EEG-TBI Project – Auditory Stimulus Details

**Stimulus Overview:**

The auditory stimulus needs to be a combination of three different trial subtypes, each of which will be part of a separate analysis: reactivity stimulus, language tracking stimulus, and cognitive-motor dissociation stimulus. Each subtype will have multiple trials. The trials should be played in a random order to mitigate any effect there might be of the stimulus being played early or late in the protocol. The total stimulus duration will be ~40-45 minutes.

Stimulus Output File:

Since trials will be randomly presented, there needs to be a record of which stimulus was presented when (for analysis of EEG later) – this should be part of the output file that the stimulus software outputs after it presents the full stimulus.

General Stimulus structure (example – trial order will be random for each patient):

A screenshot of a graph

Description automatically generated

Blue = reactivity stimulus (~45 sec each)

Red = language tracking stimulus (~17 seconds each)

Green = cognitive-motor dissociation stimulus (~200 seconds each)

**Specifics of each trial type:**

**reactivity stimulus**

* Each trial consists of a 15 second (70 decimals) beep followed by 30 seconds of silence
* There should be a total of 6 trials

**language tracking stimulus**

* Each trial consists of series of isochronous mono-syllabic words presented at a rate of 3.125 Hz. The words will come directly from the sentences that Rodika provided (there are 72 total 4-word sentence), and need to be precisely 320 ms in length with no gaps in between (this will produce the 3.125 Hz frequency).
* a trial consisted of 12 of these 4-word sentences (48 words), selected randomly (no repeats within the same trial), with a ~2 second pause after all 12 sentences run; trial duration should be approximately 17 seconds
* there should be a total of 72 trials, and every sentence should be used approximately the same number of times
* there should be no acoustic information in the sentences (e.g., you should not be able to tell that a sentence is ending because of something in the way the voice changes) - just in case the Google Voice software does anything like this by default, will need to be removed.

A black and pink sound waves

Description automatically generated

A diagram of a speaker

Description automatically generated

**cognitive-motor dissociation stimulus**

* each trial consists of eight sentence pairs, where each sentence within the pair is followed by 10 seconds of silence (total of ~25 seconds x 8 pairs = ~200 seconds)
* each sentence pair should be “keep opening and closing your (right/left) hand” followed by “stop opening and closing your (right/left) hand”
* There should be a total of six trials, three (3) where the hand laterality is RIGHT and three where the hand laterality is LEFT

A diagram of a graph

Description automatically generated with medium confidence