

# Using Rats to Investigate the Relationship Between Environment and Depression/Anxiety

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# Background

01

## Depression and Anxiety on the Rise

Increased mortality and prevalence among many different demographics.

02

## Environment as a cause for these Disorders

Significant sources of stress lead to changes in development.

03

## Manipulations

Early life is the most important time for neural development and growth.

04

## Finding a Solution

Drugs on the market to treat disorders can be unreliable or have negative side effects. A feasible intervention to help reduce these disorders is necessary.

**Continued**

### Early Life

Limited bedding produces maternal maltreatment, leading to early life stress in the offsprings

### Enrichment

Social and physical enrichment has been shown to offset early life stress

Most interesting to examine the effects of a dynamic environment compared to a static one.

# Hypothesis

H1: A stressful early life will increase the prevalence of depression and anxiety

H2: An enriching environment will reduce the prevalence of depression and anxiety.

# Manipulations

## Behaviors

### Anxiety- Open Field Test

Rats innate fear of open spaces causes them to stay in corners and borders



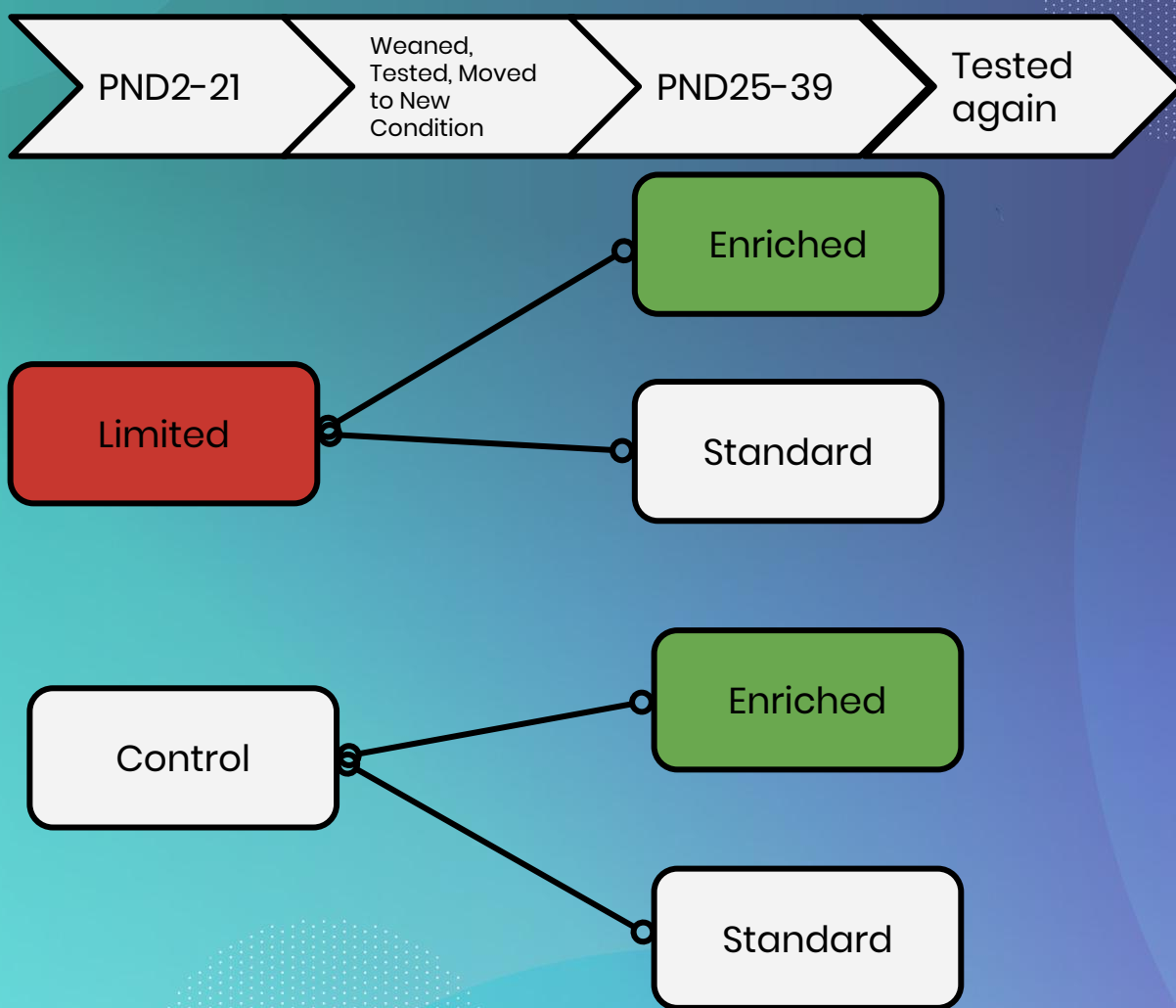
### Depression- Forced Swim Test

Learned Helplessness gets induced because rats do not think they can get out. The less they try to escape, the more depressed they are



