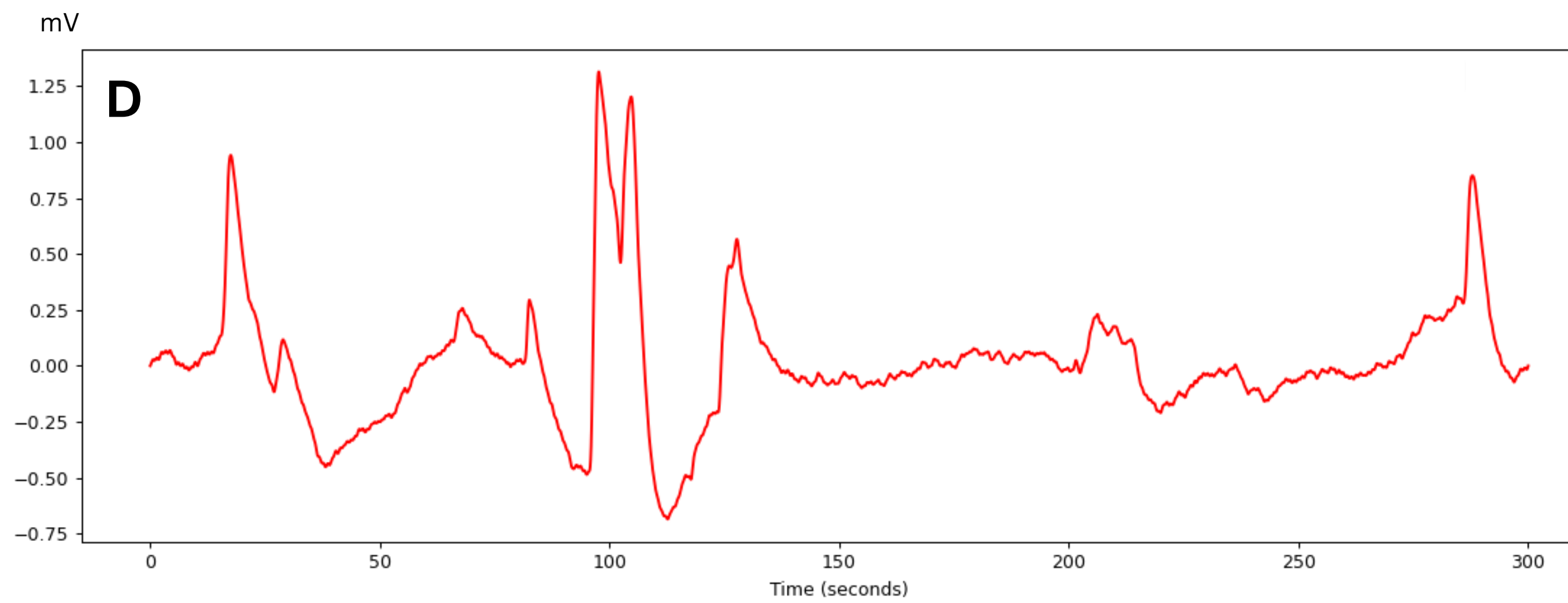
