

Informativity in adaptation: Supervised and unsupervised learning of linguistic cue distributions

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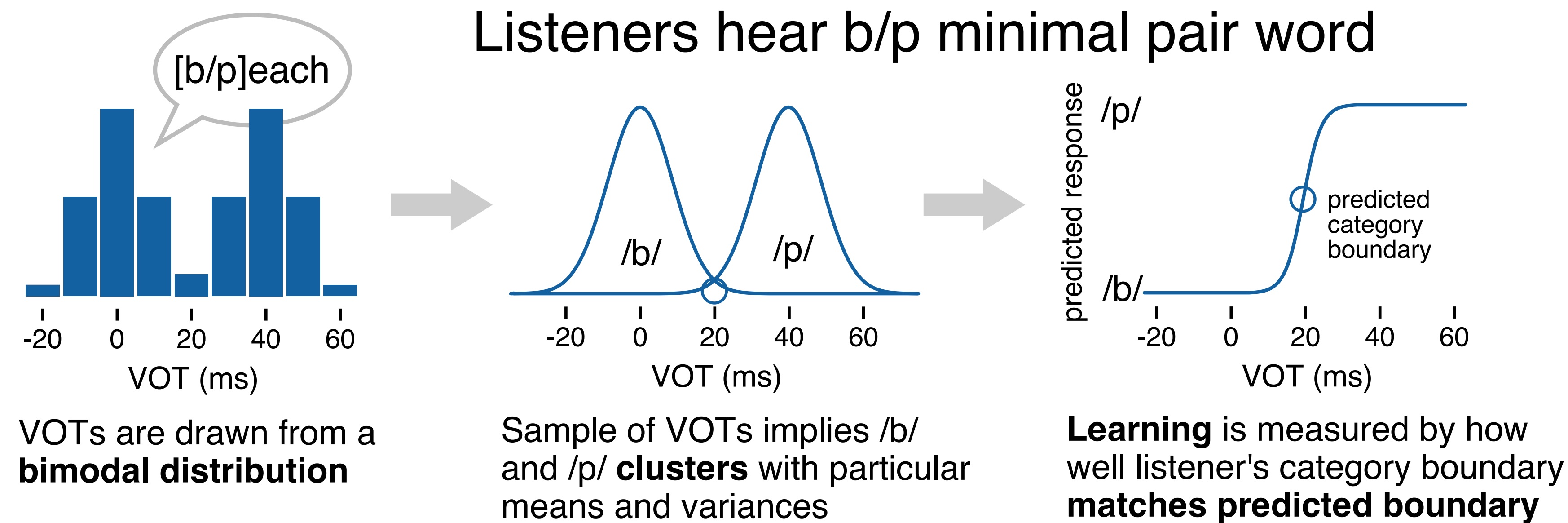
Our question: Do people use **category labels** during adaptation?

Language learning doesn't stop once you reach adulthood: talkers use linguistic cues to realize their intentions in different ways. To **adapt** to a new talker, you have to learn the way they use cues. If you know their intended meaning, this learning should be a lot easier. Learning with known category labels is called **supervised learning**, and learning from cues only is called **unsupervised learning**.

