The effects of musical predictability and hedonic response on motor learning in non-musicians

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BACKGROUND

- We learn patterns in the environment through statistical learning
- Based on implicit knowledge of musical structure we generate expectations of music
- Musical predictability influences liking
- Musicians use predictions to plan motor actions

We test the joint effects of subjective liking and melody predictability on motor learning using a piano training task with melodies whose predictabilities have been controlled.

METHODS

PARTICIPANTS

- N = 17 (12F; Age: M = 21.2 years, SD = 3.11)
- Music experience (M = 0.5 years, SD = 0.87)

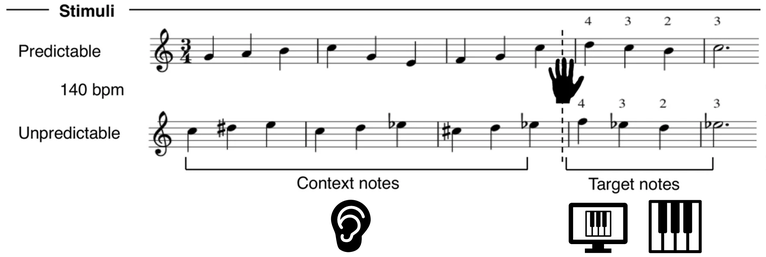
STIMULI

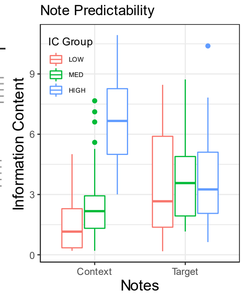
- 16 monophonic melodies (13 notes; 6.4 seconds)
- Average melody predictability calculated using computational model of music (IDyOM)
- Predictability = **Information Content** (IC): Low IC = Predictable, High IC = Unpredictable
- 9 context notes with varying predictability (IC) across melodies
- 4 target notes with similar predictability (IC)

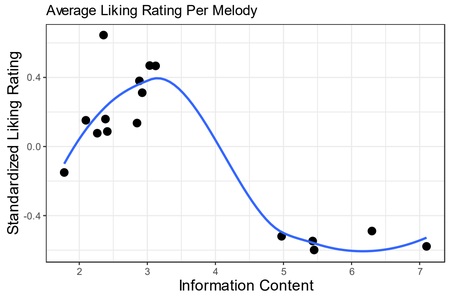
TASK

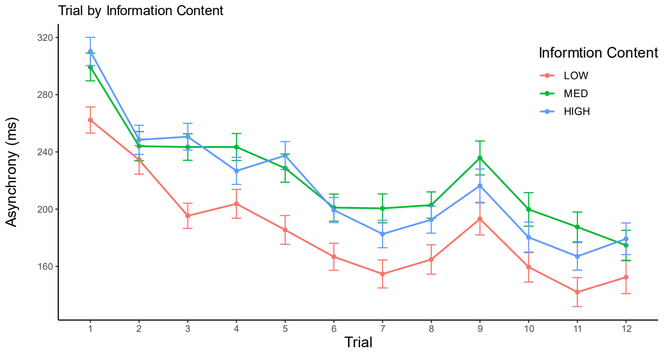
- Liking ratings (Likert 1-7)
- 15 training trials; 3 blocks of 5
- Participants hear context notes then play 4 note endings with the help of a visual aid
- Performance measured by asynchrony (ms)
- Post task recognition (16 stimuli; 16 foils)

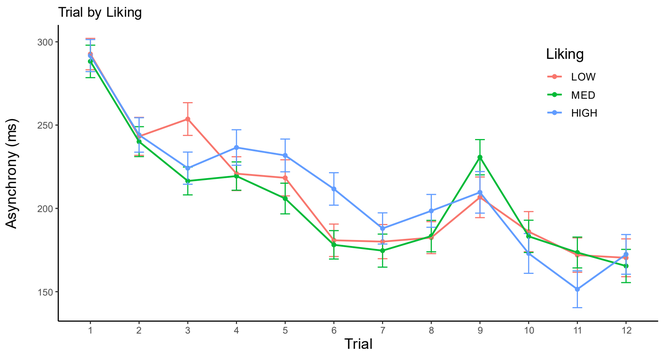
EXPERIMENTAL DESIGN

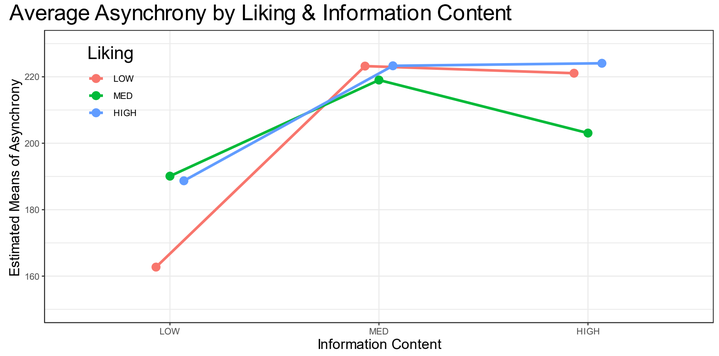


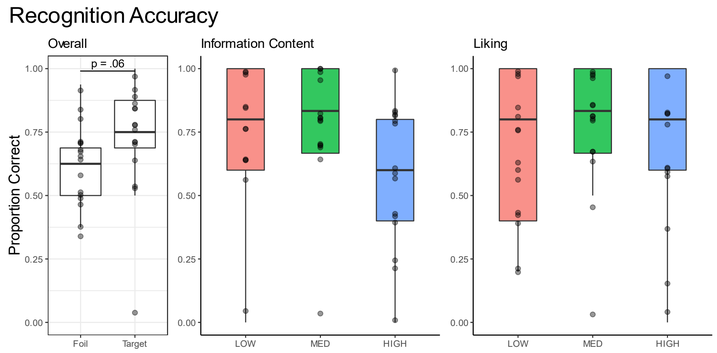












RESULTS

- Learning of target notes was affected by IC, but not liking
- Melodies were learned best in low-IC contexts
- In low IC contexts, the low-liked melodies were learned best
- In high IC contexts, medium-liked melodies were learned best
- Learned melodies were recognized over foils
- Recognition was affected by IC but not liking. High-IC melodies were less well recognized

DISCUSSION

- The predictability of context notes influenced learning of target notes despite having similar motor requirements and predictability levels
- Liking also affects learning, but only at high and low levels of predictability
- Motor learning is affected not only by objective characteristics of music but also prior context
- More unpredictable melodies are harder to discriminate, despite equal exposure

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