Disclosure Statement: I have a financial relationship relevant to the content of this presentation.


Goals of Today’s Talk

1. Describe the sentence-focused framework, including the developmental accomplishments associated with each step.
2. Describe how to assess and monitor developmental change in verb diversity, subject diversity, and sentence diversity using parent report, language sampling, and structured protocols.
3. Describe “toy talk” as an intervention strategy, how its design modifies properties of adult language input, and can work together with responsive interaction to promote children’s sentence diversity.
4. Explain the relationship between sentence diversity and the development of later developing grammatical structures.

Is sentence structure a relevant goal for early childhood intervention?

If you answered yes,

- why is sentence structure important?
- when should we address sentence structure?
- what sentence-focused targets should we emphasize?
- how should we intervene?

Why is sentence structure important?

- Difficulty with grammar is a hallmark of specific language impairment (SLI), the most common form of developmental language disorder (DLD).
- The ability to speak in sentences enables children to express their needs and share their interests in objects and events efficiently.
  - Share interest in comment-worthy moments
  - Ask questions to gain information
  - Tell about past events, make plans for the future

What is a COMMENT WORTHY moment?

- Child displays heightened interest in something surprising or interesting
  - A bubble appears
  - A block tower falls down
  - Child knocks sippy cup over
  - A squirrel scampers up a tree
  - C (smiles at M & claps hands).
  - C (ohno!)
  - C (oops!)
  - C (gasps & points!)
  - The child’s eagerness to share this moment creates the perfect opportunity to respond with a COMMENT about the object.

Differences in early sentences?

Child 1 (Low average)

I want that.
I want there.
I want more.
I want more.

Child 2 (Average)

I want the (baby) babydoll out.
He don’t have a plate.
It doesn’t go in there.
Waffle goes in there.
Early Language Assessment and Intervention in a Sentence-Focused Framework

Pamela A. Hadley, PhD, CCC-SLP, University of Illinois at Urbana-Champaign

Brown’s Stages of Grammatical Development

<table>
<thead>
<tr>
<th>Stage</th>
<th>Age Range</th>
<th>MLU Levels</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I</td>
<td>12–26 mos</td>
<td>1.00-2.00</td>
<td>Linear semantic relations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- entity=attribute; big ball; ball big</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- agent+action; I eat; baby sleep</td>
</tr>
<tr>
<td>Stage II</td>
<td>27–30 mos</td>
<td>2.00-2.50</td>
<td>Morphological development</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Plurals –s, progressive –ing</td>
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<td></td>
<td></td>
<td></td>
<td>- Prepositions in, on</td>
</tr>
<tr>
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<tr>
<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Negation (Pooh doesn’t like peas.)</td>
</tr>
</tbody>
</table>

Sentence-Focused Framework

Goal: To increase the diversity of subjects and verbs in simple sentences

Different Verbs and Subjects → Different Grammatical Morphemes (Adult Sentences)

- **Type of Lexical Verb**
  - states = need/3s (simple present)
  - actions = is sleep/ing (present progressive)

- **Type of Subject (Person & Number)**
  - 1st person = I'm hungry; I need food. We are hungry. We are eat/ing.
  - 2nd person = you're hungry; You all need food.
  - 3rd person = She is hungry; She need/3s food. The birds are eat/ing too.

Hallmark difficulties of preschool language disorders are related to sentence structure

- Late onset and slow growth of verbs
- Omission of sentence subjects
- Pronoun case errors, especially on subject pronouns
  - me/I; him/he; her/she; them/they
- Omission of tense and agreement (T/A) morphemes
  - T/A marking is an obligatory property of English sentences
  - Copula BE, -3s, -ed, auxiliary DO, auxiliary BE

In other words ...

Preschool children with language disorders have difficulty with the development of sentence structure.

- However, sentence structure (diverse SV, SVO sentences) is not emphasized in Brown’s stages.
- Instead, Brown’s stages emphasize utterance length/MLU and early grammatical morphemes (e.g., plural –s, progressive –ing)
- Therefore, these structures are emphasized in language interventions.
Brown’s Stages of Grammatical Development

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</table>

Why Sentences?

