**Note on the GUI- it may be advisable to check the monitor configuration is set up correctly for your machine. Also, this has been set up so that a second screen can be used to display the GUI.**

**Stimuli/Mixing Notes**

Note that Sets 01 and 04 are only used for practice stimuli

**Chords and Keys:**

Sebastian and Daksh used major and minor keys to control emotion; I believe that Set 1 and set 2 are the same chord progression, but with major keys used for the latter, and minor keys used for the former (same for sets 3 and 4).

For George M’s pieces (based on the keyb/vibr ones Sebastian had already created): “I used a combination of major and minor tuned harmonicas and even multiple harmonicas per example.”

**Mixing/normalisation:**

BEFORE calibration is run:

Pieces set to 30s exactly, then set from stereo to mono. Then, RMS loudness set to -25dB.

Process: 30s, mono, normalised to -25dB (norm verified), 0.6s fade in and 0.6s fade out

-23.25 dB for Set07-Harm and THINK -23.25dB for Set07-Keyb (-23.2 for both?)

E-Z patch applied over a click in Set02-Harm

Reason for mixing down to mono:

-In part 2, the participant will hear each stream in mono form. We want to compare the results across parts (e.g, comparing part 1 and part 2 results), so it makes sense to use mono consistently for comparability. This might be especially important with earEEG (subtle-ish differences in what is heard and perceived between the two sides may matter).

Reasons for RMS normalization (even though we later run personal calibration tests):

1. Having things normalised/part-way there just makes it easier for the participant.
2. Certain files, even for the same instruments, louder than others depending on how artists recorded and so on. Hence, want to normalise “within instruments”.
3. The weighting system used works linearly- this doesn’t work as well for dealing with human perception (particularly considering the different instruments). So it’s good to normalise by RMS beforehand for this reason.

Oddballs:

Pitch ‘zigzags’ are used.

Pitch is first raised by 0.95 semitones across a segment, then decreased by the same amount over the next segment (i.e, 0.95 semitones less than what it would have been originally, and 1.9 semitones less than the preceding segment). This is repeated thrice, i.e for six segments in total.

Each segment is (ideally) 0.08199546485s long. The sampling rate is 22.5kHz; the length ‘1808’ samples first cropped up due to an error where the wrong sampling rate was used in calculations, but these segment lengths were found to work well and kept as trial-and-error was used to ‘hone’ the oddballs.

Total length of an oddball is: 0.49197278911s ± 0.1%; the tolerance is necessary to ensure all other constraints could be followed precisely (in practice, oddball lengths are generally less than 0.05% from this)

**NOTE ON SET07:**

-Conducted tests where people completed parts of the calibration (finding their centre correctly for each instrument), and then listened to:

Set01-Vibr, Set01-Harm, Set01-Keyb (or Set04 counterparts). They would adjust linear loudness until it was set correctly.

They would then listen to the Set07 versions and do the same.

5 people (inc me) listened to Set04 ones, four others listened to Set01 ones. I was the only one who had heard the pieces prior (one other person may have briefly heard Set07 pieces months prior).

Note- set07 ones may have already had slightly different dB loudnesses to each other/others. Also note that for this test, participants hear fully-processed versions (including fade-ins!) for first 10s.

Also note that due to minor differences (e.g, associated with Audacity rounding, fade-ins), there were slight differences in loudness for the set01/set04 comparison pieces (all were about -25dB +/- 0.27dB RMS). Don’t think these should matter too much as considering relative differences..

Converting between linear results to RMS power values, and also extrapolating (as we only used the first 10s of each piece in the listening tests), decided to set the Set07 pieces as follows. These are RMS values, after fade-in/out applied (i.e, took pieces which were previously processed just as the others were, then changed RMS volume):

Vibr: -23.30dB Harm: -19.67dB Keyb: -23.15dB