

# Cognitive and Affective Responses in Chiari Malformation Type I Patients

Philip Allen, Frank Loth, Bryn Martin,  
and Josh Pollock

# Our CM Project

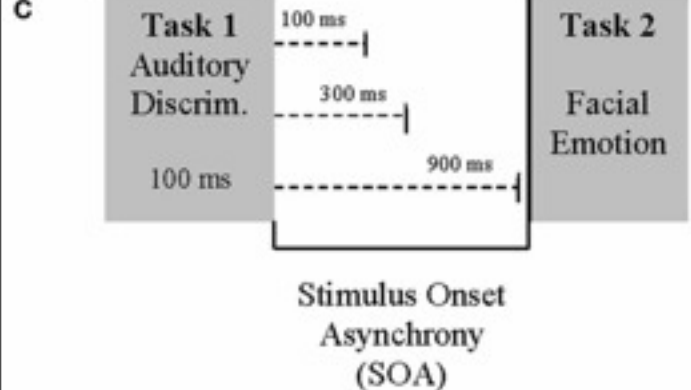
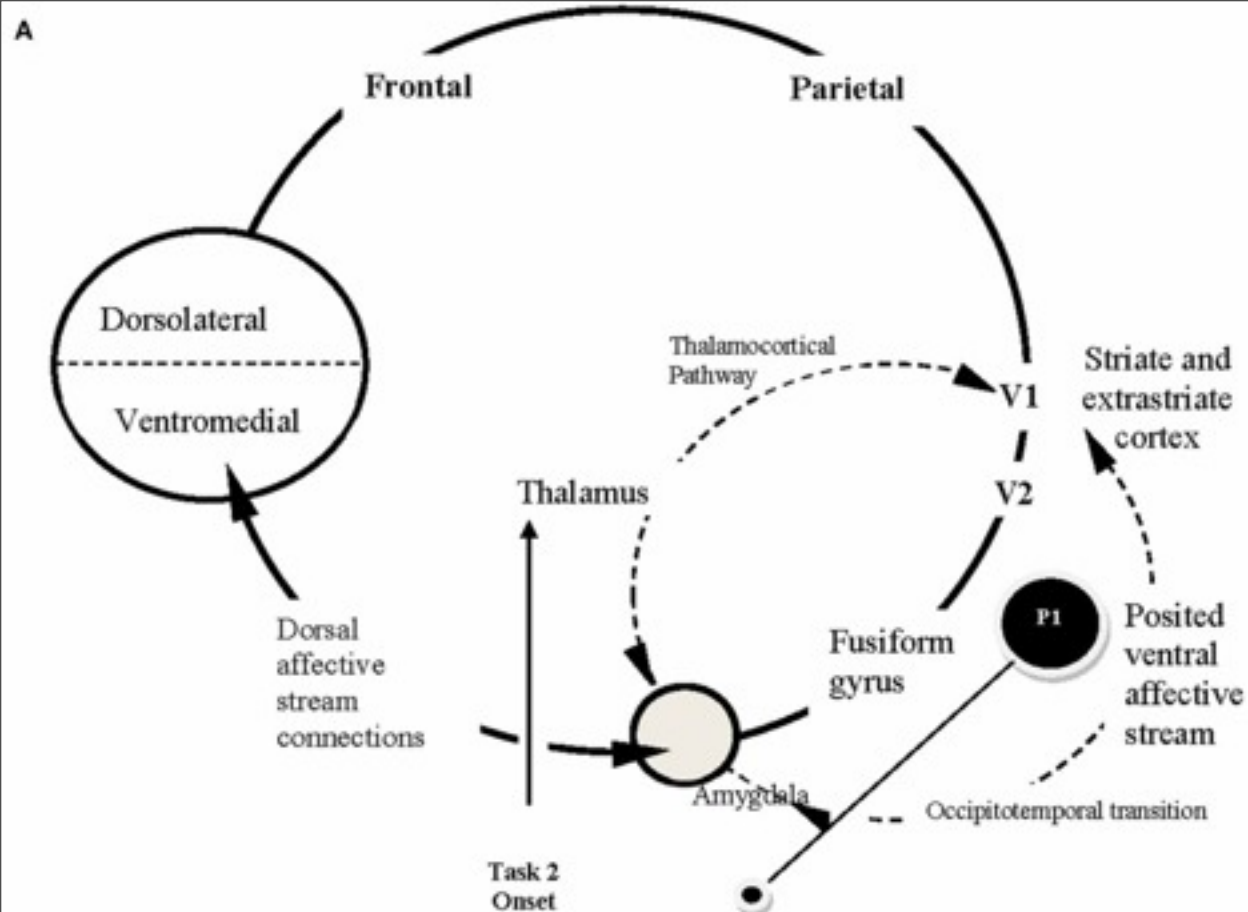
- We will test 40 CM patients and 20 healthy age-matched controls on a series of neuropsychological tests (RBANS and the IGT) as well as on an event-related potential (ERP) attentional task that tests for emotional modulation of visual processing
  - On a subset of 20 of these CM patients and 10 controls, we will collect MRI/DTI data from eight cognitive/affective ROIs as well as on CSF motion dynamics to determine whether abnormal CSF fluid dynamics are related to cognitive and affective symptoms in CM

