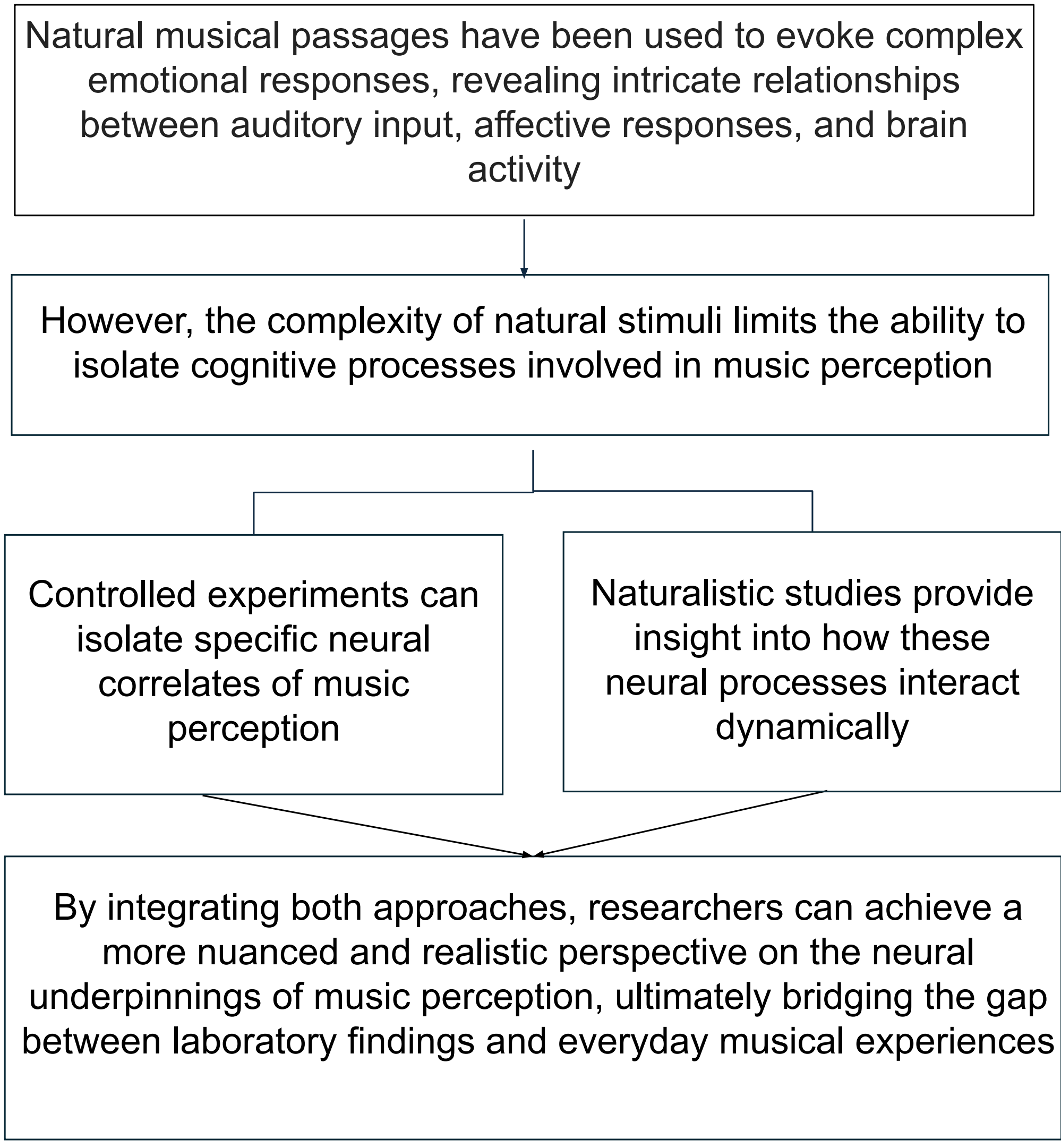


Ata Yilmazemre, Alex Litovchenko, Nikhil Saxena, Brian Mohseni, Faith Hicks, Oliver Ward, Mark Faust, PhD