# Design and Timeline

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# Testing Procedure

Day 1

Groups of Four rats were put through the Open Field Test for five minutes



Groups of 6 had went through the exposure trial of the Forced swim test for 15 minutes



Day 2

Rats went through the Forced Swim Trial for 5 minutes

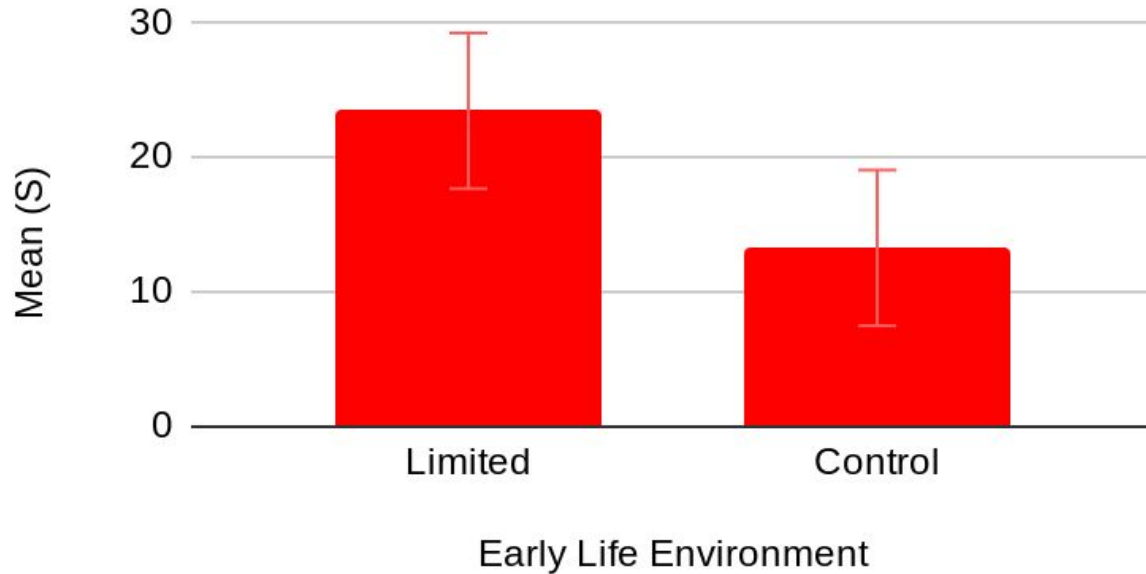


A Saccharin Bottle was added to cages and rats had 18 hours to consume freely

# Graphs and Figures



## Time Spent In Center



No difference in time spent in center (S)

$t(31) = .99$   $p = .332$

No difference in time spent immobile after early life stress (limited)

$t(52) = -1.907$   $p = .062$  \*data not shown

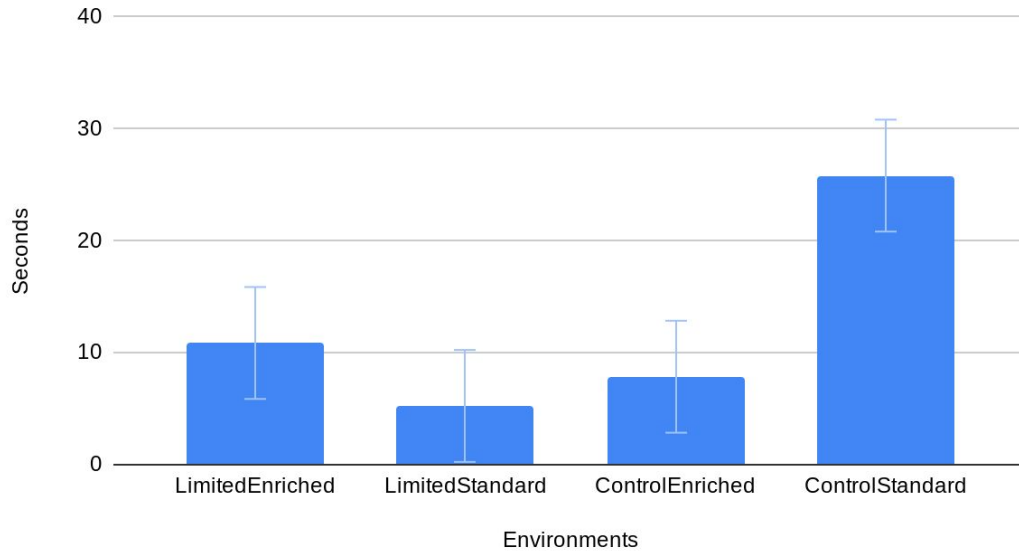
H1: A stressful early life will increase the prevalence of depression and anxiety



