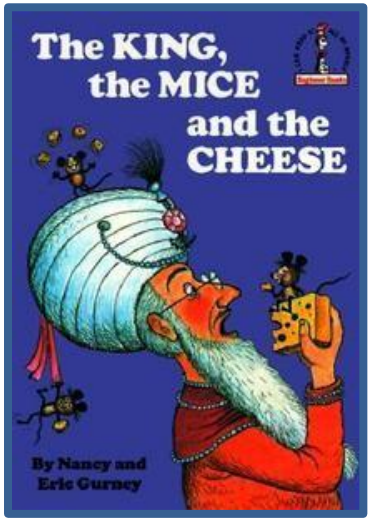
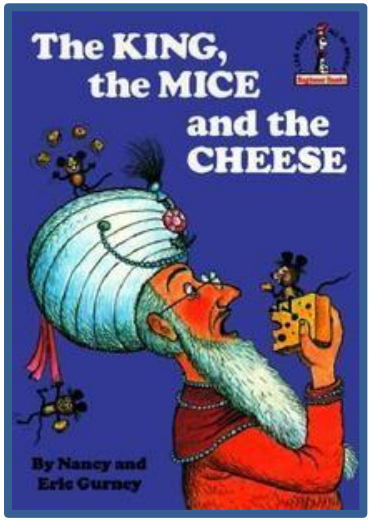
Counterbalancing



Can newborns recognize sounds they heard in the womb?

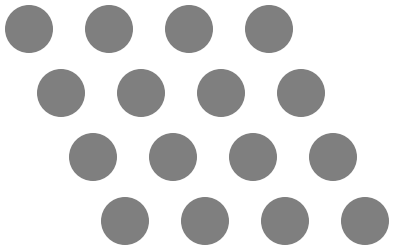
- Say we read “Cat in the Hat” to infants in the womb, and they choose to listen to “Cat in the Hat” after birth
- Maybe they recognize the story, or maybe…

Counterbalancing

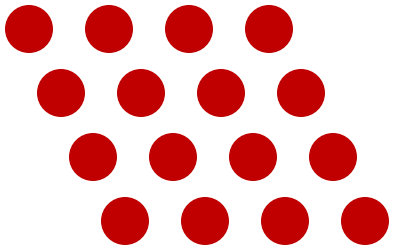


Can newborns recognize sounds they heard in the womb?

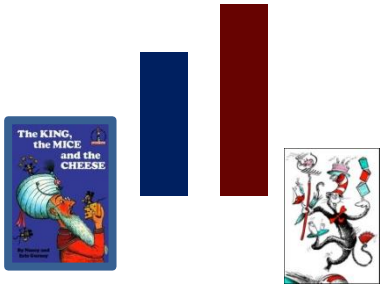
One solution: a baseline measure.

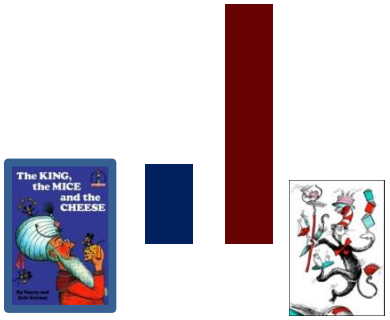


No training



Training





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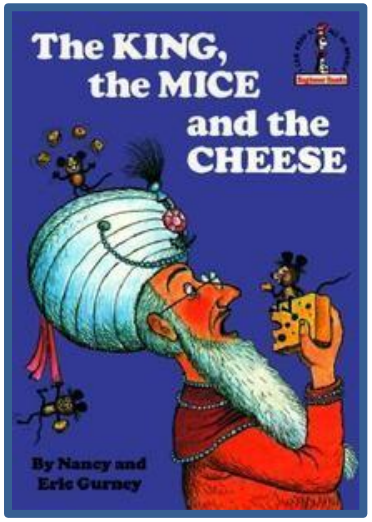
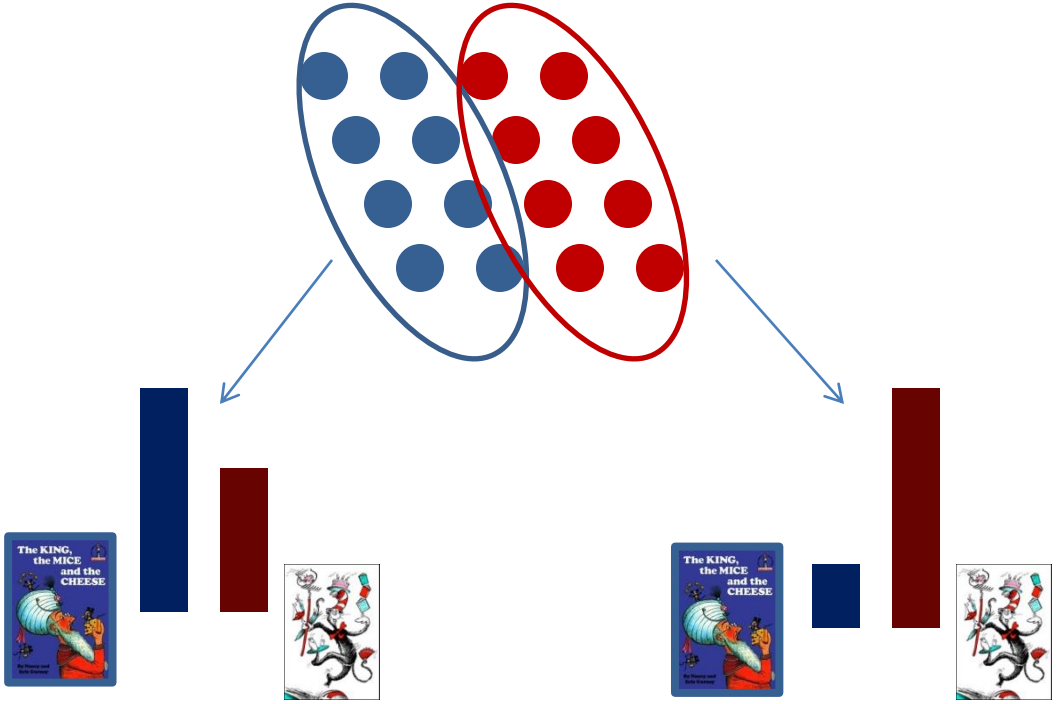


