

The Effect of Auditory Feedback on Motor Sequence Learning in Novices

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ABSTRACT

Background

Is learning to play music a purely motoric process, or does the auditory feedback contribute to learning and memory of motor sequences? In musicians, absence of auditory feedback has no effect on performance of well-learned music. It does, however, affect learning, with musicians making fewer errors after learning new music with sound compared to learning without sound (Finney & Palmer, 2003). Pfordresher (2005) previously found no effect of auditory feedback absence on learning in novices; however, this study allowed participants in the no-sound condition to hear feedback for three trials before removing it. We therefore address this confound by fully withholding auditory feedback in one condition.

Aims

We aim to explore the effect of presence or absence of auditory feedback on motor sequence learning in musical novices. We hypothesise that learning with or without auditory feedback will have a differential effect on immediate recall and recall after a 24-hour consolidation period.

Method

Data collection is currently ongoing, and we plan to recruit 50 novices with less than 3 years of musical training, none of which occurred in the past 10 years. In this task, participants learn to play a simple 4-bar melody on a MIDI piano. Half of participants learn with sound and half learn without sound. Participants repeat the melody from beginning to end for 10 minutes, and are then tested on recall after 5 minutes (immediate) and 24 hours, with test conditions congruent to the learning condition (i.e. with or without sound).

Results

Preliminary results are presented for $N = 16$ participants (8 per condition). Model comparison showed that the model with an interaction between test (test/retest), condition (sound/no-sound) and bar (1-4) was the best-fitting model: $\chi^2(10) = 69.43, p < .001, R^2 = .87$. Tukey-corrected post-hoc tests showed a significant difference between conditions at bar 3, $t(48) = 3.67, p = .013$ and bar 4, $t(48) = 4.37, p = .002$ in the immediate test, and between conditions at bar 3, $t(48) = 7, p < .001$ and bar 4, $t(48) = 6.3, p < .001$ in the 24-hour test, with the auditory feedback condition having lower accuracy scores overall.

Conclusions

Whereas previous research showed that auditory feedback may enhance learning in musicians (Finney & Palmer, 2003),

our preliminary results demonstrate that this effect is reversed for novices. Recall was less accurate in the latter half of the 4-bar sequence for participants who learned with auditory feedback compared to participants who learned without feedback. Specifically, the recency effect is diminished in the auditory feedback group. This might mean that auditory feedback interferes with motor sequence learning in novices. Further analysis will elucidate whether this result persists in the full sample.

Keywords

learning; memory; serial position; recall; recency effect

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