

Surprise, Surprise – How Musical Surprises Might Benefit Language Learning in Children



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Introduction

- Language input sources in early childhood:
 - **Child-directed speech** (CDS) [1,2,3]
 - Children’s songs
- **Dynamic Attending Theory** (DAT) → On-beat songs support language acquisition [4]
- **Models of surprise** → unexpected events capture attention → promote processing and learning [5]

Methods

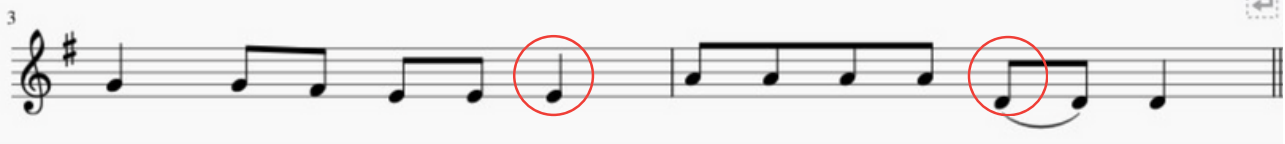
Participants

- 4-Year-Olds (n = 33)
- Undergraduate Students (n = 31)

Stimuli

- 4 Conditions: **Adult-Directed Speech** (ADS), **CDS**, **On-Beat Song**, and **Off-Beat Song**
- German sentences sung to 4/4 children’s melodies; target words On- or Off-Beat.

On-Beat



Off-Beat



Familiarization Phase

- Each stimuli presented for ~15 seconds

Testing Phase

- Match heard word to one of three pictures



Results

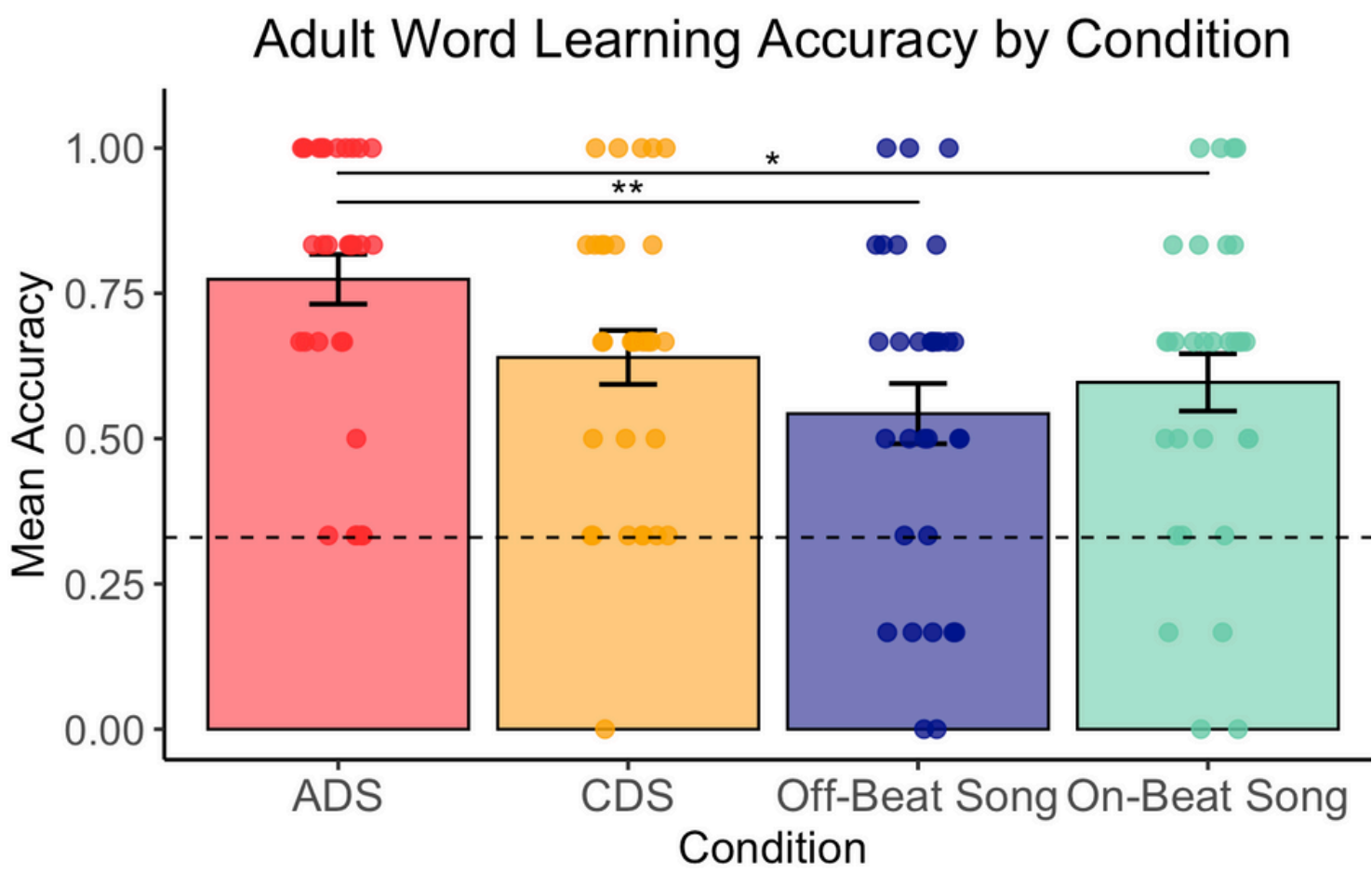


Figure 1. Mean accuracy (±SE) by condition; dashed line = chance (33%); * = $p < .05$, ** = $p < .01$