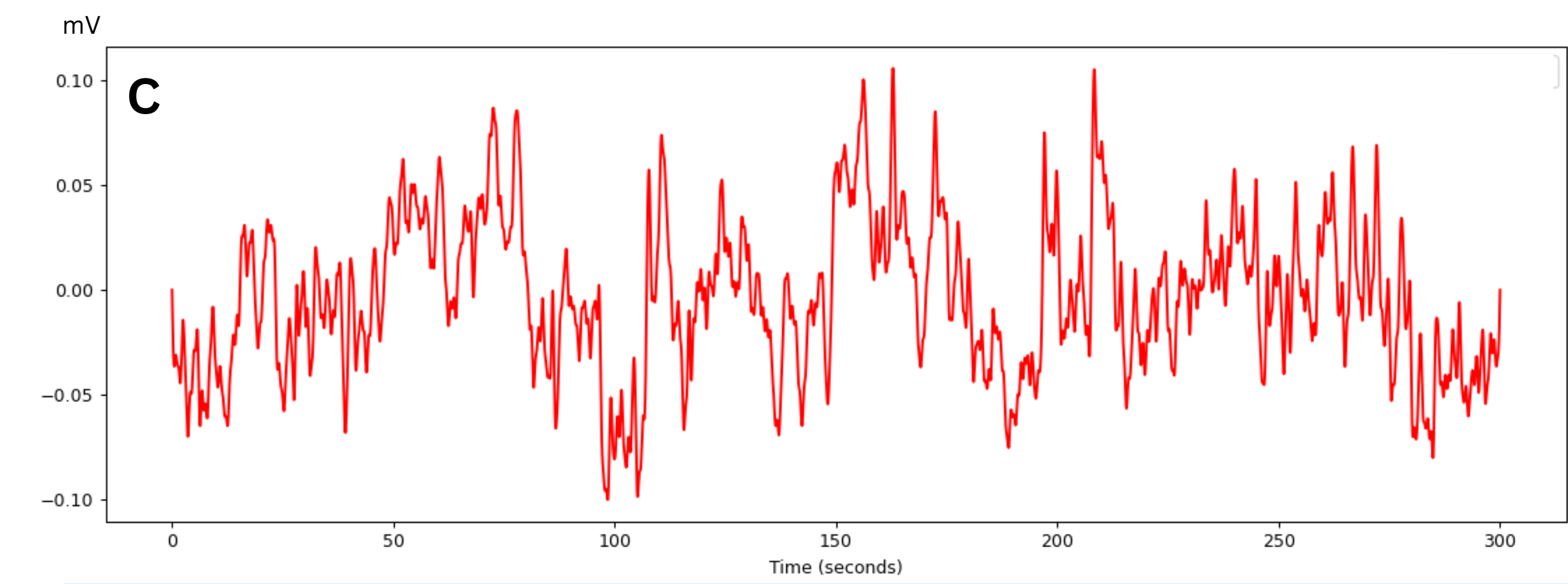
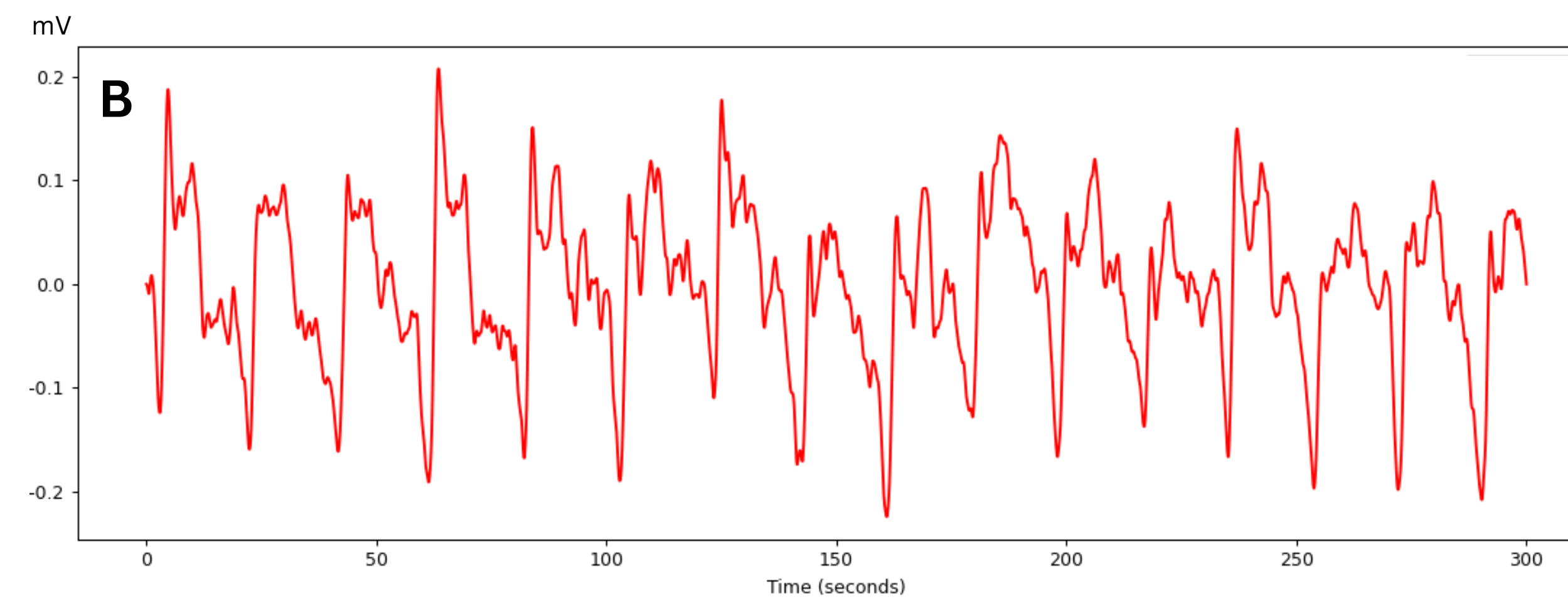
