When Traditional Methodologies Fail: Cognitive Studies of Great Apes
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Since the classic work by Kohler (1925), Yerkes and Yerkes (1929), and Tinklepaugh (1932), researchers have been developing methods to investigate the minds of apes. In this essay, we present a set of principles that we use in guiding our joint and separate research programs which address cognition in great apes. General questions that guide our research address broad cognitive skills such as symbolic representation and the role of memory in serial processing. We are interested in understanding how apes extract and use information in solving problems. As we attempt to characterize cognition we develop methods that guide the ape through experimental procedures to reveal the cognitive processes involved in performing the task. We come to our research from different backgrounds, but with similar perspectives and goals. Shumaker is an evolutionary biologist interested in primate behavior and perception. Swartz is an experimental psychologist with a comparative developmental emphasis.

In light of the evolutionary closeness of humans and the other great apes, one assumption underlying our research is continuity of cognitive ability. Our own experiences, as well as data from the human literature, are useful as a reference point for developing procedures for investigating cognition in great apes. Although this assumption of continuity provides a starting point, we formulate specific research questions and develop methodologies that are appropriate to the behavior of the species being studied. We study these animals because we are interested in understanding them in their own right.

It is a common misperception that the behavior of apes is "analogous to", "similar to", "like", or "equivalent to" young humans or humans with developmental delay. Although we can look at developmental parallels in the achievement of specific cognitive skills in apes and humans, we cannot make statements about overall ability. Great apes are not the equivalent of preschool-age human children. For example, a 2 ½ year old human and a 2 ½ year old chimpanzee may both show the ability to recognize themselves in a mirror (Amsterdam 1972; Lewis and Brooks-Gunn 1979; Lin et al. 1992), but that does not imply equivalence of other cognitive skills. Further, Murofushi (1997) reported that an adult female chimpanzee has demonstrated the ability to numerically label random arrays of dots (ranging from one to six) faster than adult humans tested on the identical task. This does not imply that adults of both species share an overall equivalence in cognitive skill. To the point, a discussion of specific abilities generates meaningful comparisons while the search for overall equivalence is unproductive.

Our empirical methodologies are diverse, depending on the cognitive process under investigation. While we frequently use classical and operant conditioning principles in our research design, the endpoint is not to document these forms of associative learning. Rather, we view these as techniques to initially convey information to the apes about the task at hand. Our intention is to manufacture a situation that allows the ape to demonstrate the ontogeny of a particular cognitive skill or ability.

Our goal is to discover the nature of the internal psychological state and the series of cognitive operations that an animal successively passes through as solution is achieved. Not only is it important to devise a task that will allow the ape to demonstrate the "how and why" of the solution to a problem, we also may find that some of our preexisting assumptions about the usefulness of a particular task, or the ability of a particular animal, may be challenged. What we may perceive as the most efficient means to elucidate the cognitive processes that lead to solution may not be optimal, or could be completely in error. Complicating this problem is the inevitable presence of significant behavioral and cognitive differences between individual apes (Boysen 1994). The challenge for the experimenter is to balance task and subject variables in such a way that reliable data are collected and the integrity of the research agenda is