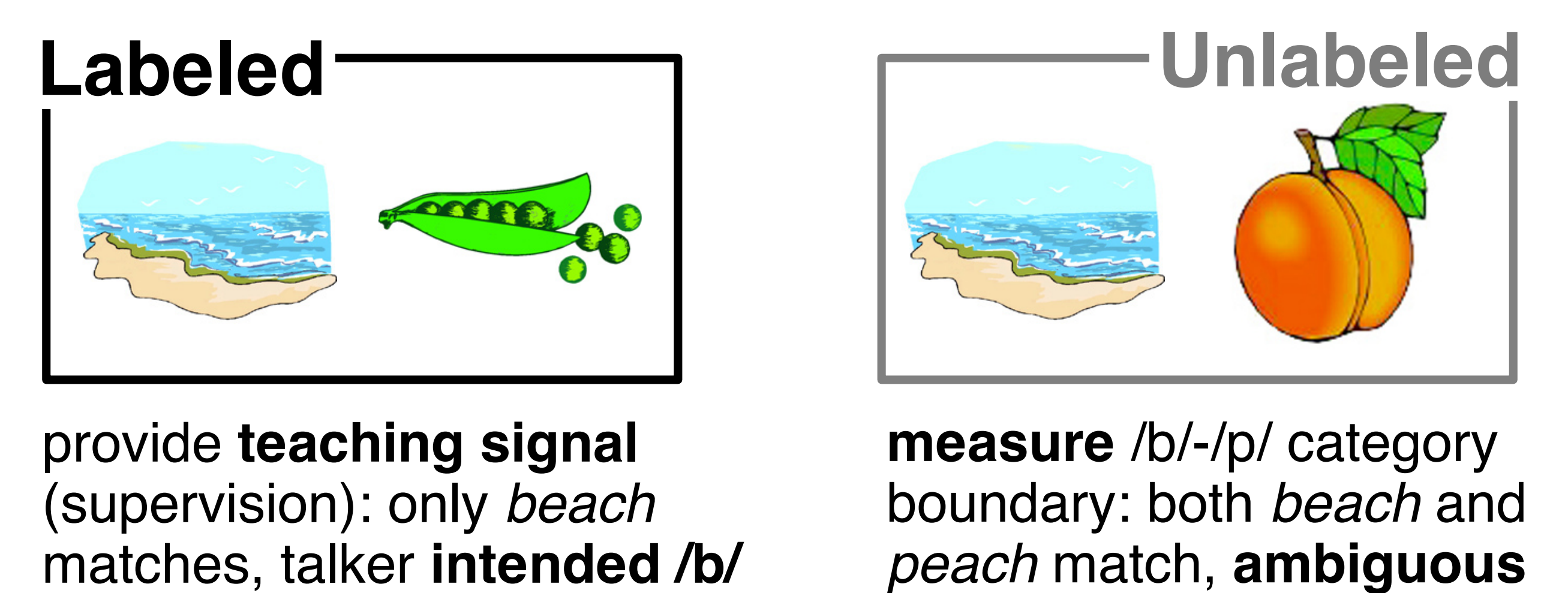
Why we ask:

Categories are **distributions** of cues
Productions vary within talker
Productions vary across talkers
Requires **distributional learning** for
Acquisition: learn language's distributions
Adaptation: learn talker's distributions
Are they the same underlying process?
Why is acquisition **slow** and adaptation **fast**?
Adults have more information from experience
Other cues **label** sounds with intended category

