

# Ability of horses to understand human pointing cues

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Horses (*Equus caballus*) are social prey animals that have been domesticated for more than 5000 years. In recent years, studies have been made to assess their ability to understand human pointing cues, following similar investigations in dogs, primates, and other animals. Results indicate that horses pick up on human cues to a statistically significant degree, relying on gaze, direction of attention, and human cues.

A pilot study (McKinley and Sambrook, 2000) tested 4 horses for their ability to use human-given manual and facial cues in an object-choice task, where the correct choice was rewarded. Two of the horses made the correct choice when the experimenter was touching the correct object, while only one succeeded when the experimenter was simply pointing. In the same study dogs were tested for comparison and performed better than the horses, explained by the authors in terms of differential social experiences and different selective pressures in the domestication of horses and dogs.

In a more recent study (Maros et al., 2008,) 20 horses were tested by a comparable methodology, where 4 different cues were used to identify the correct object: Distal momentary pointing (DM), distal dynamic-sustained pointing (DDS), proximal momentary pointing (PM), and proximal dynamic-sustained pointing with gaze (PDS-G). Horses were able to make the correct choice using DDS, PM, and PDS-G cues, but on an individual basis they failed to perform significantly above chance level (50%) using the DM cue. The results demonstrated the cognitive demand of horses to understand cues in the following order: PDS-G (success rate app. 75%), PM (app. 65%), DDS (app. 60%), and DM (app. 50%,) which indicates that horses use other clues to choose the correct object, such as the experimenter's hand's proximity to it.

It should also be noted that for the dynamic-sustained pointing cues (where the experimenter would hold the cue until the subject had made its choice), both Maros et al. and McKinley/Sambrook found that the successful horse would often move its nose down the arm of the experimenter and onto the correct object, or examine the pointing finger before turning their attention to the object, thus solving the problem in a manner that excludes understanding of the cue itself.

Without exception, gaze toward the correct object improved the subjects' performance in this study and several others, suggesting that gaze is an important cue of attention to many animal species. It is also worth noting that the horses' performance declined during the trials of more cognitively demanding cues (such as DM). The author attributes this to mental exhaustion (as mentioned earlier), decreased motivation due to lower success rate and fewer rewards—which caused some subjects to attack the experimenter in frustration upon failure—and lack of cue variability in certain phases of the experiment.

In conclusion, the author states that one should perhaps discriminate between the

utilization of a signal (group level effect) and reliability of signal utilization (individual level), and that the terms "comprehension" and "understanding" (signifying spontaneous utilization) should be reserved for cases where a higher proportion of individuals in a group are known to be reliable responders.

A third study (Proops and McComb, 2009) tested 36 horses for their ability to discriminate between an attentive and an inattentive person to obtain food, where the cues provided for attentiveness included body orientation (facing subject **VS.** back against subject), head orientation (facing subject **VS.** head turned away 90°), open **VS.** closed eyes, and a mixed condition (body facing subject, face turned away). Horses chose the attentive person to a significant degree for all cues except the mixed cue, suggesting that domestic horses are sensitive to human cues of attention, including gaze to a significant degree.

None of these three studies demonstrate that horses have a natural understanding to the purpose of human manual cues. All studies conclude that gaze and attention significantly facilitates the success rate. This is an indication that horses may not have the mental faculty to make use of human manual cues and rather assess the direction of the experimenter's gaze/attention to make the correct choice. This interpretation is supported by Maros's report that some horses demonstrated frustration through aggression during the cognitively more demanding trials. Maros et al. also concluded that the subjects did not learn from the testing.

McKinley and Sambrook's study, focusing on domestic dogs mainly, established that the dog is highly sensitive to human cues and particularly adept at determining the focus of human attention, outperforming chimpanzees, hand-reared wolves, and horses. Moreover the working gundogs, previously trained to mind pointing cues, grossly outperformed the non-trained pet gundogs and the non-gundog pet groups, indicating that true comprehension of pointing as a directional cue can be learnt.

McKinley/Sambrook pose three contributory factors to the disparity in performance between dogs and horses. One is a fundamental difference in canid and equine intelligence in a problem-solving context, or the difference in *form* of intelligence between these species, as a consequence of their respective predatory and grazing niches. Another factor may be the differing selective pressures exerted on the evolution of domesticated horses and dogs, and that the dog was domesticated earlier and in closer social contact with humans than was the horse. A third factor may be the enculturation process undergone by dogs during their lifetime, typically involving an intimacy with humans that may sensitize them to human cues and attention.

## **References**

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