

1. Detailed List of Issues Dealt With

- **ISSUE:** Original .txt files exported during testing do not include all events (e.g., extra/non-final responses, the start of the trial) and FISH condition names were too long
 - o **Fix:** Recreating all text files to include these extra responses and other relevant events
 - o **Script:** reexport_log2text.m (Re-export Text Files in GUI)
 - o **Details:** event code and time columns taken from .log file; condition column created for each task (BADE/FISH/WM) separately (reducing condition names for FISH); irrelevant events (e.g., ITI, fixation, 'thanks', 'Quit') deleted; file saved as *_fixed.txt.
- **ISSUE:** Infrequent conflict when sending the port codes to the EEG computer leading to events in Presentation file not showing up in EEG timing.
 - o **Fix:** Remove these events from new *_fixed.txt Presentation timing file and add them back in after syncing is complete.
 - o **Script:** find_missed_codes & reexport_log2text.m & syncEEGtiming.m
 - o **Details:**
 - Linux "find_missed_codes" script goes through all logfiles to find the line "The following output port codes were not sent because of a conflict on the port." and then creates text files listing the missing codes.
 - MATLAB script calls this file and finds the missing codes in the Presentation timing, removes it before the new text file is created, and creates a new file of the missing codes and event info so it can be added back in.
 - **Note:** Some issues with rounding occurred when trying to compare the codes (in ms) to the Presentation timing (in 10ths of ms); the solution was to **round the Presentation timing** when converting to ms and **add the uncertainty value** listed in the Presentation logfile (also converted to ms and rounded).
 - After sync timing, the missing codes are imported into the EEG structure using the pop_importevent EEGLab script. This timing will be in Presentation timing rather than in more accurate EEG timing (but is properly synced/offset).
- **ISSUE:** After timing sync, some negative timing shows up (this is due to participants responding between the onset of Presentation and the onset of EEG).
 - o **Fix:** simply removed any negative values from the Presentation event timing after sync and before merging the runs
 - o **Script:** syncEEGtiming.m
- **ISSUE:** DIN4s/DIN7s not being registered in the Presentation file (UBC/CFRI respectively)
 - o **Fix:** Removed from EEG event timing
 - o **Script:** syncEEGtiming.m
- **ISSUE:** EEG exporting event called 'net' and caused script to fail (A010a Run1 BADE)
 - o **Fix:** Removed any events not called either 'DIN*' or 'boundary' from EEG timing.
 - o **Script:** syncEEGtiming.m
 - o **Note:** This turned out to be because the wrong data file was chosen, but this "fix" was left in the script in case of future issues.

2. Factors Affecting Syncing Timing

- In our goal to get the most accurate timing for the EEG events, we identified several factors that can have an effect on the timing of the events for both the EEG and Presentation softwares. We found that the EEG timing was more accurate, but had to come up with several ways to make sure we could use it. If the number of events recorded in Presentation and EEG were equal, we could easily use the more accurate EEG timing with the Presentation conditions and event codes. Otherwise, the less accurate Presentation timing would have to be used. In terms of accuracy, there can be up to a 25ms difference between the timing for an identical event
- Different clocks
 - o Using two computers, each with different clocks and they do not start at the same time
 - Must zero the timing like we do for fMRI
- Hardware offset
 - o When a stimulus appears on screen, it sends a code is sent to the EEG computer to register an event, but there is a minor delay between the onset of the stimulus and the registered EEG event. This is due to multiple factors, such as the amount of memory being taken up by the Presentation computer, etc.
- EGI amplifier offset
 - o The offset amount in ms depends on the amplifier, the netstation version and the sampling rate.
- Hardware inconsistencies
 - o At CFRI, we used a USB cable and then switched to parallel port. The USB cable ended up not capturing all of the Presentation events and the missed codes were not listed in the logfile like they are now. So for CFRI subjects tested with the USB cable, we have to use presentation events because they events don't match up.
- Linear drift
 - o Seems less pronounced for USB cable, thankfully, because we need to use the presentation timing