**The Mirror Test**
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Can animals recognize themselves in mirrors? Gallup (1970) conducted an experimental test of this question using a relatively simple approach. Individually housed chimpanzees were confronted with a full-length mirror outside their cages for a period of 10 days. The chimpanzees initially reacted as if they were seeing another chimpanzee and engaged in a variety of social displays directed toward the reflection. These social responses waned after the first few days. Rather than continue to respond to the mirror as such, the chimpanzees began using the mirror to respond to themselves by engaging in mirror-mediated facial and bodily movements and self-directed responses such as grooming parts of the body only visible in the mirror. The transition from social to self-oriented responding gave the impression that the chimpanzees had learned to recognize themselves; i.e., that they had come to realize that their behavior was the source of the behavior being depicted in the mirror. To assess this possibility Gallup devised the mark test. Each chimpanzee was anesthetized and, while unconscious, a red mark was applied to the brow above one eye and the top half of the opposite ear. A nonodorous, nonirritant dye was used, so that upon recovery from the anesthetic the chimpanzees would have no knowledge of the marks. Observations in the absence of the mirror confirmed this as the chimpanzees rarely touched the marks. When the mirror was reinstated, however, the effect was dramatic: the chimpanzees looked at their reflection and guided their fingers to the marks on their faces that could only be seen in the mirror. In addition to touching the marks repeatedly and looking at their fingers, some even smelled their fingers.

**Comparative Data on Self-Recognition**

Gallup's (1970) initial study was comparative in the sense that the same procedures were carried out with three different species of monkeys: stumptailed, rhesus, and cynomolgus macaques. The monkeys' initial reactions to the reflection were also social, but in contrast to chimpanzees, the tendency to respond as if in the presence of another monkey persisted. Even after three weeks of mirror exposure, none of the monkeys showed any mirror-aided self-directed behaviors, nor did they use the mirror to investigate the marks during the mark test. The major implications of the study were not only that chimpanzees shared with humans the capacity for self-recognition, but that the capacity might be limited to those primates most closely related to humans, namely the great apes (family *Pongidae*).

In the three decades since this study a substantial literature has accumulated concerning the phylogenetic distribution of self-recognition. Studies involving dozens of species and scores of individual prosimians and monkeys have been conducted to determine to what extent other primates might show any of the criterion behaviors for self-recognition (spontaneous mirror-guided self-exploration and mark-directed responses on the mark test). Primates tested for mirror-image reactions include lemurs and bushbabies (prosimians), squirrel monkeys and several species of marmosets, tamarins, and capuchin monkeys (New World monkeys), several species of baboons and guenons (African Old World monkeys) and numerous species of macaques (Asian Old World monkeys). Even gibbons (Asiatic apes of the family *Hylobatidae*) have been assessed. Some studies have been carefully designed to replicate Gallup's original mirror exposure and mark test regime, while others have systematically manipulated other variables in an effort to increase the likelihood of getting monkeys to make the transition from a socially oriented to a self-oriented perception of their reflection. Experimental manipulations have ranged from giving monkeys many months or even years of almost continuous exposure to their reflections, starting mirror-image experience at a very young age, and providing mirrors of various shapes and sizes and at various angles and degrees of accessibility. Other attempts to find self-recognition have included training monkeys to attend explicitly to their reflections, training them to use the reflected environmental