the scientific literature on animal cognition, we developed five categories describing the ways animals can think. The four categories include: 1) Learning and memory (including problem solving), 2) Communication, 3) Counting and numerosity, 4) Self-awareness and consciousness. Using these categories, we developed a questionnaire that will be administered via qualitative interviews with the general public to assess what people know and how they think about animal thinking. These results will be used to develop a quantitative, online consumer survey that will be used for a broader evaluation of the ways in which the general public thinks about animal minds.

Methods

Participants

We conducted qualitative interviews with visitors at the New York Hall of Science and Staten Island Zoo. A total of 68 participants were interviewed over two days in December 2009. Using purposive sampling, we recruited visitors for the interviews in attempt to get equal numbers of men and women, along with a range of ages over the age of 20. The majority of the visitors were parents with children, so some interviews included answers from more than one adult and some children. Since many of the participants were in the 30-40 age range, a few employees were also interviewed at the New York Hall of Science to get a younger age sample and to increase the total number of interviews.

Procedure

The basic interview procedure was the same for both locations; however, at the New York Hall of Science, we conducted most of the interviews at tables. Visitors were recruited by the interviewers asking them to participate in a brief interview as part of the process of developing a new exhibit on animal thinking. Audio recordings were made of the interviews as long as the participant gave their consent. For each participant, the only information recorded included gender, an approximation of age, and their responses to eight, open-ended questions (*See questionnaire attached*). The interviewers transcribed the responses to each question on a clipboard with an interview sheet for each person.



Results

After reviewing the transcribed notes and recordings, we determined that there was a range of responses, including what seem to be some commonly accepted responses. Most of the visitors we interviewed at the science center and zoo had never really thought about animal thinking. However, when queried, they could give examples from the popular media or reflect on their own experience (most of the participants had pets) to infer processes. In general, most of the participants tended to separate instinct (proprioceptive self, instinct, and perception) from the ability to synthesize information. There is a general misconception that these processes do not equal thinking. Most of the participants tended to respond that animals need to have repetition and/or experience for thinking instinctually and provided examples that were mostly non-social animals. However, when challenged, the participants did find exceptions beyond this basic rule. These exceptions included social animals and animals that live in hives (i.e. bees) or schools (i.e. fish), along with pets.

The participants' responses also revealed a hierarchy of brains, with humans as the model to which animals are compared. Few participants mentioned comments like "it depends on the animal" or "there are different levels," which parallels the effect of phylogenetic scale discussed in the social science literature about people's attitudes towards animals. The existential conundrum was that the participants did not appear to think about evolution since there was no discussion of history and there was no mention of continuity in terms of evolution. There was a lack of connection and a difficulty in generalizing to categories of animal cognition, which suggests that the participants could not go beyond these barriers to discuss the types of animal thinking.

There were also some vocabulary challenges that should be addressed in the development of the online survey. We asked questions using terms from the scientific field of animal cognition, but these terms were generally not understood well by the participants. For example, the question concerning deception in animals was not understood as an intentional behavior. Instead it challenged the participants' beliefs about the innocence of animals, and was described to be more about preservation and protection. Many of the responses focused on the adaptations of animals that are used to deceive predators (i.e. camouflage). Empathy was another term that was misinterpreted since most of the participants gave examples concerning parental instinct, defense of young or weak, protection, grief/sense of loss, and/or preservation. The notable exceptions to these responses were pets, social animals, and prey animals. In particular, pets were often assumed to show empathy for their owners or other people due to the effect of domestication. Also, there may have been an order effect since the empathy question preceded the problem solving question. As a consequence, some participants interpreted the problem solving question in connection to the empathy question, and responded that animals can help solve human problems or vice versa. Despite these misconceptions, there were some interesting trends in the participants' responses that are summarized below with reference to the four categories.



Animal thinking

Questions relating to this category did not specifically assess learning, but the participants often commented that animals can learn through training and repetition. We did not ask how animals learn, thus the participants did not describe the specific types of learning such as concept formation, imitation, etc., but one participant mentioned cultural transmission. With respect to memory, participants had no trouble recognizing that animals can remember things. However, this understanding was limited and the participants did not provide an in depth description of the capacity and types of memory use. Memory was generally attributed to animals as a survival need. For example, responses focused on the ability of animals to remember and recognize people and remember where food and home is located. Two main examples of spatial memory were provided using salmon spawning and bird migration, which focused on the idea that animals can follow some path.

