

Project: Behavioural Synchrony

Note 09: Prosocial Pulling Experiment Protocol

Date: 2023-08-30

VK

Based on the meeting with JB, RB and NP on 28th August 2023

A sliding board with a detachable handle at the ends and food trays will be presented to a marmoset dyad separated by a transparent partition. Each individual will be able to pull the board closer such that the other individual can access the food (prosocial pulling), and they will take turns pulling for each other in a session using a detachable handle at their end of the board. In the control experiment, the individuals separated by a transparent partition will pull separate boards for themselves.

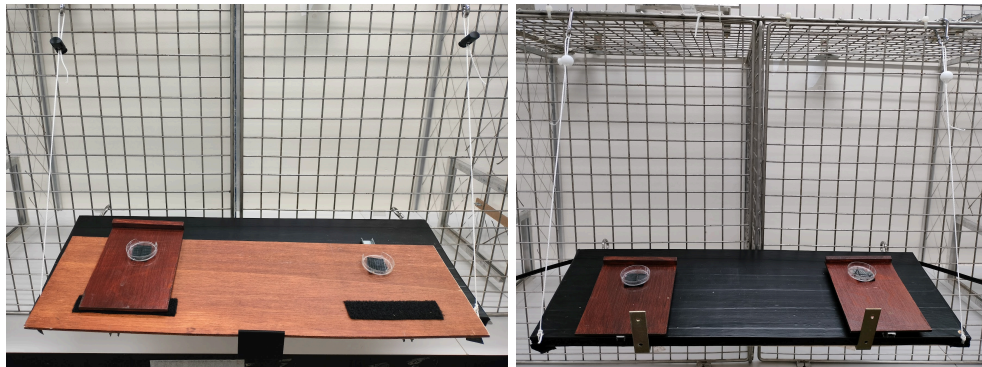


Figure 1. Prosocial and Individual Sliding boards

Each session will involve a pre-task baseline behaviour period, the experimental task and a post-experiment behaviour period. During the period before and after the task, the marmosets are allowed to move freely in the experimental arena and engage with the enrichments provided (wooden logs and hollow pipes). Behavioural synchrony (posture imitation, gaze following, kinematics of pulling etc.) before and after the task will be correlated with the amount of prosocial behaviour during the task and compared with the behavioural synchrony during the control experiment and between pseudo-pairs of individuals.

