THE INFLUENCE OF CONTEXTUAL INFORMATION: DISCOVERING SIMILARITIES IN MUSIC AND LANGUAGE PERCEPTION BY MEANS OF ERPS

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Background

There is an ongoing debate whether or not music and language share similar cognitive processes. One major underlying reason for this debate is that in comparison to music, language shows a well described subdivision of processes from phonological up to phrase processing. It is therefore important to define a compatible experimental question for both domains.

Aim

Our aim was to find event-related brain potentials (ERPs) correlating with specific processing stages in music and language and might allow to differentiate underlying cognitive processes.

Method

Familiar idioms and melodies were utilized to test contextual effects at different processing stages in language and in music. Correct idiomatic language phrases were contrasted with phrases containing a violation at the end of the phrase (literal and semantically incongruous). Similarly, correct familiar melodies were contrasted at phrase endings with a counterpoint or a harmonic shift. All stimuli were rated to differentiate between high and low familiar language and music stimuli. For each domain, we recorded event-related brain potentials at 56 electrodes from 24 subjects. The stimuli were auditory presented.

Results

ERP data for both the language and music condition show a negative deflection during the first 300 ms as a result of unexpected phrase endings. Thereafter, the violation of musical context resulted in a long lasting negative shift, whereas in language, violations elicited a N400. The negative shift was most prominent for the counterpoint condition for more familiar melodies, and varied as a function of familiarity. We propose that this component reflects the effort to integrate a probable continuation of a familiar melody. However, the N400 in the language study varied as a function of both familiarity and semantic violation.

Conclusion

We suggest that the early negative component might reflect a perceptual process connected to phonological as well as singleton selection modulated by expectancy, whereas the later potentials might reflect modality specific reactions to music and language violations.

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