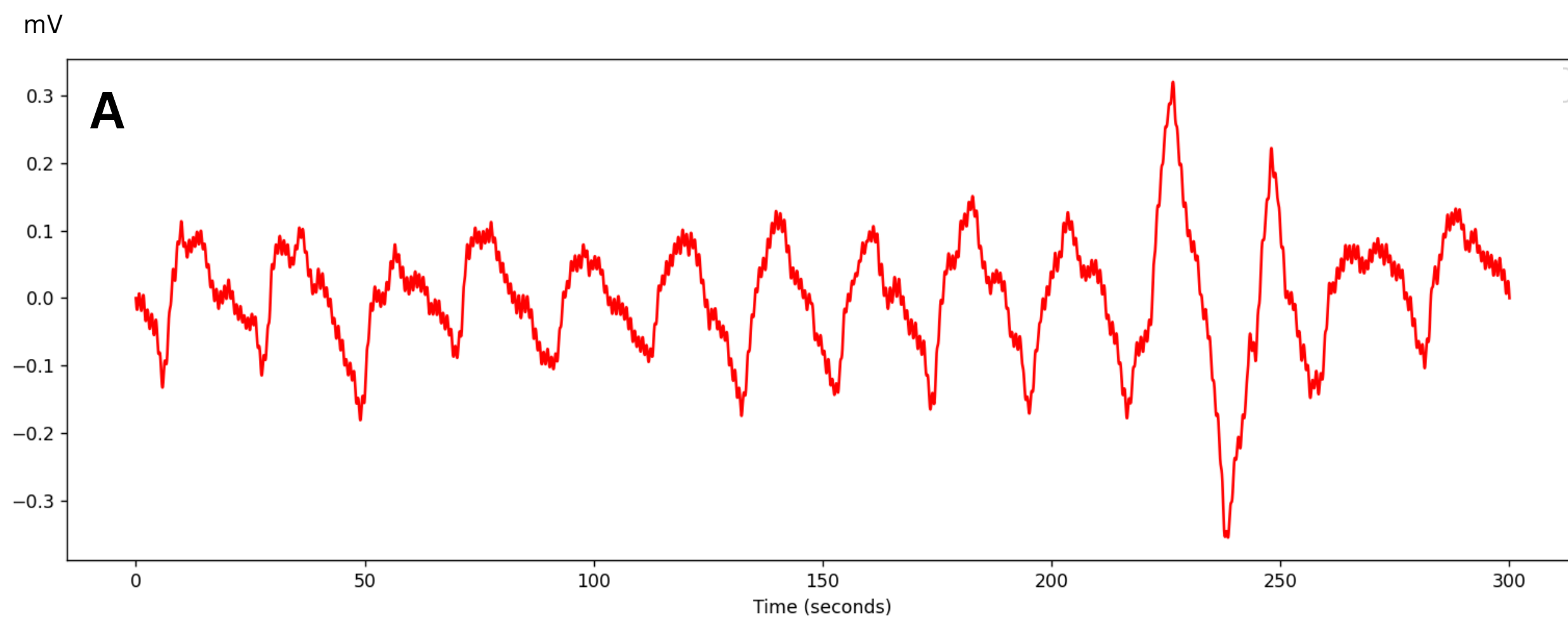


