EEG Data Acquired from German Vocabulary Learning Task

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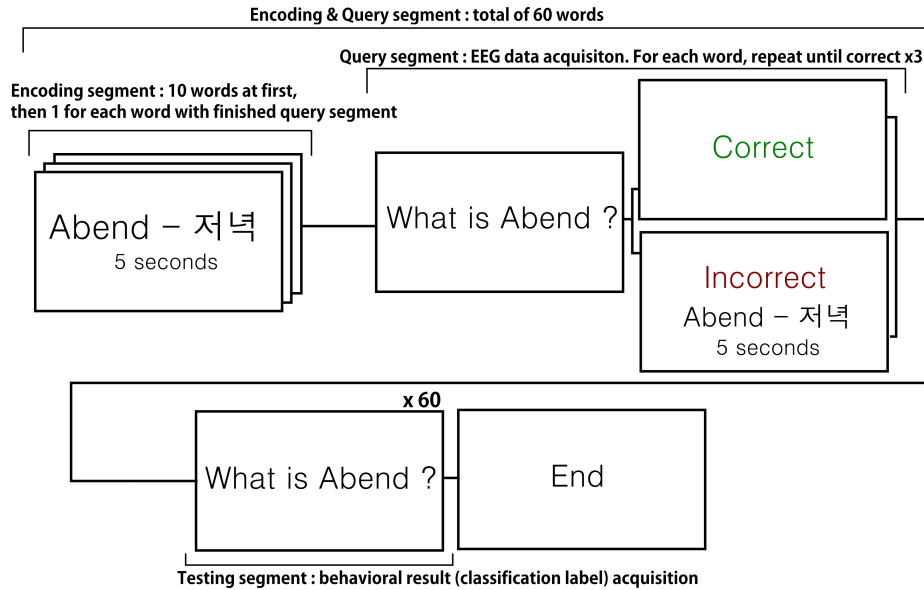
1 Experimental Paradigm

Fig. 1. Visual aid of the experiment paradigm.

The experiment consisted of two types of sessions: the learning session and the test session as can be shown in Figure 1. Learning sessions were done to facilitate learning of new words and were comprised of two segments, the encoding segment and the query segment (figure 2). In the encoding segment, native Korean speakers with no prior knowledge of German were presented with 60 German words and their respective Korean translation in pairs. When a word was presented for the first time, the pair would be displayed on screen for 5 seconds. Once the first 10 pairs were presented in this manner, a query segment showing one of the German word without its Korean translation would occur, prompting participants to recall and type the exact Korean translation they were given with

a keyboard. If their response matched the translation, a message indicating they were correct wold be displayed for 1 second. If their response was incorrect, the correct German-Korean association pair would be displayed again for 5 seconds.

Each association pair was queried repeatedly-but non-successively-in random order until it was correctly answered 3 times, and then a new word pair would be presented in the same manner as before. Importantly, the brain activity during these queries was used for the analyses reported below. In each query trial, 3 temporal markers were collected (see Figure 2): when the query was displayed (stimulus onset), when the participant pressed the first key during response (first key-press), and when the participant pressed the final key of the response (response-end). Once querying was done for all 60 word-pairs, the encoding segment would finish and the testing segment would begin.
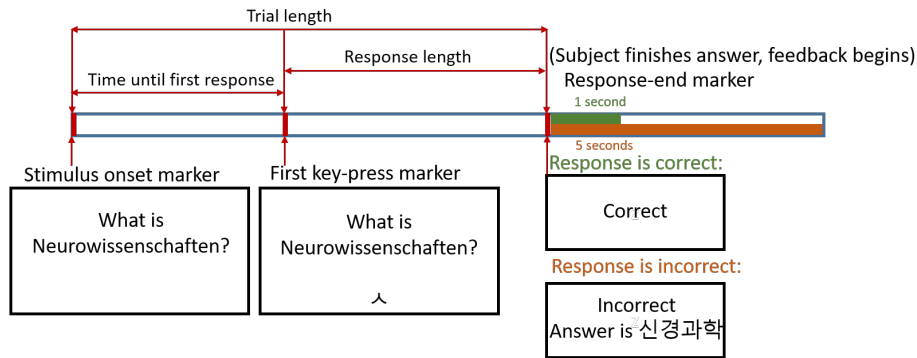

Fig. 2. Visual aid of the trial layout for a query segment with feedback.

Finally, in the testing session, the 60 previously learned words would reappear in the same query format, only this time there would not be any feedback of whether their responses were correct or not. The goal of this testing session was to facilitate recollection of information that was learned recently. Importantly, for our analysis, the behavioral result during this session was used as the same-day label as a measure of recall accuracy.

2   Data Recording

For this study, a 63 channel wet electrode EEG was deployed and recorded at a sampling frequency of 1000Hz. The measured channels were (following MCN notation): EOGv,h,1, F1,5,z,2,6,10, FFT7,8,9, FT9,7,8,10 FC5,3,1,z,2,4,6, FTT7,8, FCC5,6, T7,8, TTP7,8, TP7,9,8,10, TPP7,8, P3,5,9,z,4,6,10, PO3,7,z,4,8, O1,Oz,O2, CP1,3,5,z,2,4,6, C3,5,z,4,6. All channels were set to sub-10KΩ impedances before signal measurement. We used ActiCAP electrodes and BrainAmp Amplifier from Brain Products, Germany to acquire EEG signals.

3   File Description

Here we provide EEG epochs in a Matlab-compatible data format (.mat). The EEG data contains pre-processed time-series epochs that were sliced according to the description above. Two binary labels are included in this datafile, each denoting whether a trial represents remembered and forgotten stimuli for same-day and next-day labels. Also included in the datafile is a variable that denotes which trial corresponds to which participant.

4   Citation

Corresponding journal article TBD.