- The sentence is the most basic unit of grammar.
- The sentence is a universal structure.
- Sentences provide the platform for later learning of language-specific grammatical systems such as tense, agreement, aspect, and case.

Why Sentence Diversity?

- The more lexical diversity children display in the subject and main verb position of sentences, the more likely they are to be producing sentences using grammatical knowledge and not memorized chunks.

Review: Developmental Steps Defined

- **Verb** – Lexical verbs carry semantic meaning
  - States (want, need or actions (eat, go))
- **Subject** – The noun phrase (NP) in the pre-verb position of an active declarative sentence
  - Pronoun (I), noun (Grandma), or noun phrase (the baby).
- **Child-like sentence** – Must contain a subject and a verb with omission or errors in grammatical structure.
  - SVO (I want baby) and SV (baby sleeping) are the basic sentence types
- **Adult sentence** – Include the obligatory structures of the adult grammar
Early Language Assessment and Intervention in a Sentence-Focused Framework
Pamela A. Hadley, PhD, CCC-SLP, University of Illinois at Urbana-Champaign

Goal 1: Notes

Goal 2

Describe when and how to assess and monitor verb diversity, subject diversity, and sentence diversity using parent report, language sampling, and structured protocols.

Assessing verb diversity: When and How?

- **When?**
  - For children who are not producing sentences with a number of different verbs
  - Children with fewer than 600 words in their expressive vocabulary
- **How?**
  - Parent report
  - Spontaneous language samples
  - Structured protocols

Assessing Verbs: Parent Report

<table>
<thead>
<tr>
<th>14. Action Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>bite</td>
</tr>
<tr>
<td>blow</td>
</tr>
<tr>
<td>break</td>
</tr>
<tr>
<td>bring</td>
</tr>
<tr>
<td>build</td>
</tr>
<tr>
<td>bump</td>
</tr>
<tr>
<td>buy</td>
</tr>
<tr>
<td>carry</td>
</tr>
</tbody>
</table>

(continued)

Longitudinal Verb Growth: Parent Report

Hadley, Rispoli, & Hsu (2016) LSHSS

n = 45 typically developing toddlers

---

Utah State University Summer Seminar, June 13, 2022
Does Verb Diversity Predict Grammar Outcomes?

Measures of Noun/Verb Diversity and Grammar Outcomes

- **Parent Report (24 months)**
  - MacArthur-Bates Communication Development Inventory (CDI)
  - Nouns: animal names, vehicles, toys, clothing, body parts, small household items, food, and furniture (280 possible items).
  - Verbs: action words (103 possible)

- **Language Samples (24 months)**
  - Number of different nouns/verbs in 30-min parent-toddler conversation in free play

- **Index of Productive Syntax (30 months)**
  - 100 utterances from parent-toddler conversation during free play

Assessing Verbs: 24-Month Language Samples

- **Parent Report CDI**
- **Language Sample Analysis**
  - Number of different nouns/verbs in 30-min parent-toddler conversation (free play)

Why does verb diversity promote grammar outcomes?

- Verb diversity provides a foundation for different sentence types
  - Transitive verbs → SVO
  - Intransitive verbs → SV
  - Alternating verbs → SVO or SV
- Verb diversity provides a foundation for different subject types
  - Animate agents → I want juice
  - Inanimate themes → it fall/pop, tower fall, bubble pop

Why does verb diversity promote grammar outcomes?

- Verb diversity provides a foundation for learning the interaction between tense and aspect.
  - State verbs → simple present
  - Action verbs → present progressive
  - (The doggy wants food)
  - (The doggy is eating food)
**Independent Replication**

*Key finding: Childhood Verb Diversity was a value-added predictor of all four adult outcome measures (Verbal IQ, ADOS, PPVT, and Vineland) whereas noun diversity was not a significant predictor of any outcome measure.*

**Discussion**

- Are these findings about verb diversity interesting?
- Do you think assessing and monitoring progress in verb diversity with parent report and/or language sampling would be beneficial?
- If so, what are the barriers to implementation?

**Structure-Specific Language Sampling**

*Verb Use at 30 Months*

- Girl 1
- Boy 1
- Girl 2
- Boy 2

**Pair & Share**

- If you were to implement structure-specific language sampling in your practice, how would you do it?

