

# ManyPrimates: A New Multinational, Multi-institutional, Multi-species Collaborative Effort to Study Primate Cognition and Behavior

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## Introduction

While accredited zoos house a variety of species collectively, each institution often only houses a few members of each species. If researchers are interested in studying primate behavior or cognition, collaborating in multi-institutional efforts ensures that more subjects can be tested and more species can be represented within a single study [1, 2].

In recent years, platforms such as ManyLabs [3] or ManyBabies [4] have been established to facilitate large-scale collaborative research efforts by fostering cross-lab communication and consensus on research efforts. Thus, researchers can effectively address outstanding methodological and theoretical issues that a single research group could not study on its own.

This year (2018) the ManyPrimates project was created to enable those within primatology to systematically answer questions from a phylogenetic or ontogenetic perspective by facilitating the collective development of methods and the free sharing of data.

## Aims

The aim of the ManyPrimates project is to establish a platform for researchers to interact and collaboratively decide on research projects to be run at each contributing facility (laboratories, zoos, and sanctuaries).

- Large and diverse samples
- Pooling of resources across research settings
- Infrastructure to support studies

Our first goal was to run a pilot study to evaluate the feasibility of this collaborative effort. We report the result of that pilot study here.

## Pilot Study Methods

We selected the “three-cups” method [5-7], a previously-validated test of short-term memory, as our initial test case. We selected this protocol because we believed it could be easily adapted for a range of species and facilities.

In each trial a subject was shown three opaque cups (Fig. 1a). A food reward was placed under one cup (Fig. 1b) and the other two were inverted (Fig. 1c).

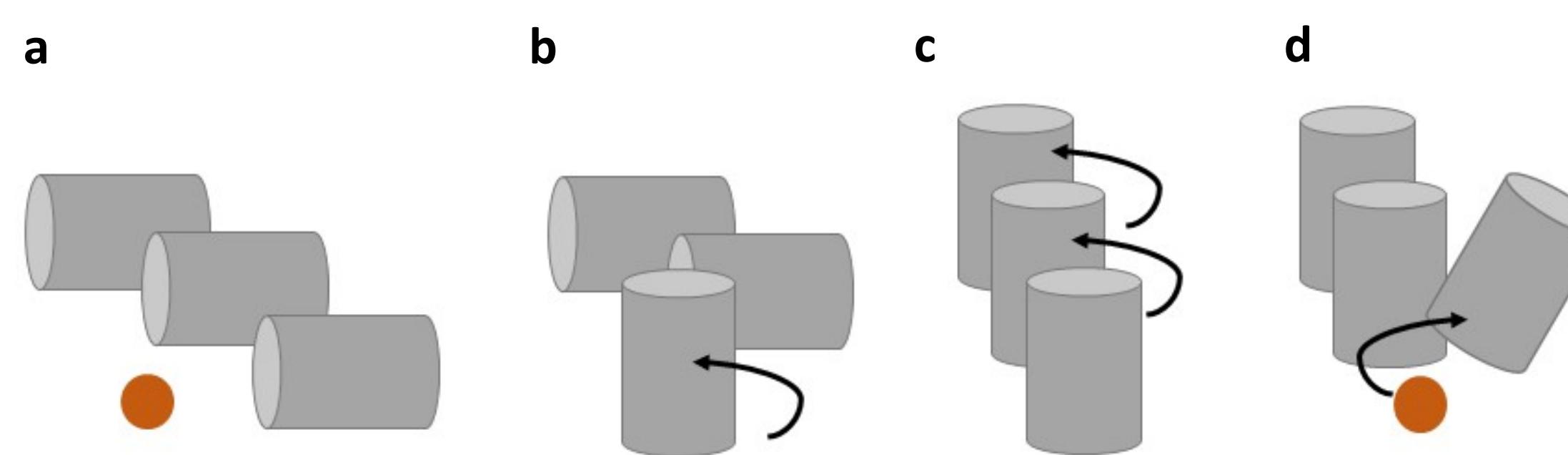


Figure 1. Showing one trial of the three cups game.

The subject was then asked to choose the cup that covered the reward after a 0-second (short), 15-second (medium) or 30-second delay (long), depending on the condition. If the subject selected the cup hiding the food reward, the experimenter gave it to them (Fig. 1d). If not, no reward was given.

Depending on the species and facility, subjects either completed 12 trials, 24 trials or 30 trials, with trials balanced across conditions, and hiding location balanced across trials.

