



# Background

- **Dyslexia** is the inability to read, write, and spell fluently
- Children with dyslexia have **difficulty** retrieving, retaining and reciting words from memory
- Predictable musical rhythm primes help people with **dyslexia** and fluent readers judge the grammar of sentences<sup>[1]</sup>



- These rhythm priming effects are interpreted within the **Dynamic Attending** Theory<sup>[2]</sup>
- Our brain aligns with regular patterns of sound we hear (e.g., the beat of a song), setting us up to successfully **predict future** events in time (i.e., grammar errors in the middle of sentences)

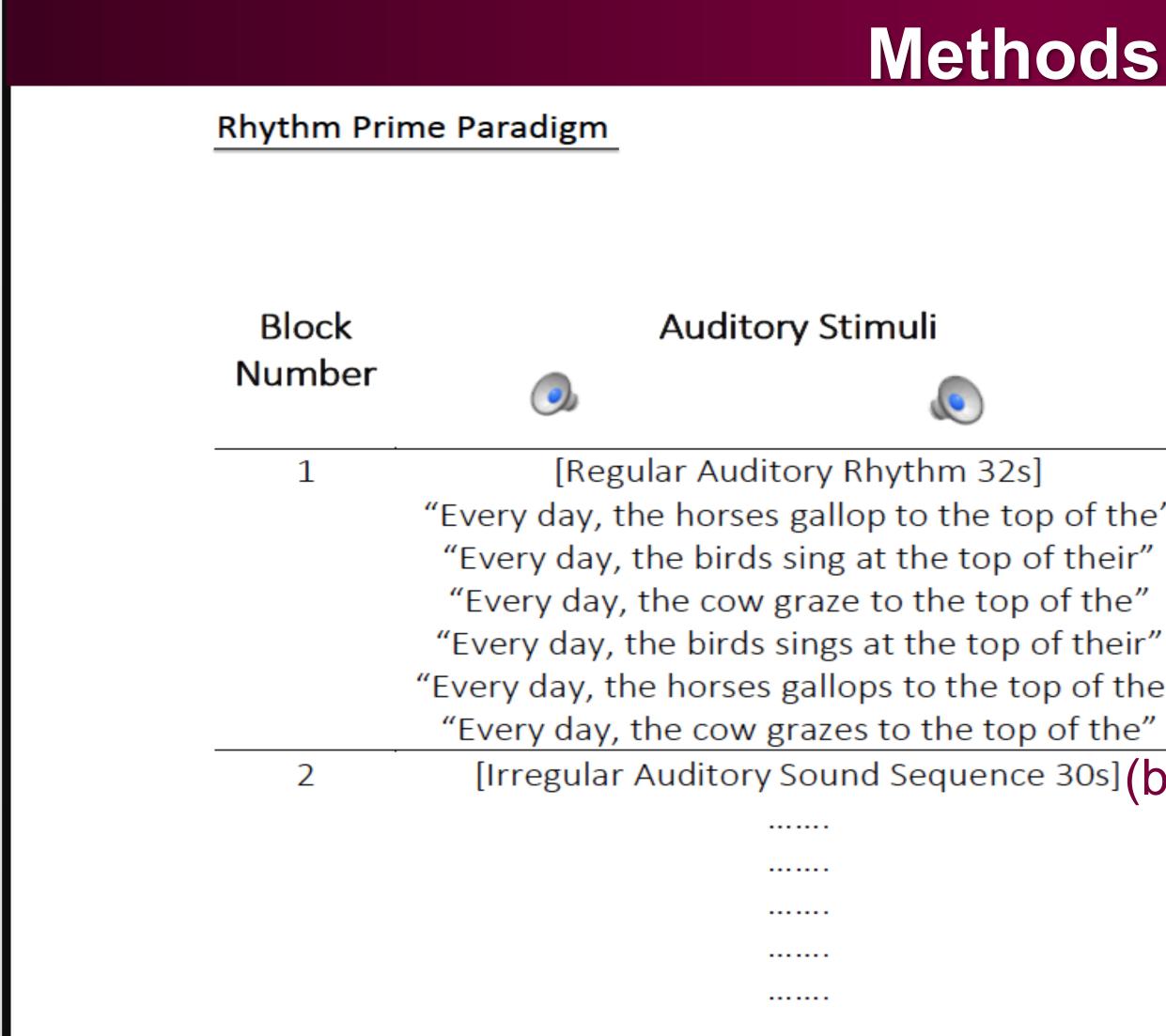
# Study aim

A previous study <sup>[3]</sup> showed greater grammar error processing in adults with dyslexia after listening to predictable rhythms, but whether predictable musical rhythm stimulation can improve memory for new words in children is unknown.

# **Can rhythmic stimulation benefit verbal memory?**

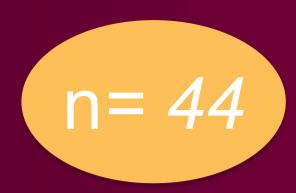
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# Results

Predictable musical rhythms decreased memory accuracy for new words and significantly decreased grammar judgement performances compared to the baseline condition.



	Pseudoword to Recognize	Subject Response
the"	bloz	correct
eir"	cret	correct
ne″	hooze	incorrect
eir"	cret	incorrect
the"	bloz	incorrect
he"	hooze	correct
(baseline condition)		

Cohen's d = 0.20

[1] Przybylski, L., Bedoin, N., Krifi-Papoz, S., Herbillon, V., Roch, D., Léculier, L., Kotz, S.A., & Tillman, B. (2013). Rhythmic auditory stimulation influences syntactic processing in children with developmental language disorders. Neuropsychology, 27, 121–131.

[2] Jones, M.R. (2019). Time Will Tell: A Theory of Dynamic Attending. Oxford University Press, New York, NY.



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### Conclusions

• The addition of the **secondary** pseudoword recognition task may have interfered with the primary grammar judgement task and detracted from **beneficial rhythmic** entrainment.

• The baseline environmental sound sequence prime without temporal regularities was **significantly** beneficial (*p*=0.003) but **only for grammar** processing and not verbal memory.

• These analyses need to be **interpreted** with caution given the unbalanced sample sizes (13 dyslexics and 31 control participants).

• A **future study** will employ a similar paradigm, but **removing grammar** judgements. We will solely focus on verbal memory recall for nonsense sentences—removing the likelihood of dual-task interferences.

### References

[3] Canette, L. H., Fiveash, A., Krzonowski, J., Corneyllie, A., Lalitte, P., Thompson, D., Trainor, L., Bedoin, N., & Tillmann, B. (2020). Regular rhythmic primes boost P600 in grammatical error processing in dyslexic adults and matched controls. Neuropsychologia, 138, 107324.