

Isolating the effect of beat salience on rhythmic auditory stimulation outcomes.

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Background

Rhythmic auditory stimulation is an intervention for gait disorders such as Parkinson's disease that involves synchronizing steps to regular auditory cues.¹

High-groove music increases stride length and velocity relative to low-groove music,^{2,3} but beat salience may drive this relationship because clear beats are easier to synchronize to.

Research Question

Is groove responsible for improvements in gait independent of beat salience?

Method

- 40 healthy older (N=11, 70-78 yrs) and younger adults (N=28, 19-28 yrs)
- Walks recorded on pressure-sensitive mat
- Participants completed baseline walks, musical ratings tasks, then walked to songs
- To assess whether groove and beat salience had independent effects on gait, we added a metronome (high beat salience) to both low- and high-groove songs

High Groove / High Beat Salience

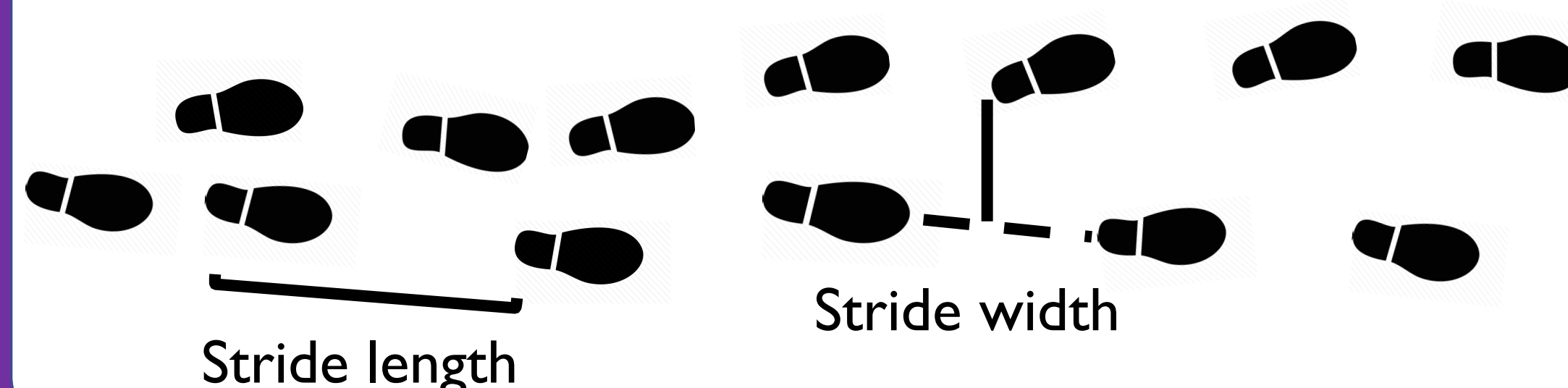
High Groove / Low Beat Salience

Met. only

Low Groove / High Beat Salience

Low Groove / Low Beat Salience

- IVs: groove (high, low); beat salience (high, low)
- DVs: stride length, width, velocity, & cadence
- All songs played at 10% faster than baseline cadence