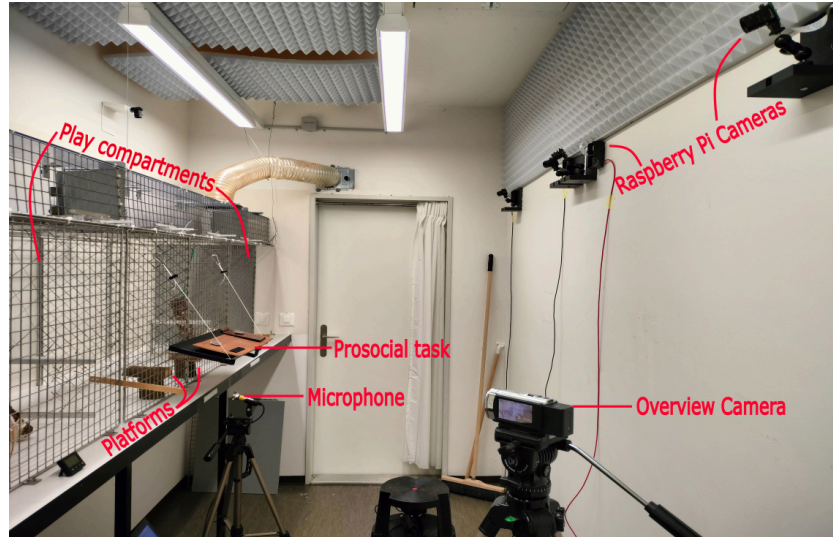


Figure 2. Schematic representation of the experimental arena

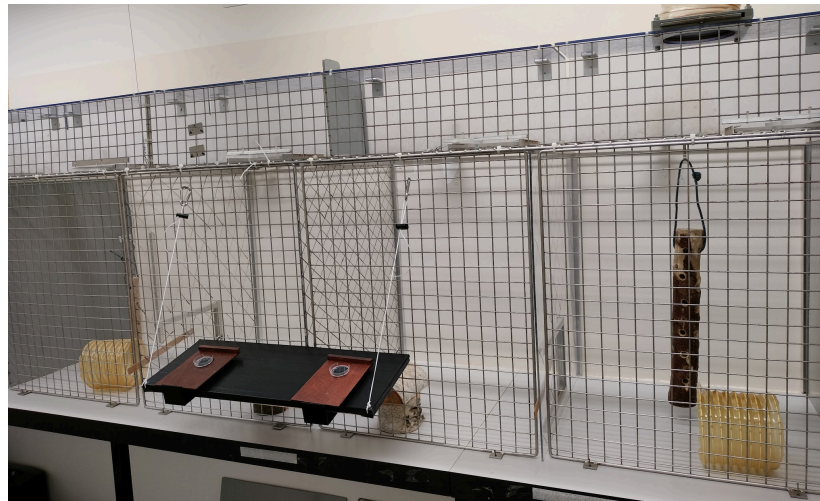


Figure 3. Picture of the experimental arena with the task

Experiment Protocol

1. Set up:
 - a. Prepare the arena by placing the enrichments and platforms inside, and removing the transparent partition and leaving the sliding doors open.
 - b. Ready the task and small frozen crickets which are offered as treats during the task.
 - c. Turn on the raspberry pi cameras and start recording
 - d. Set up a handheld-camera on a stand to the side, which captures an overview of the session
 - e. Set up a microphone to record vocalisations
2. Baseline behaviour period: Allow the animals to come inside and move about freely for 2 minutes in order to gauge baseline levels of synchrony, while the experimenter faces away from them, looking at a computer screen or something

3. Task: Slide in the transparent partition such that the marmosets each stay on either side of the transparent partition, close the sliding doors so they can't access the enrichments, and hook up the experimental sliding board on the cage at an angle (so that the boards slide down naturally). Conduct the individual, prosocial or joint reward task.
4. Post-task period: After the task, remove the board and the transparent partition, open the sliding doors and allow the animals to move freely in the arena for 2 minutes, while the experimenter is facing away from the animals
5. Move the animals to their home enclosure and clean up

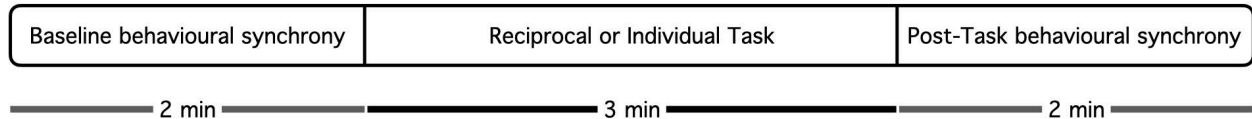


Figure 3. Timeline of each experimental session

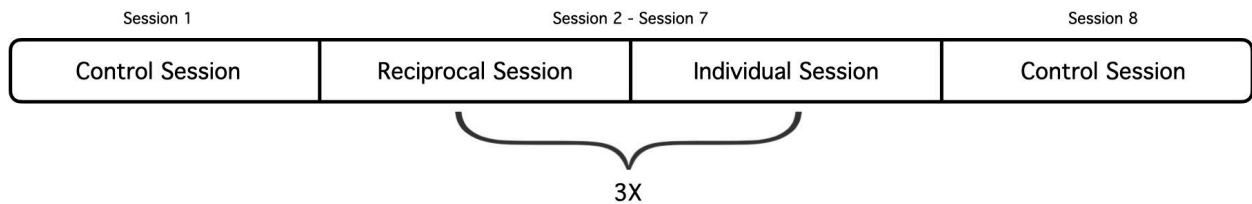


Figure 4. Order of experimental sessions

Prosocial Session

In the prosocial task, when one individual pulls the board, the other individual gets the treat. Each trial within the task should be timed at 30 seconds each. The treats placed on the board should follow the format in the table below. 1 means a food treat is placed on the board, 0 means no treats and the asterisk indicates the individual who gets the handle to pull the board. The first two trials are motivational trials to encourage both of them to pull the board. The next four trials are prosocial trials, with the handle alternating between two individuals

Trial No.	Individual 1	Individual 2
1	1*	1
2	1	1*
3	0*	1
4	1	0*
5	0*	1
6	1	0*

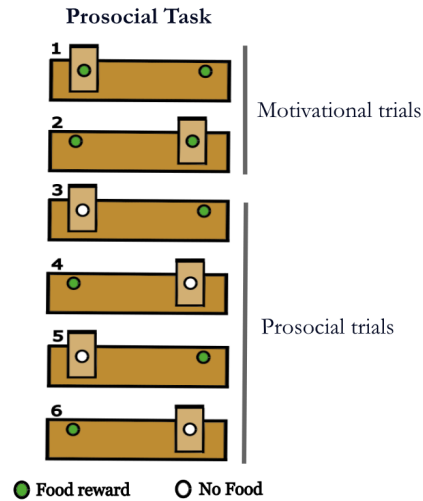


Figure 5. Illustration of the prosocial session

Individual Session

In this case, both the individuals get 6 crickets simultaneously at 30 second intervals, so the amount of time spent doing the task remains the same. Since the animals are given treats simultaneously, they don't have to focus on each other during the task.