**Assessing sentence diversity: When and how?**

- Intended for the developmental transition from word combinations to sentences, corresponding to MLU from 1.50 to 3.00.
- Once children are regularly combining words (i.e., MLU > 1.50), saying several verbs per parent report (> 20), and using some verbs in spontaneous speech, assessment of sentence diversity is appropriate.

**Assessing sentence diversity: When and how?**

- Computed from parent–child play samples because conversations with familiar partners typically reveal toddlers’ best language performance
- **Sentence**: an operationally-defined syntactic structure – SV(O)
- **Diversity**: protects against reliance on rotes and limited scope formula
- **Rate-based**: computed from utterances produced in a fixed length of time (30 min) rather than from a fixed number of utterances (50, 100)
  - Reflects ability to translate message/idea into language in real time

*Hadley, McKenna, & Rispoli, 2018, AJSLP*
Developmental Expectations

- Expectations for the onset of subject-verb-object (SVO) and subject-verb (SV) sentences can be found in data reported for omnibus grammatical analyses (i.e., DSS, Lee, 1974; LARS, Klee & Gavin, 2010).
  - “average” toddler = 24 to 26 months
  - nearly all toddlers (90%) = 30 to 32 months

- However, these analysis methods do not consider the number of different words children can produce in structurally-defined positions of these two basic sentence types.
  - structurally-specific lexical diversity

Assessing “Structurally-Specific” Lexical Diversity

Subject Diversity
- The number of different pronouns and head nouns in the subject position of simple, active, declarative sentences

Verb Diversity
- The number of different lexical verbs in simple, active, declarative sentences

Computing Sentence Diversity

<table>
<thead>
<tr>
<th>Utterance</th>
<th>Sentence?</th>
<th>Unique subject-verb combination?</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>more</td>
<td>juice</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>I</td>
<td>want that</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>I</td>
<td>need more</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>I</td>
<td>want drink</td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>help</td>
<td>me</td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td>go in</td>
<td>there</td>
<td></td>
</tr>
<tr>
<td>g.</td>
<td>baby</td>
<td>sleep</td>
<td></td>
</tr>
<tr>
<td>h.</td>
<td>baby</td>
<td>up</td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>kitty</td>
<td>sleep</td>
<td></td>
</tr>
<tr>
<td>j.</td>
<td>it</td>
<td>tall</td>
<td></td>
</tr>
<tr>
<td>k.</td>
<td>it</td>
<td>go in</td>
<td></td>
</tr>
</tbody>
</table>

Developmental Change in Sentence Diversity

Hadley, McKenna, & Rispoli, 2018, AJSLP

Rispoli & Hadley, NSF; Hadley, NIDCD R03

Rate in 30-min parent-toddler interaction
1 new SV combination
Every minute

Every 2 minutes
Every 10 minutes
Developmental Change in Sentence Diversity

- Hadley, McKenna, & Rispoli, AJSLP 2018

Sentence Diversity in At-Risk Toddlers

- The purpose of this study was to explore patterns of sentence diversity at the boundary of typical and impaired language abilities.
  - Verb Type
  - Subject Type
- Three groups were formed based on 36-month language abilities; developmental change from 30-36 months was examined retrospectively
  - Low average language abilities
  - Mild/moderate delays
  - Severe delays

Sentence Diversity by Verb & Subject Type

<table>
<thead>
<tr>
<th>Verb Type</th>
<th>1st Person Pronoun Subject</th>
<th>2nd Person Pronoun Subject</th>
<th>3rd Person Pronoun Subject</th>
<th>Noun Subject</th>
</tr>
</thead>
</table>
| Copula Context    | = a state predicate ascribing a location or attribute to the sentence subject.
| Intransitive [V:I] verbs are the foundation of SV sentences. They do not require/allow a direct object noun phrase.
| Transitive [V:T] verbs are the foundation of SVO sentences. They require a direct object noun phrase.

Developmental Expectations at 30-months

- In 30 min of parent-toddler interaction, all 40 children produced
  - at least 10 different subject-verb combinations
  - subject-verb combinations from at least two subject categories (i.e., 1st and 3rd person singular)

Hadley, 2020, JSLHR

Utah State University Summer Seminar, June 13, 2022
What have we learned from *at-risk* toddlers?