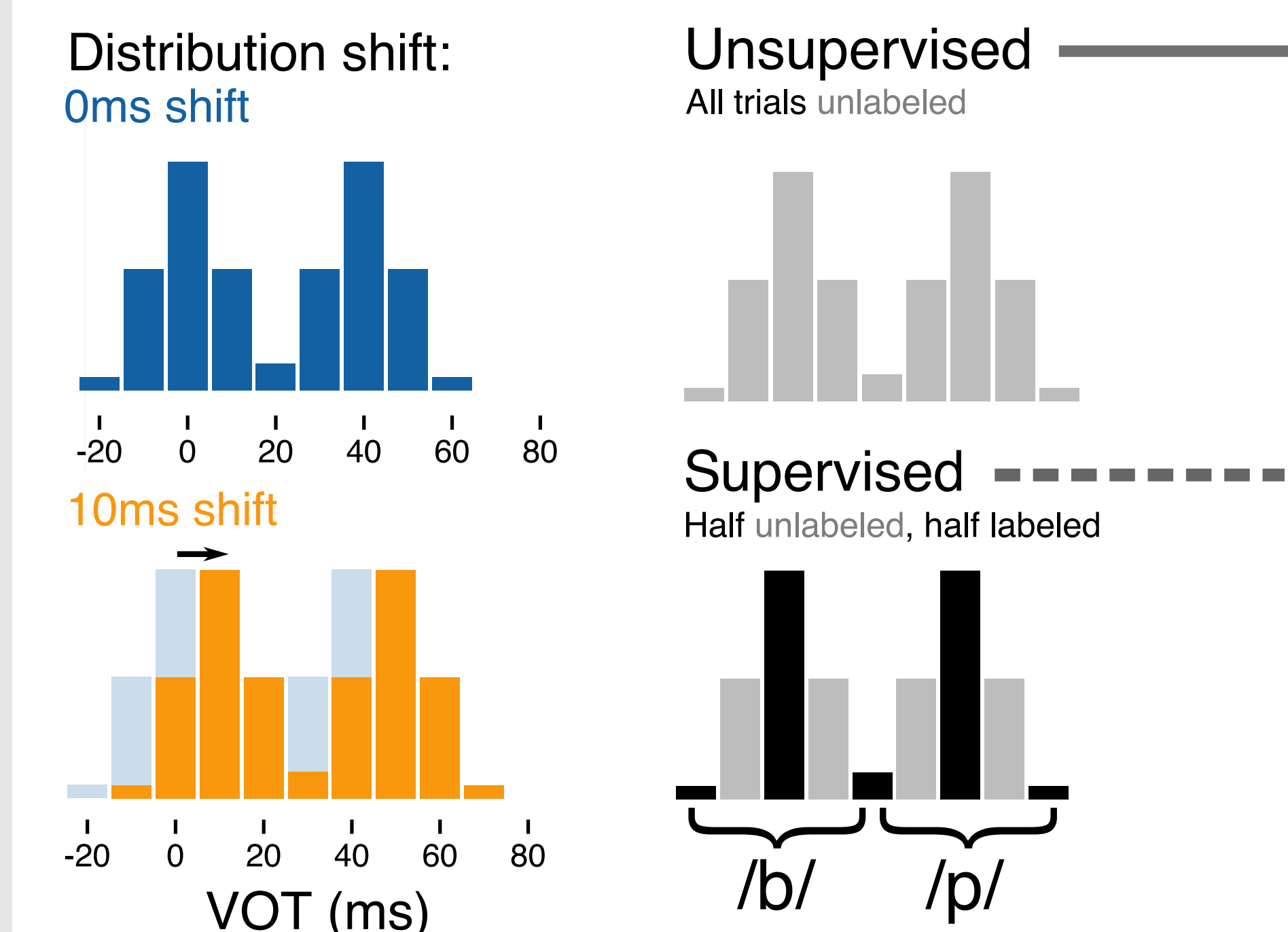
What we did: Distributional learning of /b/ and /p/ Listeners hear b/p minimal pair word



