Introduction Experiment Protocol

While the planed 2AFC experiment for the embodiment project is not particularly complicated, a certain extra effort is needed to apply a more experiment-general structure.

A more abstract description of the experiment will help design a template like sequence easily applicable to other experiments with minimal reprogramming effort. Having a comparable template configuration file will also help the replication of experiments and added transparency in open science projects.

An experiment should be sufficiently described with the following general processes:

* **S**: stimulus presentation (e.g., light, noise, food, conspecifics, etc.)
* **I:** sensor input (e.g., keypress, video tracking, motion detector, etc.)
* **O:** effector output (reward/punishment e.g., light, noise, food, conspecifics, etc.)
* **M:** manipulation/intervention (e.g., optogenetics, experimental condition, etc.)
* **T:** idle time (e.g., reaction time, between trials interval, habituation, timeout, etc.)

Following this scheme, the 2AFC task would consist of a general temporal sequence:

* T1 🡪 S 🡪 T2 🡪 I 🡪 O

In other words: Following a short habituation time (T1) a stimulus key-pair is presented (S). For a given reaction time interval before timeout (T2) the subjects choice is recorded (I) and respectively rewarded (O).

For the planed experiment specifically, subjects have to walk a maze of approx. 2m between habituation and 2AFC task. To balance the effort between walking the maze and stimulus choice, the stimulus- input – output interval is repeated several times. I.e., after the initial habituation time (T1) the stimulus key-pair is presented (S), the choice is recorded (I) and rewarded (O). The stimulus key-pair is presented again (Sn), the choice recorded (In) and rewarded (On), before the trial ends after n repetitions.

* T1 🡪 SI 🡪 T2 🡪 II 🡪 OI 🡪 SII 🡪 T2 🡪 III 🡪 OII 🡪 … 🡪 Sn 🡪 T2 🡪 In 🡪 On

repetition

trial

Each single session may in turn consist of a number of trials that again consist of a number of repetitions after each single habituation and maze walk.

While some of these processes and their sequence need to be predefined for each experiment, a number of parameters can be easily changed to adapt a given experiment template to different conditions. The configuration file attached (experiment.yaml) can be opened with any text editor, preferable by right click > open with > Editor or Notepad++, and contains a number of useful parameters to configure each individual trial, session and condition.