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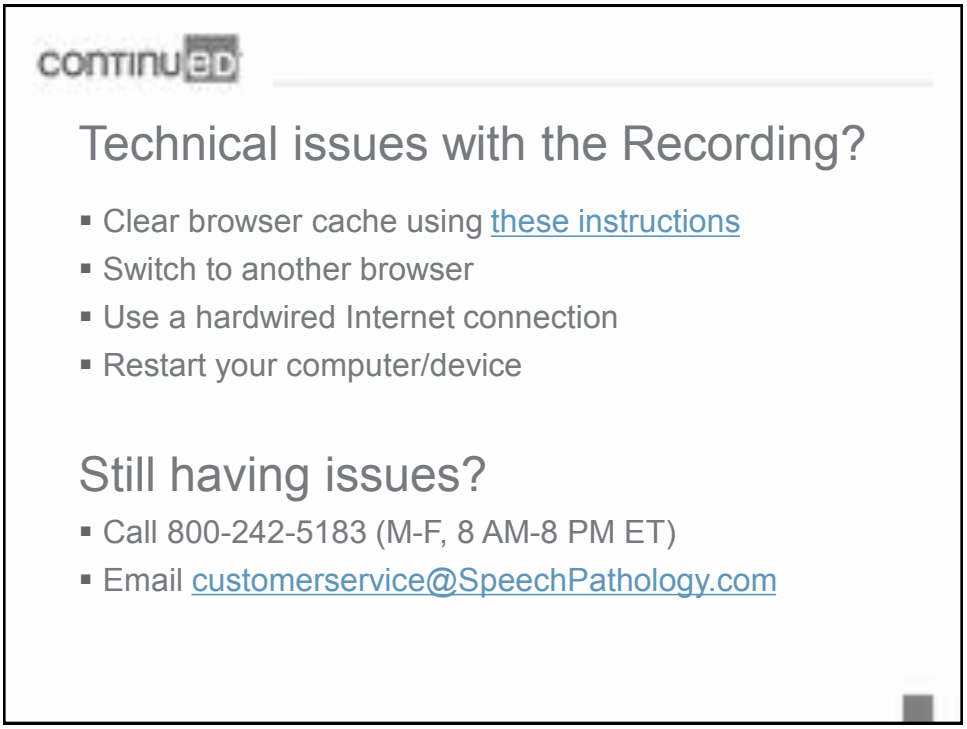
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Do the Hard Things First? Treatment of Morphology and Syntax

1. **Which of the following words is the MOST phonologically complex when inflected?**

   A. Played
   B. Messed
   C. Weighed
   D. Freed

2. **Which of the following predicates is LEAST likely to promote past tense use based on the aspectual qualities of the word?**

   A. Played with a ball
   B. Ate a sandwich all gone
   C. Jumped over a fence
   D. Closed a door

3. **Aspect describes _____ and tense describes _____.**

   A. Something that happened in the past; something that is ongoing
   B. The complexity of the phonology; the position in the sentence
   C. The time properties/duration of the event; when the event happened
   D. Word final consonants; the number of syllables in the word

4. **Children with DLD have difficulty with:**

   A. Tense and agreement, but not aspect
   B. Tense and aspect, but not agreement
   C. Agreement and aspect, but not tense
   D. Tense, aspect and agreement (all three)

5. **The most common grammatical challenge observed in English speaking children with DLD is:**

   A. Omission of morphemes
   B. Omission of content words
   C. Substitution of morphemes
   D. Substitution of content words

6. Recast therapy is an effective approach to treatment if:

A. The child is paying attention to the recast
B. Recasting is provide at a rate of 1 recast/minute
C. Between 600-1000 recasts are provided
D. All of the above

7. Another explanation for why hard first treatment is effective is:

A. Children can proceed developmentally from one target to the next
B. It increases the input variability that children are exposed to
C. It introduces new vocabulary words to the child
D. It puts all the target words at the end of the sentence

8. Recast therapy can be augmented by:

A. Adding auditory bombardment
B. Addition of a syntax story or observational modeling
C. High variability in the input
D. All of the above

9. The evidence around complexity-based approaches:

A. Is preliminary, but positive
B. Fails to draw on multiple lines of evidence (phonology, aphasia, child language)
C. Needs no further study or examination
D. Is unequivocally in favor of this approach

10. A barrier to implementation of hard first approaches that is unique to this approach is:

A. The difficulty of providing recast therapy intensely enough
B. The need for more research to identify and describe complexity gradients in other areas (e.g., third person singular)
C. Disagreements about why the approach works
D. Knowledge and time on the part of the provider