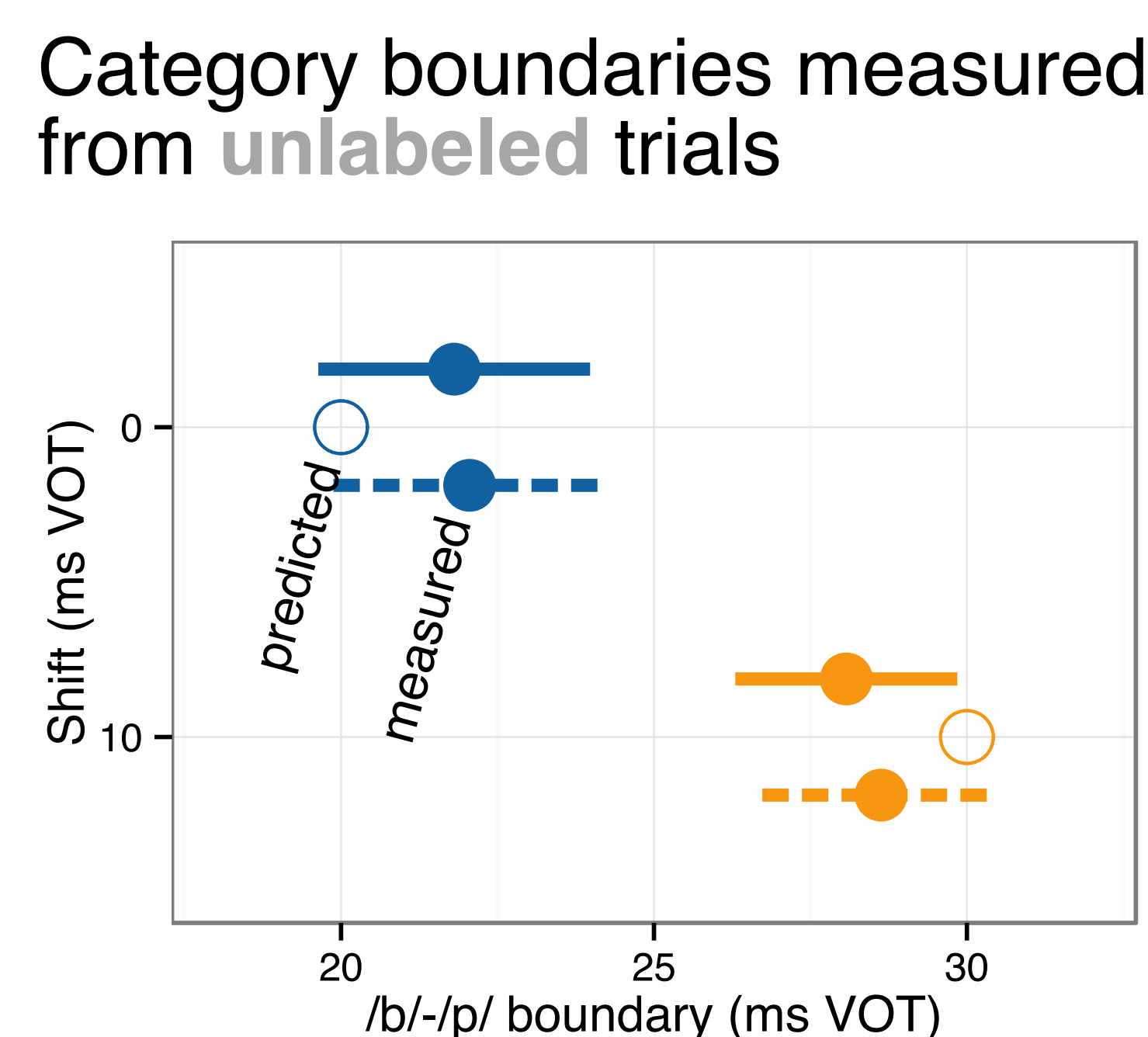
...with and without labels and click on matching picture. Trial is either:



