### Task Version 1

**Original Sample Size**

* 19 participants

**Paradigm**

* Visual task: Participants press the key when they detect the circle's color becoming lighter.
* Also included auditory stimuli in separate blocks.

**Integration Hypothesis**

**Regression Analysis**

* **SSVEP (Steady-State Visual Evoked Potential)**
  + Measured the deviation from baseline at specific time points.
* **Cumulative Sum Analysis**
  + For each participant, used the cumulative sum of SSVEP-baseline deviation to predict LHB (Low Frequency Brain Activity).
  + For each participant, used the cumulative sum of SSVEP-baseline deviation to predict CPP (Central Parietal Positivity).
* **Raw Deviation Analysis**
  + For each participant, used the raw SSVEP-baseline deviation to predict LHB.
  + For each participant, used the raw SSVEP-baseline deviation to predict CPP.

**t-test**  
null hypothesis: Rcumsum - R raw = 0

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效应量95%置信区间的下限  
95%的power

* Compared the values of the regression models using cumulative sum versus raw deviation to see if there is a significant difference.
* **CPP (Central Parietal Positivity)**
  + t-test results: t(18)=4.0,P=0.0009
  + Cohen's d = 0.94 (by effectsize package)
* **LHB (Low Frequency Brain Activity)**
  + t-test results: t(18)=3.4,P=0.003
  + Cohen's d = -0.8 (by effectsize package)
* **Reaching a threshold**
* before response the amplitudes of LHB and CCP is lower than permutation distribution, but SSVEP is higher

result1\_LHB <- t\_to\_d(  
 t = c(-3.4),  
 df = 18,  
 paired = TRUE  
)  
  
result1\_CPP <- t\_to\_d(  
 t = c(4.0),  
 df = 18,  
 paired = TRUE  
)

### Task Version 2：Decision signals determine perception

**Sample Size**

* 11 participants

**Paradigm**

* Visual task: Participants press the key when they detect the circle's color becoming lighter.
* Add five different difficulties

**Using hit rates and false alarm to predict amplitude**

**ANOVA**

* **On amplitude in an 80ms window centerd on response time**
* ANOVA1: five levels of response type (correct hits at each of the four lowest levels of target difficulty plus false alarms)
* ANOVA2: the peak latency of the CPP was inversely related to target difficulty
* **CPP (Central Parietal Positivity)**
* ANOVA1
  + (F4,40 = 8.9, P < 0.0001)
  + Eta2 (partial) = 0.47 (by effectsize package)
* ANOVA2
  + (F3,30 = 5.6, P < 0.01)
  + Eta2 (partial) = 0.36 (by effectsize package)
* **LHB (Low Frequency Brain Activity)**
  + (F4,40 = 1.9, P = 0.14)
  + Eta2 (partial) = 0.16 (by effectsize package)

result2\_CPP <- effectsize::F\_to\_eta2(f = 8.9, df=4, df\_error=40)  
result2\_LHB <- effectsize::F\_to\_eta2(f = 1.9, df=4, df\_error=40)  
result2\_CPP2 <- effectsize::F\_to\_eta2(f = 5.6, df=3, df\_error=30)