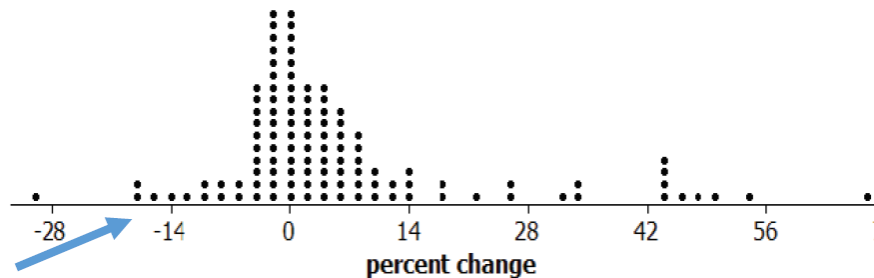# Math 361

## Inv. 1.1: Friend or Foe

*Is a particular study result consistent with the null model?*

# Review

## Inv. A: Traffic Fatalities

*Is a particular observation unusual compared to a distribution?*



## Inv. B: Random Babies

*Simulate a random process to estimate a probability.*

# Learning Outcomes for Inv. 1.1

1. Identify the **null model** explanation of a study result

2. Relate a null model explanation to a specific **random process**, a coin toss

3. Decide whether or not a particular study result is consistent with the null model explanation

# Inv. 1.1: Friend or Foe?

**Research Question:**

Do babies prefer characters that appear to be friendly?

**Data Collection:** infantlab

**Study Result:** 14/16 babies chose the "helper" toy, rather than the hinderer toy.

# Inv. 1.1: Friend or Foe

Do parts (a) and (b).

Read page 21 on your own.

Let's assume that babies have no preference and just randomly chose either the helper or hinderer toy.

This explanation is called the **"null model".**

**Tip:** the *null model* can often be identified by imagining the explanation that will disappoint the researchers: *nothing* interesting is going on.

Assuming babies have no preference:

baby choosing  = coin toss

baby choses "helper" = coin lands "heads"

**Rationale:** If we can relate the null model to a random process, we can estimate the probability of seeing the study result by simulation.

# Simulation

Do **parts (g) and (h)** on your own.

Combine your simulated study results with those of your classmates in **part (i).**

# Simulation via One-Proportion Applet
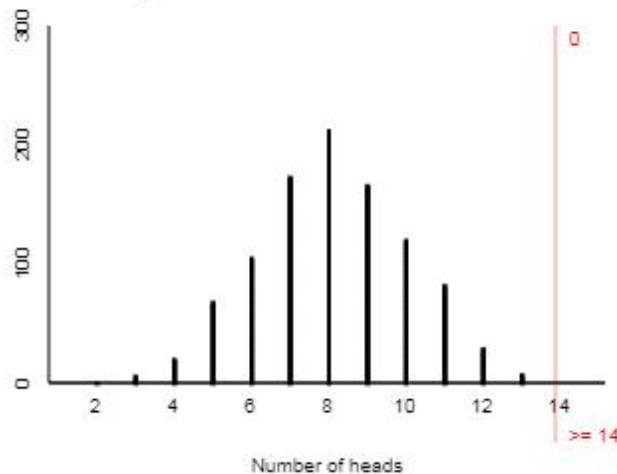
**Decide** whether or not a particular study result is consistent with the null model explanation

**Original study result:**

14 /16 babies chose the "helper" toy.

**Simulation under null model:**

Assuming babies have no preference, it is very unlikely (0 times in 1000 simulations) to see a study result of 14 /16.

**Therefore…**

Decide whether or not a particular study result is consistent with the null model explanation

There is *strong evidence* babies are **not** randomly choosing between the two toys.

Read the **study conclusions** on page 25!