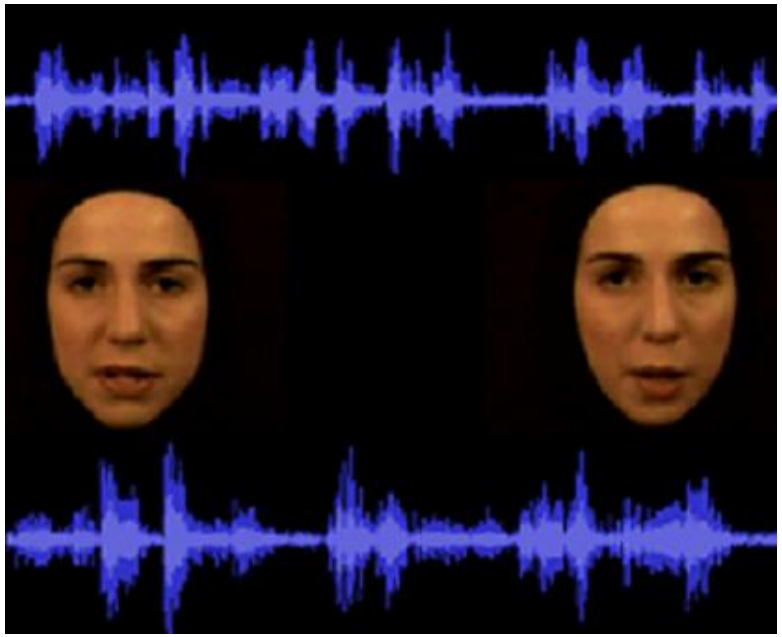
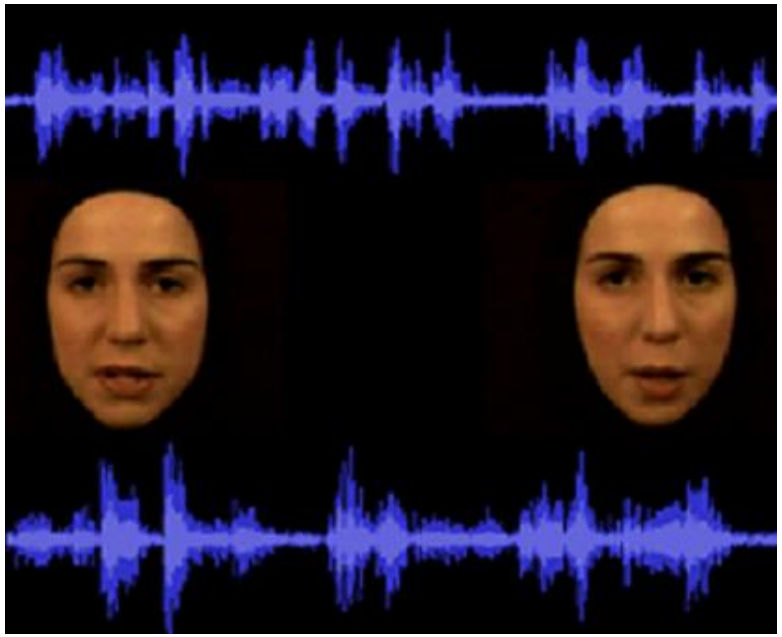
Counterbalancing: averaging out potential confounds



- Suppose we find that infants do spend more time looking at the face on the right which matches the ‘Cat in the Hat’ audio.

- Maybe it’s intermodal speech matching…
- Maybe infants tend to look to the right
- Maybe that recording is just more interesting to look at (more expressive, faster, more eye contact, etc.)

Counterbalancing: averaging out potential confounds



- 'Best practices' try to minimize the SIZE of these effects (e.g. by using the same face)
- Counterbalancing allows us to actually rule out low-level explanations like "in general infants prefer to look right" for a positive (or negative) result
- NOT the same as introducing extra independent variables!

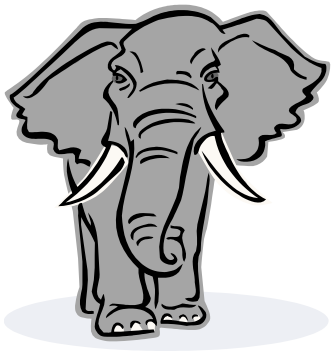
- Show half of the subjects this video with the 'correct' face switched to the left: is that enough?
- Show half of the subjects this video but play the other story: is that enough?
- Should we flip the entire video (reflect left-right) or translate the face areas?
- Is 'individual infants have side preferences' ruled out? How?

Order effects

- Both perseveration (continue doing the same thing you did earlier) and alternation are reasonable alternative explanations for a pattern of results
- Showing four videos: a child looking left, left, left, left should not be compared to chance performance of 1/16… neither should a child looking left, right, left, right.

“Folding factors together”

- Often there are lot of alternative “boring” explanations for results.
- We want to rule out all of them
- …and don’t care which ones actually affect the results (or there would be too many conditions to fully counterbalance)



It’s a modi!

