World Academy of Science, Engineering and Technology
International Journal of Cognitive and Language Sciences
Vol:11, No:08, 2017

The Study of Mirror Self-Recognition in Wildlife

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Abstract : Animal cognition provides some evidence for self-recognition, which is described as the ability to recognize oneself as an individual separate from the environment and other individuals. The mirror self-recognition (MSR) or mark test is a behavioral technique to determine whether an animal have the ability of self-recognition or self-awareness in front of the mirror. It also describes the capability for an animal to be aware of and make judgments about its new environment. Thus, the objectives of this study are to measure and to compare the ability of wild and captive wildlife in mirror self-recognition. Wild animals from the Royal Belum Rainforest Malaysia were identified based on the animal trails and salt lick grounds. Acrylic mirrors with wood frame (200 x 250cm) were located near to animal trails. Camera traps (Bushnell, UK) with motion-detection infrared sensor are placed near the animal trails or hiding spot. For captive wildlife, animals such as Malayan sun bear (Helarctos malayanus) and chimpanzee (Pan troglodytes) were selected from Zoo Negara Malaysia. The captive animals were also marked using odorless and non-toxic white paint on its forehead. An acrylic mirror with wood frame (200 x 250cm) and a video camera were placed near the cage. The behavioral data were analyzed using ethogram and classified through four stages of MSR; social responses, physical inspection, repetitive mirror-testing behavior and realization of seeing themselves. Results showed that wild animals such as barking deer (Muntiacus muntjak) and long-tailed macaque (Macaca fascicularis) increased their physical inspection (e.g inspecting the reflected image) and repetitive mirror-testing behavior (e.g rhythmic head and leg movement). This would suggest that the ability to use a mirror is most likely related to learning process and cognitive evolution in wild animals. However, the sun bear's behaviors were inconsistent and did not clearly undergo four stages of MSR. This result suggests that when keeping Malayan sun bear in captivity, it may promote communication and familiarity between conspecific. Interestingly, chimp has positive social response (e.g manipulating lips) and physical inspection (e.g using hand to inspect part of the face) when they facing a mirror. However, both animals did not show any sign towards the mark due to lost of interest in the mark and realization that the mark is inconsequential. Overall, the results suggest that the capacity for MSR is the beginning of a developmental process of self-awareness and mental state attribution. In addition, our findings show that self-recognition may be based on different complex neurological and level of encephalization in animals. Thus, research on self-recognition in animals will have profound implications in understanding the cognitive ability of an animal as an effort to help animals, such as enhanced management, design of captive individuals' enclosures and exhibits, and in programs to re-establish populations of endangered or threatened species.

Keywords : mirror self-recognition (MSR), self-recognition, self-awareness, wildlife
Conference Title : ICAC 2017 : International Conference on Animal Cognition
Conference Location : Bangkok, Thailand
Conference Dates : August 30-31, 2017