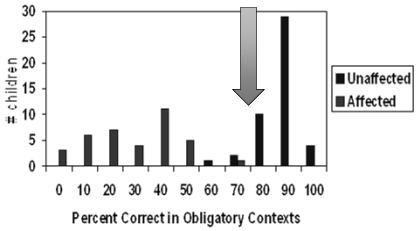
Grammatical Deficits as a Clinical Marker

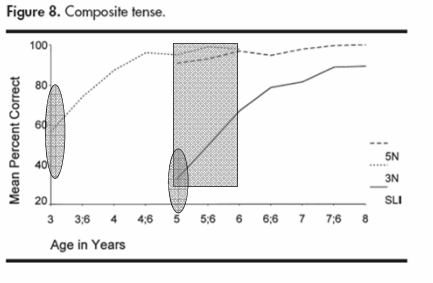
(cf. Bishop & Snowling, 2004; Tager-Flusberg & Cooper, 1999)

- Children's non-mastery of grammatical tense is especially sensitive to the diagnosis of SLI between the ages of 5 and 6 (Rice, Wexler, & Cleave, 1995; Rice & Wexler, 1996; Rice et al. 1998)



Grammatical Deficits as a Clinical Marker

(Rice, Wexler, & Hershberger, 1998)



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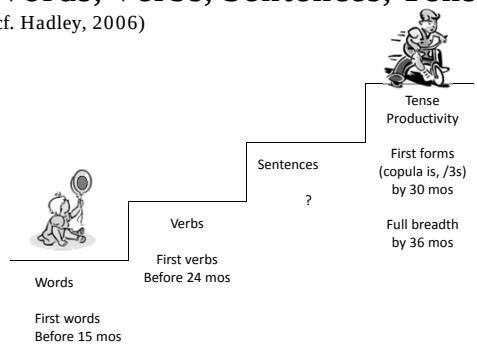
Clinical Questions

- Is it possible to detect grammatical difficulties at younger ages?
  - To do so, we need
    - Better metrics for assessing young children
    - Better understanding of "precursors" to mastering tense and agreement
    - Clearer expectations for early grammatical growth over time.

Words, Verbs, Sentences, Tense

(cf. Hadley, 2006)



Clinical Questions

- Can we identify the grammatical properties of input that facilitate that facilitate the acquisition of tense and agreement?
  - If so, we may be able to
    - Modify input properties to provide "optimal" input
    - Accelerate rate of growth during the time period best suited to implicit grammatical learning

Objective 1:

Understand grammatical encoding as a developmental accomplishment

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Sentence Production and Grammatical Encoding

- *Grammatical Encoding* (Bock & Levelt, 1994) is the real-time process by which grammatical knowledge is incorporated into production.
- For children to generate novel sentences, they need to grammatically encode their messages.

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Sentence Production Routes

Direct Activation

- "direct associative connections between referential content and phonetic content" (Bock, 1982; p. 24)
- arise because of their high frequency in input and use (MacWhinney, 1978; Bybee, 2006)

Grammatical Encoding

- Sentences assembled from underlying grammatical representations (Bock & Levelt, 1994)
- a set of procedures operate on abstract word classes to form hierarchically organized sentences

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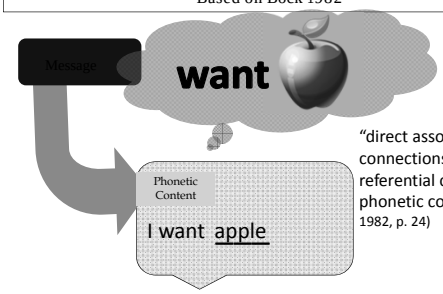
Direct Activation

Based on Bock 1982



"direct associative connections between referential content and phonetic content" (Bock, 1982, p. 24)

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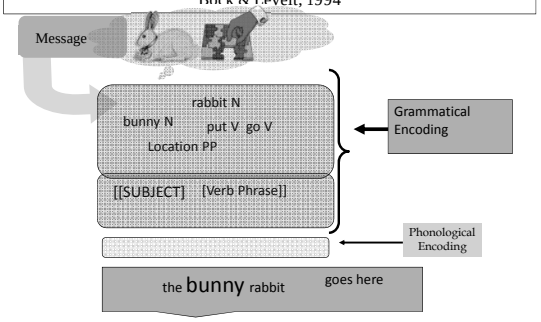
Sentence Production in Adults

Bock & Levelt, 1994



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Real time differences in sentence diversity

Slow developer	Average developer
I want that.	I want the (baby) babydoll out.
{6}want that.	He don't have a plate.
I want there.	It doesn't go in there.
I want more.	Waffle goes in there.
I want more.	

