

Estimation of Time in Music: Effects of Tempo and Familiarity on the Subjective Duration of Music

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ABSTRACT

Background

Our perception of time is open to manipulation in different ways. Two similar events with the same duration can be judged to have different lengths based on their properties. According to Ornstein (1969) and Boltz (1991) this difference comes from different factors such as the complexity of the events or our familiarity with them. In the case of musical stimuli, Jones and Boltz (1989) considered equally long tunes with more tones as getting perceived as longer, which led us to our hypothesis regarding tempo.

Aims

The current study investigates the manipulation of perceived durations of musical pieces through changing the inner-musical parameters tempo and familiarity. Additionally, musical expertise of listeners was observed in two groups, on suspicion that musically trained individuals may be more used to estimate durations in music than non-musicians.

Method

Both groups of respectively 10 subjects rated the duration of musical pieces of different categories of familiarity and tempo on a rating scale after listening. We chose short passages (10 seconds) of various styles of music and divided into slow, medium and fast but also into familiar and non-familiar musical stimuli by ourselves. We did not concentrate on the styles of music, but tried to vary as much as possible. Familiar music was considered as familiar to a western culture listener. Unfamiliar music was unfamiliar in musical culture, instrumentation or sound. Our tempo categories were not chosen by bpm, but rather based on our impression of pace and speed of the rhythm. Regarding the groups, musicians were students of musical instruments and non-musicians did not play an instrument for less than two years in their lives.

Results

Statistical analysis by 3-way ANOVA showed an effect of the different tempo categories, namely that faster music is perceived as longer than slower music ($p < .001$). Significant effects of the familiarity and the expertise variables were not found. In general, both groups of participants tended to underestimate the length of the stimuli.

Conclusions

The amount of information perceived in a certain period of time seems to have an influence on time perception also in music. Possible effects of familiarity cannot be ruled out yet,

but will be considered in further investigation, for example at a post-study to validate our choice of stimuli categories. Other considerable influences, like complexity and arrangement of stimulus items – how the interval is filled – (Jones, 1990) still create further questions on which role the music itself plays at estimating durations while listening.

Keywords

music perception; time perception; estimation of duration; information processing; tempo; familiarity

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