Can rhythmic stimulation benefit verbal memory?

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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[1]

- These rhythm priming effects are interpreted within the **Dynamic Attending Theory**[2]
- 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 [3] 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.

Methods

Rhythm Prime Paradigm

Block Number	Auditory Stimuli	Pseudoword to Recognize	Subject Response
1	[Regular Auditory Rhythm 32s]		
	"Every day, the horses gallop to the top of the"	bloz	correct
	"Every day, the birds sing at the top of their"	cret	correct
	"Every day, the cow graze to the top of the"	hooze	incorrect
	"Every day, the birds sings at the top of their"	cret	incorrect
	"Every day, the horses gallops to the top of the"	bloz	incorrect
	"Every day, the cow grazes to the top of the"	hooze	correct
2	[Irregular Auditory Sound Sequence 30s] (baseline condition)		
	.....		
	.....		
	.....		
	.....		
	.....		
	.....		

Results

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

n= *44*

Cohen's *d* = *0.20*

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

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