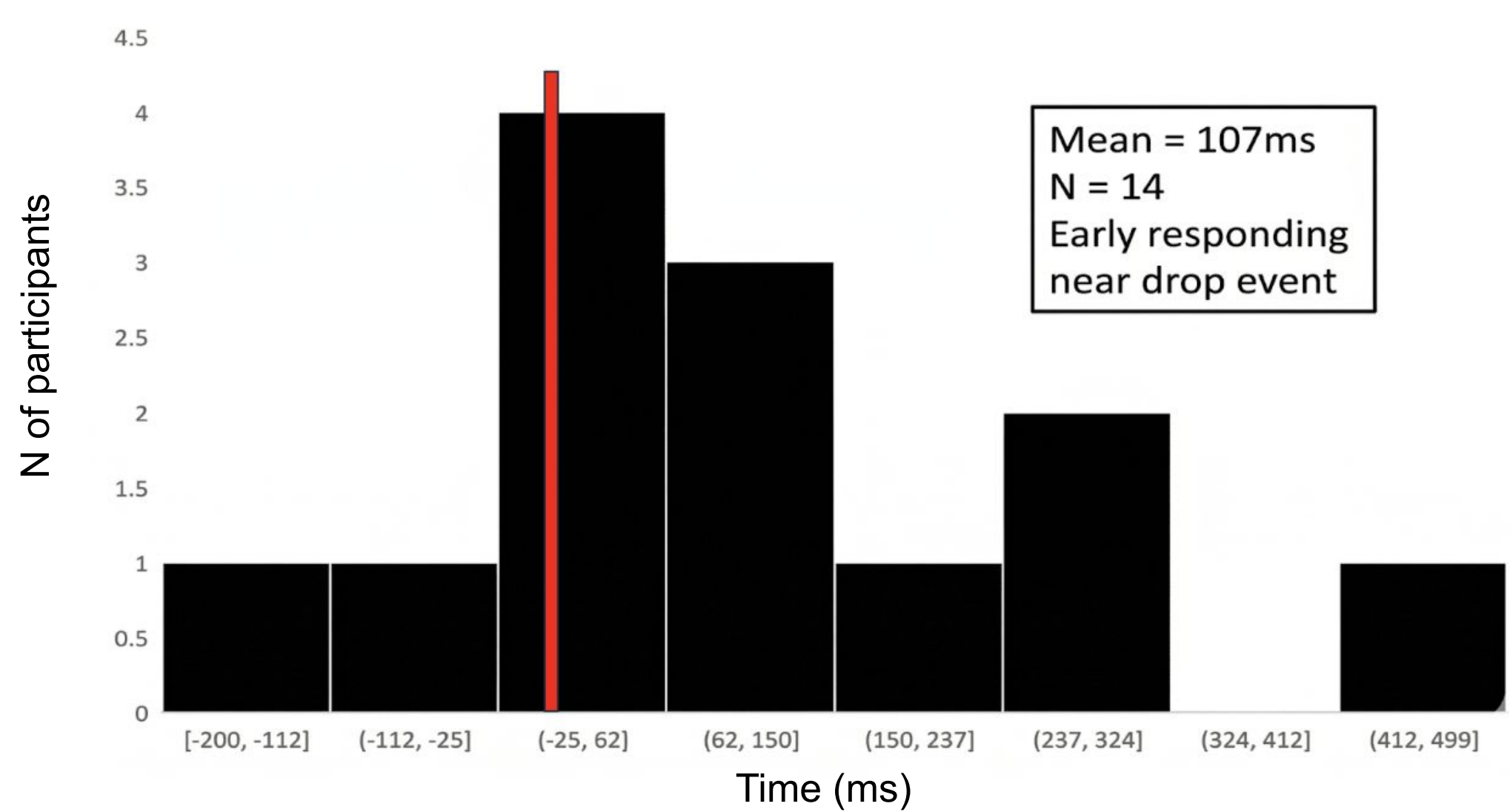
## Introduction & Background



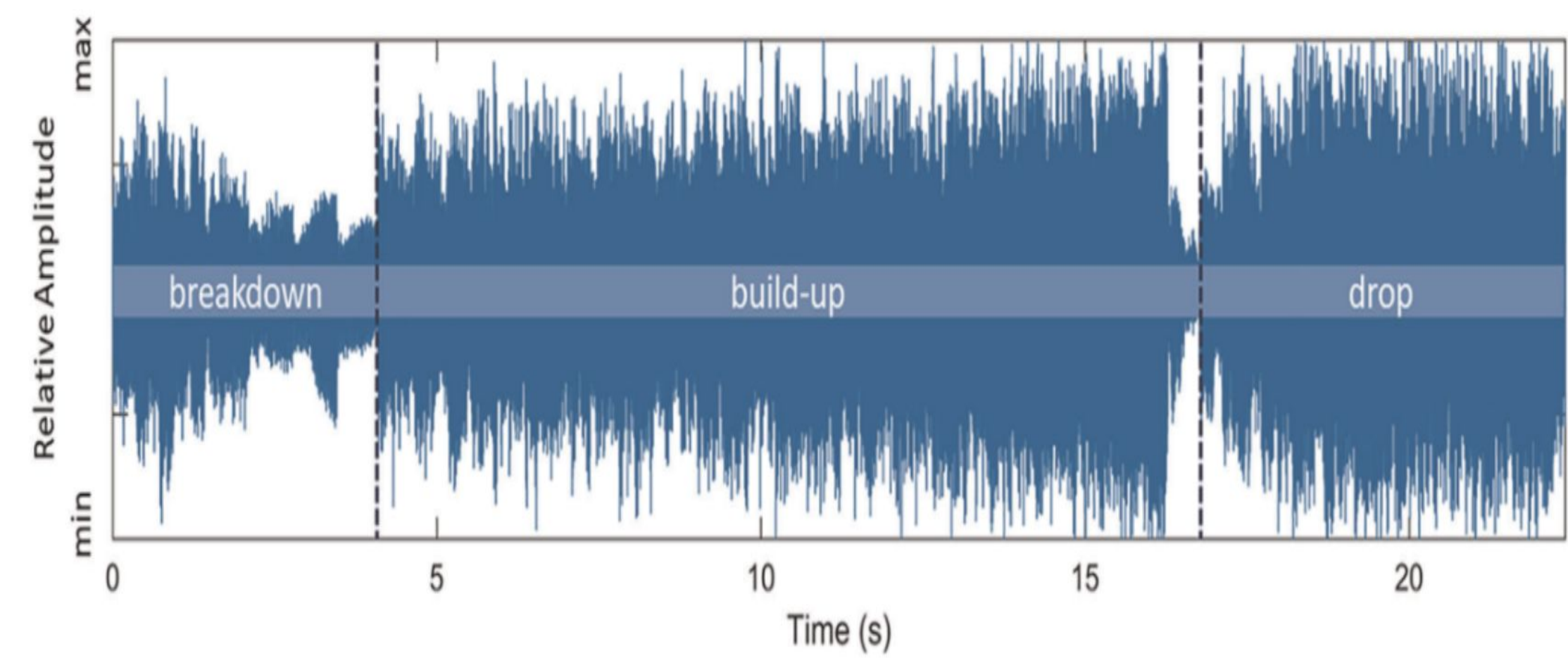
## Hypotheses

- It will be possible to isolate meaningful ERP components using dipole modeling of ICA
- Three ERP components (MMN, P3a, P3b) hypothesized to reflect sequential cognitive processes:
  - Anticipatory expectation (MMN)
  - Novelty detection (P3a)
  - Contextual re-evaluation (P3b)
- Provides dynamic view of neural processing of temporal violations in complex auditory events

