Lexical Representations and Growth in Morphosyntax

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Specific Language Impairment (SLI)

- Affects approximately 7% of kindergarten children
- Delayed language comprehension and/or production with no obvious cause or presence of developmental disability
- Late language emergence (i.e., first words)
- Core impairment in the emergence and mastery of morphosyntactic markers
  - ▹ Third person singular (e.g., he kick<u>s</u>)
  - ▹ Past tense (e.g., he kick<u>ed</u>)
  - ▹ Copula and Auxiliary Be (e.g., She <u>is</u> happy; They <u>are</u> happy; he <u>is</u> kicking; they <u>are</u> kicking)
  - ▹ Auxiliary Do (e.g., <u>Does</u> she like milk?)
- Children with SLI can make errors of omission (e.g., she kick the ball) on these forms until 8-years of age
- Few studies have considered how to increase the rate of growth for morphosyntactic forms

Neighborhood Density

- The number of similar sounding words based on a one sound substitution, addition, or deletion
  - ▹ Neighbors of "kick": kiss, click, kit, cake, tick, pick, etc.
- Dense words have many neighbors (kick: 21 neighbors)
- Sparse words have few neighbors (move: 5 neighbors)
- Dense and sparse words are processed differently by typically developing children across a variety of language tasks
  - ▹ Dense words facilitate production, memory, and novel word learning
  - ▹ Sparse words facilitate recognition and sound changes
- What about neighborhood density and growth in morphosyntax?
- Do certain verbs (dense vs. sparse) differentially trigger growth in finiteness marking?

Main Research Question:

- Does manipulating the neighborhood density of verbs presented during a controlled exposure learning task increase the rate of third person singular production in treated and un-treated verbs for children with SLI?

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General Procedures

- Single subject controlled exposure design (n = 3 children per condition)
- Random assignment to 1 of 2 conditions (dense or sparse exposure condition)
- Baseline period (3 to 5 sessions of morphosyntax monitoring)
- Exposure/treatment period (12 sessions across 6 weeks)
- Post-exposure test (1 session immediately after 12 exposure sessions)

Participants

	Dense Condition (n = 3)	Sparse Condition (n = 3)
Age	4;8	4;4
†TEGI Probe Scores		
Third Person Singular	31%	18%
Past Tense	10%	20%
Be Probe	40%	28%
Do Probe	0%	0%
Grammar Composite	20%	17%
Spontaneous Third Person Singular	21%	36%
MLU in Words	3.0	3.7
PPVT-4 Standard Score	93	99

*All children had normal hearing, normal nonverbal intelligence, and were native English speakers
* All children were able to correctly articulate word final /s, z, t, d/
†TEGI: *Rice-Wexler Test of Early Grammatical Impairment*

Stimuli

Dense Verb Set	Sparse Verb Set
Spin	Work
Crash	Laugh
Make	Drive
Peek	Step
Bump	Fix
Take	Give
M = 13 neighbors	M = 6 neighbors

Exposure/Treatment Session

Task	Child's Production	Adult's Production
Story	0	24
Story Re-tell	12	0
Elicited Imitation + Game	12	0
Direct Imitation + Game	12	12
Cumulative Exposures	36	36

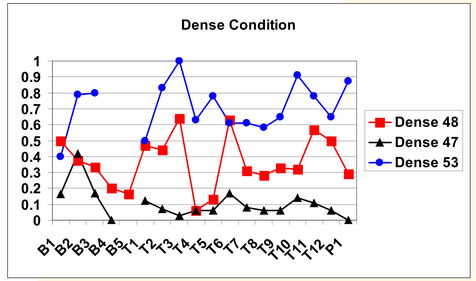
Dense Script	Sparse Script
It's almost time to go inside, but first Zoe and Max want to make a snowman. Zoe ***MAKES*** the snowman's body. Max ***MAKES*** the snowman's head. Zoe and Max want to make a face for the snowman. Zoe ***MAKES*** the snowman's eyes and nose while Max ***MAKES*** the snowman's mouth. The snowman is going to look so great when Zoe and Max are done!	It's almost time to go inside, but first Zoe and Max want to fix their snowman. Zoe ***FIXES*** the snowman's body. Max ***FIXES*** the snowman's head. Zoe and Max want to fix the snowman's face. Zoe ***FIXES*** the snowman's eyes and nose while Max ***FIXES*** the snowman's mouth. The snowman is going to look so great when Zoe and Max are done!