A Gut Feeling: Examining Electrogastrography as a Biomarker of Affective Responses

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Examples of gastric signals; about 30% of our data resembles A or B, while 70% resembles C or D.
A: Good data with a clear gastric signal, low-amplitude respiration artifacts, and limited motion
B: Good data with high signal amplitude and some respiration artifact
C: Poor data with low signal to noise ratio; the gastric signal is obscured by respiration and motion artifacts
D: Very poor data with very low signal amplitude and numerous large artifacts

Introduction

- Autonomically mediated bidirectional communication between the brain and digestive organs supports allostasis by coordinating behavioral and digestive responses to cues of safety and threat (e.g., inhibiting digestion during perceived threat)¹
- Disorders of this relationship are implicated in diseases such as Irritable Bowel Syndrome²
- Electrogastrography (EGG) is an inexpensive and noninvasive measure of the electrical waveforms produced by autonomically innervated cells during peristalsis in the stomach³
- Though underutilized, this low-cost signal may be an informative biomarker of the organism's ability to adaptively regulate digestion in response to environmental cues, such as affective stimuli
- While promising, this signal is highly susceptible to artifacts due to its low amplitude and inter-individual variability in stomach position.
- We aim to test the feasibility of EGG as a biomarker in psychophysiological research.

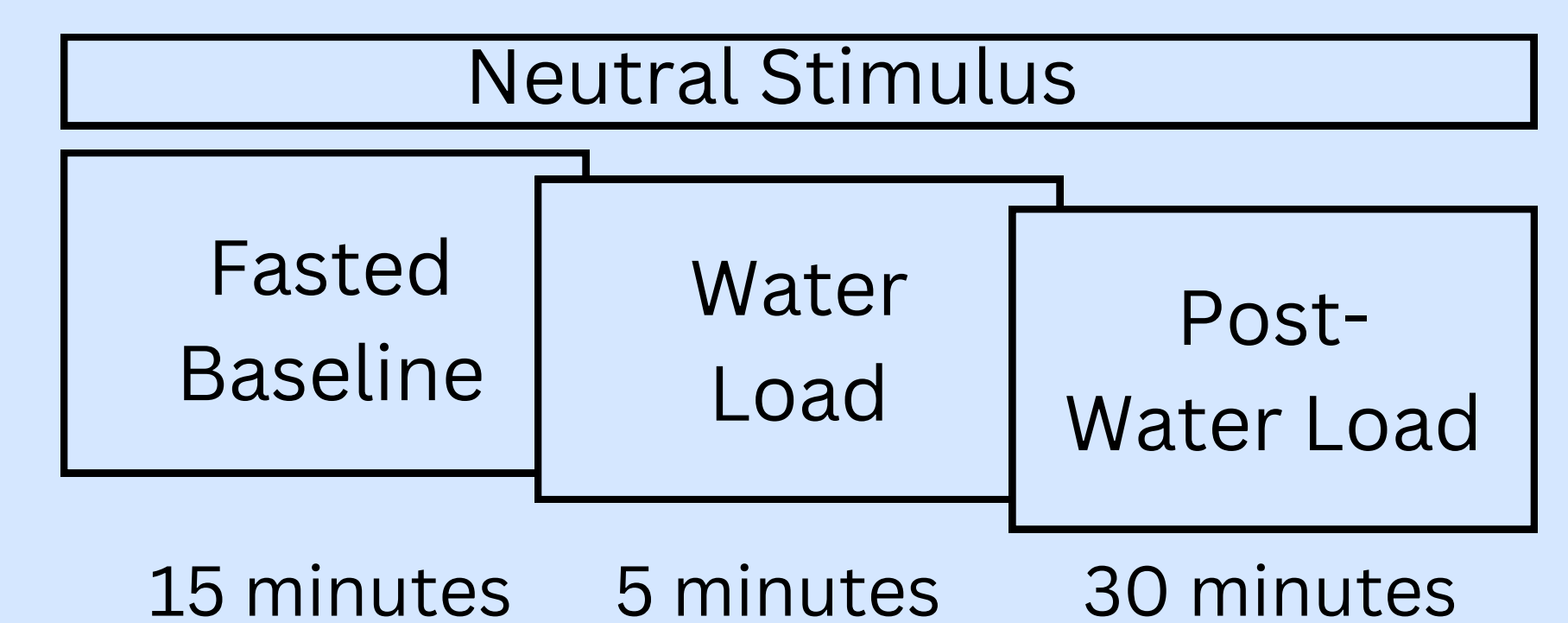
Electrogastrography could be an informative signal, but data loss to artifacts is a major issue in the current study design

