

Selectional restriction and chord sequence incongruities: Further evidence from event-related potentials in processing language and music

In order to test the domain-specificity/generalizability of language and music processing, this study used the event-related potential (ERP) paradigm to compare neural responses elicited from violations in language and music. Employing selectional restriction (SR) for language and chord sequence (CS) for music, we constructed sentences and musical pieces where the sentence/musical piece-final verb or chord was manipulated to be either congruous or incongruous with the preceding structural context, and then went on to zoom in on the following questions.

- Q1: What ERP component(s) result from semantic-syntactically incongruous verbs in language?
- Q2: What ERP component(s) stem from harmonically incongruous chords in music?
- Q3: What commonality or difference arises in ERP responses to semantic-syntactically incongruous verbs in language and harmonically incongruous chords in music?

Twenty right-handed, native Korean-speaking subjects (male: 10; age: 19-26 years) participated in the present experiment.

The two sessions of ERP experiments revealed that SR-violating sentence-final verbs and harmonically incongruous sequence-final chords evoked two different sets of ERP components: N400 followed by N600 in language, and anterior P600 in music. In accounting for these results, we set out to attribute the divergence between the ERP results of our study and those of Patel et al. (1998) to the different experimental designs. SR violations in our experiment elicited more meaning-centered ERP components such as N400 and N600, while phrase structure violations in Patel et al.'s (1998) elicited more structure-dependent ERP components such as LAN and P600. For

music, on the other hand, the elicitation of anterior P600 from harmonically incongruent chords in our study was attributed to non-musician participants perceiving harmonically incongruent chords as being simply complex, thus giving rise to an anterior scalp distribution of P600. In fact, musically trained subjects in Patel et al.'s study (1998) perceived harmonically incongruent chords as being anomalous, calling for revision processes that give rise to a posterior scalp distribution of P600. Factoring out the presumably meaning-proper correlate of SR and the presumably structure-proper correlate of CS, we narrowed down to the ERP component elicited approximately 600 ms from SR, and suggested that this component is a right candidate for a comparison with the ERP component elicited at approximately 600 ms from CS, noting the parallelism between SR and CS in terms of temporality of ERP responses. Thus, ERP components elicited approximately 600 ms in both SR and CS are understood analyzed as indexes of syntactic integration: N600 is an index of meaning-centered syntactic integration, whereas P600 is an index of structure-centered syntactic integration. To the extent that this analysis is on the right track, the results in our study especially in terms of ERP component render further compelling evidence showing that SR-related semantic-syntactic and CS-related harmonic incongruities elicit the ERP component that is indistinguishable at about 600 ms.