- Toddlers at-risk for poor grammatical outcomes at 36 months have limited sentence diversity, especially with third person subjects.
- Late emergence of third person subjects, after 36 months, may elevate risk for persistent SLI/DLD.
- Third person subjects appear in copula contexts and with intransitive verbs before appearing with transitive verbs.
  - Based on these descriptive findings, we recommend using copula contexts as well as intransitive verbs to promote the emergence of third person subjects.

Hadley, 2014; 2020; McKenna & Hadley, 2014

Discussion

- Are these findings interesting?

- Do you think assessing the verb types and subject types would be beneficial?

- If so, what are the barriers to implementation?
Pair & Share

- If you were to use structure-specific language sampling to track diverse sentences in your practice, how would you do it?

- What would be easy to do? What would be more difficult?

Assessing Sentence Diversity Efficiently:
Sentence Diversity Priming Task

Language Measures SDPT vs Play Samples

<table>
<thead>
<tr>
<th>Language Measures</th>
<th>SDPT</th>
<th>Play</th>
<th>t(31)</th>
<th>p</th>
<th>t,</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChI Utterances</td>
<td>20.7</td>
<td>3.1</td>
<td>64.7</td>
<td>25.7</td>
<td>-9.90***</td>
</tr>
<tr>
<td>MLU</td>
<td>4.4</td>
<td>1.3</td>
<td>2.6</td>
<td>0.7</td>
<td>11.54*** .69***</td>
</tr>
<tr>
<td>NOW</td>
<td>47.9</td>
<td>12.5</td>
<td>58.2</td>
<td>23.4</td>
<td>-2.58** .32*</td>
</tr>
<tr>
<td>Verbs anywhere</td>
<td>13.1</td>
<td>5.0</td>
<td>9.1</td>
<td>4.5</td>
<td>3.96*** .22</td>
</tr>
<tr>
<td>3P Subjects</td>
<td>10.5</td>
<td>5.4</td>
<td>1.9</td>
<td>1.6</td>
<td>8.78*** .0011</td>
</tr>
<tr>
<td>3P Sentence Diversity</td>
<td>13.0</td>
<td>5.9</td>
<td>2.5</td>
<td>2.3</td>
<td>9.58*** .04</td>
</tr>
</tbody>
</table>

Third Person Subject and Sentence Diversity
Play vs SDPT

Review: Key Concepts Defined

- Transitive Verb – basis of SVO sentence; requires a direct object
  - I want lemonade; I have a plate. The baby likes milk. The boy is building a castle.

- Intransitive Verb – basis of SV sentence; does not have a direct object
  - baby sleeps; bear eating; tower fall; ball go in; water come off; hands get wet

- Third person Subject – A subject other than the speaker or listener.
  - First person/speaker = I; Second person/listener = you
  - Third person = he, she, they, doggy, baby, tower, bubble, etc

- Inanimate Subject – non-living; not prototypical
  - tower, bubble, water, hands, box, door, cabinet

Rispoli, 2019; Hadley, 2020
**Summary**

- Introduced several structurally-specific measures of lexical diversity
  - verb diversity
  - sentence diversity
  - subject diversity

- Introduced several different assessment methods
  - Parent report using the CDI
  - Language sample analysis from parent-child play samples
  - Structured protocol: Sentence diversity priming task

**Goal 2: Notes**

**GOAL 3**

Explain how to select sentence-focused treatment targets and how “toy talk” instruction can modify properties of adult language input to promote children’s sentence diversity

---

**So, what targets should we emphasize?**

How should **vocabulary targets** be identified to support the production of early sentences?

How should **sentence targets** be identified to support the production of diverse sentences?