Do the Hard Things First? Treatment of Morphology and Syntax

Amanda Owen Van Horne, PhD, CCC-SLP

Moderated by:
Amy Natho, MS, CCC-SLP, CEU Administrator, SpeechPathology.com

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Do the Hard Things First? Treatment of Morphology and Syntax

Amanda J. Owen Van Horne, PhD CCC-SLP

Dec 10th, 2019

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Disclosures

- Financial disclosures:
  - The University of Delaware pays my salary
  - I draw salary from NIH and NSF funded research projects.
  - I receive an honorarium for presenting here
- Non-financial disclosures:
  - I am a member of ASHA & some ASHA SIGs
  - I contribute to DLDandMe.org

5

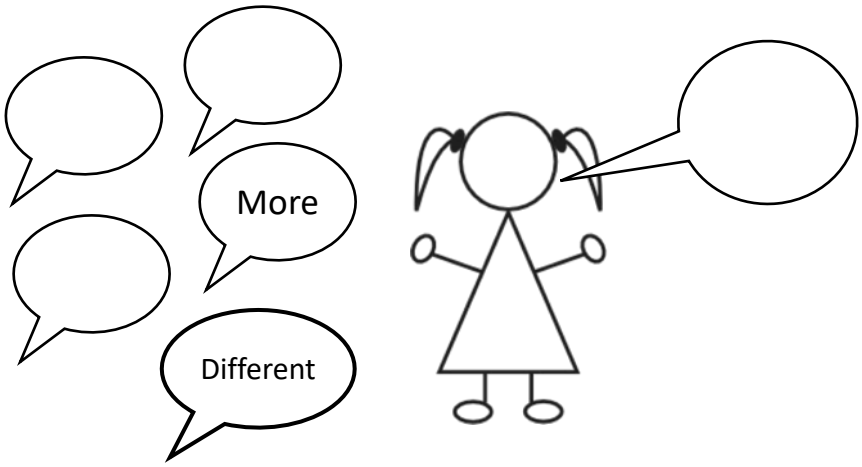
Learning Outcomes

After this course, participants will be able to:

- Describe the challenges related to tense and aspect faced by children with DLD.
- Describe the semantic and phonological properties of tense and agreement morphemes that are associated with difficulty gradients.
- Explain the rationale and treatment method for 'easy first' or 'hard first' treatment targets.

6

What is Language Therapy?



7

More

- Auditory Bombardment
- Observational Modeling
- Syntax Stories
- (Enhanced) Recast Therapy

Q4 8

CONTINUED

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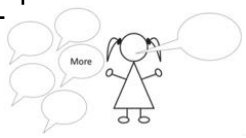
More



- Auditory Bombardment (Plante et al. 2018)
- Rationale:
  - Intense exposure to high quality models
- Implementation:
  - Read (unrelated) sentences to the child so they hear the structure
  - Child passively listens
  - Best provided after production therapy
- Observational Modeling
- Syntax Stories
- (Enhanced) Recast Therapy

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CONTINUED

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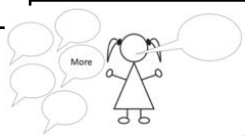
More

- Auditory Bombardment
- Observational Modeling (Leonard, 1975)
  - Rationale:
    - Intense exposure to high quality models paired with meaning
    - Allow comparison to other structures
  - Implementation:
    - Use toys to act out a meaningful situation
    - Describe the situation using the target form
    - Sometimes provide a contrastive model
      - *he hops… uh, I mean he hopped*
- Syntax Stories
- (Enhanced) Recast Therapy

10

More



- Auditory Bombardment
- Observational Modeling
- Syntax Stories (Finestack et al., 2006)
  - Rationale:
    - Intense exposure to high quality models in meaningful contexts
  - Implementation:
    - Read a short (10-30 sentence) narrative in which the target structure occurs at a high rate (25+ times)
    - Usually provided before recast therapy as a means of priming/supporting access to the structure
- (Enhanced) Recast Therapy

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More

- (Enhanced) Recast Therapy (Meyers-Denman & Plante, 2016)
  - Rationale (Cleave et al., 2015):
    - Follow child's attentional focus
    - Prior activation of sentence elements reduces working memory load
    - Immediate repetition with modest changes allows comparison and puts focus on target elements
    - Intense exposure to high quality models in meaningful contexts

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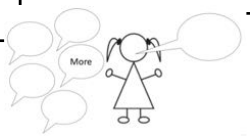
More



- Implementation:
  - Elicit a platform utterance from the child
    - May be imitative, elicited, or spontaneous
  - Child produces an utterance related to the target in some way