Can newborns recognize sounds they heard in the womb?

Counterbalancing



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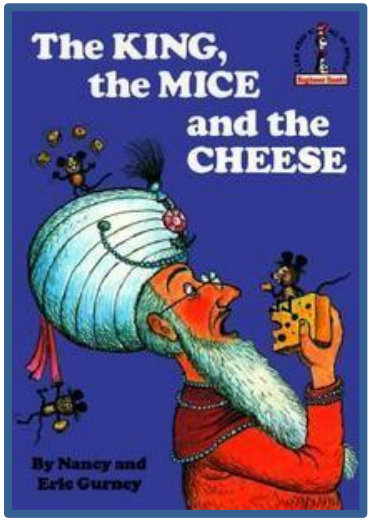
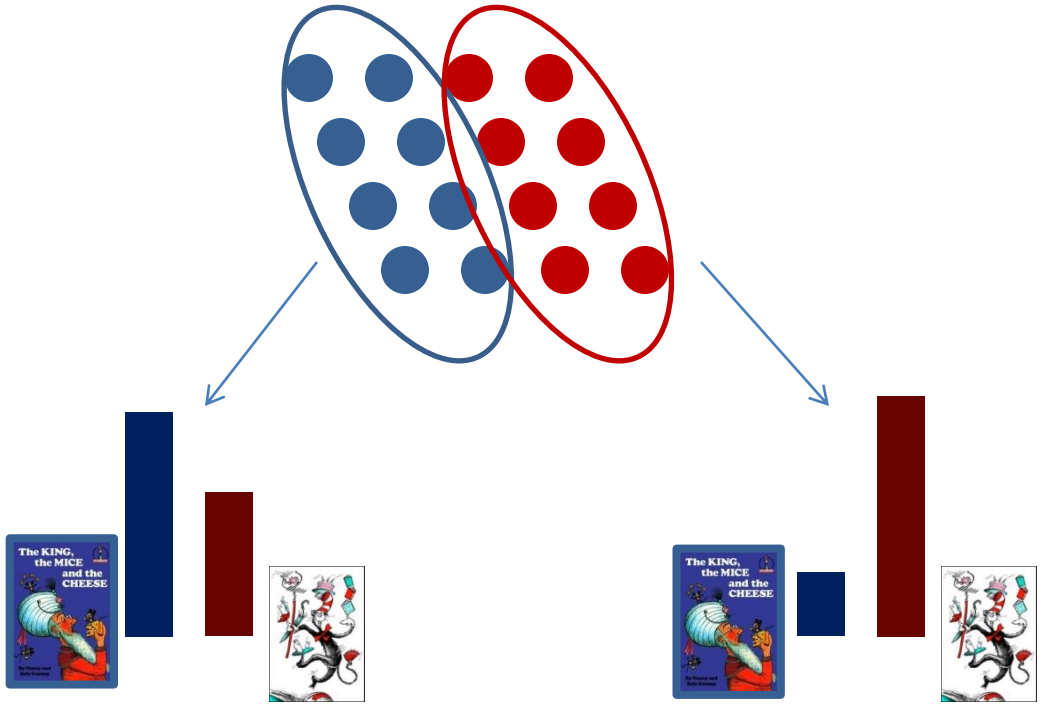
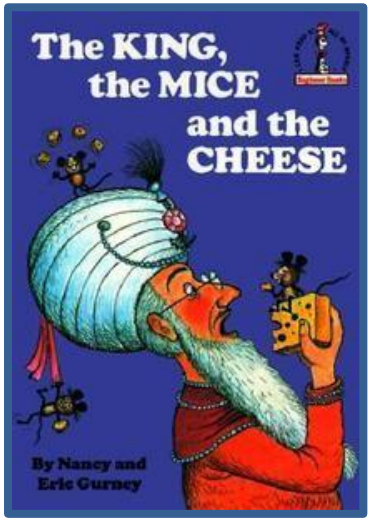


Can newborns recognize sounds they heard in the womb?