---

**Sentence-Focused Framework**

- **Goal**: Increase the diversity of subjects with simple predicate types

---

**Diverse Subjects & Verbs in Adult Input**

- Child Lexical Diversity
- Child Sentence Diversity
- Child Tense & Agreement

---

Hadley, Rispoli, Holt, Papastratakis et al., 2017; Hadley, Rispoli, & Holt, 2017; Rispoli et al., 2018; Plante et al., 2014; Krok & Leonard, 2018

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Hadley, 2006, 2014, 2020

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Early Language Assessment and Intervention in a Sentence-Focused Framework
Pamela A. Hadley, PhD, CCC-SLP, University of Illinois at Urbana-Champaign

Child-like Sentences

**Early Words**
- **Object Labels** (nouns): Mommy, doggy, juice, & others
- **Locations** (prepositions): up, down, on, off, in, out
- **Description** (adjectives): hot, cold, wet, dry, dirty, clean, empty, full, open, closed

**Early Verbs**
- **Daily Activities**: eat, drink, sit, walk, sleep, play, ride
- **General All-Purpose**: go, come, fall, get
- **Verb Combinations**: drink milk, go in, come out, fall down, get wet

**Early Subjects**
- **Entity-Location**: hat on, shoe off
- **Entity-Attribute**: pizza hot, hands wet

**Sentence-Focused Framework**

Hadley, 2006, 2014, 2020; Rispoli, 2019
### Subject Sequence in SV(O) Sentences

<table>
<thead>
<tr>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentence diversity: Expand Person</td>
</tr>
<tr>
<td>1st person singular and 3rd person singular</td>
</tr>
<tr>
<td>Child Examples</td>
</tr>
<tr>
<td>I get it.</td>
</tr>
<tr>
<td>I found pig.</td>
</tr>
<tr>
<td>It got.</td>
</tr>
<tr>
<td>That not fit.</td>
</tr>
</tbody>
</table>

| Subject diversity |
| Increase nouns as subjects and use of case-marked singular pronouns (he, she) |
| Child Examples | Readiness |
| Dog barks. He barks. | Words > 300 parent report |
| Baby sleeping. She sleeping. | Verbs > 50 parent report |
| The balloon pops. | SV sentences in long sample |
| The hat fits. | MLU > 2.00 |

| Subject diversity: Expand Number |
| Increase plural nouns and pronouns as subjects, and use of case-marked plural pronouns (we, they) |
| Child Examples | Readiness |
| The cows go in here. | SV sentences with diverse subjects in language sample |
| The guys got in the house. | Plural nouns and/or pronouns in object position |
| Those look like pumpkins. | MLU > 2.50 |
| We can eat pizza. | |
| They spinning together. | |

### Discussion

- Do you think incorporating sentence-focused targets into your practice would be beneficial?
- If so, what are the barriers to implementation?

### Identifying Facilitative Input Properties

- Develop *simple* strategies that clinicians, parents, and teachers can use in everyday interactions to promote children’s sentence diversity.
- Early efficacy studies of *toy talk* strategies

### GOAL 3

Explain how to select sentence-focused treatment targets and how *“toy talk”* instruction can modify properties of adult language input to promote children’s sentence diversity

---

### Parent Input to Single-Word Users

M turn.
M turn on the stove.
M is there anything inside our oven?
M is there a cake in there?
M let’s pull it out.
M I’ll put it here on the table.
C hot.
C cake.
M cake.
M it’s hot.
C cake.
M yes.

### Parent Input to Single-Word Users

What structures are present?
- Questions
  - is there anything inside our oven?
  - is there a cake in there?
- Imperatives
  - turn.
  - turn on the stove.
  - let’s pull it out.
- Lexical diversity
  - N: stove, oven, cake, table
  - V: turn, make, pull, put
Parent Input to Single-Word Users

What structures are present?
- Questions
  - is there anything inside our oven?
  - did you make a cake?
  - is there a cake in there?
- Imperatives
  - turn
  - turn on the stove
  - let's pull it out.
- Lexical diversity
  - N: stove, oven, cake, table
  - V: turn, make, pull, put

What structures are rare?
- Declaratives
  - I'll put it here on the table.
  - It’s hot.
- Nouns in subject position
  - Subjects: I, it
- Will increasing parent use of noun subjects in declarative sentences facilitate children’s sentence diversity?

Noun Subjects in Input

- Variability in the subject position of declarative sentences will highlight constituent structure in input, strengthening the child’s representation of sentence structure in the mental grammar.

- The best way to introduce variability in the subject position is with noun subjects.

