

# Altruism Freely Behaving Experiment

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**Subjects:** Common marmosets

**Goal:** The goal of the altruism experiment is to investigate whether the marmosets will cooperate in a Prisoner's Dilemma-like situation. Previous experiments have examined whether the tamarins would share in a pull/no pull situation in which sharing did not benefit them and possibly cost them (Hauser et al. 2003). In this case, the tamarins pulled in about 40% of the trials against an altruist stooge (always pulled) and almost never against a defector stooge (never pulled). If pulling is costly, this indicates that the tamarins were cooperating in a Prisoner's Dilemma (Rapoport and Chamah 1965; Axelrod and Hamilton 1981). If, however, pulling was not costly, the tamarins cooperated in a different game (Opponent Control) in which there is no single stable strategy (Stevens and Stephens in press). Here we will determine whether two freely behaving marmosets will cooperate in this paradigm.

## Procedure:

- Determine treatment (solo barrier, solo no barrier, or paired), side of tool if no barrier, and subjects from Assignment Sheet.
- Fill in condition on data sheet: SB=solo barrier, SNB=solo no barrier, P=paired, R=right, L=left, and replicate number (increment after each paired condition).

### *For solo trials:*

- Randomly order trial types according to barrier condition (no barrier—3 *A*, 3 *B*, 3 *C*, 7 *D*; barrier—4 *A*, 4 *B*, 4 *C*, 4 *D*). Fill in **solo** data sheet.
- Place transparent barriers between cages if barrier treatments. Place subject in appropriate side.

### *For paired trials:*

- Determine which side each subject is on and which subject chooses first.
- Randomly order 1 of each of the *A*, *B* and *D* trial types with random number generator. Fill in two of each in the **paired** data sheet. For example, if the order was C-B-A, fill in C-C-B-B-A-A. After filling in these six trials, then enter 12 *C* trials.
- Place transparent barrier between cages. Place subjects in appropriate sides.

### *Trial structure*

- To begin paired session, start with appropriate subject and alternate which subject chooses for remaining trials.
- To begin a trial, place 2 pellets in the food bin determined by the trial type (Figure 1). In *A* trials, place both the subjects' pellets in the food bins simultaneously. In all other trials, either place or *simulate placing* food in both bins.
- After food is in place, place appropriate tool in front of either subject.
- The subjects get 3 seconds to make a first attempt to pull the tool and 30 seconds to get the food. If they subject does not touch the tool after 3 seconds or retrieve the food after 30 seconds, remove the tool.
- After the subject(s) obtain the food, draw the tool back and remove the tool.
- Record no pull (N) or pull (Y). Repeat until all trials are completed.
- Please transfer all data to computer files when you are finished for the day. Solo sessions go under "Solo" worksheet in data file and paired sessions go under "Paired"

### *Solo criteria*

To **pass** a solo session, the subject cannot make an error on more than one of each trial type (i.e. missing one *A*, one *B*, one *C*, and one *D* counts as passing, but missing two *As* counts as failing). If the subject passes, enter date passed and experimenter in log.

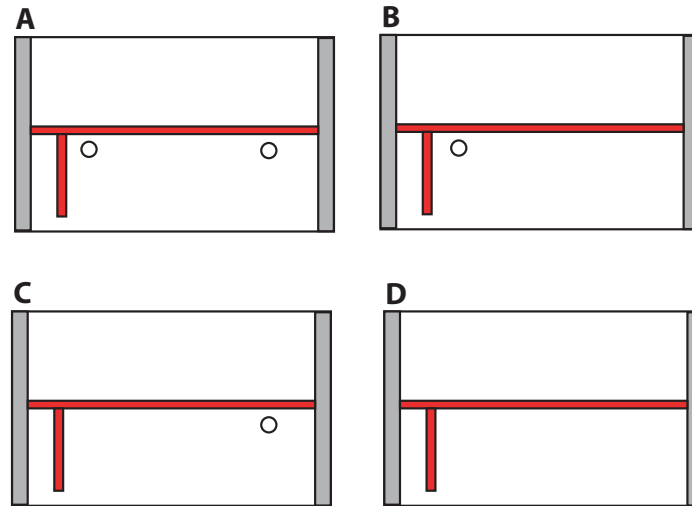


Figure 1: Trial types

Random number generator:

<http://www.wjh.harvard.edu/~mnkylab/apps/trialtype.html>

### **References**

- Axelrod R, Hamilton WD. 1981. The evolution of cooperation. *Science* 211:1390-1396.
- Hauser MD, Chen MK, Chen F, Chuang E. 2003. Give unto others: genetically unrelated cotton-top tamarin monkeys preferentially give food to those who altruistically give food back. *Proceedings of the Royal Society of London, Series B* 270:2363-2370.
- Rapoport A, Chammah AN. 1965. *Prisoner's Dilemma: A Study in Conflict and Cooperation*. Ann Arbor: University of Michigan Press.
- Stevens JR, Stephens DW. in press. The economic basis of cooperation: trade-offs between selfishness and generosity. *Behavioral Ecology*.