## Results and Analysis

The ManyPrimates group tested 187 primates, representing 12 species (prosimians, monkeys, and apes), housed in zoos, sanctuaries, and research centers across four continents (Fig. 2, Fig. 3).



Figure 2. The sites where data for the ManyPrimates pilot study were collected

We aggregated the data for each individual for each condition within species and compared the proportion of correct choices to a level expected by chance (0.33). We used one-sample t-tests for statistical comparisons. This revealed condition as a key predictor of the subjects’ success (Fig. 3).

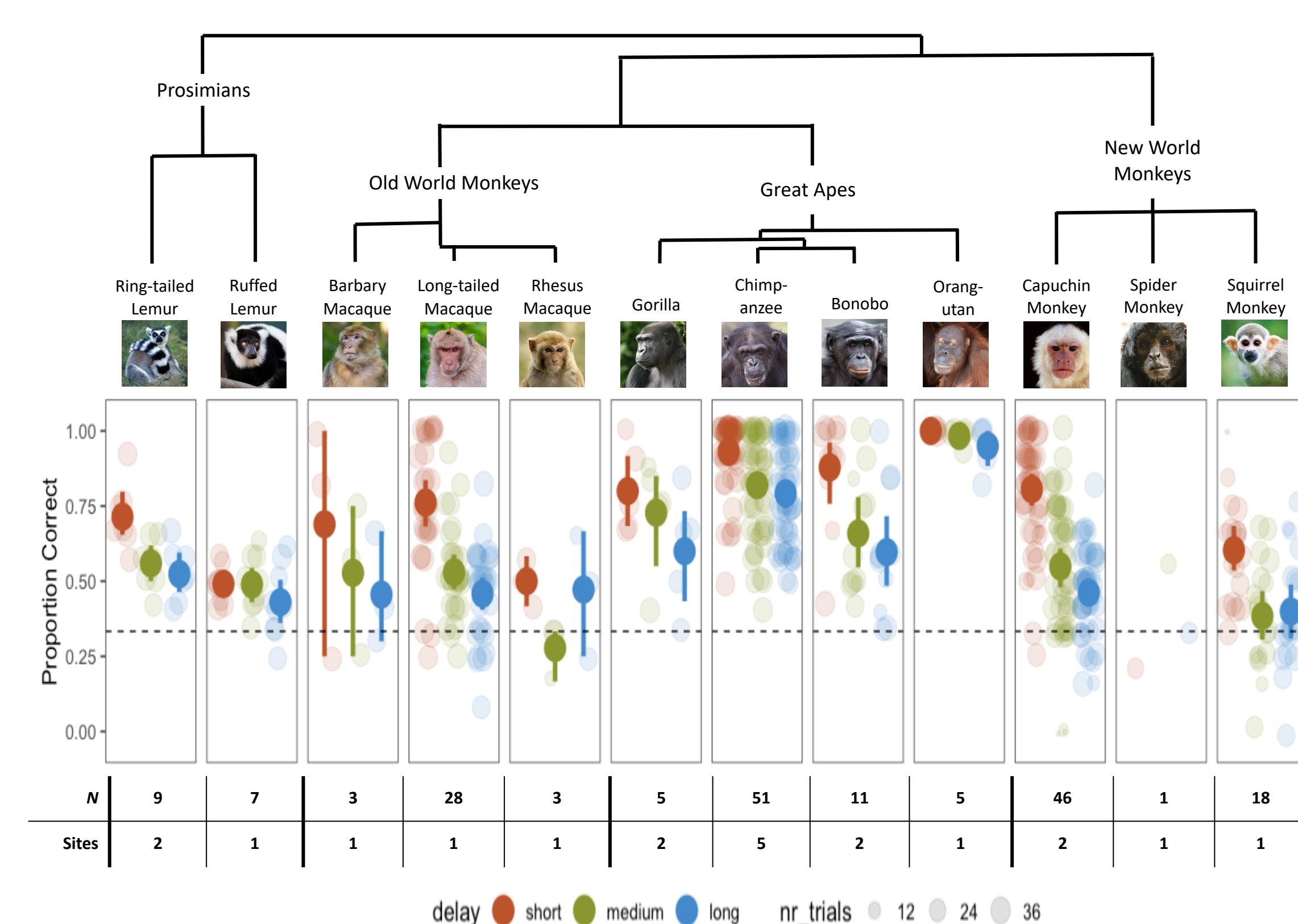


Figure 3. The success of each species by condition: short (0 seconds), medium (15 seconds) and long (30 seconds) delay. Also showing the number of each species tested (by site).