    (Ensure you have the child's attention)
  - Restate the utterance to include the target structure
  - Focus on 1 target structure at a time
  - Provide a high rate of recasts (1/min) with high intensity (10-20hrs of therapy) for a dose of ~1000 exposures
  - Make the input variable

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A LOT More

- (Enhanced) Recast Therapy ~ Dose
  - Provide a high rate of recasts (1/min) with high intensity (10-20 hrs of therapy) for a dose of ~600-1000 exposures

Recast Rate	1 hr 60 min, 1 x	7.5 hrs 30 min/wk ~ 15 weeks	15 hrs 60 min/ wk ~ 15 weeks	30 hrs 120 min/ wk ~ 15 weeks
1 every 1 min	60	450	900	1800
1 every 3 min	20	150	300	600
1 every 5 min	12	90	180	360
1 every 10 min	6	45	90	180

Cleave, P. L., Becker, S. D., Curran, M. K., Owen Van Horne, A. J. , & Fey, M. E. (2015). The efficacy of recasts in language intervention: A systematic review and meta-analysis. *American Journal of Speech-Language Pathology*, *24*(2), 237-255.

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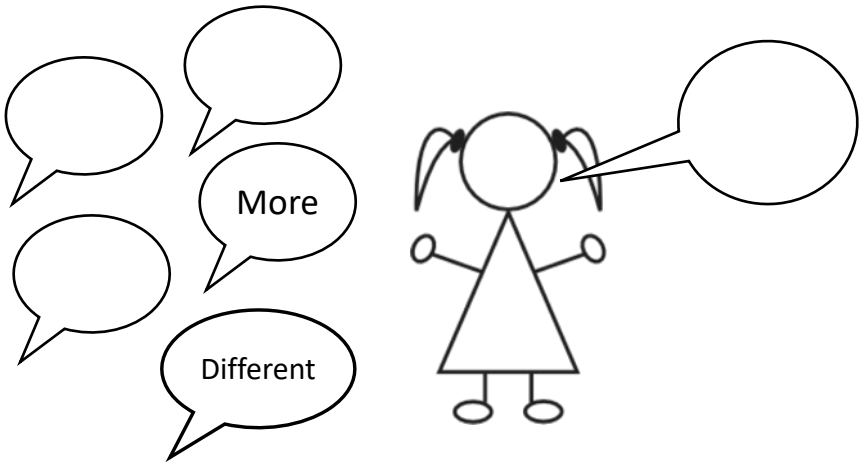
What is Language Therapy?



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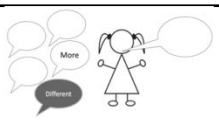
Different



- How we select the verbs (words) to use
  - Increase Exemplar Variability
  - Select Exemplars to Promote Generalization

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Different

- How we select the verbs (words) to use
  - Increase Exemplar Variability
    - Vocabulary Example (Perry et al. 2010)
      - Use Variable Exemplars
    - Grammar Example (Plante et al. 2014)
      - Variability = 24+ Examples

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Vocabulary Instruction

Teach kids with small vocabularies (<10 words) new words

Half the kids will learn 12 new words via very similar exemplars

Half the kids will learn 12 new words via different exemplars

Measure if kids learn target words (they do!)

Track word learning over time

Parents complete MacArthur-Bates CDI weekly

Similar (Tight) Exemplars

Variable Exemplars

Perry, L. K., Samuelson, L. K., Malloy, L. M., & Schiffer, R. N. (2010). Learn locally, think globally: Exemplar variability supports higher-order generalization and word learning. Psychological science, 21(12), 1894-1902.

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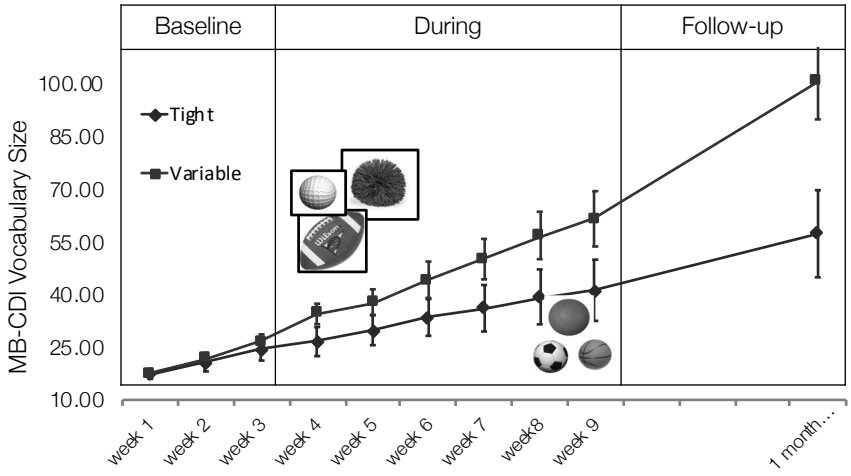
Vocabulary Example: Increased Variability



