
Introduction

- The magnocellular (M) pathway’s contributions to Pattern Pulse Multifocal Visual Evoked Potentials (PPmfVEPs) was examined.
- VEP characteristics with isoluminant (ISO) colour and Luminance Contrast (LC) dartboards were compared.
- The M pathway should be ‘blind’ to ISO stimuli, while it should ‘see’ LC stimuli.

Results

- ISO produced a response delayed in initial rise and in peak relative to LC reflecting the absence of faster M pathway transmission for ISO.
- 90% of the channels were significant (p<0.03), with over 50 times power to signal to noise ratio (SNR) for occipital channels.

Methods

- Eleven participants (males=7, females=4)
- Stimuli were observed through a stereoscopic display (two screens viewed via mirrors at 45°)
- Stimulus was an 84 region centrally scaled dartboard, eccentricity 23°. 4x4 checkersboards briefly pulsed pseudo-randomly (mean frequency 2/second/region).
- Ten conditions were tested with 30 or 60 cd/m^2 mean luminance and grey or chromatic (red green) checks yielding six LC and four ISO conditions.
- RGB values were selected with a photometer.
- Participants viewed a 30Hz reversing dartboard of all regions, for ISO they made it not flicker; for LC they verified it flickered, they then viewed PP dartboards (4.1 minute segments/condition).
- 64 EEG channels were recorded at 256Hz.

V1 & V2 Dipole Fit

- V1 and V2 in currents for subject s012.
- Isoluminant (red) has greater amplitude and slower to maximum peak than Luminance Contrast (gray).
- V1 has a significantly greater contribution to amplitude than

Isoluminant vs. Luminance Contrast

By subject averaged over 84 regions.

- Isoluminant consistently shows greater amplitude (p<0.0003, channel O2).
- Isoluminant is slower to max peak time. (p<Re-015, channel O2).

Conclusion

- Pattern Pulse presentation has better signal to noise ratio (SNR) than traditional contrast reversing stimuli, allowing for more conditions in a reasonable length session.
- Interestingly, the response to isoluminant stimulus is larger in amplitude than the luminance contrast stimulus, despite the M component’s absence.
- This research is the first usage of PPmfVEPs to identify M pathway effects.
- Potential applications include Dyslexia and Schizophrenia, which have a correspondence with dysfunctional M pathways.