For the main analysis, we fitted a GLMM. We treated each length of delay (0, 15 and 30 seconds) as a discrete factor level, and explored different methodological factors as fixed effects (Fig. 4). All data were analyzed in R.

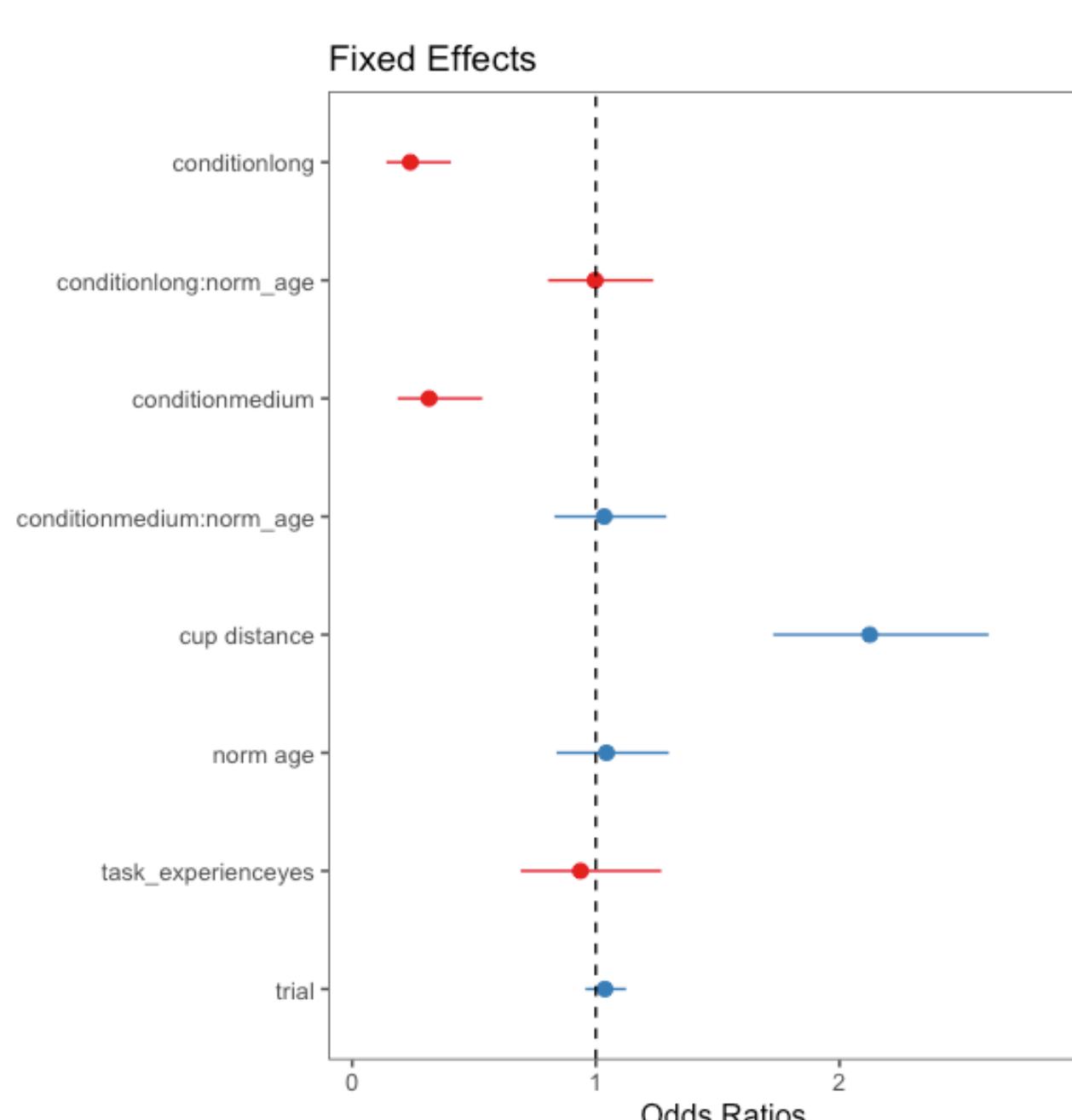


Figure 4. The distance between the cups, likely correlated with species tested, was a strong predictor of success.

## Discussion

We were successfully able to administer the same experimental protocol across multiple research facilities, adapting it for use with apes, monkeys, and prosimians (Fig. 5). Thus, we were able to compare a number of factors related to subjects’ success including condition, species, and prior research experience.