# Graphs and Figures



Time Spent in Center



Regardless of enrichment, no difference in time spent in center (S) after early life stress (limited)  
 $t(23) = 1.185$   $p = .248$

Less time spent in center after enrichment (opposite direction than expected)  
 $t(32) = -2.162$   $p = .038$

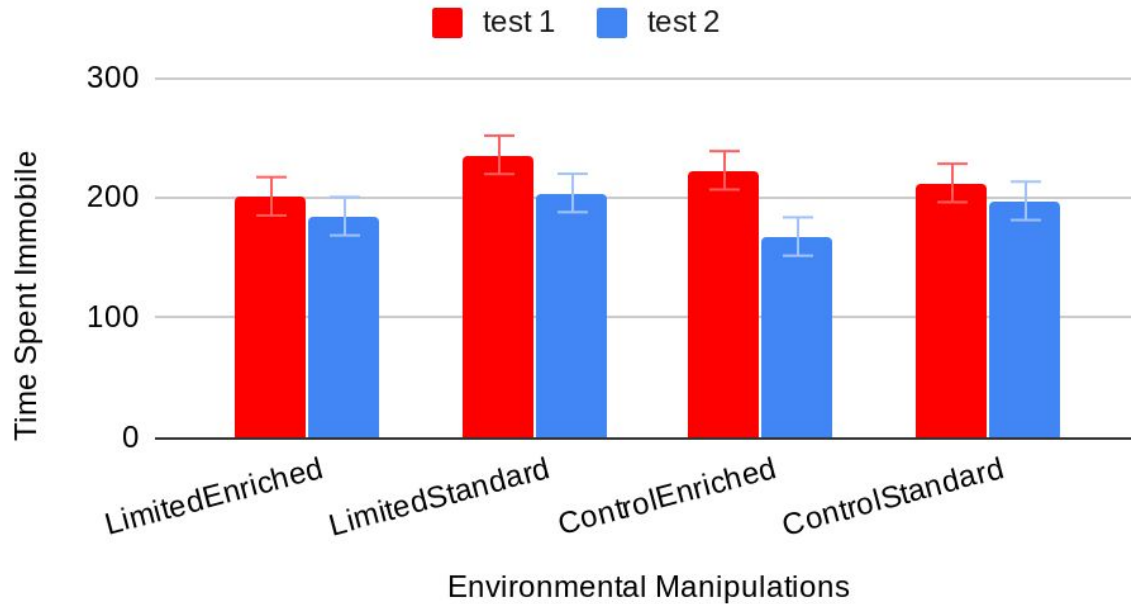
H1: A stressful early life will increase the prevalence of depression and anxiety

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# Graphs and Figures



## Environmental Effect on Depression



Significant difference between a control and enriched environment on time (S) Immobile  
 $t(4)=3.71$   $p = .021$

No difference between early life stress and an enriched environment on time (S) Immobile  
 $t(4)=1.135$   $p=.320$

H2: An enriching environment will reduce the prevalence of depression and anxiety.

# Take Home Points

## Limited Condition

Unable to show an increase  
in prevalence of depression  
or anxiety

## Enriched Condition

Shows ability to lower  
depression when rats did not  
experience early life stress,  
however it did not help  
reduce the prevalence of  
anxiety

# Implications

Possible that depressive  
and anxious behaviors  
were not yet evident

OFT

Manipulation was  
too long

Enrichment can be  
beneficial

FST

Those at risk for these  
disorders likely cannot use  
enrichment as an  
intervention

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