Toy Talk as Input Modification


Naturalistic language modeling strategy

Similar to self-talk and parallel talk
- descriptive commenting
- match content of language input to children’s interests and activities

Different from self-talk and parallel talk:
- Toy talk promotes nouns as subjects
- Self talk promotes I-subjects
- Parallel talk promotes you-subjects

Noun Subjects in Input

- Noun subjects may increase the cross-sentential cues that signal constituent structure (Hoff-Ginsberg, 1985; Morgan et al., 1989)

Moved phrases
- I can’t find the pig.
- The pig is hiding.

Noun Subjects in Input

- Pronominalization
- He’s hiding.
- The pig is hiding.
Noun Subjects in Input

- Noun subjects may also better align prosodic cues to constituent structure with syntactic structure (Fisher & Tokura, 1996; Frank & Jaeger, 1996; Gerken & McGregor, 1998)

Syntactic and Prosodic Alignment

\[
\text{[He’s] (hiding). } = \text{ misaligned}
\]

\[
\text{[The pig] (is hiding). } = \text{ aligned}
\]

Aims of Early Efficacy Study

1. Determine if simple instructional strategies result in significant change in the grammatical properties of parent input

   “toy talk” \rightarrow increase diversity of noun subjects in declarative sentences

2. Determine if parent use of diverse noun subjects in declarative sentences accelerates grammatical development for typically developing children

Parent Instruction

- Group parent education session
  - 1½ hours (adults only)
  - Early language milestones
  - Responsive interaction strategies
  - Toy talk strategies (~ 25 min)

  - Two individualized parent-coaching sessions
    - 1 hour each
    - Spaced 2 to 3 weeks apart

Foundation: Parent Child Interaction

Toy Talk Strategies

- In group session
  - Handout
  - Demonstrations
  - Role play

- In coaching sessions
  - Discuss strategy use
  - Record 10 min video
  - View video and discuss
  - Email follow-up

Toy Talk during Examiner-Child Play

Child’s noun promoted to subject

E where should I put this block?
C on castle.
E put the block on the castle?
E (ah, oh) the castle is wobbling.
E (oh) the castle fell over.
C xx xx.
C the castle : fell.
Recall the **COMMENT WORTHY** moment

- Child displays heightened interest in something surprising or interesting
  - A bubble appears
  - A block tower falls down
  - Child knocks sippy cup over
  - A squirrel scampers up a tree
  - The child's eagerness to share this moment creates the perfect opportunity to respond with a COMMENT about the object.

---

**Noun Subjects are RARE in Parent Input**

<table>
<thead>
<tr>
<th>Noun Subjects in Parent Input</th>
<th>Pre-instruction (21 months)</th>
<th>Post-instruction (24 months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Noun Subjects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diversity of Noun Subjects</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Cond:**

\[ F(1,36) = 27.28^{***} \]

**Time:**

\[ F(1,36) = 42.25^{***} \]

**TXC:**

\[ F(1,36) = 29.45^{***} \]

---

**Does Toy Talk Instruction Increase Noun Subjects in Parent Input?**

<table>
<thead>
<tr>
<th>Noun Subjects in Toy Talk Sentences (Dyad A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muhuh.</td>
</tr>
<tr>
<td>M turn.</td>
</tr>
<tr>
<td>M turn on the stove.</td>
</tr>
<tr>
<td>M is there anything inside our oven?</td>
</tr>
<tr>
<td>M did you make a cake?</td>
</tr>
<tr>
<td>M is there a cake in there?</td>
</tr>
<tr>
<td>M let's pull it out.</td>
</tr>
<tr>
<td>M I'll put it here on the table.</td>
</tr>
<tr>
<td>C hot.</td>
</tr>
<tr>
<td>C cake.</td>
</tr>
<tr>
<td>M cake.</td>
</tr>
<tr>
<td>M It's hot.</td>
</tr>
<tr>
<td>C cake.</td>
</tr>
<tr>
<td>M yet.</td>
</tr>
</tbody>
</table>

**Effects of Toy Talk Instruction: Dyad A Before & After**

- C hot.
- M oh, it is hot.
- C up there.
- M the egg is on top.
- C egg, cook it alldone.
- M let's cook the egg.
- C xx.
- M should we use the skillet or a bowl?
- C xx. xx. spoon.
- M (oh) are you getting a spoon to use?
- C table, egg.
- M (ooop), did the egg fall down?
- C xx. xx. egg fall. xx.
- M the egg fell.

