1
Social Intelligence in Capuchin Monkeys (Cebus apella)

KAZUO FUJITA¹, HIKA KUROSHIMA², YUKO HATTORI³, and MAKOTO TAKAHASHI¹

1. Introduction

Asking how socially intelligent capuchin monkeys are seems interesting and important for at least two reasons. The first reason is that they are New World monkeys, and answering this question gives us insights into the origin of this aspect of intelligence in the primate order. This insight is possible because the social intelligence of prosimian species seems quite limited; for instance, there have been no reports of potential cases of deception from the field observations in this group (see Byrne 1995), and triadic interactions seem rare among prosimians despite their apparently social nature (Jolly 1988). Thus, the origin of advanced social intelligence in primates may be traced back at the maximum to the common ancestor between New World monkeys and Old World monkeys that lived about 30–35 million years ago.

The second reason is that capuchin monkeys are the best primate users of tools both in the laboratory and in the wild, if we exclude great apes, and thus seem to have advanced physical intelligence (Fujita et al. 2003; Sato et al., submitted; Visalberghi 1990). Wild capuchins even crack open nuts placed on a hard surface with a hammer stone (Fragaszy et al. 2004) as do chimpanzees. The social, or Machiavellian, intelligence hypothesis (Byrne and Whiten 1988), which stresses complex social life as a most powerful pressure for advanced information-processing ability, predicts good social intelligence in capuchin monkeys. Thus, answering the foregoing question also examines this hypothesis.

Below we report a series of studies conducted at our laboratory in Kyoto University that addressed these questions with captive tufted capuchin monkeys (Cebus apella). First, we describe the two studies on the most complex social skills; one is deception and the other is cooperation between monkeys. Second, we describe several tests of various aspects of the more fundamental social recognition underlying such complex social skills.

¹Graduate School of Letters, Kyoto University, Yoshida-Honmachi, Sakyo-ku, Kyoto 606-8501, Japan
²Japan Society for the Promotion of Science; Department of Psychology, University of Georgia, Athens, GA 30602-3013, USA
³Japan Society for the Promotion of Science; Primate Research Institute, Kyoto University, Inuyama, Aichi 484-8506, Japan
2. Experimentally Induced Spontaneous Deception in Capuchin Monkeys

Although there have been numerous reports of deception in great apes and Old World monkeys, Byrne (1995) reports only four observations of possible deception in capuchin monkeys. However, this seems odd considering the fact that tufted capuchins have an ability for recognition of human-given cues comparable to or even better than that of rhesus monkeys (Anderson et al. 1995; Itakura 1997; Itakura and Anderson 1996; Vick and Anderson 2000). It is true that in some cases this ability could develop irrespective of the taxon; dogs outperform chimpanzees in object-choice tasks using human-given cues (Hare et al. 2002). Dogs could be a special case because of their prolonged domestication. Given this well-developed aspect of social recognition by capuchin monkeys, we are tempted to test whether they spontaneously start to deceive opponents in a situation where deceptive acts could benefit themselves.

Actually, tufted capuchins learn to behave in two-choice tasks deceptively to competitive human trainers who take food found in containers that the monkeys point at (Mitchell and Anderson 1997). This action may be regarded as a case of deception by this species. However, because the monkeys who succeeded in “deception” were explicitly rewarded by the experimenter after deceptive pointing, obviously the behavior could also be a result of simple operant conditioning and may not incorporate any understanding of the mental aspects of the human trainers.

We devised a situation in which monkeys could spontaneously start to deceive conspecific opponents (Fujita et al. 2002). The situation is a food competition contest. Two participants, one dominant and the other subordinate, faced each other in two transparent cages. Two food boxes were placed between the participants. One side of each food box was transparent and the other side was opaque. The food boxes could be opened only from the transparent side, which faced the subordinate monkeys, by pulling a little handle on the lid. The dominant subject always faced the opaque side of the food boxes (Fig. 1).

Before the monkeys had a food competition contest using this apparatus, we trained them in fundamental skills of how to manage the food boxes. Four subordinate monkeys learned to open the baited one of the two boxes by pulling the handle to take food out at an accuracy of 100%. One dominant monkey learned to take the food in the box by manually inspecting inside immediately after the experimenter opened it.

Each of the subordinates had ten contests with the dominant monkey daily. In each contest, an opaque screen was placed at baiting to occlude the dominant’s view and a clear screen to prevent the subordinates’ reaching. Each contest started with first removing the opaque screen on the dominant’s side and then, after 5 s, removing the clear screen. Thus, only the subordinates were able to see the food and to open the baited box at time of the contest. However, the dominant monkey was able to usurp the food once the box was opened. A possible