

## INTRODUCTION

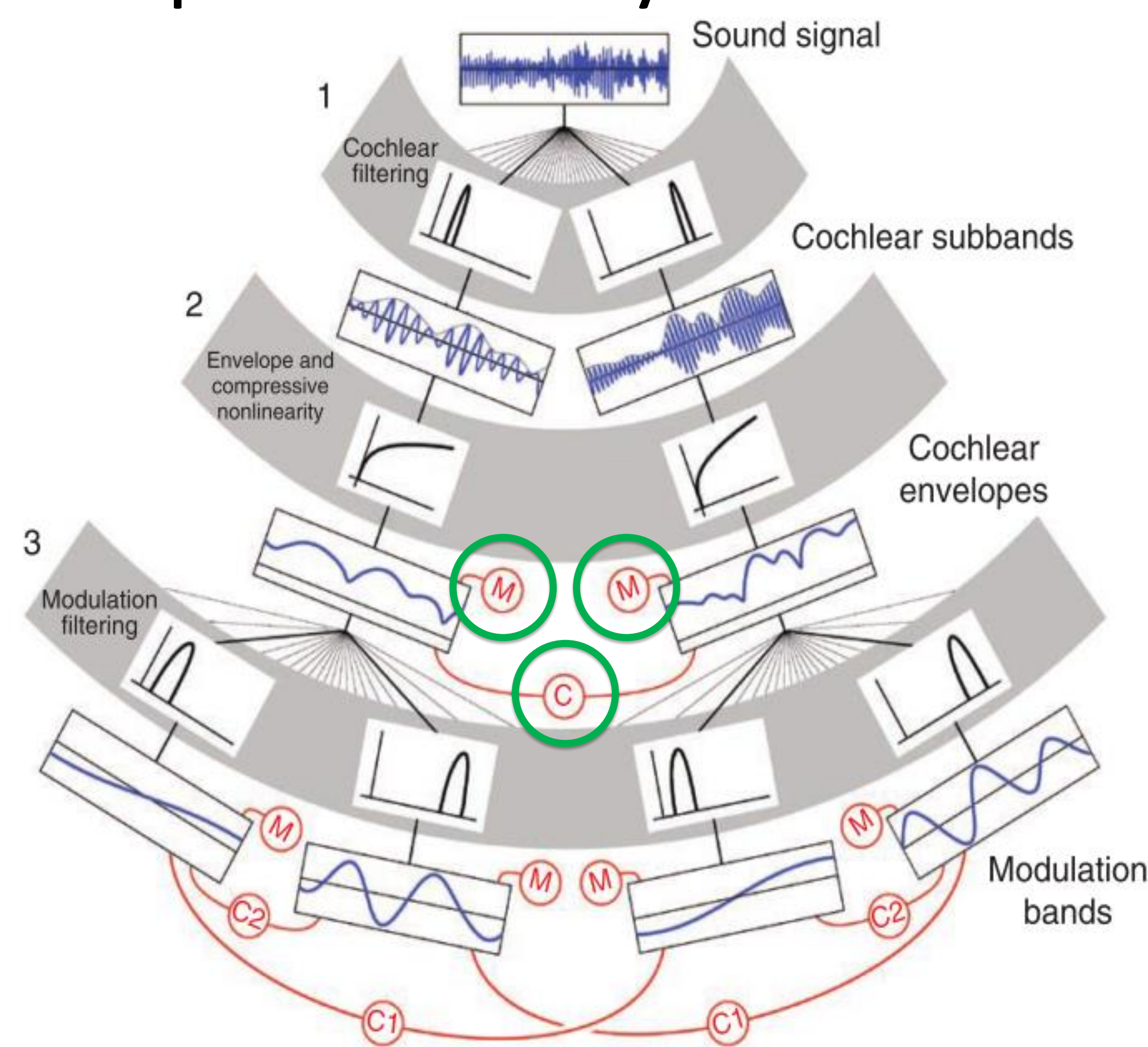
Tension in auditory scene analysis between segregation and integration

Imagine walking along a stream and listening for a bird; the stream creates a texture, which is defined by statistical properties that must be estimated over time. The bird, however, must be segregated in order to be heard.