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THE *SHIFT* TO GRAMMATICAL ENCODING

Major developmental accomplishment in the 3rd year of life

Necessary for children's production of novel and diverse adult-like sentences

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The *SHIFT* to Grammatical Encoding: Empirical Consequences

1. **DIVERSITY** in the variety of messages increases
   - sentence diversity / unique subject-verbs
2. **DEVELOPMENTAL ERRORS** appear
3. Sentence **DISRUPTIONS** appear, specifically an increase in the rate of *revisions*
   - Rispoli (2003); Rispoli, Hadley & Holt (2008)

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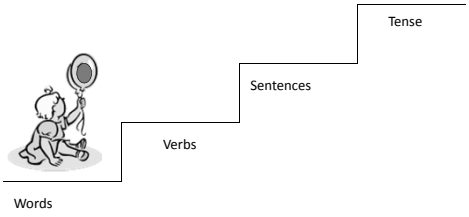
Objective 2:

Establish criterion-referenced expectations for children's early grammatical development

Words, Verbs, Sentences, Tense



Verb Lexicon Size

- MacArthur-Bates Communication Development Inventory


14. *Action Words* (103)

bite	○	catch	○	cry	○		
blow	○	chase	○	cut	○		
break	○	clap	○	dance	○		
bring	○	clean	○	draw	○		
build	○	climb	○	drink	○		
bump	○	close	○	drive	○		
buy	○	cook	○	drop	○		
carry	○	cover	○	dry	○		

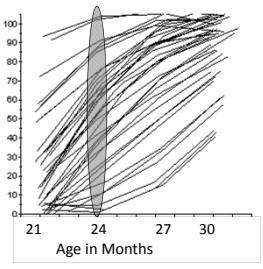
Expectations for Verb Lexicon Size

(CDI Lexical Norms)

- 50% of children use at least
  - 10 common verbs by 21 months of age
  - 37 common verbs by 24 months of age
- 75% of children use at least
  - 3 common verbs by 24 months of age
  - 28 common verbs by 27 months of age

http://www.sci.sdsu.edu/cdi/lexical_e.htm
cf. Hadley, 2006

Quadratic Model: Verb Lexicon Growth



n = 38 typically developing toddlers

Significant random effects (individual variability) in intercept, linear, and quadratic coefficients

Significant fixed effects (average) for group

- Intercept at 24 months: 51.73
- Instantaneous linear growth: 8.42 verbs per month
- Deceleration overall: -0.42

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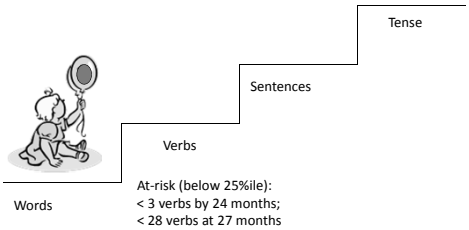
Words, Verbs, Sentences, Tense



Combining words vs producing sentences

- Existing expectations are for word combinations
  - Average = 20 months
  - Cut-off = 24 months

  (Rescorla, 1989; Zubrick et al., 2007)
- Yet **sentences**, not word combinations, are the critical foundation for the development of grammar.

First Sentences

- The simplest "sentences":
  $S = NP_{subject}\ VP$
- The earliest sentence types
  - SVO (e.g., *I want snack*)
    - $NP_{subject}$ + VP [$Verb_{transitive}$ + $NP_{direct\ object}$]
  - SV (e.g., *baby cry*)
    - $NP_{subject}$ + VP [$Verb_{intransitive}$]

Expectations for First Sentences

- The majority of children produce at least 2 SV and SVO sentences per 100 utterances before 30 months of age.

	27 to 29 mos	30 to 32 mos
SVO	83%	100%
SV	72%	91%

Klee & Gavin, 2010

- However, an agreed-upon milestone or criterion-referenced cut-off for "first sentences" is not available in the literature.

Operationalizing Sentence Diversity: Unique Subject-Verb (SV) Combinations

- Unique combinations of:
  - Grammatical subject and lexical verb
  - Same lexical verb with different grammatical subject
  - Same grammatical subject with different lexical verb
- Subjects were required to be:
  - (a) explicitly stated, not understood (*you*)

(cf. Ingram, 1989; Hadley, 1999)

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Unique SVs

Child at 21 months

1. I see you. - ONLY combination

Unique SVs = 1

Child at 24 months

1. I want plate/syrup.... - unique combination
2. I found eyes. - same subject 1, new verb
3. I got it. - same subject 1, new verb
4. I made it. - same subject 1, new verb
5. I drop it. - same subject 1, new verb
6. Danny go nightnight. - unique combination
7. Sheep go nightnight. - new subject, same verb 6
8. Piggy ride too. - unique combination.