It’s a dax!

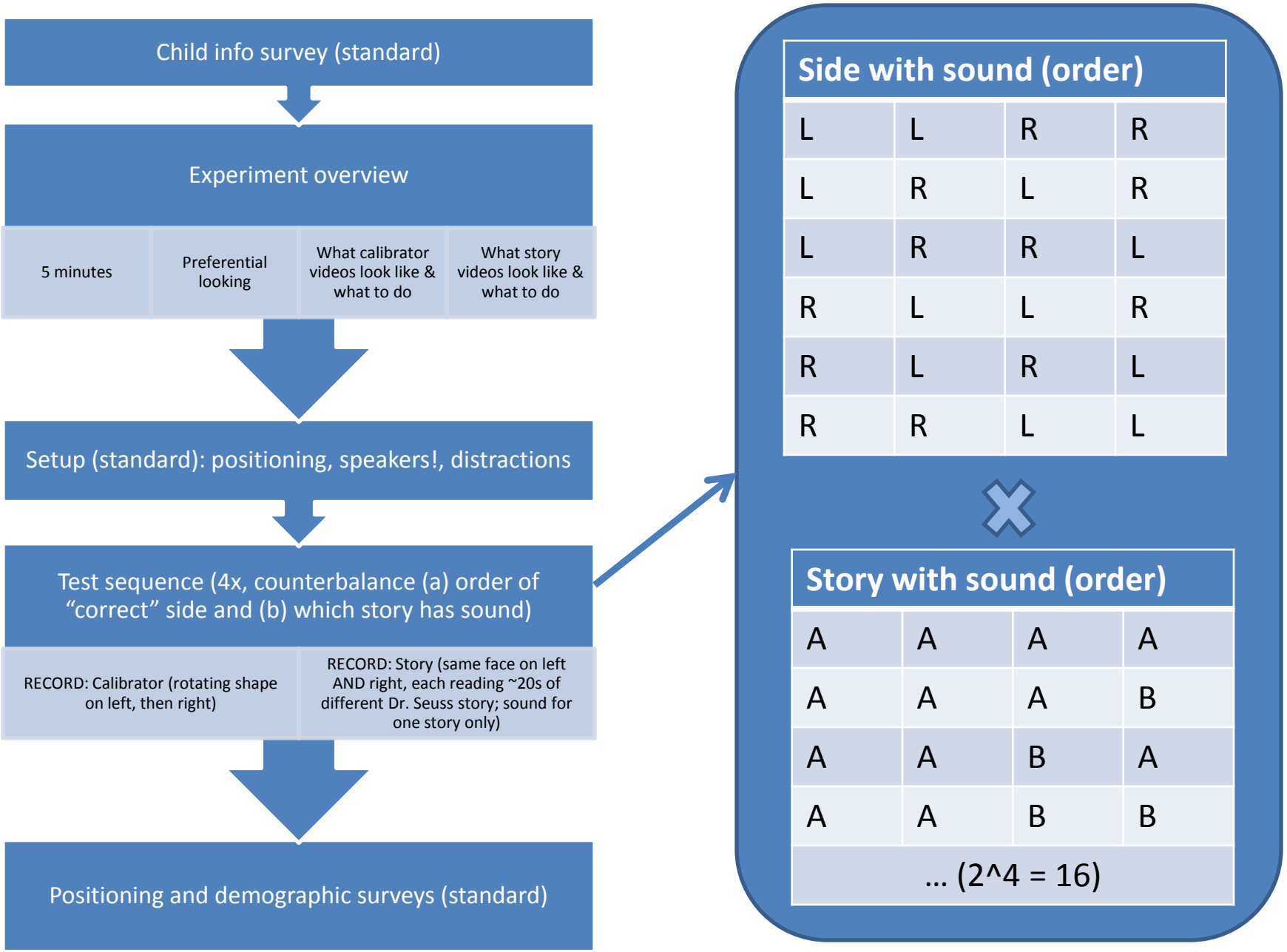
Left/right
Order of speaking
Order experimenter summarizes
Order experimenter introduces

Which animal to trust
Voice used
Animal’s name

Object name given

For almost all experiments, need to think about…

- Left/right
- Order
- Particular stimuli (sounds, appearances)


Child info survey (standard)
Experiment overview
5 minutes
Preferential looking
What calibrator videos look like & what to do
What story videos look like & what to do
Setup (standard): positioning, speakers!, distractions
Test sequence (4x, counterbalance (a) order of "correct" side and (b) which story has sound)
RECORD: Calibrator (rotating shape on left, then right)
RECORD: Story (same face on left AND right, each reading ~20s of different Dr. Seuss story; sound for one story only)
Positioning and demographic surveys (standard)
Side with sound (order)
L L R R
L R L R
L R R L
R L L R
R L R L
R R L L
Story with sound (order)
A A A A
A A A B
A A B A
A A B B
… (2^4 = 16)