

Effects of environmental enrichment on anhedonia: Protocol for a systematic review



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Environmental enrichment

Environmental enrichment (EE) involves modifications to standard cages aimed at enhancing animal welfare¹, such as:

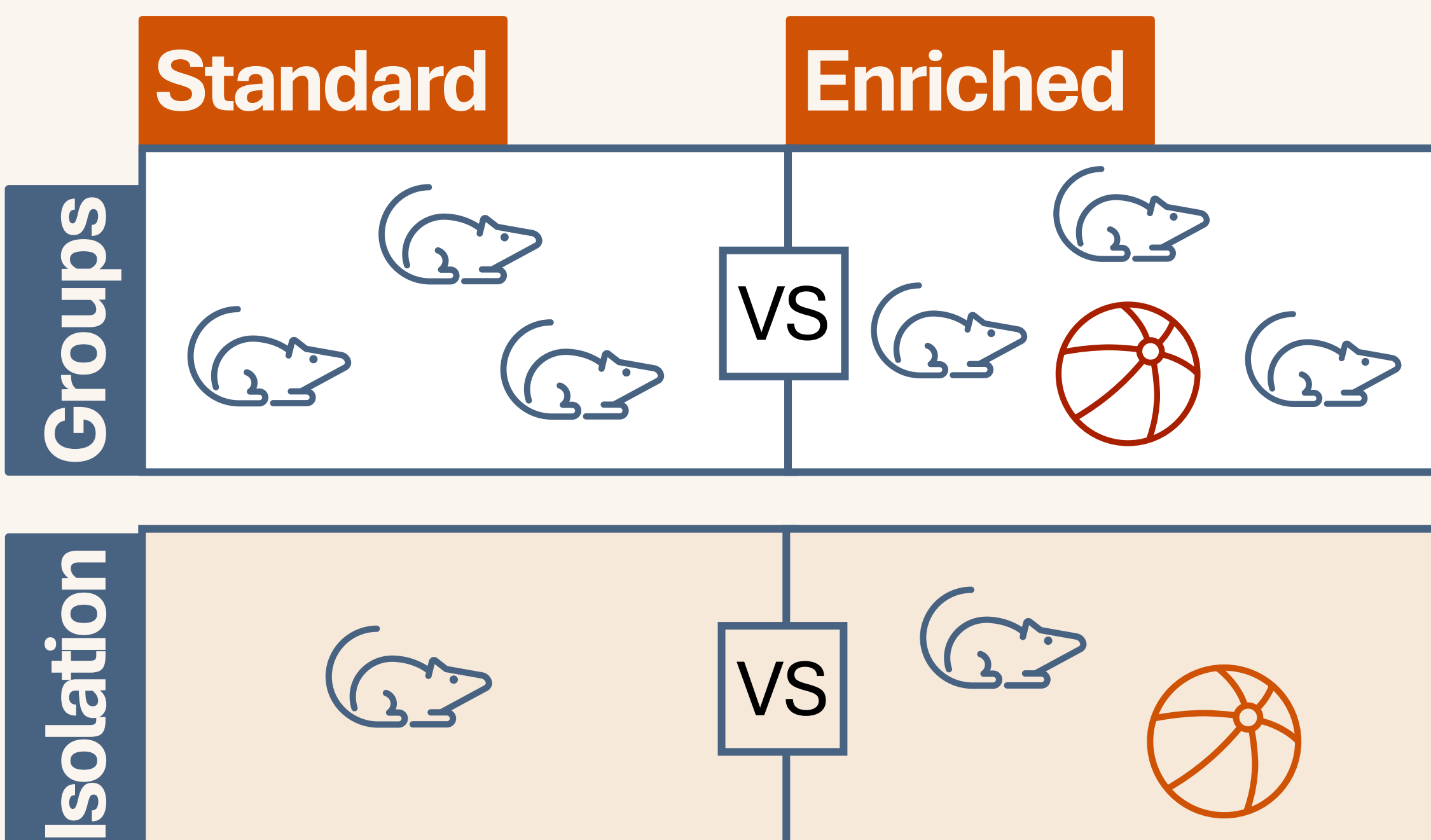
- Adding stimulating items (wheels, toys, ...);
- Increasing the space or modifying the structure of the cages (shelters, tunnels, additional floors, ...);
- Etc.

Background

EE has been extensively studied. Reviews^{1,2} highlight the wide diversity of its implementation (no two studies employ identical EE protocols), and the multiplicity of welfare indicators used to examine its effects³. In order to evaluate the effects induced by the housing cages, researchers are increasingly interested in affects and mental states⁴. Considering this heterogeneity and the wider context of the reproducibility crisis⁵, it seems necessary to analyze more closely the effects of EE.

Research question

? What is the impact of enriching the physical environment of the housing cage compared to a standard housing cage on anhedonia, as measured by the sucrose preference test (SPT), in rats and mice housed in groups or individually?



Inclusion / exclusion criteria

Population:

- ✓ Healthy mice and rats
- ✗ Disease models, other animals, etc.

Intervention:

- ✓ EE inside the cage
- ✗ EE outside the cage, forced exercise, dietary enrichment

Comparison:

- ✓ Similar rodents living in standard housing condition
- ✗ Impoverished condition

Outcome:

- ✓ Anhedonia measured by the SPT
- ✗ Other evaluation

Search strategies

Main searches:

Search equations using terms for (*mice* OR *rats*) AND (*enriched environment*) AND (*anhedonia* OR *SPT*)

Adapted for Medline, PsycINFO, CAB Abstracts, Embase, and Scopus

Supplementary searches:

Backward citation searching of the references of the included studies

Grey literature search with a discontinuation rule⁶ in Google Scholar

Methods

Following the framework of the JBI⁷ and the CAMARADES wiki⁸:

1. Searching for relevant studies
 2. Selection of pertinent sources
 - a. Based on title and abstract
 - b. Based on the full text
 3. Data extraction for the characteristics of: study, animals, intervention, control condition, SPT protocol and outcomes
 4. Quality analysis (reporting, methodological and risk of bias) of the studies with CRIME-Q⁹
 5. Synthesis of the data
- + if enough studies are found, meta-analysis of the results

Steps will be made by two independent researchers

Expectations

We expect less anhedonia for rodents in an enriched cage, compared to those housed in standard condition. It should happen in both group-housed and isolated animals, but EE should have more benefit in isolated rodents.

This decrease could be affected by different parameters (sex, strain, type of EE, etc.).

Let's stay connected so we'll send you a link to the full protocol once we publish it!
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References

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