Research question:

- Are statistical properties of sounds encoded “blindly”?
  - Do detectable “outliers” embedded in a sound affect statistical judgments about the sound
  - Or can they be willfully ignored?

Textures are thought to be represented by statistics:

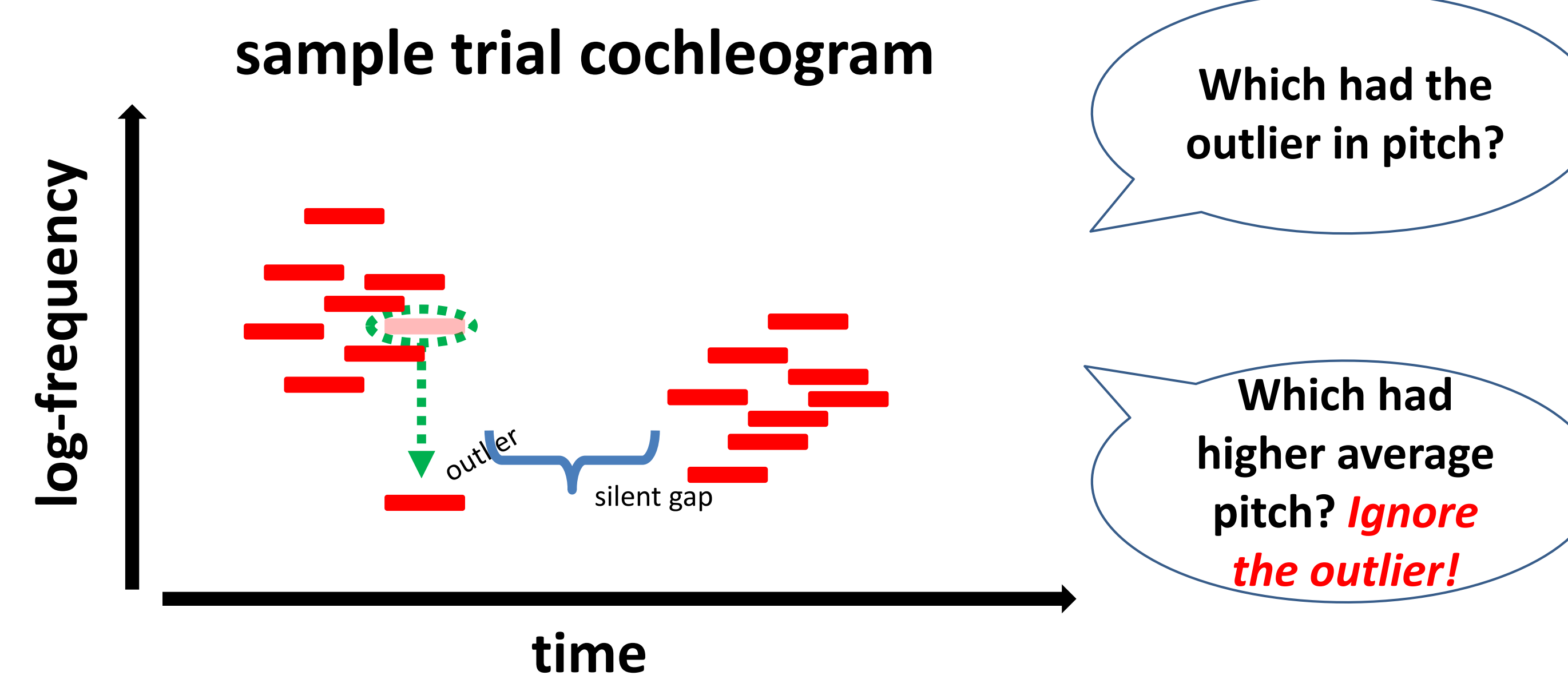


McDermott et. al, 2011, 2013