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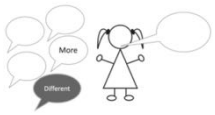
Grammar Instruction



Low Variability	High Variability
▪ 30 min/day	▪ 30 min/day
▪ 5 days/wk for 5 weeks	▪ 5 days/wk for 5 weeks
▪ 24 recasts/session	▪ 24 recasts/session
▪ play based activities	▪ play based activities
▪ 12 unique verbs	▪ 24 unique verbs

Plante, E., Ogilvie, T., Vance, R., Aguilar, J. M., Dailey, N. S., Meyers, C., ... & Burton, R. (2014). Variability in the language input to children enhances learning in a treatment context. American Journal of Speech-Language Pathology, 23(4), 530-545.

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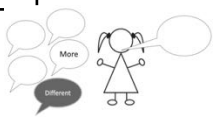
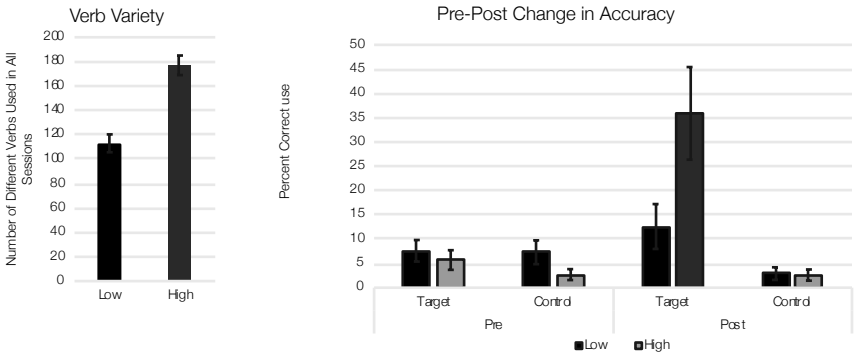
CONTINUED

Grammar Example: Increased Variability





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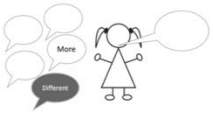
Different



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      - Variability = 24+ Examples
  - Select Exemplars to Promote Generalization
    - Vocabulary Example (Samuelson 2002)
      - Teach the Shape Bias To Kids with Small Vocabularies
    - Grammar Example (Owen Van Horne et al. 2017)
      - Highlight Morpheme Form and Meaning with 'Hard' Words

22

Vocabulary Instruction

Shape Bias: Rigid things with the same shape tend to have the same name- **bottle, chair, table, house, person, giraffe, ball**

Materials Bias: Deformable things made of the same material tend to have the same name- **shampoo, soap, pudding, milk, glue, paint**

Kids' early learned words fit the shape bias, not the material bias

Kids discover the Shape Bias from input statistics

- Kids get a word learning boost from learning this property of words

Can we induce the shape/material bias in kids?

Does it help them become better word learners?

23

Vocabulary Instruction

Shape-based Nouns

bucket

pear

Material-based Nouns

frosting

wax

Samuelson, L. K. (2002). Statistical regularities in vocabulary guide language acquisition in connectionist models and 15-20-month-olds. Developmental psychology, 38(6), 1016.

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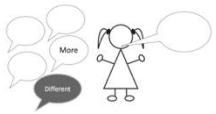
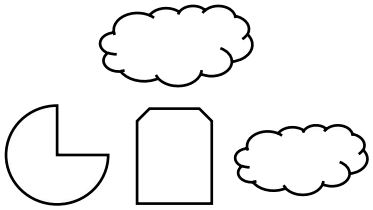
Vocabulary Instruction



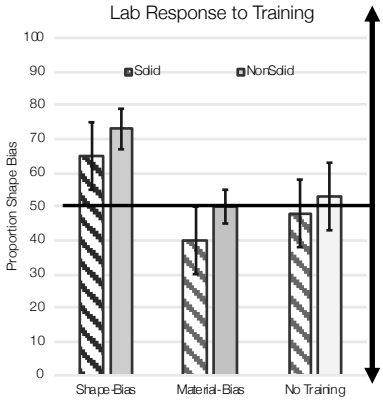
This is a merf.



Pick based on Material!

Find another merf.

Pick based on Shape!



Pick things based on Shape!

Pick things **based** on Material!

