

# Journal Article Presentation

## Introduction:

### Title:

The Effect of Gatorade on memory in rats  
Robert Lloyd, A. Bozo, & Nother Bozo  
University of Minnesota, Duluth  
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### Theory:

GatorAid enhances memory

### Hypothesis:

1.0ml/kg Gatorade injected subcutaneously into rats reduces the number of trials necessary to be able to run in a complex maze without any errors to get a food reward

### Theoretical Construct I:

Memory

#### Corresponding Operational Definition:

Trials necessary to correctly run maze

### Theoretical Construct II:

#### Corresponding Operational Definition:

## Design:

**Study (Experimental or Quazi-Experimental):** Mixed

### Subjects:

Male and female Wistar rats (180-200gm) from Horton Labs, Inc.

### Independent Variable I:

Gatorade – Independent Variable – rats Randomly assigned to treatment groups

**Scale of Measurement:** Qualitative

**Levels of Independent Variable I (If Qualitative):** 2 (Gatorade vs. saline)

### Independent Variable II:

Sex of Rat -- Quasi-Experimental Variable -- Gender is self-selected

**Scale of Measurement:** Qualitative

**Levels of Independent Variable II (If Qualitative):** 2 (male vs. female)

### Dependent Variable I:

Number of trials necessary to be able to run the maze perfectly

**Scale of Measurement:** Ratio

**Dependent Variable II:**

**Scale of Measurement:**

**Results:**

**Main Effect I (Of First IV):**

Significant reduction in Trials to Criterion,  $p < 0.01$ , two-tail  
Large effect size

**Main Effect II (Of Second IV):**

Male rats required Significantly fewer trials to meet criterion,  $p < 0.05$  two-tail.  
This difference is mainly in the treatment group, where it is large

**Interaction (If more than one IV):**

Significant Interaction ( $p < 0.05$ ); difference between males and females was greater in the treatment group. This indicates that the effect of Gatorade is much greater in males.  
The effect is in the same direction in male and female subjects

**Discussion (This is what YOU, not the Authors, think of the study):**

The researchers made a mistake in injecting animals before every training trial, instead of after each trial. This makes interpreting the effect ambiguous

The effect of Gatorade on the Operational Definition is real (significant) and large, but the methodology is flawed.

You can't really say why there was an effect on the Operational Definition. Gatorade may have an effect on memory (Theoretical Construct) or on something else

**Did the Operational Definitions Correspond well to the Theoretical Constructs?**

The Operation Definition would have been reasonable if the study had been done correctly

**If the results were significant, did they have a big effect?**

Yes, treated rats did almost twice as well as control rats

What are the Potential Confounds?

Since injection occurred before each training trial, you don't know if the effect is on memory or upon learning

The effect of Gatorade may now even be directly upon learning, it just may increase

arousal. More awake animals are going to learn better.

Gatorade may increase hunger, hungrier rats are going to be more motivated to learn the maze

Thus the drug effect may be upon a different Theoretical Construct: learning, arousal, hunger, or motivation

Do you agree with the Authors?

No!

How would you have done the Study differently?

Injecting the animals after each trial could only affect memory

Measure animal activity in an open-field to see if treated animals are more aroused

Measure how much animal eat in their home cage to see if treated animals are hungrier

Even if you are completely happy with the Study, what would you do next?

Test the “memory” effect in a different task, such as shock avoidance. This will not be sensitive to a hunger effect

Inject the females with testosterone and see if the effect of Gatorade becomes as strong as in males

Repeat the study in a different species, to test the **Generalizability** of the results.