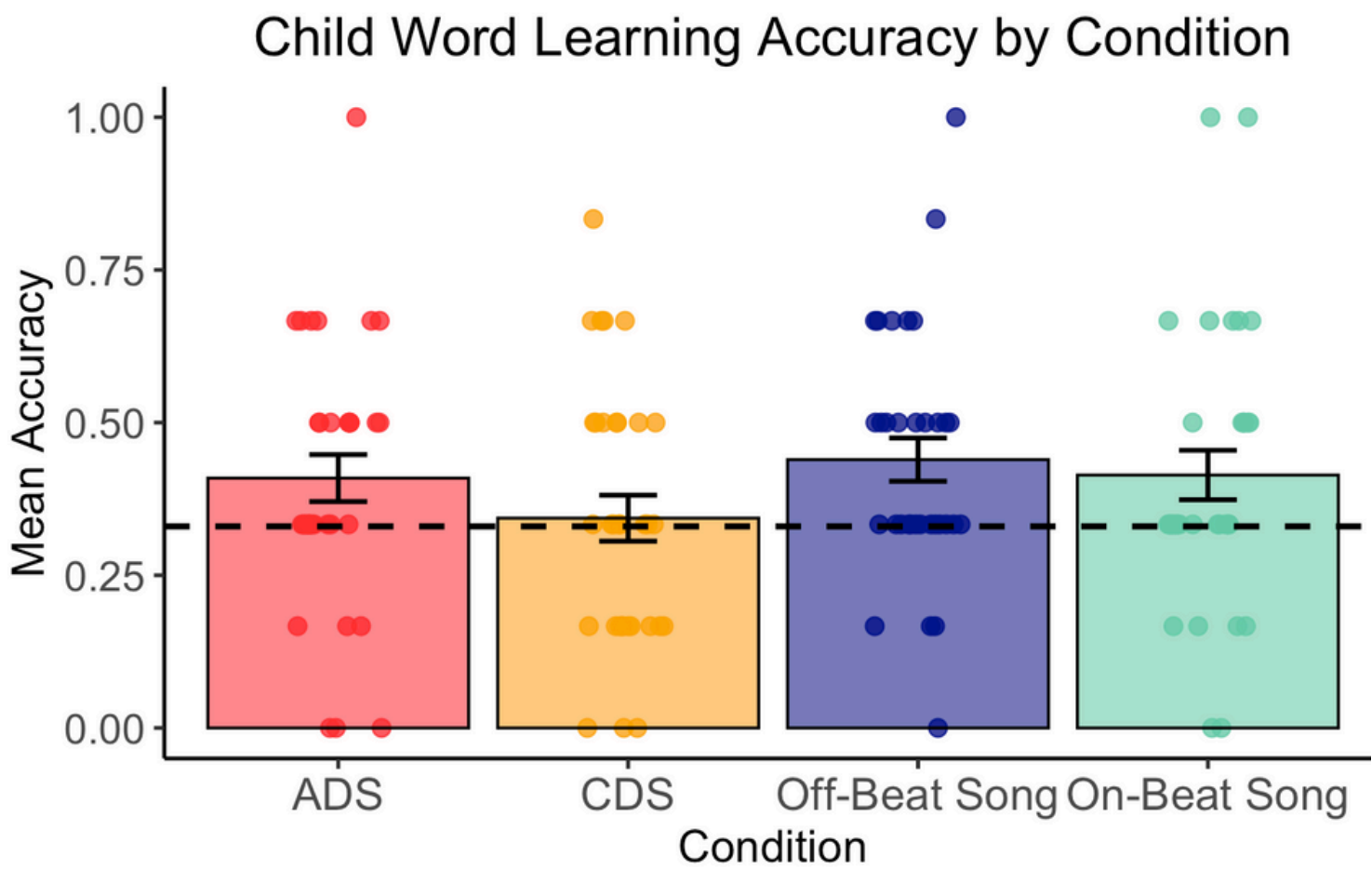


Figure 2. Mean accuracy (±SE) by condition; dashed line = chance (33%); CDS was not above chance: $t(33) = 0.490$, $p = .627$; no significant differences across conditions ($p = .335$)

Results (continued)

- Both Adults and Children learned above chance overall
- Predictions not supported
 - No song advantage in children or adults
 - Surprisingly, no CDS advantage in children
- Adults: Highest learning in ADS
- Children: No condition differences → flexible learning

Implications & Future Directions

- Adults & children learn languages across **all conditions**; adults learn best from **ADS**.
- Task very difficult for children; may mask condition effects
- Compare high-performing vs chance-level children
- Use the **same carrier sentence**; vary **target word** only
- Refine Off-Beat: Syncopated context with On-Beat targets

References

- [1] Soderstrom et al., (2008). J. Child Lang., 35(4), 869-902
- [2] Stern et al., (1983). J. Child Lang. 10, 1-15
- [3] Ma et al., (2020). Q. J. Exp. Psychol., 73(7), 1036-1054
- [4] Jones & Boltz (1989). Psychological Review, 96(3), 459-491
- [5] Bovolenta & Marsden (2021) Language Development Research. 193-243.

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