TITLE:
Investigating cognitive flexibility using a full custom-made behavioural set-up

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ABSTRACT:
Cognitive flexibility is an executive brain function that refers to the ability of a subject to switch between thinking about two different or multiple concepts and to shift attention between task sets, attributes of a stimulus, responses, perspectives, or strategies. Many animal species, including humans, succeed in various cognitive flexibility test paradigms. Nevertheless, evaluating animal performance in a given task can vary greatly depending on the experimental set-up used. Here, we designed and built a touch screen operant chamber, controlled by the one-board computer RaspberryPi TM (RPis), that we used to investigate cognitive flexibility abilities in rodents (mice) on a set-shifting task. The set-up allowed us to record behavioural parameters fundamental to understand the degree of cognitive flexibility in mice. Moreover, we used Python language programming to adjust specifically our task to the animal performances. Although preliminary, with our work we further confirmed the possibility to build an efficient custom-made set-up for animal cognitive testing that is considerably low-cost than other options available on the market. The main advantages are certainly the cost reduction and the opportunity to easily adjust the set-up based on the researcher's needs. Finally, our behavioural set-up is also compatible for *in vivo* electrophysiological recordings, hence both behavioural and neural physiological measurements can be acquired.