Unique SVs = 8

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Unique SVs: 1 vs 8 (60 min)

Child at 21 months

I — see$_{you}$

Child at 24 months

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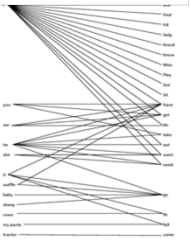
Unique SVs = 44 (60 min)

Child at 27 months



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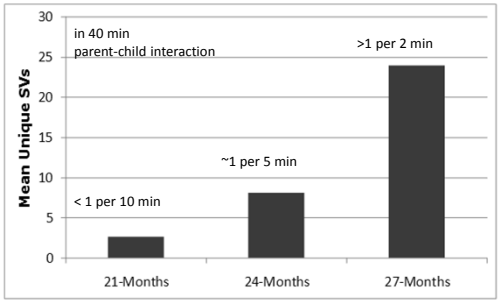
Developmental Change in Unique SVs
(Villa, 2010)



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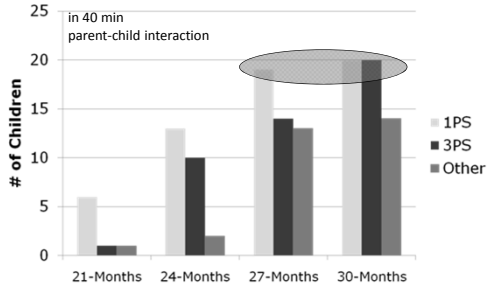
Productive Subject Types
(Villa, 2010)

- At least 2 different SVs for each grammatical subject type
  - 1st person singular, *I*-sentences
  - 2nd person singular, *you*-sentences
  - 3rd person singular, 3ps-sentences
  - 1st person plural, *we*-sentences
  - 3rd person plural, 3ppl-sentences

Number of Children with Productive Subject Types by Age (Villa, 2010)



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Words, Verbs, Sentences, Tense

At risk (proposed):
Limited sentence diversity at 30 months;
lack productivity of 1PS, 3PS, SVO, and SV sentences

The Importance of "Sentences" to Tense and Agreement

- ***Tense*** is a property of sentences, NOT verbs
  - signal the relationship between speech time and event time.
- ***Agreement*** operates on the hierarchical structure of sentences, not the linear sequence of words.
  - reflects an abstract, structurally-dependent relationship between the grammatical subject and its predicate.
    - The **cows** in the barn **are** hungry.

The Importance of Sentence Diversity

- Sentence diversity creates opportunities for children
  - to discover the abstract nature of tense/agreement marking in the input, and
  - to learn the forms (i.e., words/affixes) that are specified for grammatical features
  - to practice encoding grammatical features in their sentence production

Types of Diversity to Consider

- Lexical verb :
  - simple present vs present progressive
  - state = verb/3s; action = is verbing
- Grammatical Subject:
  - agreement
  - 1PS = am, 2PS = are, 3PS = is, 3PPL = are
- Declaratives vs Non-declarative:
  - Requires auxiliary DO as surrogate for lexical verbs
  - Pooh likes honey vs Pooh doesn't like carrots.

Tense / Agreement in English

Five morpheme classes

- Copula BE
  - the baby is hungry, I am hungry, you (we, they...) are hungry
  - the baby (I) was hungry, you (we they...) were hungry
- Auxiliary BE
  - the baby is crying, I am crying, you (we they...) are crying
  - the baby (I) was crying, you (we they...) are crying
- Third person present /3s
  - the baby want-s milk (cf. I, you, they... want milk)
- Past /ed
  - the baby want-ed milk (note irregulars are frequent: went, came...)
- Auxiliary DO
  - the baby does cry, I (you, we, they...) do cry
  - the baby (I, you...) did cry

Tense / Agreement in English

Five morpheme classes

- Copula BE
  - Encodes tense and agreement features;
  - Enables predication of Adjective, Noun and Prepositional Phrases.
- Auxiliary BE
  - Marks tense and agreement when the verb is in the progressive aspect; present progressive used with action verbs
- Third person present /3s
  - Marks 3PS in the simple present tense on state verbs;
  - Only verb suffix that encodes agreement.
- Past /ed
  - Marks past tense on regular verbs
- Auxiliary DO
  - Marks tense and agreement in non-declarative sentences (negation, questions, ellipsis, emphatic)

Tense Agreement Productivity (TAP) Score

- Based on spontaneous language samples of parent-child interaction (40 min, Hadley & Short, 2005; 60 min, Rispoli et al., 2009)

Five forms

- Copula BE
- Auxiliary BE
- Third person present /3s
- Past /ed
- Auxiliary DO

Strict productivity criteria

- Contracted copula/auxiliary forms are not allowed (e.g., he's, it's, what's, here's) unless contracted to NPs
- Only unique subject + cop/aux combinations allowed
- Only unique verb stems + affixes allowed
- *Don't* not allowed