Samuelson, L. K. (2002). Statistical regularities in vocabulary guide language acquisition in connectionist models and 15-20-month-olds. Developmental psychology, 38(6), 1016.

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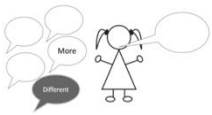
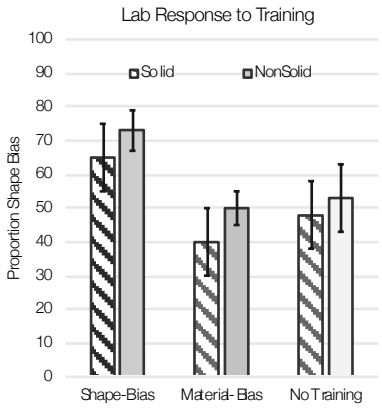
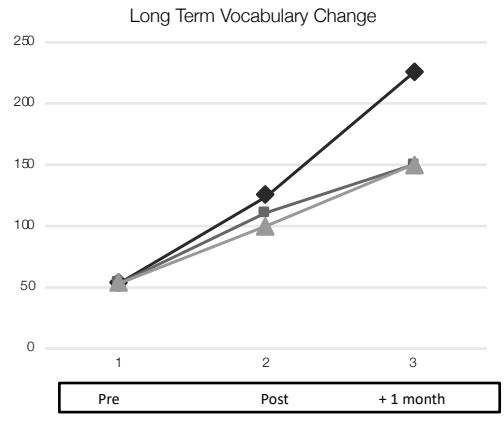
Vocabulary Instruction







Samuelson, L. K. (2002). Statistical regularities in vocabulary guide language acquisition in connectionist models and 15-20-month-olds. Developmental psychology, 38(6), 1016.

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Vocabulary Instruction

Can we induce the shape/material bias in kids?

- Yes to the Shape Bias
- Unclear to the Material Bias
  - Not Reinforced in the Real World

Does it help them become better word learners?

- Yes to the Shape Bias
  - Learning 12 words prompted generalization of this principle and accelerated word learning
- No to the Material Bias
  - Wasn't learned? Or wasn't useful?

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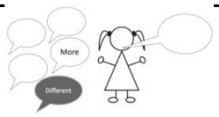
Different



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      - Highlight Morpheme Form and Meaning with 'Hard' Words

Q9 28

Hypothesis 1:
Use phonologically easy to inflect verbs with prototypical event semantics

play	Played CCVC
color	Colored CCVC
fish	Fished CVCC
jump	Jumped CVCCC
rest	Rested CVCC.VC

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PHONOLOGICAL PROPERTIES
Past Tense - ed

1. Coda Complexity

play	Played CCVC
color	Colored CCVC
fish	Fished CVCC
jump	Jumped CVCCC
rest	Rested CVCC.VC

2. Pattern Matching

Mess	Messed CVCC
Res	Rest CVCC
Rest	Rested CVCC.VC
Weigh	Wade CVC
Wade	Weighed CVC
	Waded CVC.VC
	Weighed-ed CVC.VC

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PHONOLOGICAL PROPERTIES
Past Tense - ed

1. Coda Complexity

Played
Colored CCVC

rowed

Jumped CVCCC
Fished CVCCC

ask
mess
hug
watch
help
kick

Rested CVCC.VC

wait
wade

2. Pattern Matching

Ends in –t, -d, -ld

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Hypothesis 1:
Use phonologically easy to inflect verbs with <u>prototypical event semantics</u>

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Event Semantics

- Tense
  - When did the event happen relative to speaking time?
- Aspect
  - Event Duration (Telic, Atelic, Habitual)
    - Lexical Aspect → Inherent in the verb phrase
    - Morphological Aspect → Added information from morphology
- English combines Tense and Aspect
  - He is/was jumping
  - -ing = atelic aspect (ongoing)
  - ~ + is/was provides tense info
    - He jumped He jumps
  - -ed = past tense, telic (completed) aspect
  - -s = present tense, habitual aspect

33

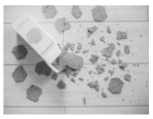
Hypothesis 1:
Use phonologically easy to inflect verbs with prototypical event semantics

Fell

Falling

Dropped

Dropping



Closed

Closing

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Hypothesis 1:
Use phonologically easy to inflect verbs with <u>prototypical event semantics</u>