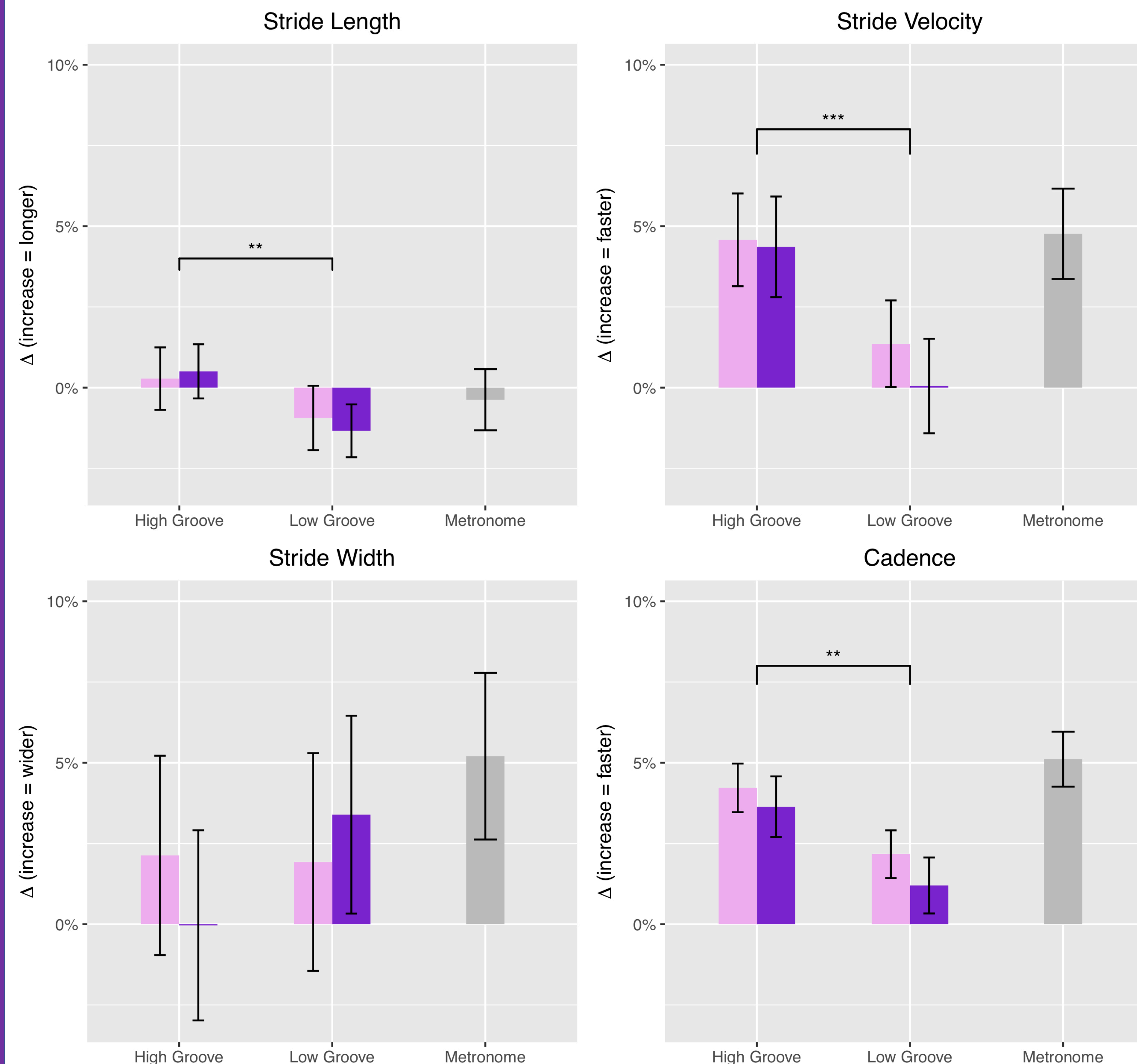


Results

High beat salience (pink) Low beat salience (purple)

High-groove music increases stride length and velocity relative to low-groove music without compromising balance

Both high-groove and high-beat-salient music improve cadence compared to low-groove/low-beat-salient music



Discussion

Summary

- High-groove music elicits longer and faster strides than low-groove, and balance is unaffected
- High beat salience (metronome-embedded) improves cadence relative to low beat salience (no-met), but the effect is small
- Groove is responsible for gait improvements separate from beat salience

Implications / future directions

- We can optimize RAS cues by providing high-groove music
- Future studies will characterize groove/beat salience response in clinical populations and investigate other methods of amplifying beat salience
 - High-pitched triangle tone used in this study may be too out-of-context from the original music

References

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Acknowledgements