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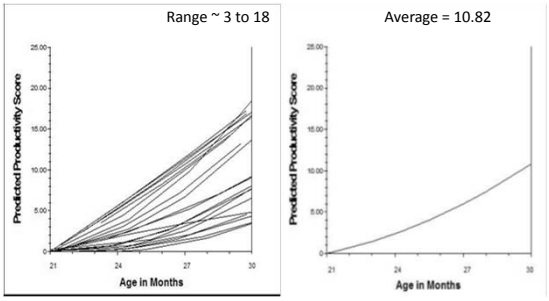
Tense Agreement Productivity (TAP) Score

USE	COP	/3s	/ed	DO	AUX
1st	Dad is	go/3s	look/ed	did dog..?	baby is
2nd	dog is	fit/3s			
3rd	baby's	eat/3s			
4th	shoes are	need/3s			
5th		want/3s			

TAP Score = 12
(total number of unique uses)

Developmental Expectations: TAP Scores

(Rispoli, Hadley, & Holt, 2009)

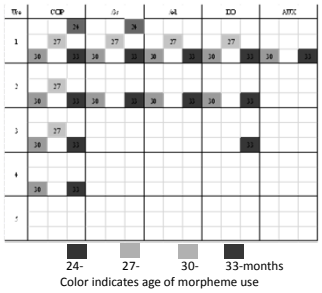


Developmental Expectations: TAP Scores

- In Rispoli et al. (2009) sample, the first productive forms were evident by 27 months **for all** of the typically developing children in the sample (n=20).
- In our current NSF sample, the first productive forms are evident by 30 months of age **for all** typically developing children in the sample (n = 38).
- Similarity in the developmental sequence observed (Rispoli, Hadley, & Holt, in press):
  - copula BE < /3s, /ed, auxiliary DO < auxiliary BE

Similarity in TAP Sequence

Hadley & Short (2005); Rispoli, Hadley & Holt (in press)



- Productivity Increase
  Copula > {-3s,-ed, DO} > Aux BE
- Observed across developmental rates
  - Fast developers
  - Average developers
  - Slow developers
  - Children at-risk for SLI

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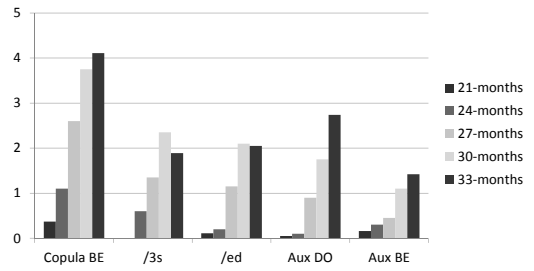
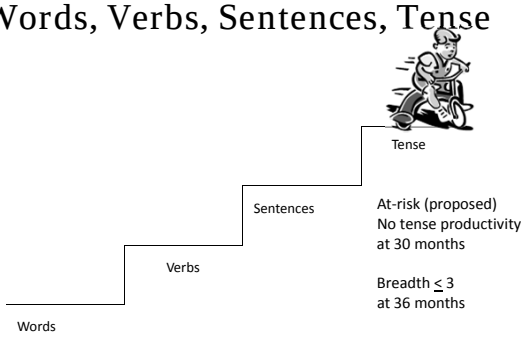
Productivity Increase with Age by Morpheme



Words, Verbs, Sentences, Tense



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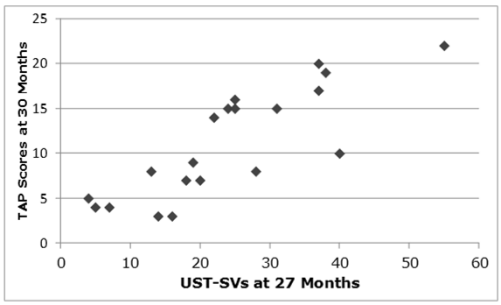
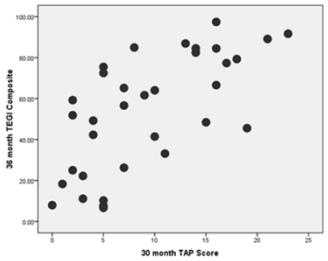
Sentence Diversity and TAP Scores

Villa (2010); Rispoli et al. (2009)



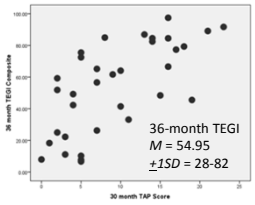
TAP Score (productivity) and TEGI (mastery)

Hadley, Rispoli, Holt, Fitzgerald, & Bahnsen (2012)

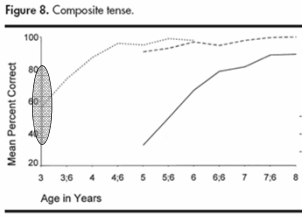


$r = .64$,
$p < .001$
n = 32

TAP Productivity & Mastery



36-month TEGI
M = 54.95
±1SD = 28-82



Acquiring Tense and Agreement

- The acquisition of English tense and agreement system is gradual, systematic and predictable.
  - Measures of diversity and productivity are well suited to revealing the stability of growth during this period of early grammatical development.
- The acquisition of tense and agreement is related to, and supported by, increasing diversity in sentence type.
- From our perspective, the shift to grammatical encoding underlies the developmental changes observed in both sentence diversity and the acquisition of tense and agreement.

