

Pre-schoolers' abstract knowledge of Western harmonic tonality

Manuela M. Marin and Richard Parncutt

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Abstract

Background. A musical grammar incorporates hierarchically organised, implicitly learned principles that determine music-structural expectancies (Sloboda, 2005) and may be investigated by priming paradigms (Justus & Bharucha, 2001; Bigand et al., 2001). Little is known about the early acquisition of musical grammar (McMullen & Saffran, 2004), but recent behavioural (Schellenberg et al., 2005) and electrophysiological (Koelsch et al., 2003) studies suggest that 5- and 6-year-old Western children have implicit knowledge of Western harmony. The effect is relatively independent of musical training (Jentschke et al., 2005), but there may be a gender difference in the neural processing of syntactic incongruities (Koelsch et al., 2003).

Interdisciplinary issues. Patel (2003) proposed a sharing of neural resources in the processing of syntax in language and music (cf. Fedorenko et al., 2007; Slevc et al., 2007). Grammatical knowledge of L1 develops in the first months after birth (Kuhl, 2000; Hirsh-Pasek & Golinkoff, 1996), and children younger than two possess some abstract syntactic knowledge (Gertner et al., 2006). At two years, children produce two-word combinations; at three, sentences (Kuhl, 2004). At four, there is a developmental shift towards abstract representations (Nelson, 1996; Karmiloff-Smith, 1992). We ask to what extent the syntactic processing of music and speech develop in parallel.

The issue/hypothesis under investigation. Do children aged 4-5 years have implicit knowledge of Western tonality?

Findings/description. 60 pre-schoolers in three age groups (3;5-4;4, 4;5-5;4, 5;5-5;11) heard a tonal chord progression followed by a target chord and were asked whether the target was played by trumpet or piano. Preliminary results suggest that response times were longer for tonally unstable (subdominant) than stable (tonic) targets, reflecting implicit tonal knowledge in all three age groups.

Conclusions/future directions. (1) If 4-year-olds have implicit knowledge of tonality, does that help them learn new pieces of music? (2) Sloboda (2005) and others noted that children aged 6-8 years respond emotionally to musical syntax. Can this effect be observed at earlier ages? (3) We also collected data on our children's linguistic competence (SETK 3-5; Grimm, 2001). Results suggest that the syntax of language and music develop in parallel. Is there a direct functional connection?