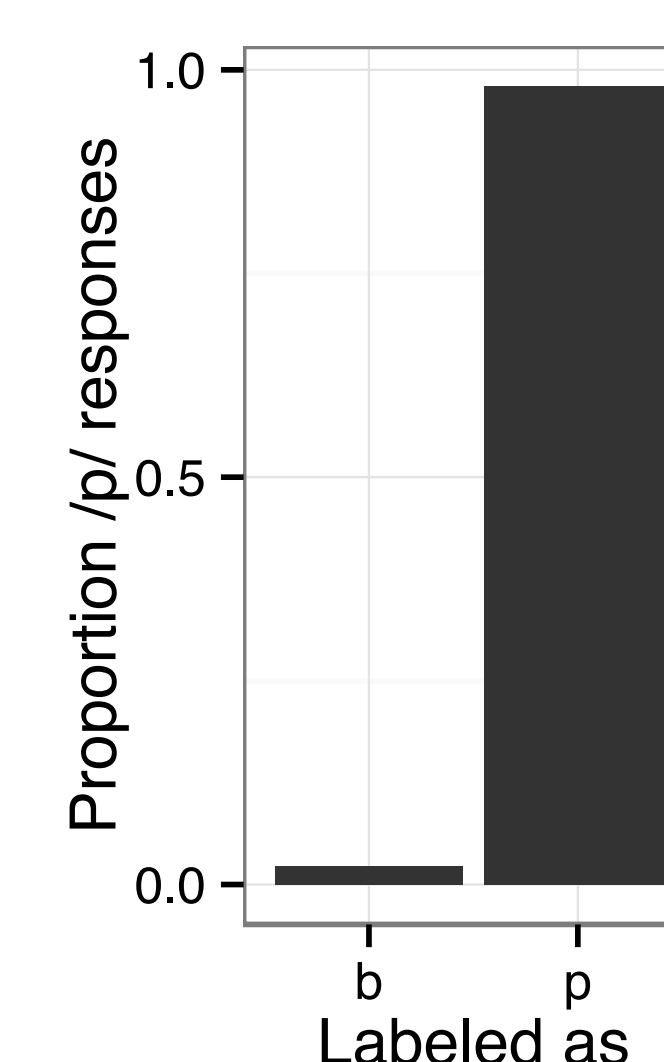
Experiment 1



Results



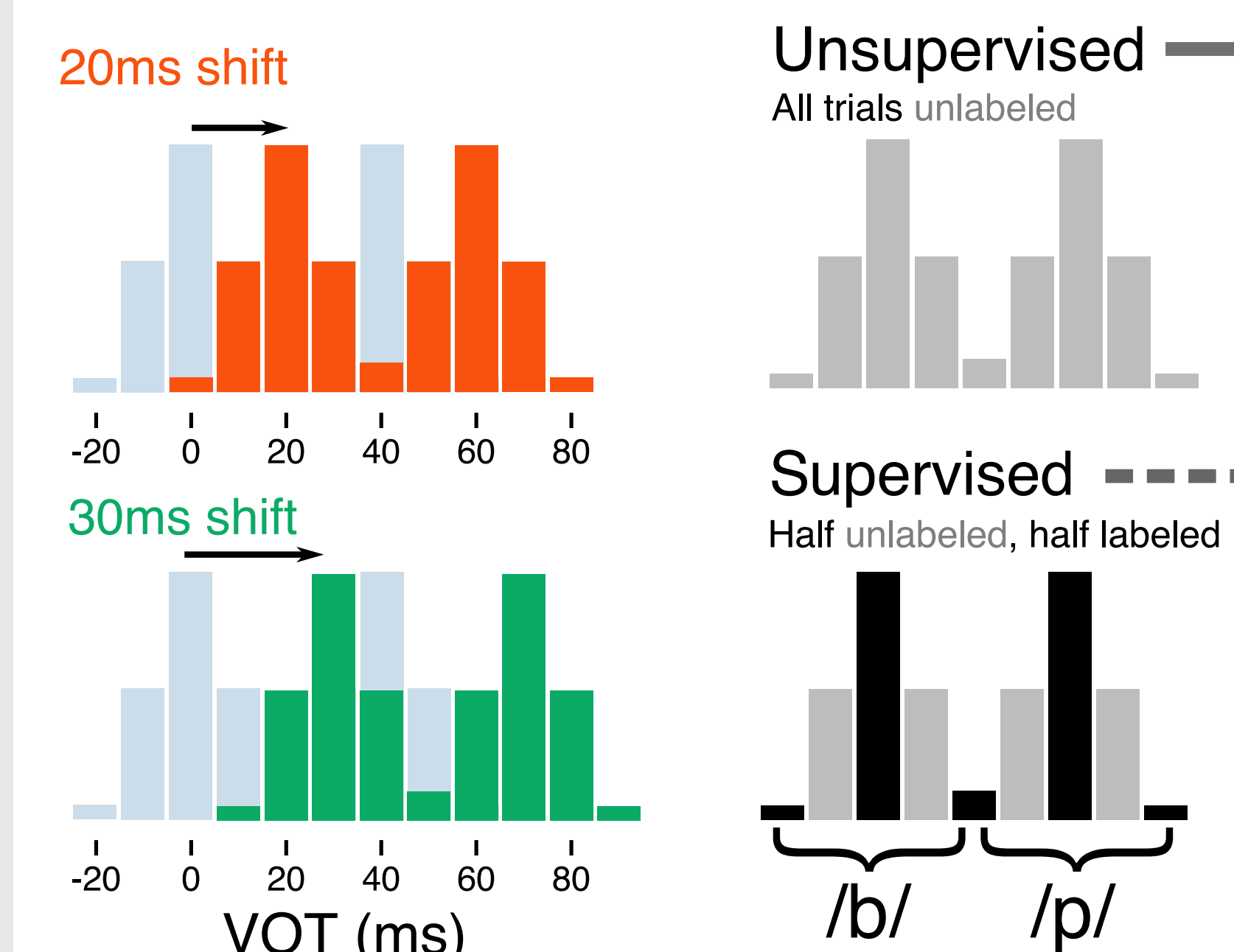
Accuracy on **labeled** trials: **98%**



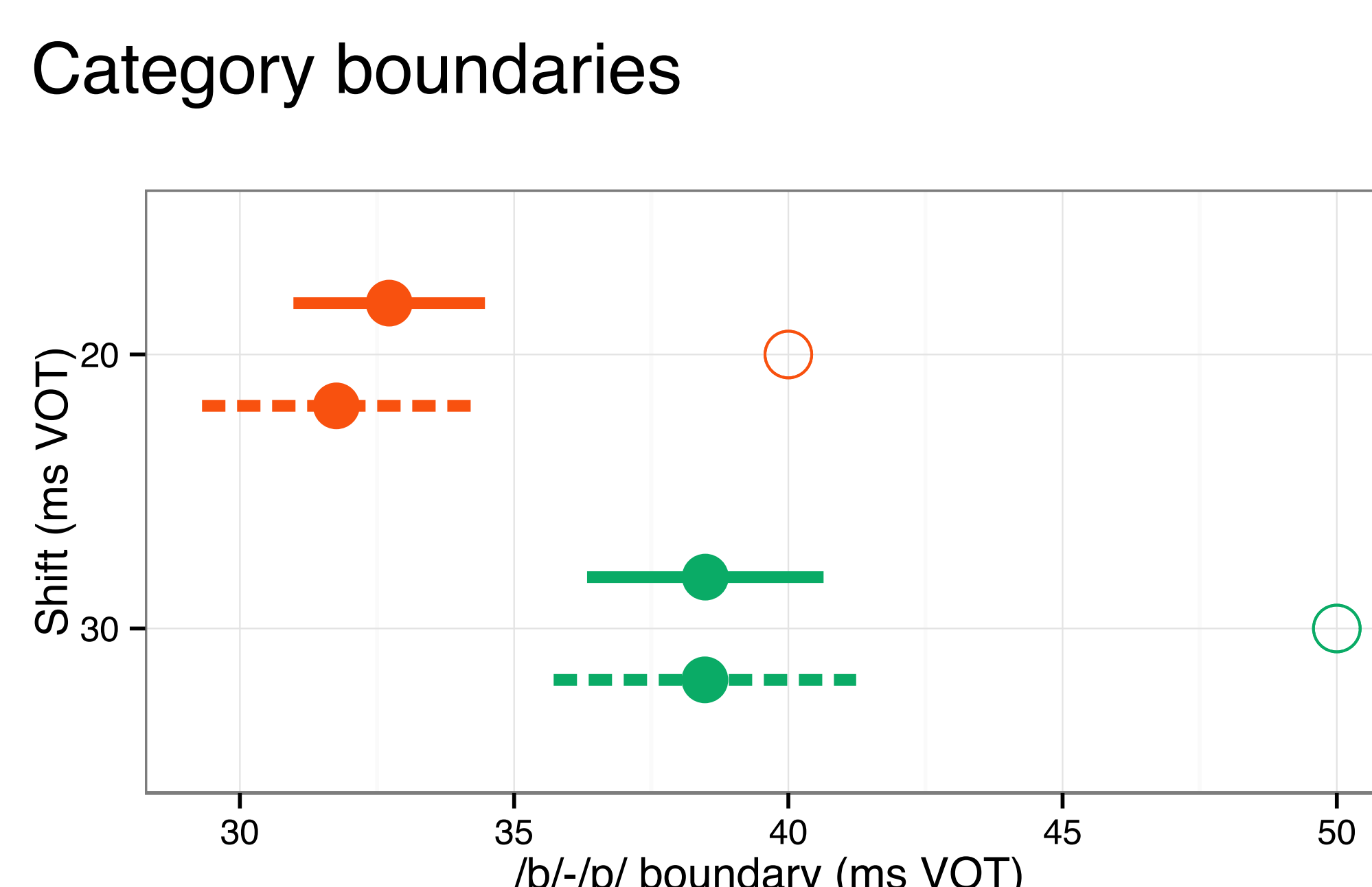
Discussion

- 1) Learning was good: category boundaries match distributions
- 2) People used labels to **choose responses** (98% accurate)
- 3) But **labels didn't change learning** (no difference between supervised and unsupervised)
- 4) Was it **too easy**?