We conclude that ManyPrimates is a successful network to connect researchers, plan, and conduct collaborative studies. Moving forward, we will continue to collaboratively decide on research agendas.

We are open to all interested in primate cognition and welcome people/research centers to join our project.

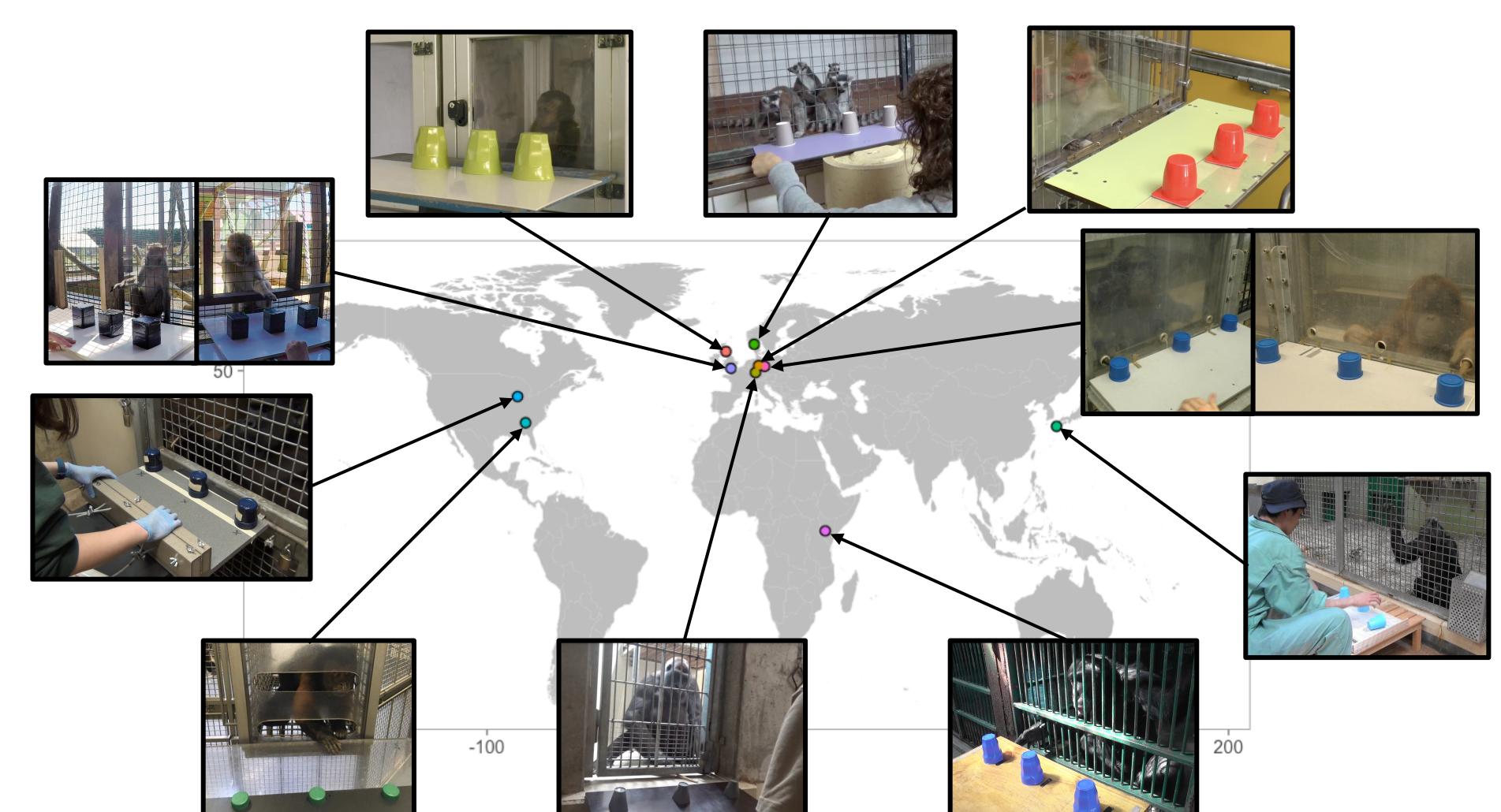


Figure 5. Examples of the experimental protocol run at the different sites with apes, monkeys, and prosimians.

## Interested in Joining ManyPrimates?

 Visit our website: <https://manyprimates.github.io/>

 Email us: [manyprimates@gmail.com](mailto:manyprimates@gmail.com)

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## References

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