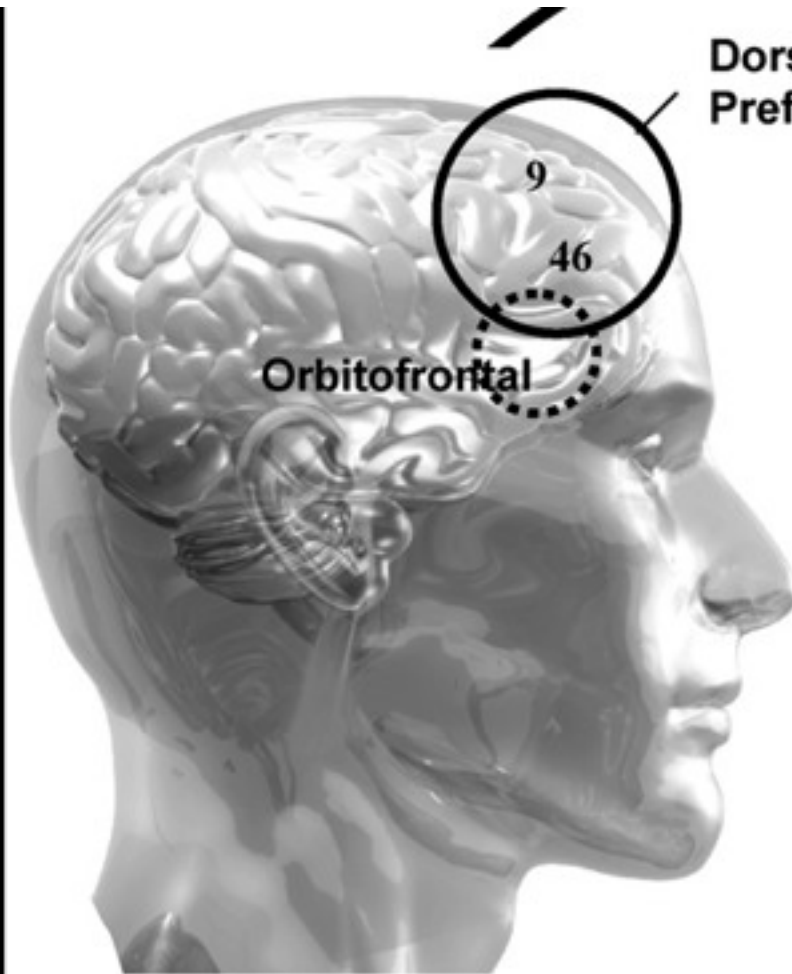
# Our Neural Circuits:

- We wish to observe whether early visual processing is affected by the emotional valence of a presented stimulus (angry vs. happy faces)
- We also wish to determine whether one can make response decisions for Task 2 while also making response decisions for Task 1 (this is a type of parallel processing that is known to occur in healthy younger adults, Pollock et al., 2012)

# Our Neural Circuits:

- We have early and later components of interest:
  - The early component consists of the amygdala, inferior longitudinal fasciculus, fusiform gyrus, and V1 and V2 (primary and secondary visual cortices)
  - The later component consists of the a largely prefrontal cortex system involving the amygdala, ventromedial prefrontal cortex, and dorsolateral prefrontal cortex

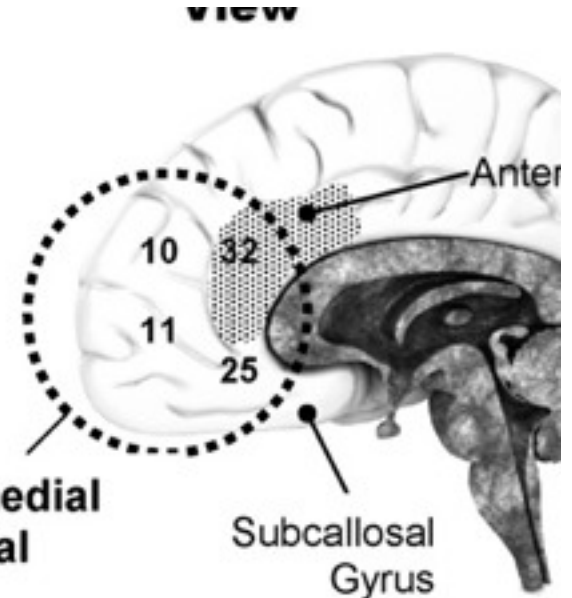




**Right Hemisphere  
Lateral View**

**Dorsolateral  
Prefrontal Cortex**

**Orbitofrontal**

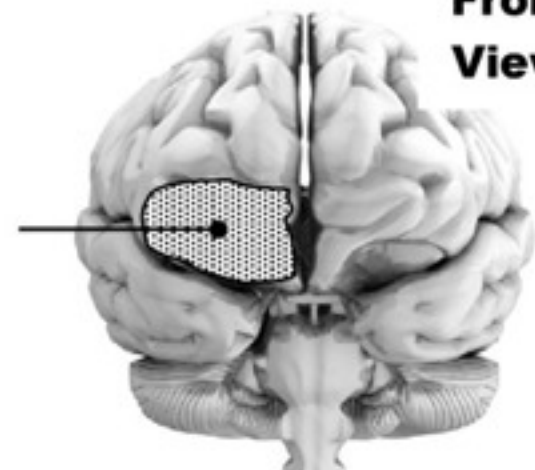


**Ventromedial  
Prefrontal  
Cortex**

**Subcallosal  
Gyrus**

**Frontal-V  
View**

**Ventral  
Surface  
areas 14,  
11, 13,  
12, 47**



# Hypotheses:

- CM patients will show less early (P1 ERP component) emotionally valenced activation (i.e., relatively greater P1 activation for angry faces than for happy faces) than will healthy controls
- CM patients will show relatively less P1 activation at shorter SOAs between Task 1 and Task 2 than longer SOAs compared to controls

# Additional Hypotheses:

- CM patients will show decreased white-matter integrity in the eight ROIs as indexed by DTI fractional anisotropy (or FA)
- This decreased FA in CM patients will be correlated with MRI-obtained measures of flow dynamics at the fourth ventricle (Frank and Bryn's portion)