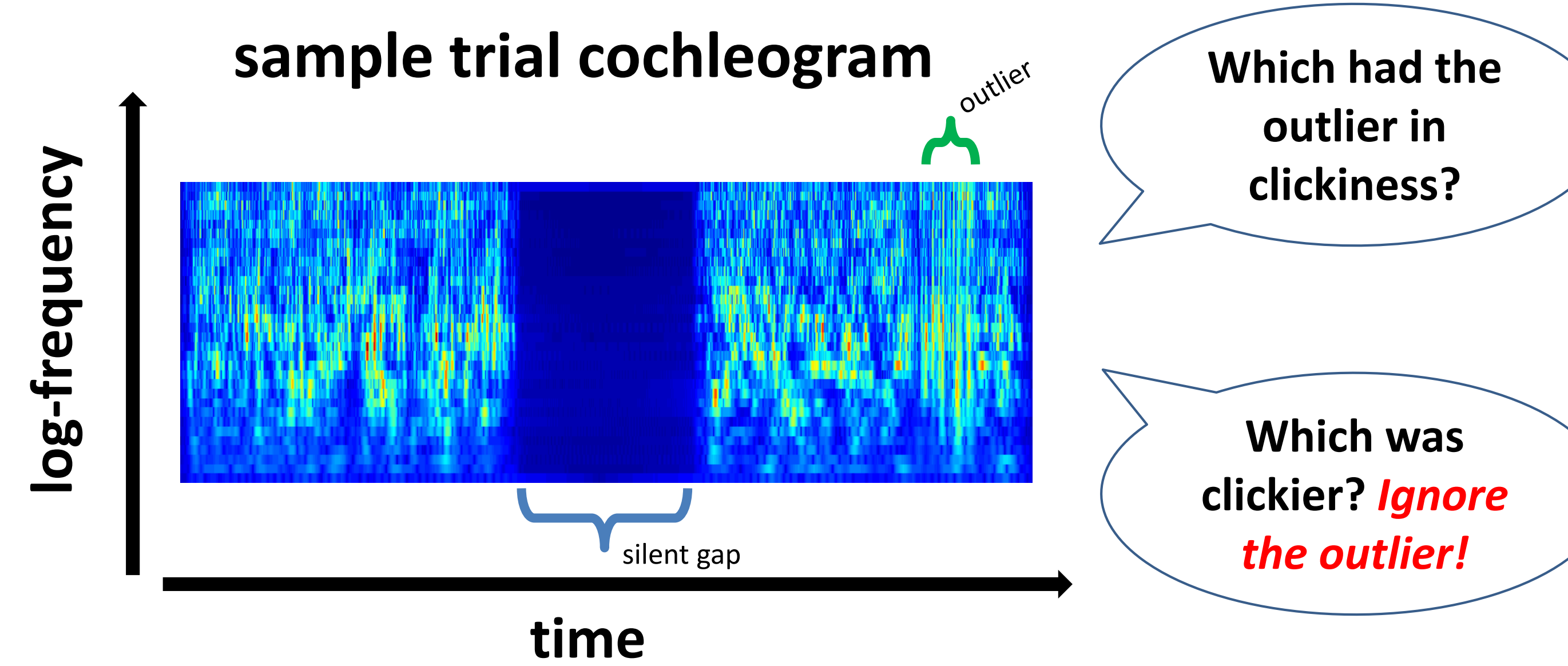
## EXPERIMENTS

There are two experiments. In each experiment listeners do two tasks with the same stimuli; in one block of trials, they detect statistical outliers. In the other, they discriminate between statistical estimates while attempting to ignore the outliers.