Thirds Person Singular – S

He wants ice cream
He is wanting ice cream

He owes me money
He is owing me money

She knows the boy's dad
She is knowing the boy's dad

She detests broccoli
She was detesting broccoli

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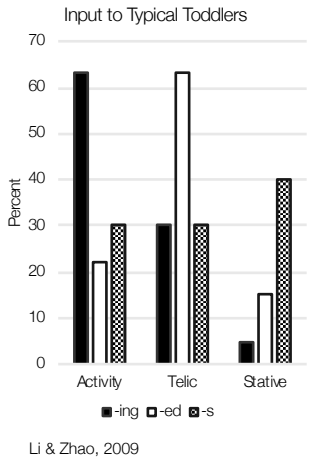
Tense and Aspect: More Info



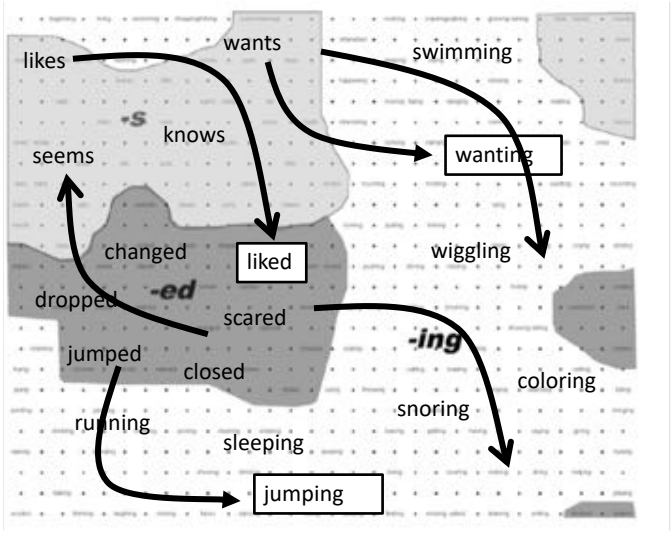
Li & Zhao, 2009

- **Weiler (2014) Recommends:**
  - Use Prototypical Event Semantics
    - High Frequency Verbs
    - Telic (Completed) Predicates
  - Use Phonologically Easy Stems
    - Doesn't form consonant clusters
    - Doesn't end in –t or -d

Owen Van Horne & Green Fager
Past Tense ~ DLD (6yo-9yo)

	High Freq/Telic	Low Freq/Atelic
Stem Ends w/ Vowel	92%	71%
Stem Ends w/ Cons	86%	57%

Children initially learn word + morpheme pairs through prototypical/high frequency exemplars



Li & Zhao, 2009

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Hypothesis 1:
Use phonologically easy to inflect verbs with prototypical event semantics

Hypothesis 2:
Use non-prototypical word + morpheme combinations on phonologically harder to inflect verbs

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CONTINUED

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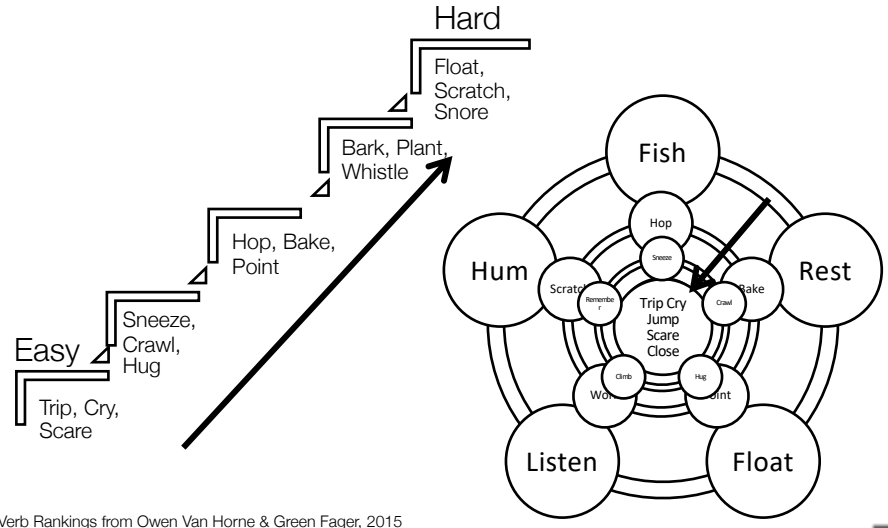
Morphology Intervention



Verb Rankings from Owen Van Horne & Green Fager, 2015

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Questions

- Do the children assigned to the **Easy First** or **Hard First** condition:
  - Make **faster progress** in therapy?
  - Make greater gains in accuracy from pre-test to post-test on ***trained verbs***?
  - Make greater gains in accuracy from pre-test to post-test on ***untrained verbs*** held out to test for generalization?