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Early Indicators of Grammatical Weakness

- 0-3 verbs at 24 months (per parent report)
- $\leq$ 27 verbs at 27 months (per parent report)
- Limited sentence diversity at 30 months, SVO, SV, 3PS (per structure-specific sampling)
- No tense productivity at 30 months (per structure-specific sampling or parent report).
- Limited tense inventory at 36 months $\leq$ 3 (per structure-specific sampling or parent report).

Objective 3/5:

Clinical objectives and measuring progress for early grammatical objectives.

Objective 4:

List three strategies for facilitating sentence diversity and tense/ agreement productivity.

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Service Delivery, Treatment Targets, and Techniques

- Involve Parents
- Target verbs and diverse sentences
  - Help parents move beyond names for things.
  - Provide alternatives to labeling (e.g., *that's a X*)
- Use toy-talk (Hadley & Walsh, 2012; Walsh, 2010)
  - Talk about the toys:
    - Describe properties, states, and action of toys in the environment / pictures in books.
  - Give the item its name
    - Increase use of lexical nouns

Involving Parents

Parental involvement is critical for attaining the intensity required for children with true language impairments.

Examples:

- Indirect Service Delivery Models
  - Target Words: The Hanen Program for Children who are Late Talkers
- Mixed Service Delivery Models
  - Parent Education & Direct Service Delivery

Target Verbs

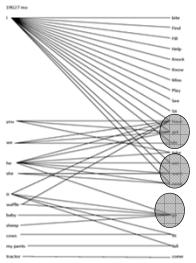
- Lexical verb diversity provides a foundation for different sentence types
  - Intransitive verbs → SV (*the tower fell*)
  - Transitive verbs → SVO (*I want juice*)
  - Ditransitive verbs → SVO or SV (*I popped the bubble; the bubble popped*)
- Lexical verb diversity provides a foundation for marking present tense with different surface forms
  - State verbs → simple (*Pooh needs honey*)
  - Action verbs → progressive (*Pooh is eating honey*)

Target Sentences

Intermediate Goal:
Gina will increase her rate of different sentences produced during parent-child interaction.

Specific Objective:
Gina will combine 5 target verbs with at least 3 different sentence subjects as measured by communication samples and/or parental reports.

- *have, get, do, eat, want, need, go*



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The Sentence Step: Productive Sentence Types

- Are there at least 2 different SVO sentences?
  - $V_{transitive}$ (e.g., *want, get, put*)
- Are there at least 2 different SV sentences?
  - $V_{intransitive}$ (e.g., *go, sleep, cry*)

(Klee & Gavin, 2010)

The Sentence Step: SVO and SV

At-risk, 30 months (2115)

- I want *clown/soap/ that/bubbles/milk/blanket.*
- Him eating.
- I try, mom.
- I get that.
- I fight you.
- I want baby too.
- I want milk go.
- I want off.

Day 1 (20 min, 189 utterances)
1 different SVO, 2 SV

Day 2 (20 min, 174 utterances)
3 different SVO, 0 SV

Slow typical, 30 months (2221)

- You do it.
- It had the firetruck.
- Hand going in.
- It can go right there.
- You shut door.
- You did it.
- It go down.
- He not working.
- The bubble have go on slide.
- The swing go really high.

In contrast, this child produces two different SVO and SV types in 2 consecutive sessions.

Day 1, 12 min, 83 utterances Day 2, 9 min, 55 utterances

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The Sentence Step: 3rd person subjects

At-risk 30 months (2115)

LSA
- I get that.
- I try, mom.
- I want *clown/soap/ that/bubbles/milk/blanket*.
- I want off.
- I want baby too.
- I want milk go.
- Him eating.

Parent Report M3L = 4 (10%ile)
- I wanna watch Tarzan&Jane.
- I want out mommy.

Slow typical, 30 months, (2221)

LSA
- You do it.
- People talking.
- He want out.
- Hand going in.
- It go right there.
- I get more stuff.
- The bubble have go on slide.
- The swing go really high.

Parent Report M3L =6.67 (25%ile)
- I want to go outside to ride my bicycle.
- I need to see dada everyday.
- Gigi needs a bath.

