The interaction of isochronous music and speech rhythms in a chanting task

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Language and music production share structurally-determined rhythmic properties like phrase-final lengthening, where events (i.e. syllables or notes) at the ends of groups are produced with longer durations than comparable events in the middle of groups (Byrd & Saltzman 1998, Byrd 2000, Todd 1985, Repp 1992). However, little work has been done to explore the rhythmic behavior of events that are planned in a simultaneously musical and linguistic context.

In this experiment, chanting was employed to test how the demands of imposed isochrony interact with phrase-final syllable lengthening at the ends of sentences. Participants learned to say four nonsense place names ("Deebobo", "Zadeedee", "Kopapa", and "Busasa") in two frame sentences that manipulated whether the final syllable of the nonsense word coincided with a sentence boundary:

• Sentence-final: "Have fun in _____. It's a nice get-away."

• Sentence-initial: "Have fun there. _____ is a nice get-away."

Every combination of word and frame sentence was repeated five times. Before each repetition, an isochronous metronome played six beeps at 200 beats per minute, with the first and fourth beats at a higher pitch and amplitude than the two beeps that followed. Participants listened to the metronome while seeing a filled frame sentence; after the last beep sounded, participants chanted aloud the sentence on-screen to the rhythm primed by the metronome. The duration of the final syllable of the nonsense word in each repetition was measured using Praat. Preliminary results indicate that, for most speakers, the presence of a language boundary altered syllable duration even in the context of an isochronous rhythmic constraint, indicating an interaction between chanting rhythm and speech rhythm. Extensions of this experiment may show how music and language rhythms interact and provide insight for how they are planned.

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