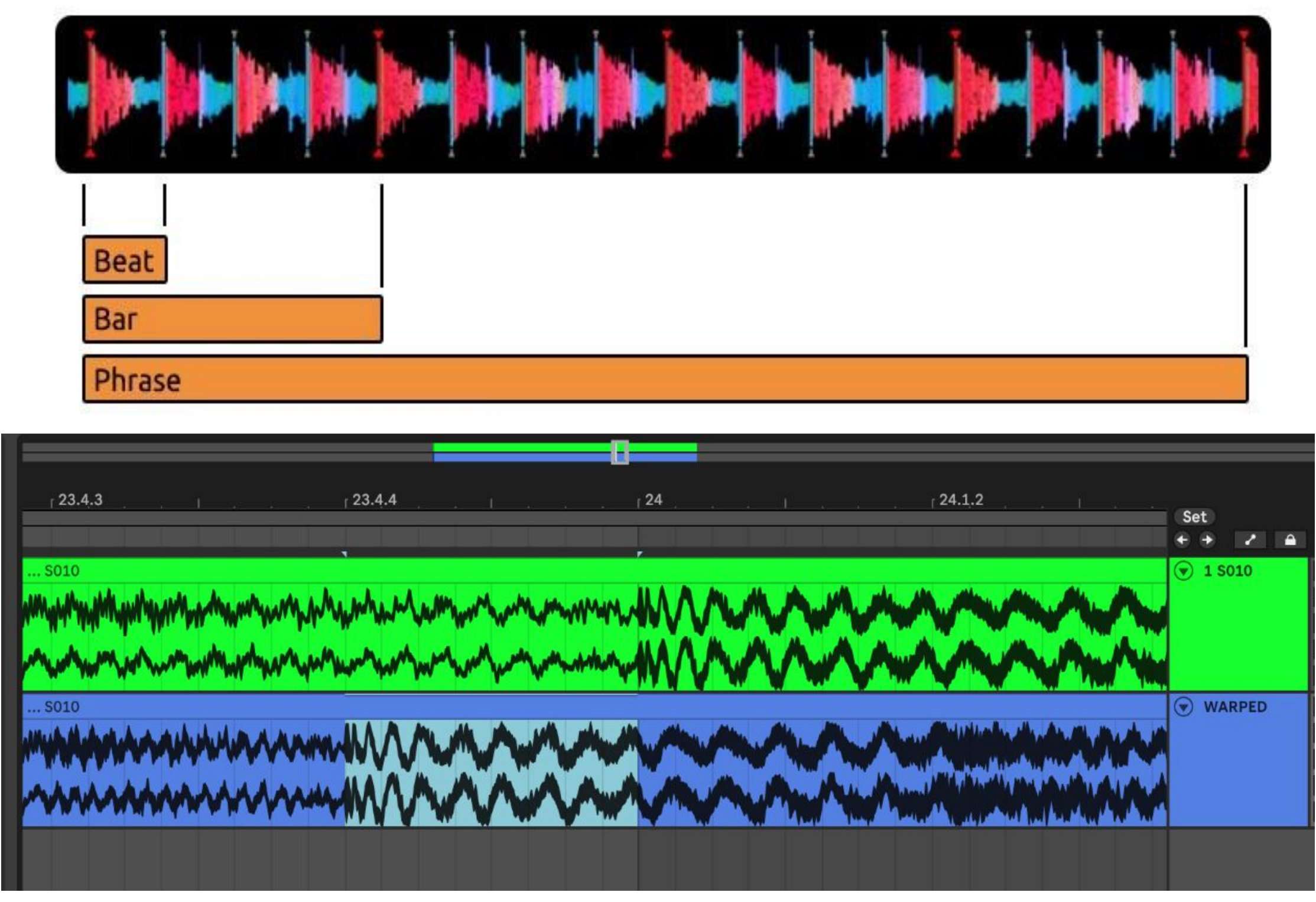
## Drop Detection Behavior



## Break Routines in EDM

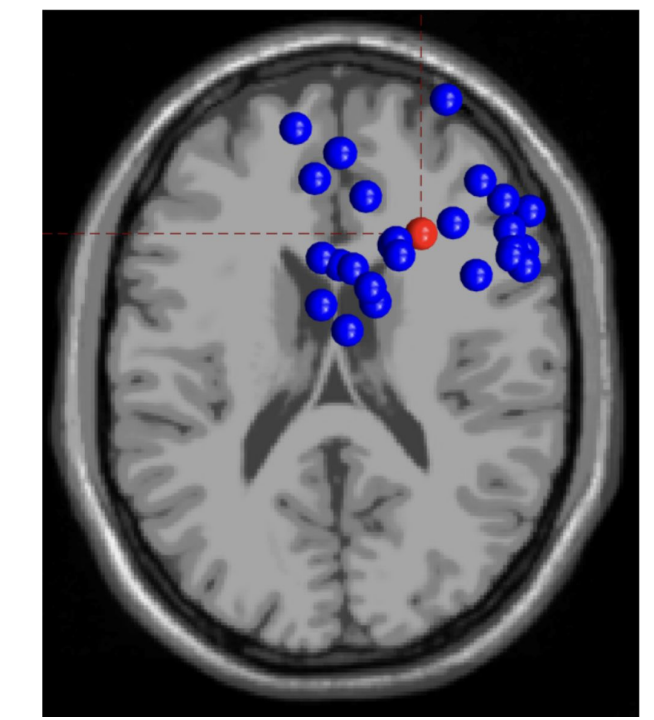
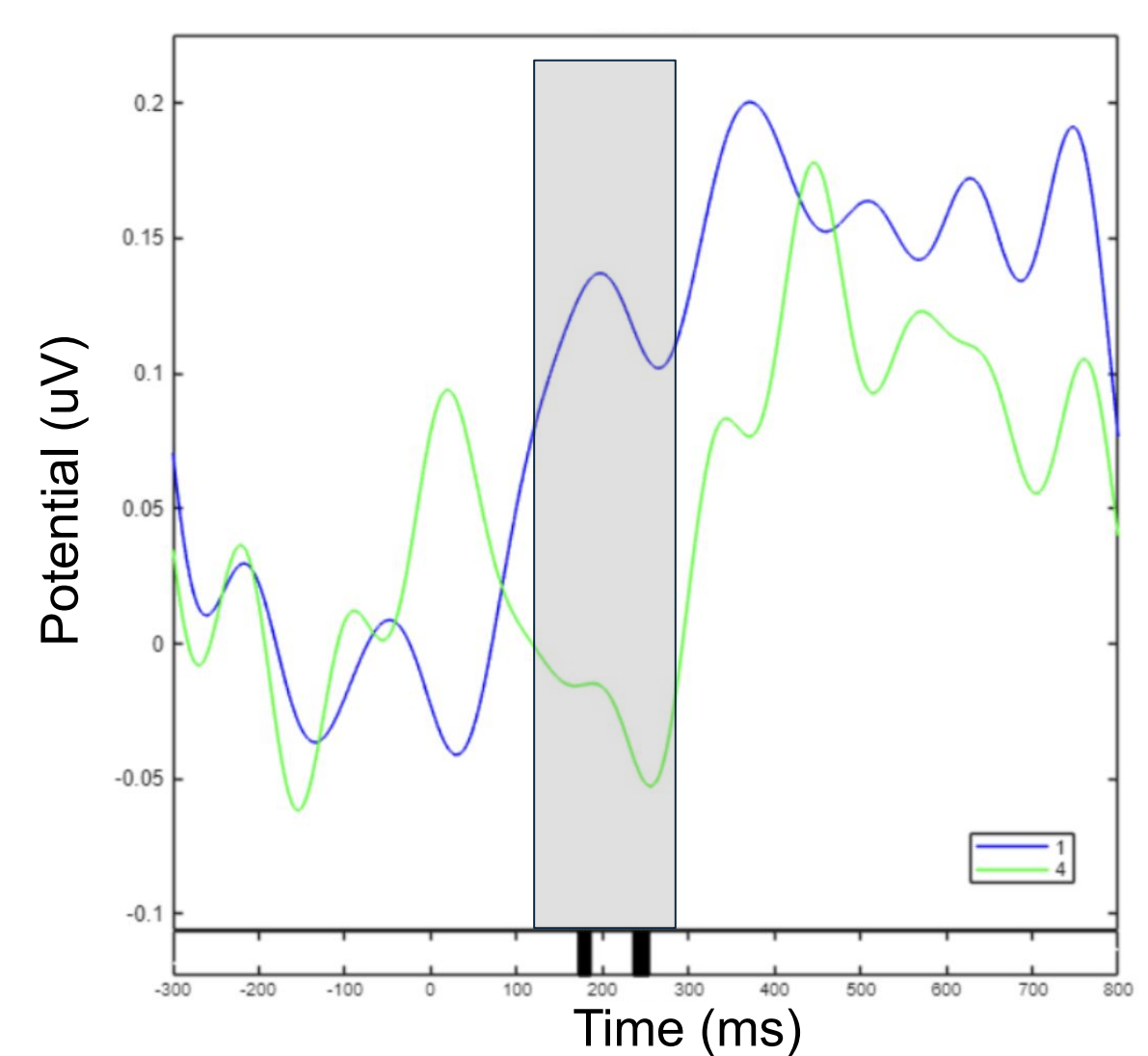


## Stimuli Structure



Ableton Live waveform display illustrating a temporal manipulation (warping) of an EDM bass drop stimulus. The top track is the original audio excerpt, and the bottom track is a warped version in which the timing of the drop region has been locally adjusted (1 Beat).