Targeting Tense/Agreement

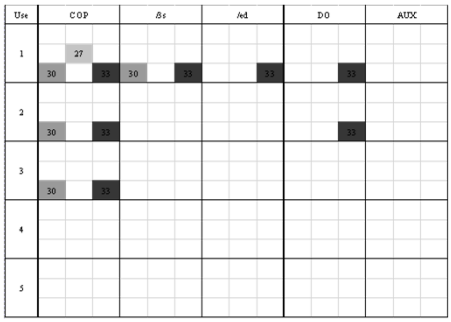
- Intermediate Goal:
  - Allison will expand her tense morpheme inventory.
- Specific Objective:
  - Allison will expand her tense morpheme inventory with the addition of 2 to 3 tense markers used in two or more sufficiently different contexts (i.e., ***/3s***, *does*, auxiliary *is*, copula *was*).
  - Why did I choose THIS list of morphemes?
  - Does this remind you of expanding the phonetic inventory before targeting the reduction of phonological processes?

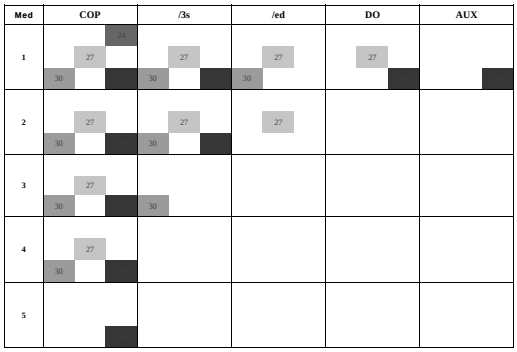
Developmental Sequence: Implications for Target Selection

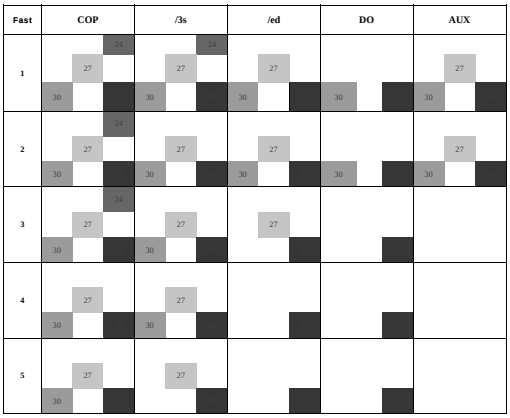
- The evidence for a developmental sequence in the emergence and productivity of different surface forms provides us with new information for selecting treatment targets.
- We have also documented evidence for cross-morpheme facilitation, indicating that acquisition of morphemes early in the sequence facilitate the acquisition of later morphemes that SHARE a similar set of grammatical features (i.e., 3rd person, singular, present).
- **Goal**: Expand the tense/agreement morpheme inventory, selecting targets in a way that capitalizes on opportunities for cross-morpheme facilitation.

Rispoli & Hadley, 2011
Rispoli et al., in press

Characterizing Development over Time







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Slow typical profile, 36 months (1218)

Noncumulative
Productivity Score = 16

	COP	/3s	/ed	Aux DO	Aux BE
1st	Him is		Dump/ed	They do	I am
2nd	Who is		Pop/ed	It did	He is
3rd	Is michael		Reach/ed	Did the rubber	We were
4th	Are we			It doesn't	
5th	Who was			I did	

Productivity alongside omissions

- I __ a bad boy.
- I __ hungry.
- What __ that?
- She __ dirty.
- More people __ in here.
- It scare__ me.
- I pop__ one.
- I __ gonna hammer.
- I __ blowing the bubble.
- He __ going in the dryer.
- And this one __ gonna be there.

Slow at-risk profile, 36 months, (1123)

Noncumulative
Productivity Score = 4

	COP	/3s	/ed	Aux DO	Aux BE
1st	Is that ..?	fit/3s	drive/ed		
2nd	That guy's				
3rd					
4th					
th					

- Is that a name for my baby brother?
- That guy/'s locked in he car.
- And her fit/3s in there good.
- Mom, who drive/ed that?

Yet ample opportunities

- That __ her firetruck.
- Her __ at firestation.
- This __ a daddy.
- (I I) we __ all done with him.
- Everybody need__ placemat.
- He eat__ there.
- Mom, that guy __ going up there.
- I __ joking.
- I __ putting gas in the car.
- That girl __ going in that.
- How __ the helicopter drive?
- __ he come up?
- Hotdog __ come/ing.

