

# After is easier: How linguistic timing impacts verb learning in preschoolers with DLD

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## Introduction

### Overview

- Verb learning particularly challenging for children with DLD (e.g., Oetting, 1999)
- Subtle changes to the learning environment impact whether children learn new verbs (Horvath & Arunachalam, 2019)
- Important to understand optimal contexts for teaching verbs during therapy

### Research question

*Is it easier for children to learn novel verbs if they hear the verb **before** seeing the referent action, or **after**?*

### Prior research

- For typically developing children (TDs), what is easier depends on verb meaning (Ambalu et al., 1997; Tomasello & Krueger 1992)
  - Manner verbs**
    - Encode how something happens (e.g., “run”)
    - More easily learned if introduced **before** referent action
  - Result verbs**
    - Encode an event endstate (e.g., “close”)
    - More easily learned if introduced **after** referent action
- For children with DLD, timing impacts noun learning (Pomper et al., 2022)
  - Nouns more easily learned when presented separately from visual information versus concurrently
  - Nouns more easily learned if presented **before** rather than **after** referent objects
- Limitations on prior research
  - Has only considered verb learning in TDs, but children with or at risk for DLD have differing knowledge of manner/result verb meanings (Horvath et al., 2019; 2021; Penner et al., 2003)
  - Confound of variable verb morphology, which may have impacted performance (Morphological Bootstrapping: Wagner et al., 2009)

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## Methods

### Participants

- N = 8 preschoolers with DLD (2 female, 6 male)
- Age: M = 61 mo; SD = 5 mo,
- DLD confirmed via testing
  - Language: <87 on SPELT-P2 (M = 73, SD = 17)
  - Non-verbal intelligence: >75 on KABC (M = 103, SD = 17)

### Conditions (within-subjects)

- Before:** Verb introduced before referent action
- After:** Verb introduced after referent action

### Design

- 8 pairs of novel verbs, each featuring the same actor and object with two different actions
- Verbs in the pair introduced in same condition

Training Phase					
Before	Wow! The girl can juff the bowl!! (x2)		Did you see?	Wow! The girl can spooov the bowl!! (x2)	How fun!
After	Look at this!	Wow! The girl can juff the bowl!! (x2)	Let's watch!		Wow! The girl can spooov the bowl!! (x2)

	Recall Phase		Generalization Phase	
Before	Which girl can juff the bowl?	Which girl can spooov the bowl?	Which boy can spooov the bowl?	Which boy can juff the bowl?
After				

**Trial structure.** In Training, children were introduced to two novel verbs. Then, children were asked to discriminate between the two training videos by pointing (Recall) and to generalize the novel verbs to a new agent (Generalization).

## Results

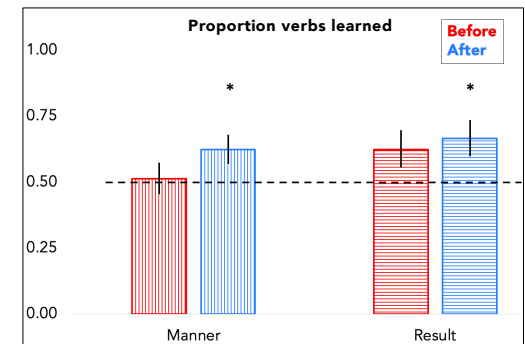
**Overall, children learned 60% of the verbs queried**

### Manner verbs

- Overall:  $\chi^2(1, N = 152) = 3.2, p = 0.07, n.s.$
- Before:**  $\chi^2(1, N = 72) = .06, p = 0.8, n.s.$
- After:**  $\chi^2(1, N = 80) = 5, p = 0.03^*$

### Result verbs

- Overall:  $\chi^2(1, N = 96) = 8.2, p = 0.004^*$
- Before:**  $\chi^2(1, N = 48) = 3, p = 0.08, n.s.$
- After:**  $\chi^2(1, N = 48) = 5, p = 0.02^*$



## Conclusions

### Main findings

- Unlike TDs (Ambalu et al., 1997), children with DLD more easily learn verbs if they are heard **after** rather than **before** the referent action, irrespective of verb meaning
- Optimal timing different for verbs versus nouns (Pomper et al., 2022)
- Children with DLD more easily learn result than manner verbs (consistent with Horvath et al., 2019; 2022)

### Future directions

- Current research grant with late talkers and typically developing children: 1R21DC020785-01