

# Neural Predictors of Inflammatory Response to Stress

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## Introduction

### Psychological Stress, Inflammatory Response, and CVD

- Psychological response exists as a risk factor for CVD, and recent research shows the inflammatory response is critical in this relationship
- Gap in knowledge of how stress-induced neural and molecular mechanisms interact, could be critical in developing interventions for CVD

**Research Question: What are the neural and molecular mechanisms through which psychological stress leads to an inflammatory response, thus increasing risk for cardiovascular disease?**

- Establish neural patterns predictive of stress-induced inflammation using multivariate machine learning and graph theory approaches
- Study pro-inflammatory gene expression and circulating inflammatory proteins
- Identify neural signatures as novel targets for future intervention to reduce the burden of CVD

## Methods

### Participants

- 100 healthy participants aged 18-30 years were recruited for a "First Impressions" study
  - Varying amounts of data have been collected from 98 participants, 2 currently scheduled to reach goal sample size
- Recruited via flyers on UNC campus and the surrounding community, via announcements in classes at UNC, and social media posts

### Task Design

- Cross-sectional observational study
- Study phases:
  - Eligibility screening
  - Zoom Session
  - In-Person Session

## Methods (cont.)

### Procedure – "First Impressions Task"

- Participants completed a video-recorded "First Impressions" interview answering personal questions (i.e., What is your greatest shortcoming?)
- Instructed that the in-person session would involve another participant for the second part (Evaluator and evaluatee roles randomly assigned)

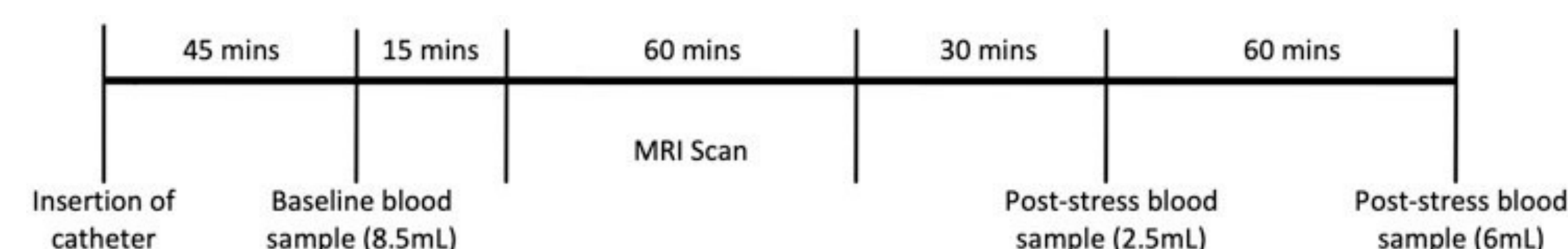
### Stimuli

- Pre-recorded video of mouse clicking adjectives in random order every 10 seconds, 10-second clip from interview in the middle of the run
  - Ensure believability of the live feed to the evaluator
- Adjectives divided into three categories (positive, neutral, negative) - approximately 15 trials per valence

### Adjective Grid

ANNOYING	EMOTIONAL	KIND	SENSIBLE
ARROGANT	FRIENDLY	LAZY	SERIOUS
BORING	FUN	NERVOUS	SHALLOW
CARING	INSECURE	PRACTICAL	SINCERE
COMPETITIVE	INTELLIGENT	RESERVED	SPONTANEOUS
CONFIDENT	INTERESTING	SELFISH	TALKATIVE