Input Modifications in Early Intervention

Variation in Parent Input and Rate of Grammatical Development

- Variational Learning
  - input informativeness for tense
- Influence of discourse style on input informativeness
- Initial attempts to modify input informativeness

Variational Learning

(Yang, 2002, 2004, Legate & Yang, 2007)

- Learning begins with UG-constrained hypothesis space
- Learning reflects a competition between possible grammars or parameter values
  +Tense vs - Tense
- Probabilistic learning drives developmental change
- Model makes quantitative predictions about development based upon properties of the input.

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Variational Learning

- Predicts acquisition will be **gradual** and influenced by the combination of both **unambiguous and ambiguous evidence** in the input rewarding and punishing the target and competing grammars.
- Metric: the proportion of input sentences that mark tense overtly (unambiguous) out of all verb forms (unambiguous + ambiguous) Legate & Yang, 2007.
  - Input informativeness for tense

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Coding Input Informativeness (Legate & Yang, 2007)

	-Tense	+Tense
Past	No change irregulars (e.g., *hit, put*)	Regular & irregular (e.g., *jumped, ate*)
Present	Zero-marked (*I want milk. You need juice.*)	Third person singular (*He likes/has juice.*)
Modals	All (e.g., *can, will, should*)	
Copula/ Auxiliaries	Ambiguous (e.g., *__you coming? Where __ you going? __ you want some? I __ gotta go.*)	All overt uses (e.g., *is, am, are, was, were, do, does, did, have, has, had*)
Bare stems	*Want more? Put your shoes on. Go get your shoes. Let's put your shoes on.*	

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Low Informativeness
4 / 4 + 8 = 0.33

M now it's [+T] stuck on there.
M is [+T] that enough?
M want [-T] more?
M wanna [-T] put it together?
M you want [-T] help?
M you want [-T] help?
M there you go [-T] .
M push [-T] it up the hill.
M push [-T] it up the hill.
M it broke [+T] .
M yes, it did [+T] break.
M play [-T] with the cars?

%Informativeness = [+Tense] / [+Tense] + [-Tense]

High Informativeness
10 / 10 + 5 = 0.67

F this is [+T] a tow truck.
F nope, tow truck doesn't [+T] work that well, does [+T] it?
F elmo is [+T] being towed away.
F put [-T] her in here.
F you press [-T] this button down and it pushes [+T] up.
F let's [-T] see [-T] how this works [+T].
F doesn't [+T] work well.
F daddy's [+T] just not using it correctly.
F you try [-T] it.
F (uh) this is [+T] a ladder of some sort.
F this goes [+T] like this?

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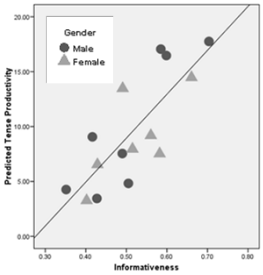
Parent Input and TAP Growth
(Hadley, Rispoli, Fitzgerald, & Bahnsen, 2011)

- 21-month parent input informativeness was strongly related to 30-month predicted productivity scores ($r = .746$, $p < .001$).



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Does Input Informativeness overlap with parent interaction styles?

YES. Fitzgerald (2010) found

- negative associations with input informativeness
  - **Directive** interaction style
  - More informal register/**reduced questions**
- positive association with input informativeness
  - **other-focused discourse** (i.e., describes actions, states, attributes of 3P subjects)

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Reduced Questions and Low Informativeness
(Fitzgerald, 2010)

Parents "drop" a lot of forms in conversationally appropriate ways.

If this occurs frequently, it is associated with lower informativeness.

M now it's [+T] stuck on there.
M is [+T] that enough?
M want [-T] more?
M wanna [-T] put it together?
M you want [-T] help?
M you want [-T] help?
M there you go [-T] .
M push [-T] it up the hill.
M push [-T] it up the hill.
M it broke [+T] .
M yes, it did [+T] break.
M play [-T] with the cars?

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Other-Focused and High Informativeness

Other-focused discourse is associated with more *informative* input (Fitzgerald, 2010).

Adult instruction on "toy talk" results in increases in informativeness (Walsh, 2010).

F this is [+T] a tow truck.
F nope, tow truck doesn't [+T] work that well, does [+T] it?
F elmo is [+T] being towed away.
F put [-T] her in here.
F you press [-T] this button down and **it pushes [+T] up.**
F let's [-T] see [-T] **how this works [+T].**
F doesn't [+T] work well.
F daddy's [+T] just not using it correctly.
F you try [-T] it.
F (uh) this is [+T] a ladder of some sort.
F this goes [+T] like this?

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NIDCD R03 DC04641, R15 DC05374,
NSF BCS-0822513

Lessons Learned from Parent Input

- When parents use lexical verbs, the subjects are most often
  - I & you (*I have....I'm eating; you need.... you're drinking*)
- When parents use copulas, they are frequently contracted
  - Pronouns: *it's, that's, what's, here's, there's, he's*

Hypothesis: *This input may NOT be optimal for detecting and analyzing how tense and agreement work in English.*

This type of input may not be as helpful for identifying the constituency of the grammatical subject and the verb phrase and may promote the acquisition of rotes and limited scope formula.

