

Replication of 'Rhesus monkeys correctly read the goal-relevant gestures of a human agent'

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Addendum

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Keywords: replication; rhesus monkeys; goal-directed comprehension

1. INTRODUCTION

In the original study by Hauser *et al.* [1], we reported videotaped experiments on action perception with free-ranging rhesus macaques living on the island of Cayo Santiago, Puerto Rico. It has been discovered that the video records and field notes are incomplete for two of the conditions. Following the discovery of the incomplete video records and field notes, Wood and Hauser returned to Cayo Santiago to re-run the three main experimental conditions reported in the paper, videotaping every trial and accompanying the video records with field notes. We found the exact same pattern of results: for the three conditions tested, two (communicative gaze gesture and pointing gesture) showed statistically significant choice responses, whereas the other (basic gaze) did not. Thus, we provide a direct replication of the originally reported results in Hauser *et al.* [1] accompanied by complete video records and field notes.

2. GOALS

Our primary goal was to replicate the three main experimental gestures reported in Hauser *et al.* [1], accompanied by video records and field notes. Specifically, we replicated the communicative gaze gesture, the pointing gesture and the basic gaze gesture. We videotaped each trial, thereby allowing the subject’s response to be coded by an observer who was blind to the experimental condition.

3. METHODS

From 3 January to 13 January 2008, we tested the same population of free-ranging rhesus macaques (*Macaca mulatta*) on the island of Cayo Santiago, Puerto Rico. The method was the same as in Hauser *et al.* [1]. We videotaped all trials and then blind-coded the trials using the procedure described by Barner *et al.* [2].

An experimenter searched for a subject who was not engaged in distracting activities such as grooming or eating. The experimenter approached to within 2–5 m of the subject, knelt and placed two white opaque containers (27×23×25 cm) on the ground between himself and the subject. Next, a foamcore occluder was placed between the subject and the containers. The experimenter then showed the subject a red apple approximately 30 cm above the top edge of the occluder, and then slowly lowered the apple into a hidden pouch between the two containers on the experimenter-side of the occluder. From the subject’s

perspective, it appeared as if the apple had been lowered into one of the two containers. After lowering the apple, the occluder was removed and placed behind the containers. The containers were then spread 2 m apart and the experimenter performed an action towards one of the two containers, which was randomly selected before the start of the trial. After performing the action, the experimenter picked up the occluder, stood up and walked away, allowing the subject to approach. We defined a choice as the first container approached and inspected.

We aborted trials when (i) the test subject failed to attend to any part of the presentation, (ii) the test subject failed to begin approaching one of the containers within 10 s, or (iii) another monkey interfered with the trial during the presentation or choice period. We performed the conditions one at a time. Subjects were tested only once in a condition. We identified subjects from natural markings along with chest and leg tattoos and ear notches.

All trials were videotaped and then blind-coded. Specifically, video clips of the trials were randomly intermixed with one another, and each was queued to start after the experimenter had performed the action. A coder then scored each trial, indicating whether the subject had made a choice, and if so on what side (right or left). The coder was therefore blind to both the condition and the container that the experimenter acted upon.

4. RESULTS

Rhesus selectively inspected the targeted container after observing the communicative gaze gesture (17 out of 21 subjects; binomial probability, $p=0.004$) and the pointing gesture (18 out of 23 subjects; binomial probability, $p=0.005$). In contrast, rhesus did not selectively inspect the targeted container after observing the basic gaze gesture (11 out of 20 subjects; binomial probability, $p=0.41$).

5. DISCUSSION

The results of our experiments on rhesus monkeys replicate those reported in the original paper [1] in terms of statistical significance (see table 1). Specifically, this replication shows that rhesus monkeys reliably recognize a communicative gaze gesture and a pointing gesture as goal-directed actions; they do not, however, perceive the act of looking at an object as a goal-directed gesture. Thus, despite the fact that a subset of the video records and field notes were incomplete, the results reported in

Table 1. Comparison of results from Hauser *et al.* [1] and Wood & Hauser (replication).

condition	results		binomial <i>p</i> -value	
	Hauser <i>et al.</i> [1]	Wood & Hauser (replication)	Hauser <i>et al.</i> [1]	Wood & Hauser (replication)
communicative gesture	30/40 subjects	17/21 subjects	0.001	0.004
pointing gesture	31/40 subjects	18/23 subjects	0.0003	0.005
basic gaze gesture	20/40 subjects	11/20 subjects	0.56	0.41

the original paper replicate with blind-coded video records and accompanying field notes.

The results from the communicative gaze gesture and pointing gesture conditions are under review at *Developmental Science* in a paper extending these findings to juvenile rhesus monkeys [3].

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