Counterbalancing

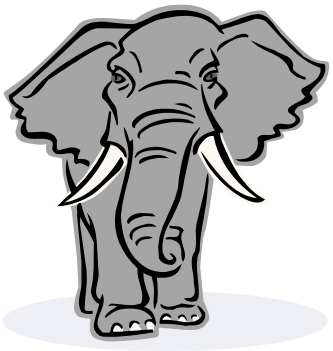


Counterbalancing



- Goal: Logically **rule out** dumb, low-level effects as potential explanations *for a positive result*
- "Best practices": **minimize** these effects
  - Cat in the Hat vs. The Lorax or vs. Wuthering Heights?
  - Makes it more likely you'll be able to see a positive result (that your experiment will "work")
- Baseline condition: **measure** these effects

Dumbo is very good at naming objects

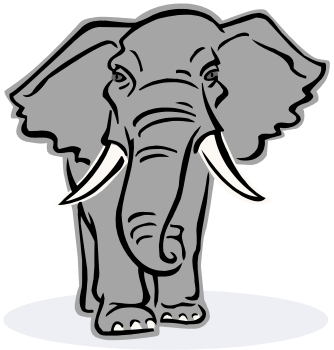


It’s a modi!

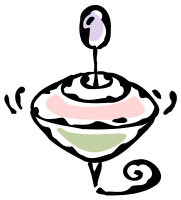
Simba is not very good at naming objects

It’s a dax!

Dumbo is very good at naming objects



It's a modi!



Simba is not very good at naming objects

It's a dax!

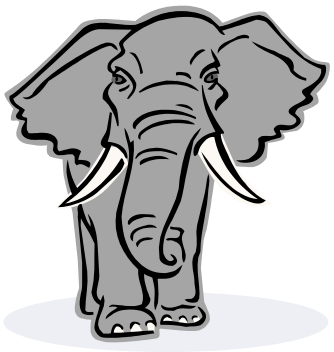
- Kids make use of past reliability to decide which new name to trust
- Kids trust elephants more than lions
- Kids like the word "modi" more than "dax", or think the object looks more like a modi, or hear "modi" better
- Kids trust whoever named the object first
- Kids trust whoever's on their left

- Kids trust animals with deeper voices
- Kids trust characters named "Dumbo" more than characters named "Simba"
- Kids trust the experimenter to summarize the correct answer first ("Dumbo said it's called a modi, and Simba said it's called a dax."

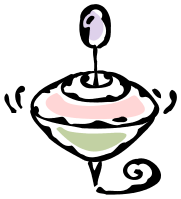
… Sometimes there are **a lot** of uninteresting explanations.

“Folding factors together”

Dumbo is very good at naming objects



It’s a modi!



Simba is not very good at naming objects

It’s a dax!

Factor A: Lion L/R	Factor B: Whom to trust
On the left…	Elephant…
Speak first	Has a deep voice
Summarized first	Is named Dumbo

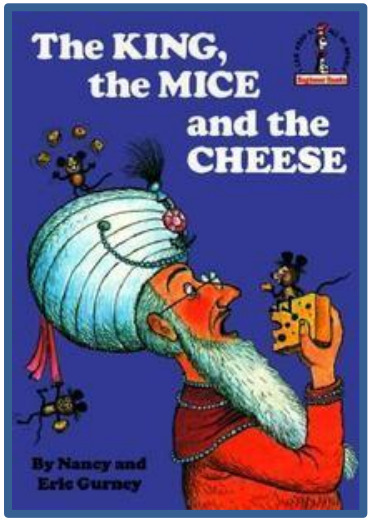
Sometimes there are **a lot** of uninteresting explanations.

Fortunately, we don’t care how much each one matters.

Q1: Two factors or one? **(Hedging your bets)**

Q2: What should we do about the object name?

Three separate techniques



- Counterbalancing: Logically **rule out** dumb, low-level effects as potential explanations *for a positive result*
  - Position
  - Specific stimuli (sounds, appearances)
  - Order of trials
- "Best practices": **minimize** these effects
  - Cat in the Hat vs. The Lorax or vs. Wuthering Heights?
  - Makes it more likely you'll be able to see a positive result (that your experiment will "work")
- Baseline condition: **measure** these effects