Preliminary Findings

- N=40 EGG files cleaned
- Blocks deemed analyzable had at least 5 continuous minutes of data with adequate signal-to-noise ratio and no motion artifacts
- % of participants with analyzable data in each block:
 - Baseline: 42.5% | Task: 35.0% | Recovery: 40.0%
- No association observed between duration of fast and data quality ($p > .05$)

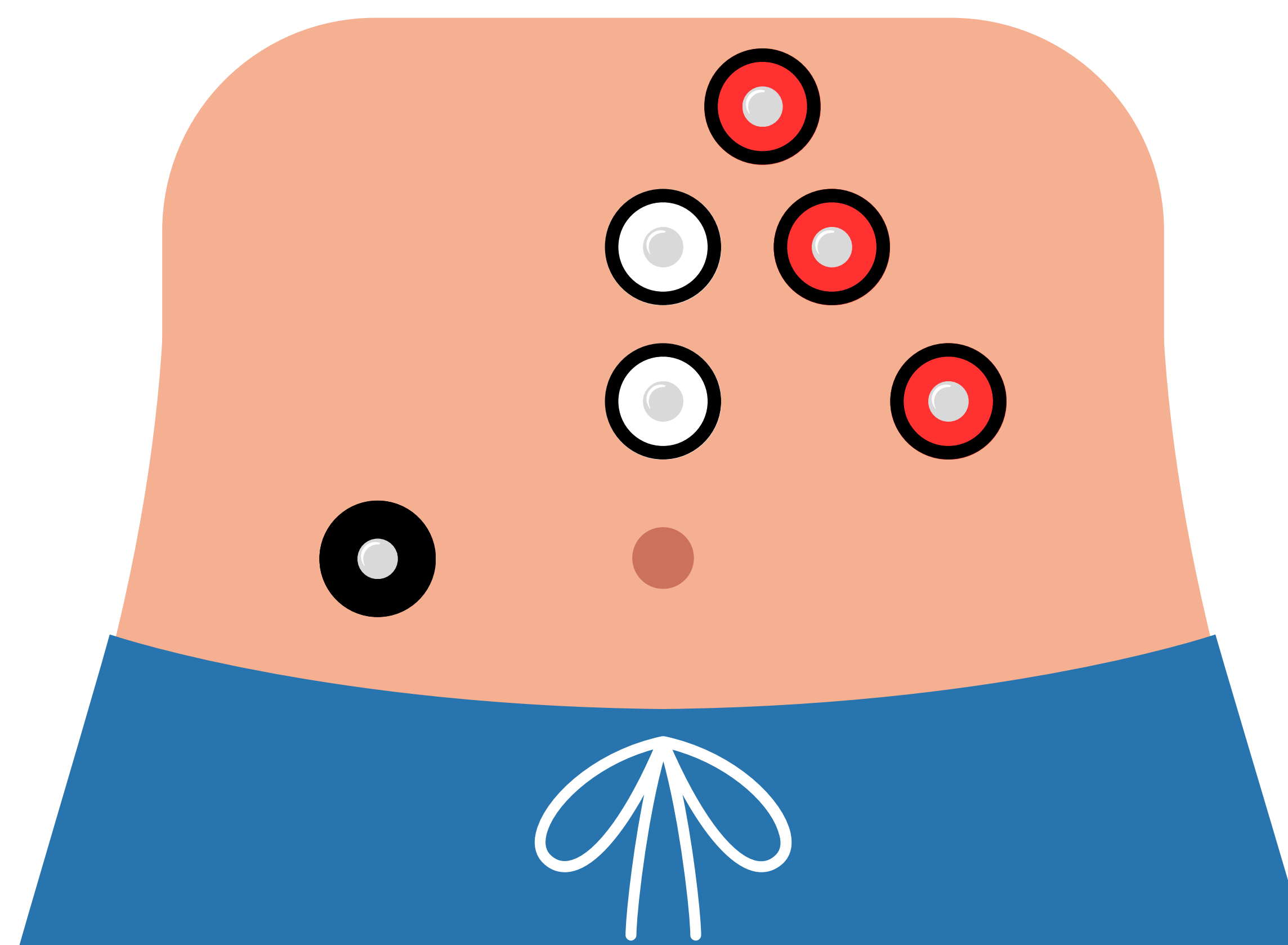
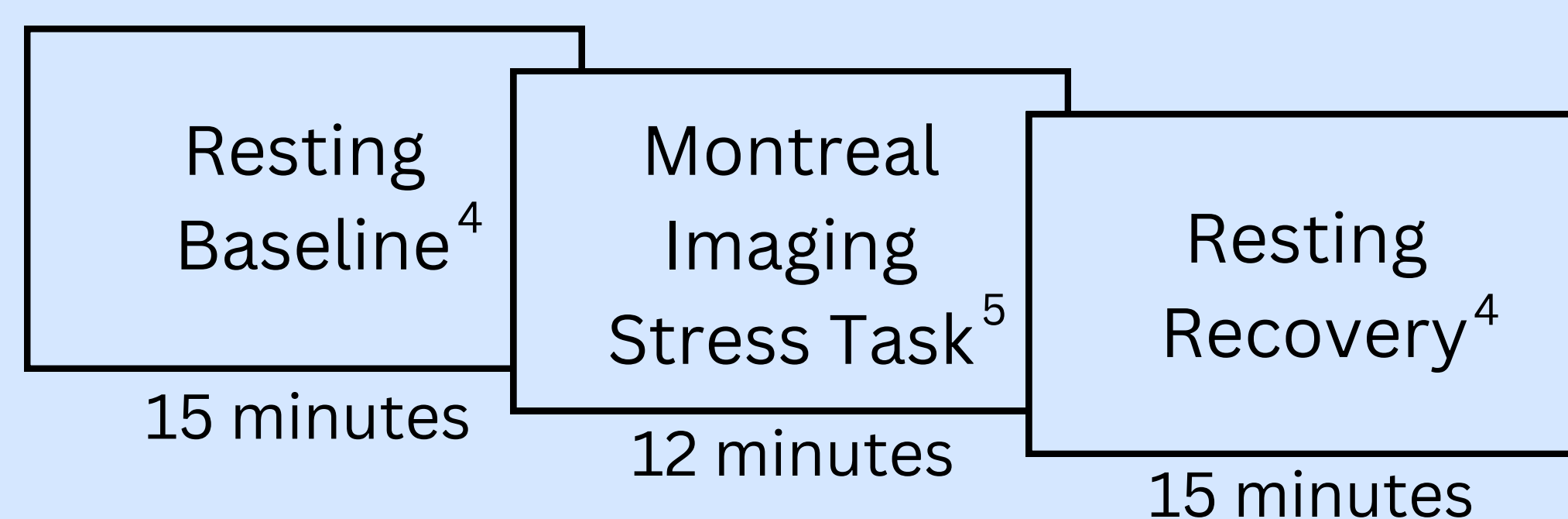
Future Directions

- Continue participant recruitment
- Limit participants' fasting duration to <6 hours
- Continue 2-channel data collection
- Utilize respiration band
- Implement water-load test³
- Adjust stimulus to minimize movement during participant response (e.g., pressing keypad)



Methods

- N=49 undergraduates (age 18-21, 78% female)
- Minimum 2 hours fasted
- Reported demographic information
- Collected height, weight, waist circumference
- Recorded EGG, electrocardiogram (ECG), and electrodermal activity (EDA) over 3 blocks



Electrode setup for a 2-channel recording: this configuration allows the experimenter to select the 2 least artifactual channels out of 4 possible options. After the recording, the clearer of those 2 channels is selected for analysis.

● Ground electrode | ○ Negative electrode | ● Positive electrode

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