



Individual variability in rat motivation to access a food reward



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Introduction

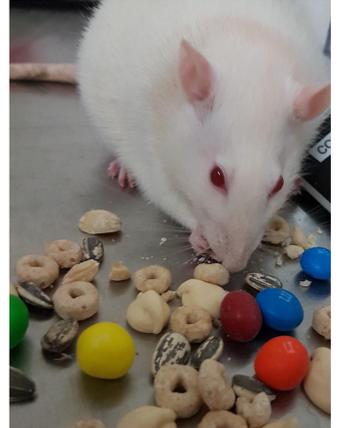
Individual rats vary in their motivation for food rewards, posing a challenge when interpreting behavioural responses in tests that rely on food rewards.

Approach-avoidance tests pair an animal's motivation to approach a reward with their motivation to avoid a negative stimulus. Approach-avoidance can be used to assess aversion to euthanasia agents like CO₂. The strength of aversion to CO₂ has been shown to vary between individuals.

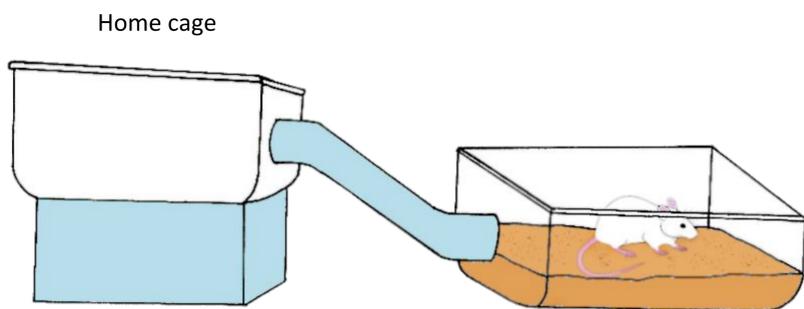
Experimental aims:

1) obtain an independent measure of individual variation in rat motivation for a sweet food reward

2) assess the relationship between this measure of motivation and measures of individual aversion to CO₂

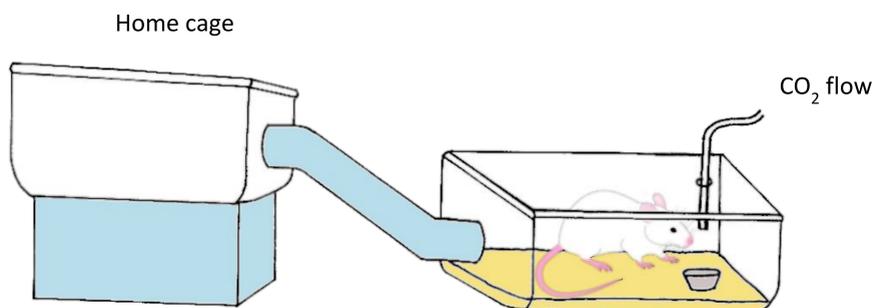


Methods



1. Sweet Reward Motivation:

- 11 female Sprague-Dawley rats, each tested 3 times
- 21 Cheerios were hidden under a thin layer of sand and increasingly dispersed in each consecutive trial
- Trials scored for time rats spent searching and number of Cheerios found



2. Approach-Avoidance:

- 8 rats with 7-10 exposures to CO₂ (20% cage vol min⁻¹)
- When a rat started eating from a dish of 20 Cheerios, CO₂ flow began and the rat could leave at any time
- Average CO₂ aversion per rat determined through latency to leave the bottom cage

Results

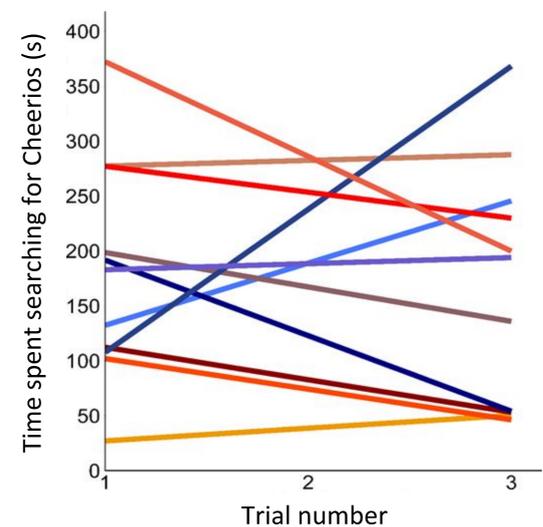


Figure 1. Amount of time rats spent searching for Cheerios in each sweet reward motivation trial. Each line represents an individual rat (Repeatability: R=0.59, p<0.001, n=11 rats).

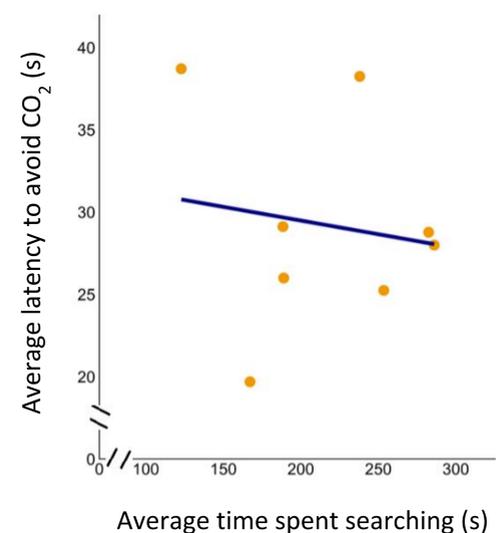


Figure 2. Relationship between average time rats spent searching for Cheerios in the sweet reward motivation test and average latency to avoid CO₂ in approach-avoidance tests (Pearson's correlation test: r=-0.15, p=0.72, n=8 rats).

Conclusions

Rats show consistent individual differences in their motivation to obtain a reward; behavioural tests that rely on rewards should account for for this individual variation.

Aversion to CO₂ in approach-avoidance is not related to motivation for a reward; individual differences in aversion may instead be due to differences in CO₂ sensitivity.