### Frequency experiment



### Comodulation experiment

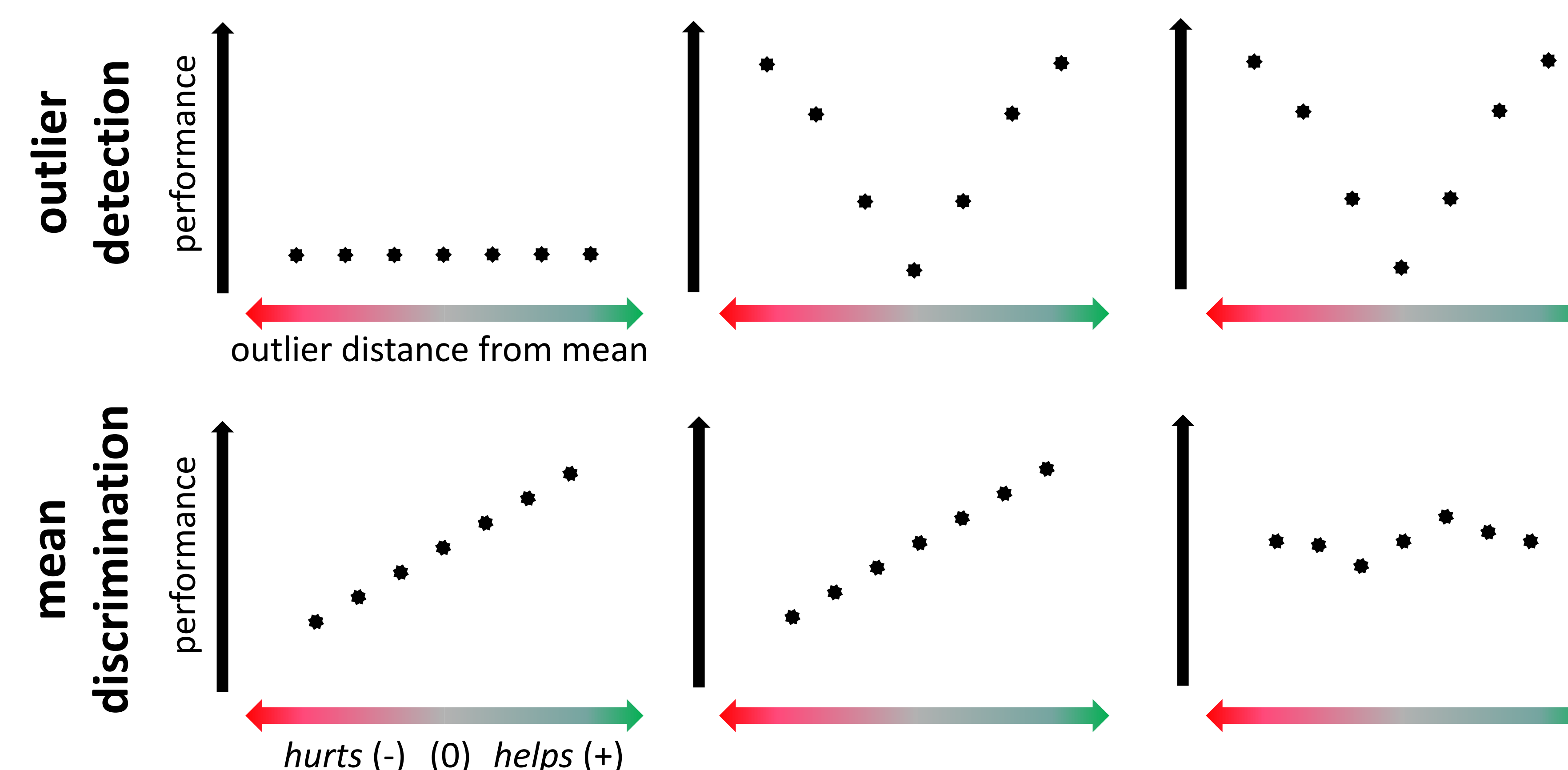


Three possible trial types for mean discrimination task:



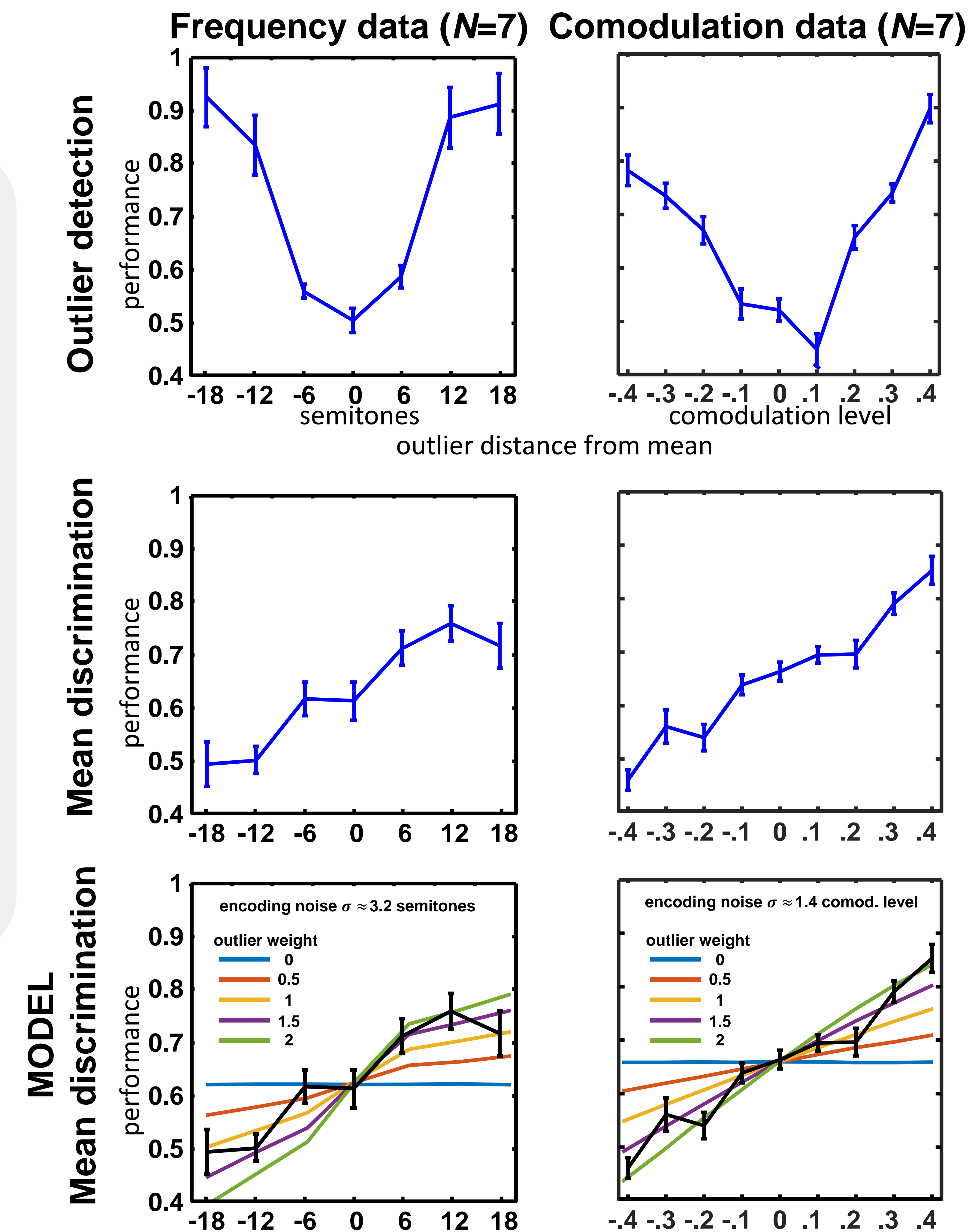
### Possible outcomes

1. Outliers undetected, averaging includes outlier
2. Outliers detected, mistakenly included in average
3. Outliers detected, correctly left out of average



## RESULTS AND MODEL

Listeners reliably detect outliers, but cannot discount them in statistical judgments. A simple model with encoding noise and outlier weighting reveals bias effect.



## CONCLUSIONS

- Data suggests outliers not down-weighted
- Integration of texture statistics is independent of source segregation
- Speculation: texture statistics are computed blindly and automatically
- Perhaps useful for capturing “gist” of scenes
- What if outliers are part of a distinct stream?