Individual Control Task

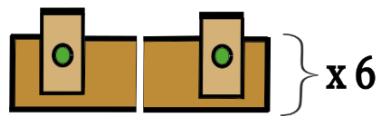


Figure 6. Illustration of the individual session

No-partner Control Session

This is a non-social control for the prosocial task, to check the innate tendency of the individual to pull the prosocial board when there's a treat on the other side with no marmoset to receive it (null prosocial), while there's no treat in front of the focal individual.

1. This control task is performed as the first and last experiment session (with 3 alternating prosocial individual sessions), once on the left half and the other time on the right half of the arena.
2. Set up the transparent partition and the prosocial board before the marmosets enter the room. There is no pre- or post-task duration involved.
3. Essentially it's an alternating (1^* , 0) and (0^* , 1) trials repeated 6 times - so the focal animal gets 6 treats in total. The focal animal always has the handle
4. The null prosocial trial (0^* , 1) lasts for 30 seconds, whereas the self-pull trial (1^* , 0) lasts as long as the animal takes to finish eating the treat.

- The other marmoset is in the play compartment on the same side as the focal individual so that it knows there's no way the other individual would get the food if it pulls the board.

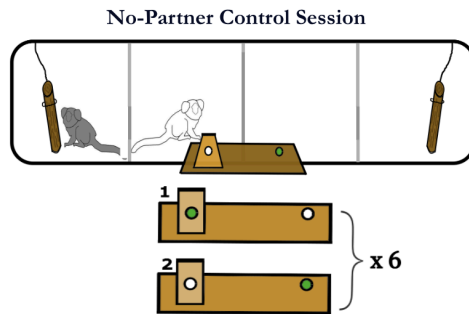


Figure 7. Illustration of the no-partner control session

Prosocial Consolidation Session (Home enclosure)

In order to improve the performance of the dyads in the prosocial sessions, they need more prosocial trials so they understand the task. We will do consolidation prosocial trials in the cage-in-cage in their home enclosures – this will involve two sessions which would contain 2 motivational trials and 6 prosocial trials alternating between two individuals, i.e., in total, 16 trials with each trial lasting 20 seconds. I will conduct these consolidation sessions everyday for two weeks, i.e. 10 days (20 sessions) for each pair.

Joint reward Session

The first three dyads did not pull much in the prosocial sessions and even in the consolidation sessions in the home enclosure. In order to obtain a difference in synchrony in contrast to the individual task, we came up with a modification that would have a positive valence between individuals after the task. In the joint reward task, we modified the prosocial task such that both individuals are rewarded when one individual pulls the board. There are six trials and the handle alternates between individuals – (1*, 1) and (1, 1*).

Checklist before starting the Behavioural Synchrony Experiment in the Right Experimental Room

- Put in enrichments (hanging logs and pipes) in the first and last compartments, place the digital clocks at the ends, put in platforms (for the animals to sit on) in the middle compartments and remove the middle partition. Make sure the sliding doors are open.
- Bring in two stools – one for the experimental board and treats, and the other for the laptop to record vocalisations
- Before the first session, make sure other entries and exits in the pipes are closed. For example, checklist for the back animals –
 - All the safety doors leading to right corridor [3]

- b. All the doors at the cages are closed and the metal clip is positioned down (closed) [4]
 - c. Make sure the door to the pipe leading left is also closed and locked [2]
 - d. Door leading to the back section [1] should be open
 - e. Doors leading to other cages in the back [2] and the doors at the cage [2]
4. Set up the microphone on a tripod and prepare the Avisoft software on the PS laptop
5. Set up the overview camera and the tripod stand to watch what the animals are doing from the side
6. Open the doors to the compartment and tunnel and the experimental room
7. Before opening the entrance to the pipe, double-check the intended path the monkeys should take to the experimental room and make sure other paths are closed off. Make sure all the nails and fixtures are fastened in the experimental room.
8. Start recording the microphone, the overview camera and the raspberry pi cameras in that order
9. After the experiment is done, make sure the doors to the compartment [2], tunnel [1], experimental room [1] and the back section [1] are all closed.
10. Cleaning –
 - a. Wipe the floor and sides of the experimental arena with ethanol
 - b. Wash the food plates and spray the experimental board with ethanol
11. Make sure to switch off the computer and unplug the power cord to the raspberry pi (they overheat otherwise). Essentially, leave the place as you found it.
12. Fill the relevant details in the experimental log book in the office