Oddball Lab
Introduction

P3 Waveform

- Third positive wave
- Peaks 300ms+ after a rare, task-relevant stimulus
Oddball Paradigm

- Common Tone (Standard)
- Uncommon Tone (Deviant)

![Tone Example](image)

Attention

- Stimuli that normally produce the P3, do not when they are ignored

![Attention Example](image)

Down is positive in old publications!

Duncan-Johnson & Donchin (1977)
P3 Amplitude vs. Latency

- Latency: measure of stimulus classification speed
- Amplitude: measure of attentional resource allocation when memory updating is engaged
  - Attention + Working memory

Some things that can affect P3 amplitude:

- Enhanced P3 Amplitude:
  - Exercise
  - Nicotine

- Lesser P3 Amplitude:
  - Sleep Deprivation
  - Alcohol
  - Schizophrenia
  - Parkinson's Disease
  - Depression
Papageorgiou et al., 2004

- Reduced P3 in schizophrenia may be related to distraction caused by hallucinations
- Clozapine: may enhance attention

**Research questions:**
- Are there differences in the P300 for schizophrenics who experience auditory hallucinations?
- Does Clozapine increase P300 amplitude?

- Method: P3 Provoking tone/memory test
  - 13 Normal Subjects
  - 16 hallucinated schizophrenic – pre-drug
  - 8 hallucinated schizophrenic – post-drug: Clozapine
  - 8 hallucinated schizophrenic – post-drug: Olanzapine

Papageorgiou et al., 2004

**Results:**
- P3: **Patients Pre Drug** < Controls
- P3: **Patients Pre Drug** < **Patients Post-drug**
- Both drugs had the same effect
- Even with drugs, working memory performance was below controls

**Conclusions:**
- Auditory hallucinations → changes in attention
- Drug treatment may help attentional control