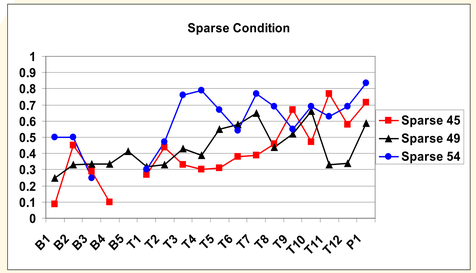
Measures of Learning

	Treated Words	Untreated Words	
		Within-Density Generalization	Across-Density Generalization
Dense Condition	3S + Dense Words	3S + Dense untreated words	3S + Sparse untreated words
Sparse Condition	3S + Sparse Words	3S + Sparse untreated words	3S + Dense untreated words

Note: Learning was measured by performance on two production tasks created specifically for this study.

Exposure/Treatment Session Data

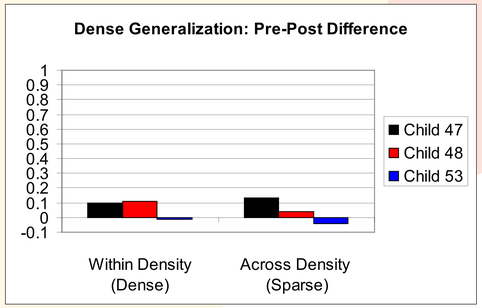


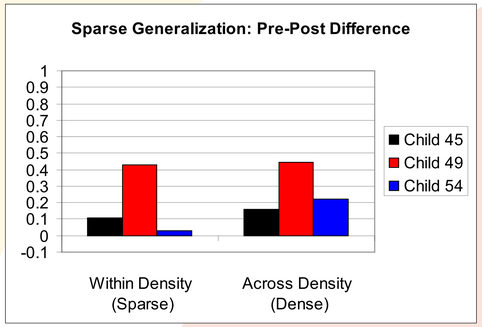


Exposure/Treatment Session Data

	Dense TX % > BL %	Sparse TX % > BL %	Dense Pre-Post % Diff	Sparse Pre-Post % Diff
Child 47	0		-19%	
Child 48	6		-3%	
Child 53	5		21%	
Child 45		12		48%
Child 49		9		25%
Child 54		11		42%
Mean	*3.7*	*10.7*	*-3%*	*38%*
Range	*0 - 6*	*9 - 12*	*-19% - 21%*	*25% - 48%*

Within- and Across-Density Generalization





Summary & Conclusions

- Sparse treatment > dense treatment
  - ▹ Greater number of sessions with accuracy above baseline
  - ▹ Greater pre-post treatment difference on measures of learning
  - ▹ Greater extent of generalization within- and across-density for untreated verbs
- Sparse ~ favorable condition for triggering morphosyntactic growth
- Because sparse words are similar to few other words, retrieval of these word forms might be easier compared to dense words
  - ▹ Easier retrieval/less confusion at the word level allows additional resources for correctly using morphosyntactic markers over time
- Sparse words are hypothesized to have less-detailed lexical representations compared to dense words
  - ▹ Words with less detailed representations might be more amenable to morpho-syntactic changes
- Characteristics of verbs used to treat morphosyntactic markers might differentially influence growth
  - ▹ Additional verb characteristics might need to be considered when planning treatment targeting morphosyntactic omission errors