Experiments 2+3



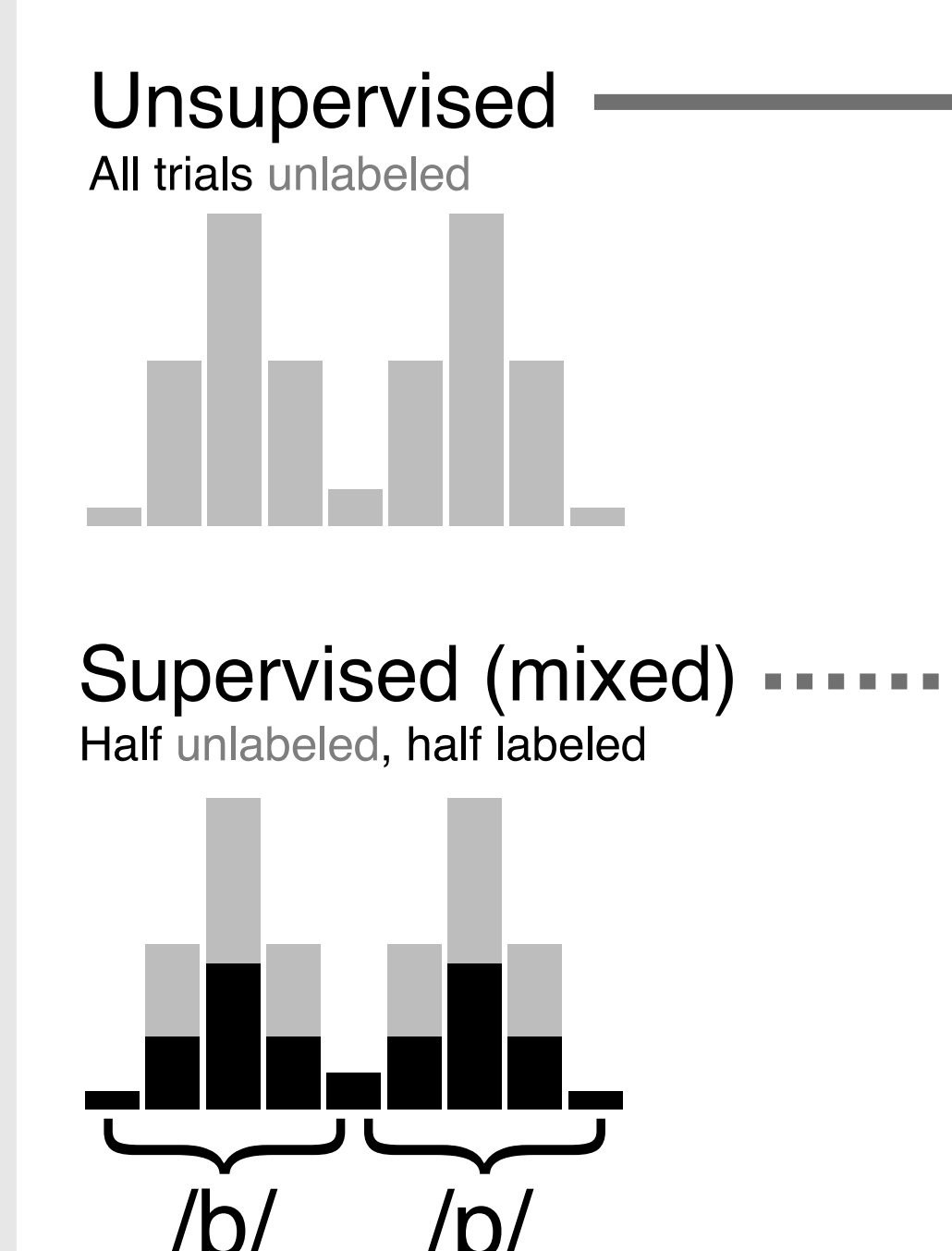
Results



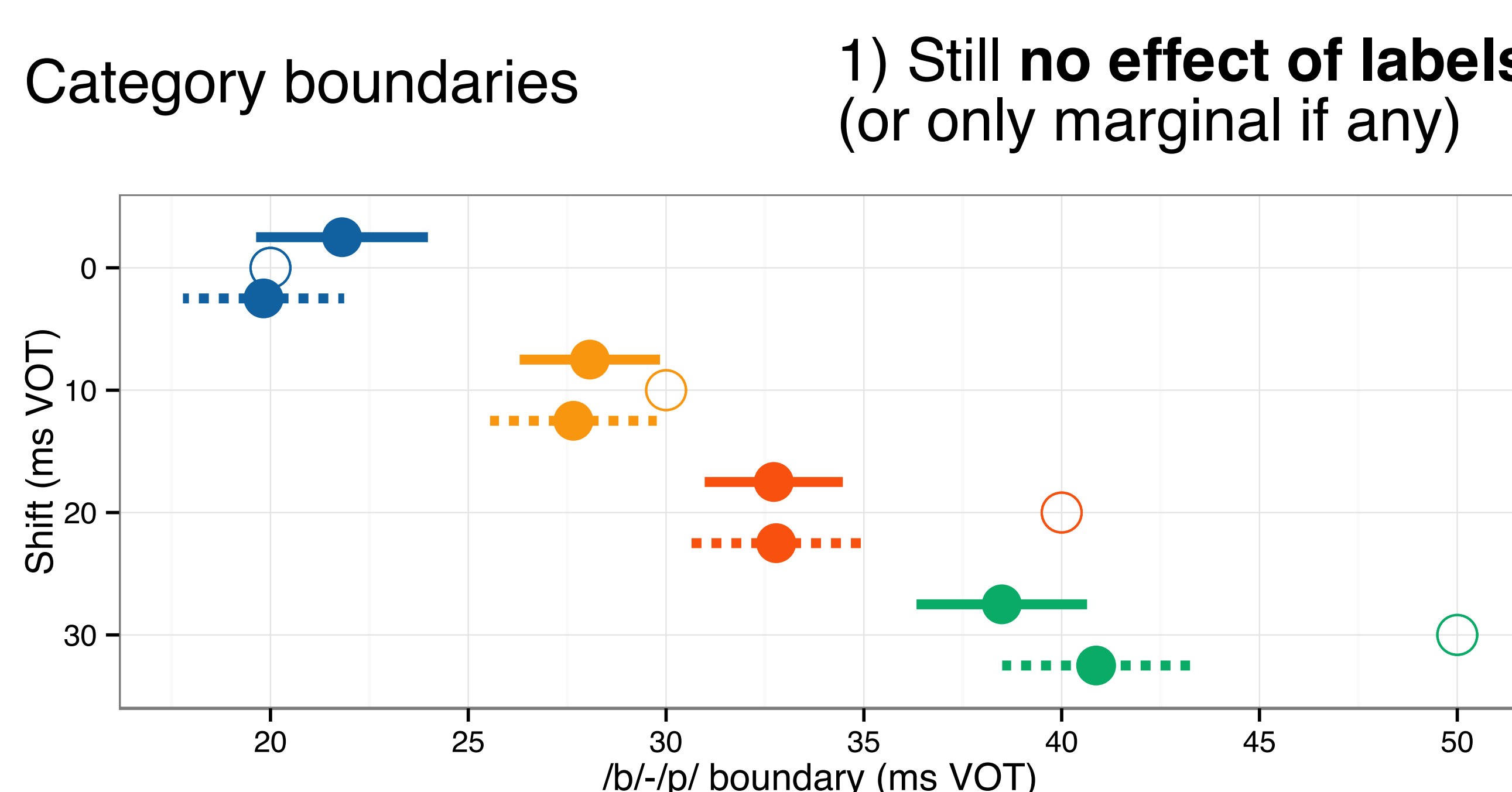
Discussion

- 1) Learning was **worse** for large shifts (category boundaries much lower than distributions predict)
- 2) Still **no effect of labels** (unsupervised = supervised).
- 3) Were labeled trials distributed **too sparsely** over VOT?

Experiment 4



Results



Discussion

- 1) Still **no effect of labels** (or only marginal if any)

Conclusions

Surprisingly, **people do not appear to use informative labels for adaptation**, even though they do for classification.

Two possible reasons why:

- 1) Other studies use **intrinsic labels** (lexical or audio-visual cues).
- 2) Goldilocks problem: **too easy or hard** for label use to be detectable. Unlabeled trials contain a lot of distributional information, and high-shift conditions are very unnatural