Owen Van Horne, A. J. , Fey, M., & Curran, M. (2017). Do the hard things first: A randomized controlled trial testing the effects of exemplar selection on generalization following therapy for grammatical morphology. Journal of Speech, Language, and Hearing Research, 60(9), 2569-2588.

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CONTINUED

Participant Characteristics

Developmental Language Disorder Profile
Poor Past Tense
Good –t/–d word finally

	Easy First	Hard First
N (Female)	9 (3)	7 (3)
N in tx	7	6
Age in Months	64.71 (23.76)	74.14 (19.51)
SPELT-III SS	81.37 (8.67)	76.28 (10.96)
KBIT-II SS	102.3(12.16)	99.57 (7.23)
PPVT-III SS	101.5 (9.23)	98.28 (8.85)
EVT SS	96.4 (9.85)	88.71 (11.80)
Percent Accuracy –t/-d	97.57 (6.16)	95.71 (8.52)

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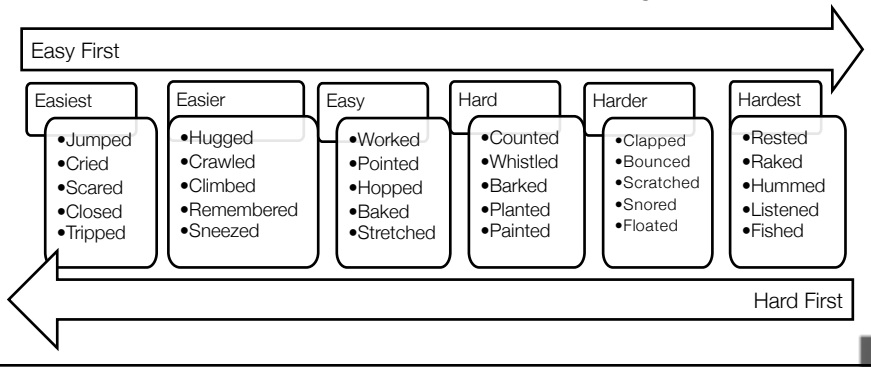
Verb Selection

- Ranked easy to hard based on predicted accuracy
  - Frequency w/ Past Tense
  - Lemma Frequency
  - Telicity
  - Verb Final Phonology
  - (Owen Van Horne & Green-Fager, 2015)
- An additional 30 verbs of equivalent difficulty served as generalization verbs.



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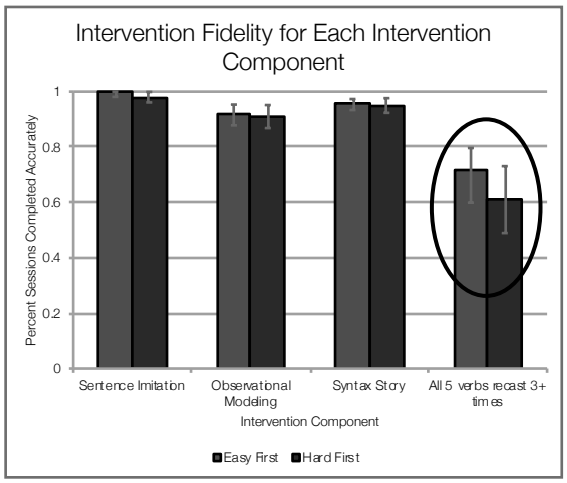
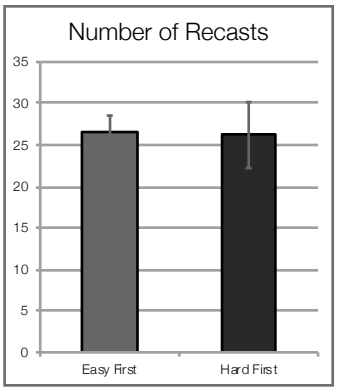
Fidelity





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~~Which group~~ makes faster progress?

EASY FIRST

Subject	List 1	List 2	List 3	List 4	List 5	List 6	TOTAL
1597	1	5	8	4	2	2	22
2641	5	6	8	4	2	6	31
2240	6	8	11	2	2	3	32
2827	9	6	20	1			36
2500	12	23	1				36
2645	5	31					36
2659	36						36
2471	36						36
2485	36						

HARD FIRST

Subject	List 6	List 5	List 4	List 3	List 2	List 1	TOTAL
2552	3	2	4	3	4	1	17
2182	3	6	2	4	2	2	19
2115	5	7	2	2	3	2	21
2320	16	4	14	2			36
2587	4	11	9	12			36
2634	7	21	4	4			36
2800	36						36

