

# An Apparatus for Single-Subject Research with Rats in Group Housing

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## Introduction

- Our lab constructed a “One-Rat-Door” (ORD) that allows for single-subject research within group housing settings.
- One rat may pass from the group housing, through the door, to an operant chamber. Once a rat has passed through, a locking mechanism is engaged that prevents additional rats from entering the ORD.
- When the initial rat leaves the operant chamber through the ORD, it steps on a pressure plate which disengages the locking mechanism.
- This allows the rat to exit and another to enter.
- The ORD permits rats to self-initiate and terminate experimental sessions.
- These features may increase the external validity of experimental results, as well as animal welfare.

## Features

- Light weight, easily assembled, 3D printed parts.
- Non-motorized mechanism reduces risk of injury and malfunction.
- Modular design allows for integration with different kinds of housing and operant chambers.
- Use of RFID technology allows for identification of rats and individualized contingency programming.
- Permits self-initiated operant behavior in the context of concurrently available behaviors and reinforcers.
- 24/7 automated single-subject data collection reduces experimenter time and animal handling requirements.
- Animals learn to use the ORD in minutes with no training.
- Rats move easily through ORD without waiting period and very little coordination with other rats.

Patent Pending. For inquiries about open source use, contact [AlexDavidson@my.unt.edu](mailto:AlexDavidson@my.unt.edu)

## Apparatus



Figure 1. **A.** Sliding mechanism attaches ORD to housing cage. **B.** Pressure plate depressed (unlocked).

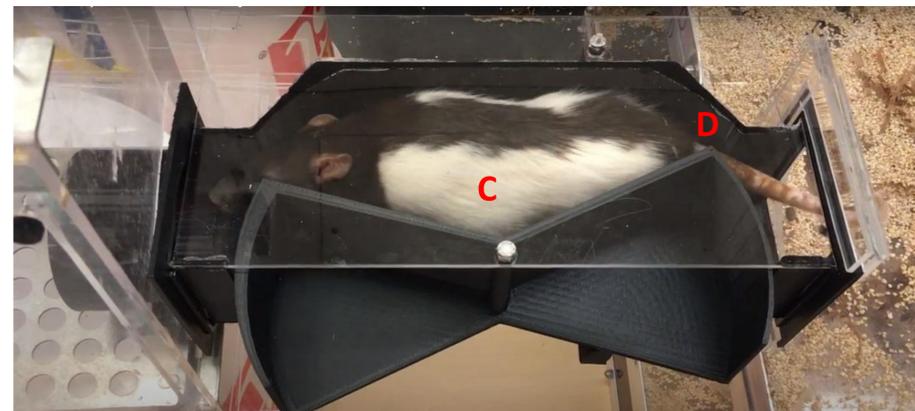


Figure 2. **C.** Just enough space for only one rat. **D.** Half-inch gap ensures revolving door does not pinch tail.

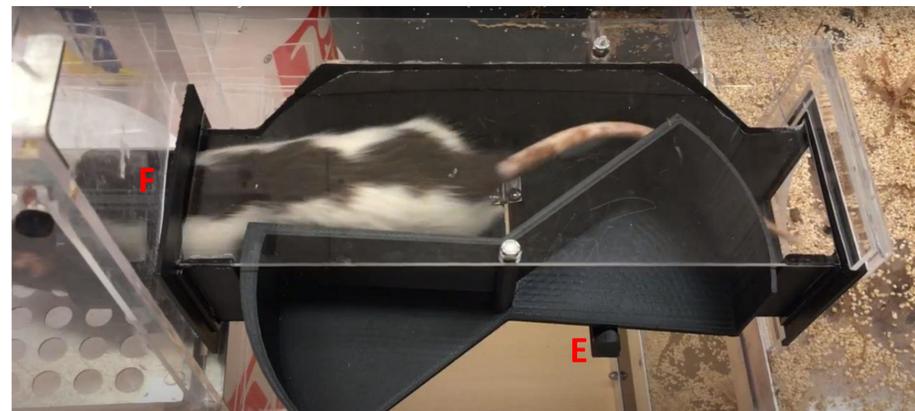


Figure 3. **E.** Spring-loaded locking mechanism attached to pressure plate engages. **F.** RFID reader identifies rat.

## Research Opportunities

- Systematic replications of basic research with concurrently available social reinforcers.
- Effects of enrichment variables on operant performances.
- Assessments of relative preference of non-social and social reinforcers and/or housing preferences.
- Combinations of single subject operant research with observational learning.

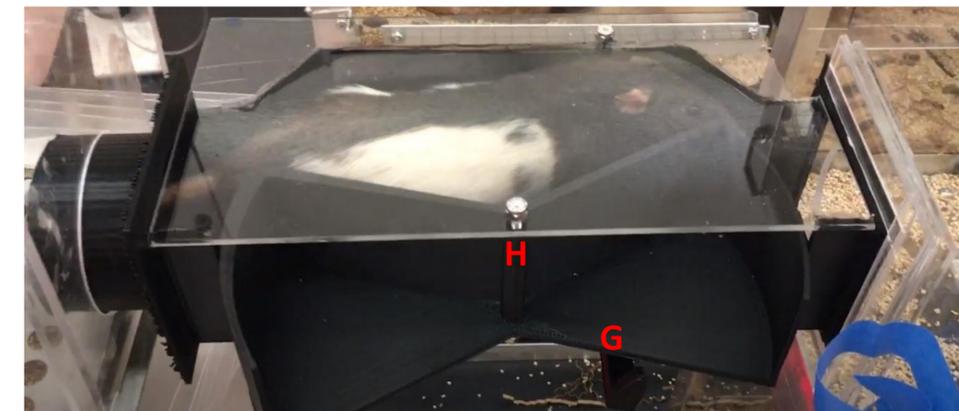


Figure 4. **G.** Depressing the pressure plate disengages locking mechanism. **H.** Axis and revolving doors removable

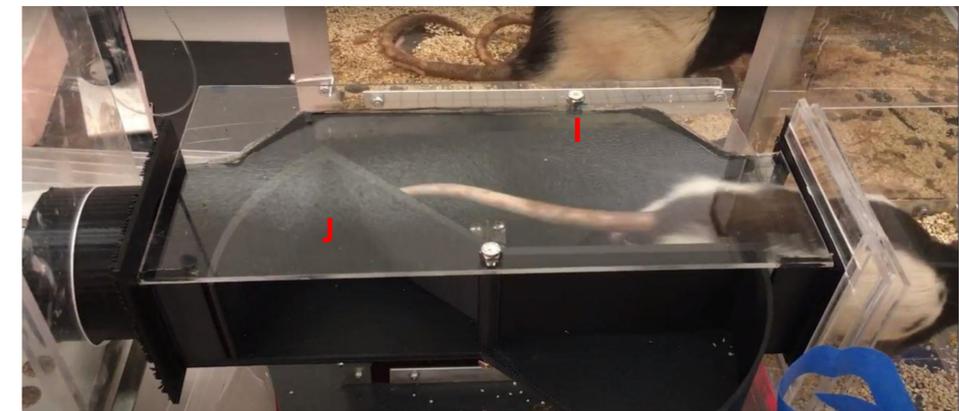


Figure 5. **I.** Replaceable spring to change pressure plate force requirement. **J.** Clear Plexiglass roof for visibility.