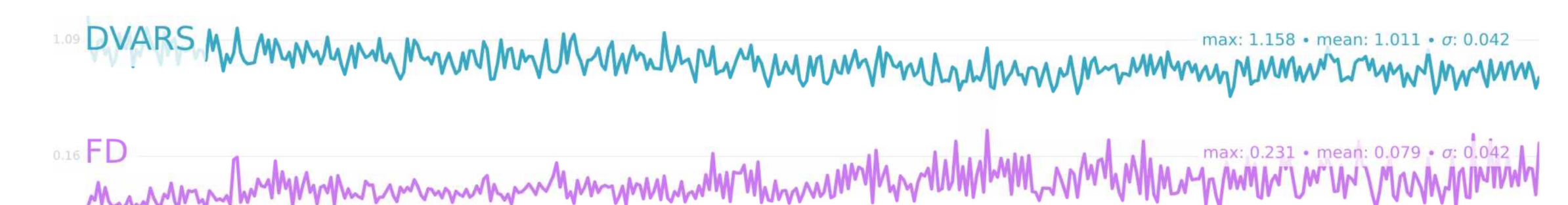
### In-Person Session Outline



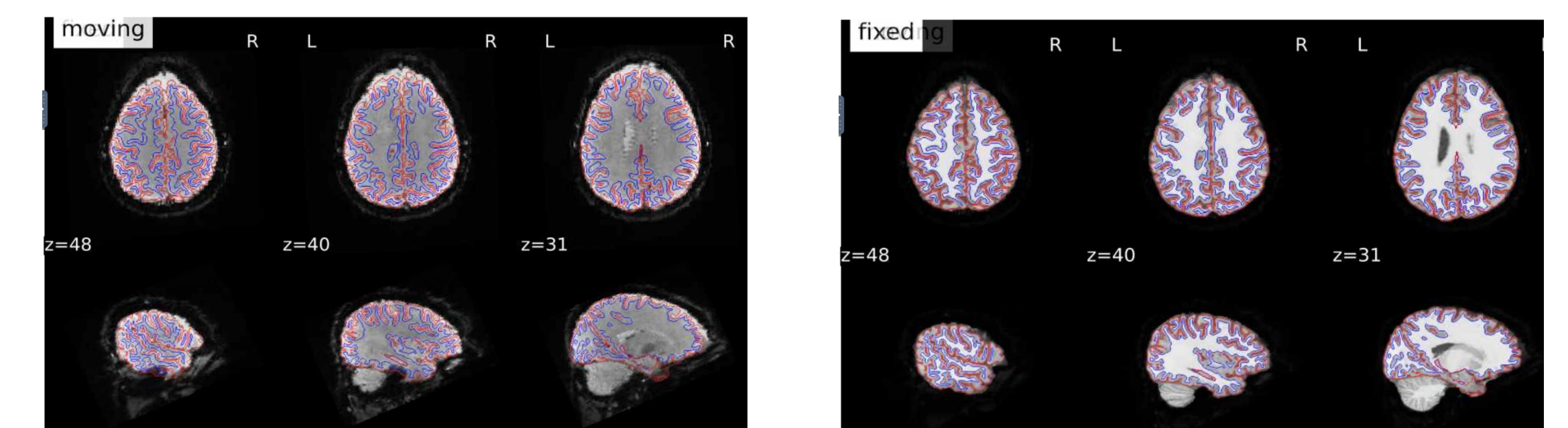
## Results

### fMRI Preprocessing Outputs

- Successful preprocessing of brain data completed for the current participants
- Head motion parameters estimated for quality control and correction if needed



- Alignment of functional (moving) and anatomical (fixed) MRI data transformed using FSL within fMRIprep



### Blood Samples

- Aliquoted plasma and whole blood samples stored in cryovials in cryopreservation freezers
- Immunoassays of proinflammatory cytokines IL-6 and CRP will be done upon completion of data collection
- Inflammatory gene expression will be evaluated off-site upon completion of data collection

## Discussion

- Currently finishing data collection for final two participants
- Future analyses will focus on multivariate pattern classification and graph theory measures of functional connectivity in ROIs
- Results will advance understanding of mechanisms through which stress leads to inflammatory processes involved in CVD
  - Possible targets for future prevention and intervention efforts

### References

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