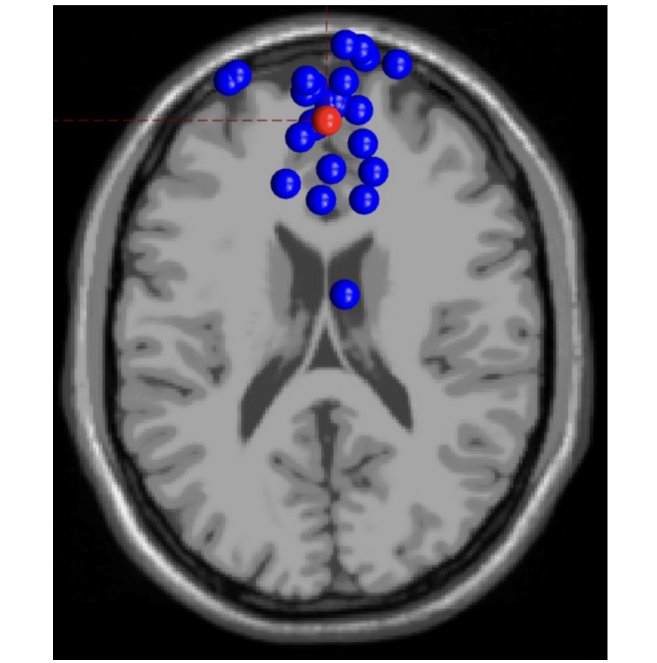
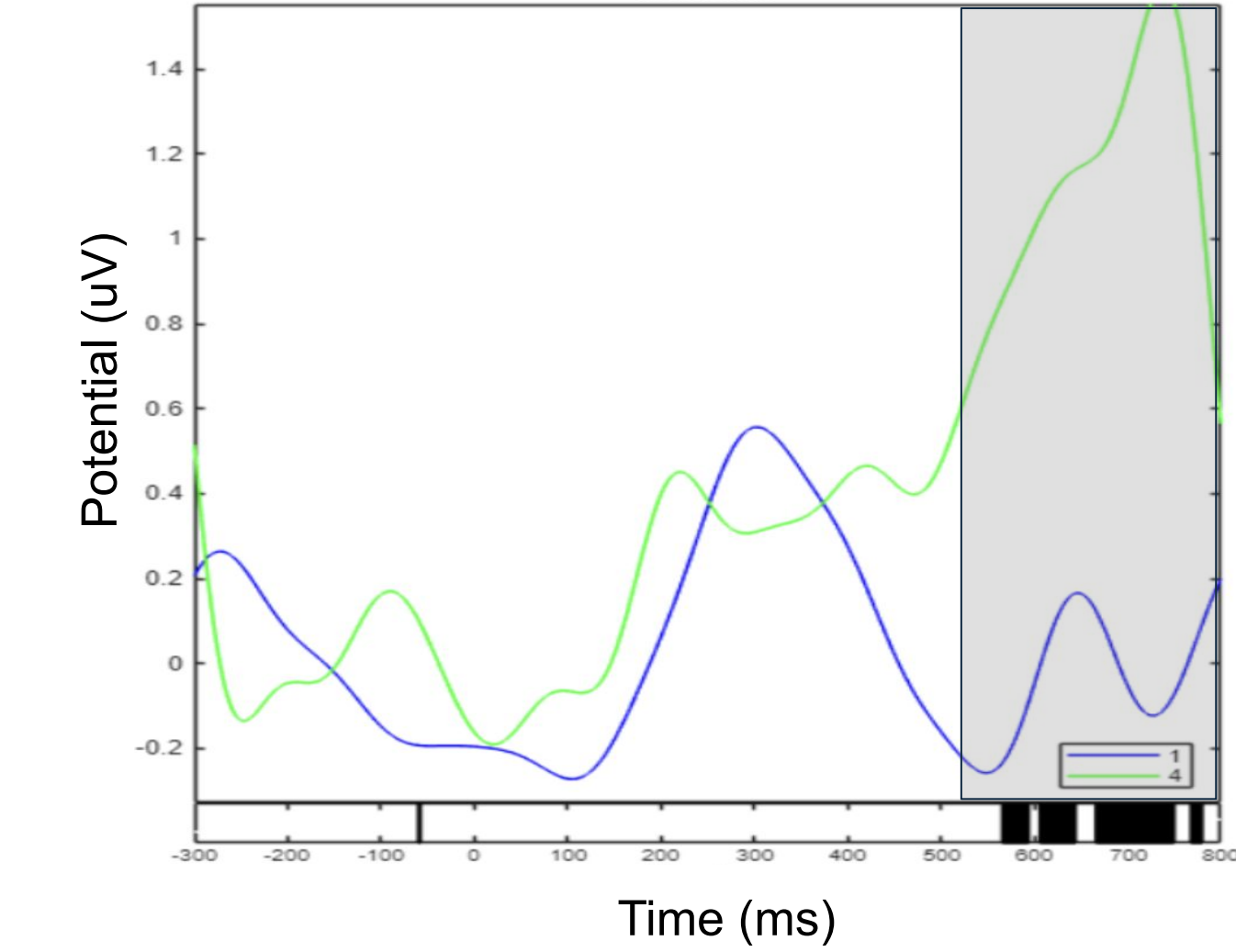
## Practice Trials



