ABSTRACT. This study describes video-task acquisition in two nonhuman primate species. The subjects were seven rhesus monkeys (*Macaca mulatta*) and seven chimpanzees (*Pan troglodytes*). All subjects were trained to manipulate a joystick which controlled a cursor displayed on a computer monitor. Two criterion levels were used: one based on conceptual knowledge of the task and one based on motor performance. Chimpanzees and rhesus monkeys attained criterion in a comparable number of trials using a conceptually based criterion. However, using a criterion based on motor performance, chimpanzees reached criterion significantly faster than rhesus monkeys. Analysis of error patterns and latency indicated that the rhesus monkeys had a larger asymmetry in response bias and were significantly slower in responding than the chimpanzees. The results are discussed in terms of the relation between object manipulation skills and video-task acquisition.

Key Words: Chimpanzee; Rhesus; Joystick; Video; Learning.

INTRODUCTION

RUMBAUGH et al. (1989) published data showing that two rhesus monkeys, *Abel* and *Baker*, were able to master the use of a joystick which controlled a cursor displayed on a computer monitor (herein referred to as video-task acquisition). The significance of these findings challenged the conclusion regarding spatial-contiguity and its affect on basic learning performance (MEYER et al., 1965). It had been hypothesized that with greater distance separating the discriminative stimuli from the subjects response, learning was often compromised if not absent. That *Abel* and *Baker* could learn the joystick tasks clearly showed that these two rhesus monkeys could overcome the problem of spatial-contiguity without compromised learning. RUMBAUGH et al. (1989) went on to argue that compromised learning due to spatial-contiguity was an artifact of HARLOW's (1949) Wisconsin General Test Apparatus (W.G.T.A.).

Since the initial publication by RUMBAUGH et al. (1989), video-task acquisition has been reported in several other nonhuman primate species including chimpanzees, bonobos, and orangutans (HOPKINS, 1991), bonnet macaques (ANDREWS & ROSENBLUM, 1993), baboons (VAUCLAIR & FAGOT, 1993), squirrel monkeys (ANDREWS, 1993), and capuchin monkeys (JORGENSEN et al., 1993). Taken together these results clearly suggest that, under certain experimental conditions, a variety of primate species representing a wide range of taxonomic families are able to learn to use this test system and are able to overcome the problem of spatial-contiguity. Notwithstanding, there has been little investigation of the mechanisms underlying video-task acquisition.
For example, whether species differences are evident in video-task acquisition has not been empirically investigated. Arguably, the video-task could represent a task which differentiates learning abilities in nonhuman primates (see Meador et al., 1987). To date, training methods, apparati, and procedures have varied considerably in the use of the video-task testing paradigm therefore precluding direct comparative analysis of the existing data. Moreover, reports of video-task acquisition in great apes have been either descriptive (Hopkins, 1991) or the subjects have been language-trained and therefore do not represent experimentally naive subjects (Savage-Rumbaugh, 1986). Thus, one aim of the current study was to investigate video-task acquisition in two nonhuman primate species under conditions in which both species were trained using identical testing procedures.

Moreover, how different primate species learn the video-task paradigm has not been investigated. The video-task paradigm is a complicated task and requires a considerable degree of learning as well as motor skill to master it. In addition to overcoming the problem of spatial-contiguity, the subjects must learn that they have control of the cursor and not the target. Moreover, the subjects must learn that a collision must occur between the cursor and target in order to receive reinforcement. Presumably, these components of the task require some learning or cognitive processes. On the other hand, video-task acquisition requires a certain degree of motor skill. Subjects must have the dexterity to be able to accurately guide the collision between their cursor and the target stimulus by manipulation of the joystick. Once movement by the cursor is initiated toward the target, a certain degree of motor skill is required in order to modify the cursor movements in response to inaccurate or misguided movements toward the target by the cursor. Based on these two proposed explanations, species differences in acquisition may be due to differences in motor abilities, cognitive abilities, or both. Thus, a second aim of the proposed studies was to compare acquisition using different training criteria: one motor based and one conceptually based.

METHODS

SUBJECTS

There were a total of 14 captive-born subjects including 7 chimpanzees (Pan troglodytes) and 7 rhesus monkeys (Macaca mulatta). For the chimpanzees, there were three adults (two males and one female) and four juveniles (three males and one female). For the rhesus monkeys, there were two juveniles (one female and one male) and five adults (all males).

APPARATUS

The basic test system has been described elsewhere (Washburn & Rumbaugh, 1992), although the actual units employed in the present study were variations upon this prototype. Generally, each test system consisted of a personal computer (XT- or 386-compatible), a 13"-color monitor, an analog joystick (3 cm long handle) and a Gerbrands 5150 pellet dispenser (monkeys only).