Thoughts about Optimal Input

- "Optimal input" guides the learner through the developmental sequence for acquiring tense and agreement most rapidly.
  - Greater use of sentences with 3rd person singular subjects will support children's discovery of tense/agreement in English because 3PS subject NPs require agreement with the most highly specified verb forms.
  - Greater use of lexical NP subjects is hypothesized to reduce the transitional probabilities between the subject NP and the verb phrase (VP), supporting learning of the proper constituency (Thompson & Newport, 2007).
  - Contracted copula and auxiliary BE forms lead to a misalignment of the tense/agreement marker with the subject NP rather than the VP in surface form, therefore, greater use of contracted 's is hypothesized to be negatively related to the acquisition of tense and agreement (Rispoli, 2012).

Toy Talk: Strategies to Promote Optimal Input

(Hadley & Walsh, in preparation)

- Naturalistic language modeling strategy
- Similar to self-talk and parallel talk in matching the content of language input to children's interests and activities.
- Different in that it promotes the use of 3rd person lexical noun phrases (NP) as grammatical subjects.
- Consists of two simple, non-technical strategies:
  - "talk about the toys" the child is playing with
  - "give the object its name" replacing pronominal subjects with lexical NP subjects

Can adults learn toy talk?

(Walsh, 2010)

- Participants - n=18 students, 18-28 years,
- Design
  - Pre-instruction: Participants viewed 12-min stimulus video of parent-child interaction and 'talked for' the adult
  - Instruction on Toy Talk strategies
    - Talk about the toys; Give the toy/item a name
  - Post-instruction: Using the strategies they had learned, the participants viewed the same stimuli video and 'talked for' the adult.

Strategy 1: Talk about the Toys

- Help parents talk about the states, actions, and properties of the toys. Move beyond labels.
  - That piece fits. (state verb)
  - The baby is drinking her milk. (action verb)
  - She likes the juice. (state verb)
- Contrast SV sentences with copula sentences
  - The kitty is soft.

Strategy 2: Give the item its name

Increase the use of lexical nouns as subjects, to support children's analysis of copula and auxiliary forms as tense morphemes separate from sentence subjects.

REDUCE	INCREASE
– It's soft.	- The kitty is soft.
– She's drinking .	- The baby is drinking.

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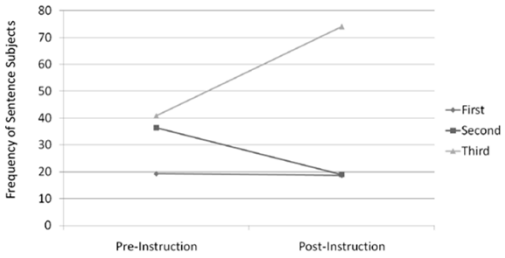
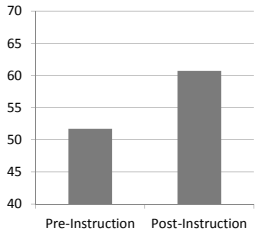
Frequency of Subject Types by Time
(Walsh, 2010)

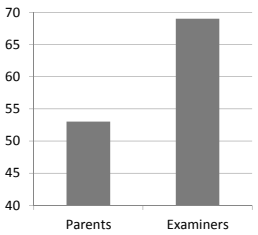


Change in Input Informativeness

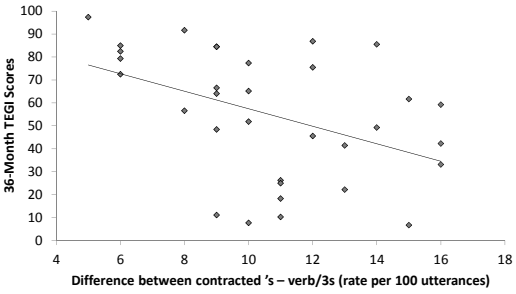
Walsh (2010)
College Students Pre-Post Instruction
20 min instruction; silent video



Jansen (2011)
Untrained Parents vs Trained Examiners
Interacting with same 21-month toddlers



Input Matters
(Rispoli, 2012)



2-Variable Regression Model Predicting 36-Month TEGI Outcomes:
$R = .586$, $R^2 = .343$, $p < .005$
21-month CDI = 15% unique variance, 21-Month Input = 13% unique variance

Conclusions

Understanding the relationships between Verbs → Sentences →Tense/Agreement in children's early language growth and in parent input may provide new ways to accelerate grammatical development with young children.

Words

Verbs

Sentences

Subjects → 3rd person

Tense

Agreement

Input:
Increase dosage of 3PS lexical NP subjects

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