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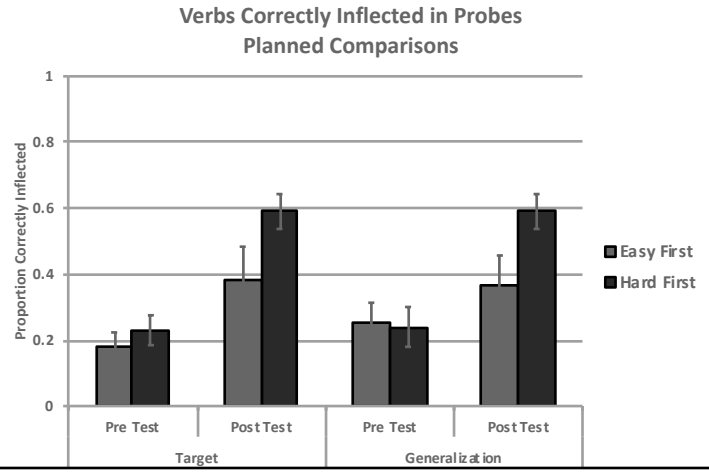
Which group is more accurate at inflecting verbs?



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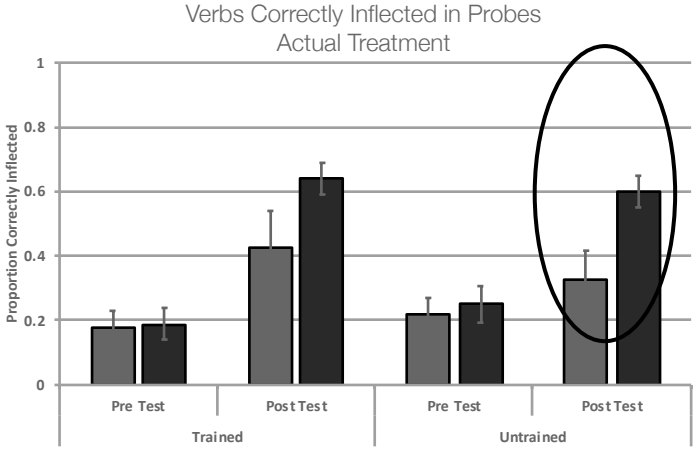
Which group is more accurate at inflecting verbs?



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Summary

- **Hard First** kids were **more accurate** on Target and Generalization verbs than **Easy First**.
  - **No group differences** on rate of progress or trained verbs → only on untrained verbs
- **Fidelity** was high for structured aspects in both conditions… but **Hard First** trended toward lower/more variable recast rates than **Easy First**.

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Why is Hard First effective?

Prototype + Extension

Children "recognize" how morphemes work given exposure to unusual word + morpheme pairs

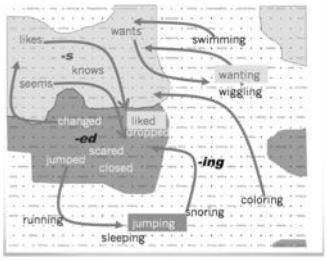
Gomez & colleagues (2002):
non-adjacent dependencies are only learnable when there is high variability in the VERB slot.

VERB = 2

is walk+ing
is run+ing

VERB= 24

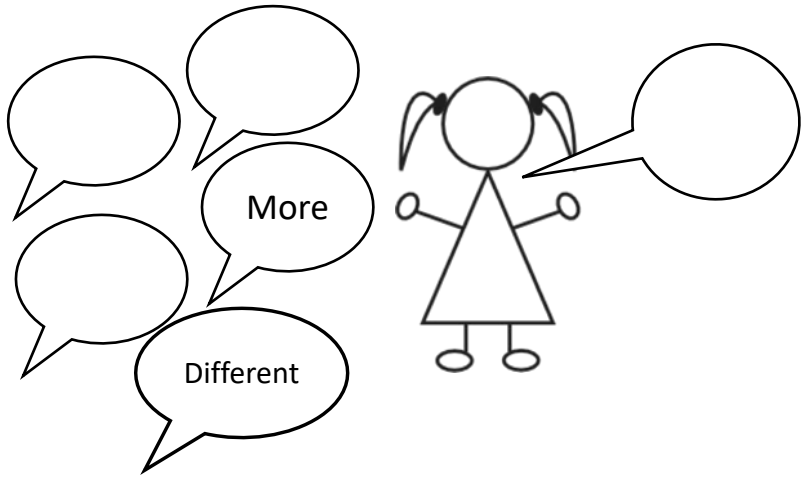
is walk+ing
is run+ing
is hop+ing
is skip+ing
….



Unusual exemplars increase variability in the input

Plante & colleagues

What is Language Therapy?



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