28 ICs, Right Frontal distribution

In the plot, **unwarped (Blue)** and **practice unwarped (Green)**. Statistical significance was assessed with a **permutation test at  $\alpha = .10$ , without FDR correction.**

## Late Positivity Response

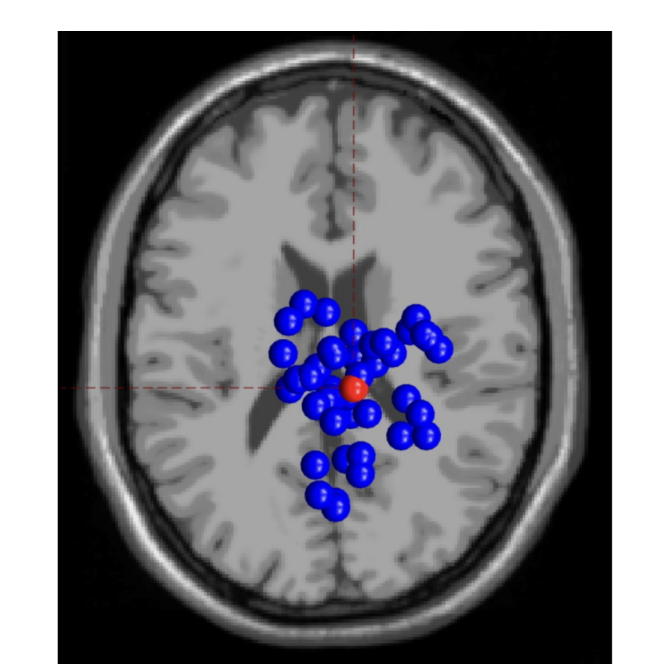
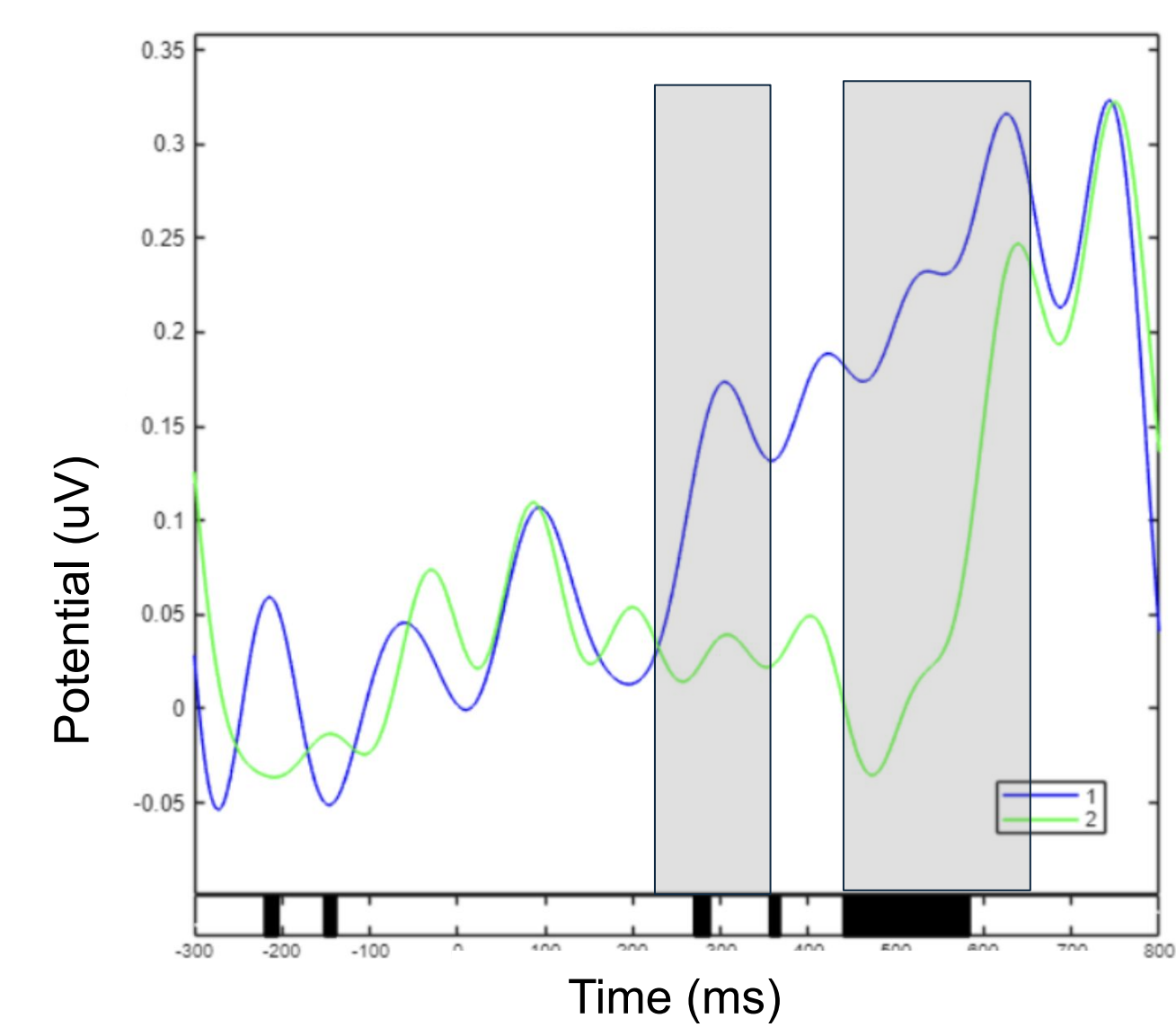


28 ICs, Prefrontal Midline distribution

In the plot, **blue = unwarped** and **green = practice unwarped**. Statistical significance was assessed with a **permutation test at  $\alpha = .10$ , FDR corrected.**

When assigned a button press task for the drop prediction, a **late stage positivity** is observed for the practice cycle.

## Warped vs Unwarped



42 ICs, Parietal-Temporal distribution

Source-localized activity shows a divergence for the **warped (Green)** condition from the **unwarped (Blue)** condition. The effect emerges consistent with differential higher-order processing of the two drop types. This could be explained by P3A, P3B; MMN-like response. **Permutation test at  $\alpha = .05$ , no FDR correction.**

## Discussion

- Despite the the noise of a naturalistic audio paradigm, method and theory come together to extract meaningful signal.
- Examples of P3A, P3B in our comparisons.
- Active engagement with the drop rather than just attending to the music provided different ERP profiles.
- Warping the drop only one beat was not significant.
- Trial-live analyses of individual differences.

References



Supplement