Similar to the responses above, the question about problem solving demonstrated that the participants generally understood these abilities in animals to be driven by survival needs. The examples given often focused on the necessity of animals seeking protection or shelter and obtaining provisions, including using tools. There was little acknowledgement of the degree of complexity in problem solving, though some participants had some idea that animals are aware of problems and can show some foresight. The challenge was to go beyond the belief about the innocence of animals that assumes they do not understand the problems they face. Another interesting observation was that the participants tended to assume that animals in captivity do not deal with the same life and death issues (i.e. finding food and shelter) as wild animals and thus do not need to solve problems. However, there were several examples given of animals solving complex problems in science experiments such as mice learning mazes and octopus opening jars to get food. Thus, the question remains as to whether the participants had trouble recognizing the degree to which animals can solve problems or is it a difference in captive versus wild animals?

Communication

The participants' responses demonstrated that the idea that all species communicate with each other in different ways was a relatively accepted concept. Many examples described the range in which animals can communicate using sound, scent, displays, gestures, body language, and more, which may come from the media or from common knowledge. However, the complexity of communication (i.e. interspecific communication or the language debate) is not well understood. The participants appeared to be open to the interpretation of communication and the idea that language goes beyond existence proof.

Awareness

Questions relating to this category seemed to be the most challenging for the participants. Common responses were either that they had not thought about it before or did not know. As mentioned before, the participants tended to agree that animals were aware of their environment (proprioception), but were not aware of their own thinking. Few participants went on to comment that there is no evidence of "metacognition" or "self-recognition," or said "it hasn't been studied" or "there is no way to test it." However, after thinking for a



minute, some participants gave examples of social animals having higher order thinking since they think in social settings.

Conclusions

These results will be used to develop questions for the online consumer survey to better evaluate the ways in which people think about animal thinking. There are a few areas where more specific questions will be asked such as the different types of learning animals are capable of asking people to attribute these abilities to certain species. By mentioning these animals, we hope to explore what it is that people feel differentiates wild and captive/domestic animals. The results from the interviews suggest that the participants attributed thinking to domestic animals as a result of the domestication process. There was also an apparent difference between food animals and domestic animals, since food animals were not really addressed. As we develop the instrument for the quantitative survey, we will include questions relating to all of the categories with specific references to cognitive abilities such as counting and self-awareness (not assessed in the qualitative survey), which will be defined as part of the question to avoid misinterpretation.

As a result of the qualitative interviews, we found that most of the participants could easily attribute instinctual and survival based abilities to animals, but these were not always associated with thinking processes. The examples were mostly attributed to social animals or higher mammals, along with some pets. We hope to use the quantitative online survey to further explore these trends. This exhibit on animal minds will challenge people to go beyond the basic rule that animals can only use instinct and recognize the continuity of these cognitive abilities across species.



Wild Minds Interview protocol

Location: _____ Date: _____ Initials: _____ Audio file: _____

Age decade: 20-30 30-40 50-60 60-70 70+ Sex: M F

Guide for visitor interviews at the New York Hall of Science and Staten Island Zoo

Hi, my name is _____, I am from Hunter College and we are conducting a survey in association with the New York Hall of Science and the Staten Island Zoo. We are helping to develop a new exhibit about scientists who study what animals do. This interview will only take about 15 minutes and you will be able to see the group you came with at all time. Would you be willing to help us by answering some questions? As part of this project, we would prefer to make an audio recording of your participation. Would you be willing to let us record the interview. If not, I will just write down what you say.

Interview Questions

1. Can you tell me briefly, what do you think about how animals think?
<probe> Can you think of examples?

2. What do you think about animals remembering things?

3. What about how animals communicate?

4. What about deception?



5. What about empathy or compassion for others?

6. What about problem solving?

7. How do you think animals might be aware of their own thinking? Can you think of an example?

<probe> What do you think about bees thinking?

<probe> How about birds like pigeons or crows?

<probe> What about fish?

8. Have you had pets in your life? What kind?

Concluding remarks

Thank you for your participation with this research project. Here is a card with contact information should you have further comments or concerns about this project.