---

**Variation among Treatment Parents Following Toy Talk Instruction**

**Noun Subjects in Toy Talk Sentences (Dyad A)**

- M bear is on the chair.
- M the penguin is up there.
- M this pizza is green.
- M the egg is on top.
- M the egg is in the cup.
- M (and) the egg went in the tractor.
- M the man is in the tractor.
- M the door went down.
- M the egg is going in the sif.
- M the eggs fell.
- M like the blocks are stacked high?
- M the pie is blowing bubble/s.
- M the penguin fell down.
- M the penguin is up there.
- M the penguin is up high.
- M the egg fell down.
- M a pear went in the cup.
- M oh and the bananas are tasty.
- M the banana/s are in the blue cup.
- M the pie is in the container.
- M holding/g are in the oven.
- M the egg is in the oven.
- M the egg is hot when you cook it.
- M (oh) the hotdog/s are in the oven.
- M the pie is in the oven.
- M (op) the egg fell.
- M the bubble popped.
- M the baby tried to blow.
- M your hand is in the sink.
- M the hotdog/s are in the oven.
Early Language Assessment and Intervention in a Sentence-Focused Framework
Pamela A. Hadley, PhD, CCC-SLP, University of Illinois at Urbana-Champaign

Effects of Toy Talk Instruction: Dyad B Before & After

| M baby mommy and daddy sheep. | M this is a baby cow. |
| C (sil). | M what does the cow say? |
| M what’s that animal in there? | C moo. |
| C xx, xx, xx. | M moo. |
| M horse... | M the cow went in. |
| C xx, xx, xx. | Is there a cow hiding? |
| M pitch up. | M the cow is hiding. |
| C xx, xx, xx. | M this lift up. |
| M mommey and Babies | M this door lifts up. |
| C xx xx. | C xx down [im]? |
| M why? this is the farmer. | M up and down. |
| C xx xx. | C up down [im]. |
| M where do those pumpkins go? | M yes. this door goes up and down. |
| C xx. | M pumpkin. pumpkins. they’re orange pumpkins. |
| M orange pumpkins. | M orange pumpkins. |

Child Language Growth (21, 24, 27, and 30 months)
• Assessed growth in children’s sentence diversity from conversational language samples during free-play
• All transcription completed by unbiased transcription team
• Measures of child language growth from 30 min of parent-child and 30 min of clinician-led interaction

Child Sentence Diversity
Number of unique combinations of 3rd person subjects and lexical verbs fitting the phrase structure of a sentence

1. it fall
2. egg fall
3. it go
4. they going in
5. cows eating

5 unique combinations

Empirical Evidence for Toy Talk Instruction
Direct effects on sentence diversity
✓ Treatment parents significantly increased the frequency and diversity of noun subjects in toy talk sentences relative to control parents.

✓ The number of different noun subjects in parents’ declarative sentences was a significant predictor of children’s sentence diversity
  ○ linear growth at 27 months
  ○ acceleration from 21 to 30 months

Indirect Benefits: Noun Subjects and Full IS Declaratives

Empirical Evidence for Toy Talk Instruction
Indirect effects on tense and agreement in parent input
Hadley, Rispoli, & Holt, 2017, JSLHR

As parents produced more noun subjects in declarative toy talk sentences, they also produced more full IS forms.

It’s on top → The egg is on top.
It’s wobbling → The castle is wobbling.
Empirical Evidence for Toy Talk Instruction

Indirect effects on tense and agreement in parent input
Hadley, Rispoli, & Holt, 2017, JSLHR

- Child sentence diversity growth from 21 to 30 months was a significant predictor of growth in children’s tense and agreement productivity (TAP) during the same time period, after controlling for children’s number of different words.
- Parents’ use of noun subjects and full forms at 24 months were significant predictors of TAP growth at 30 months.

Summary

- Explained how to select sentence-focused treatment targets
  - location and description words
  - early verbs
  - early subjects (entity-location; entity-attribute)
  - subject diversity in simple 3P sentences
- Described toy talk, a language modeling strategy that can be used in combination with responsive interaction strategies to promote growth in 3P sentence diversity

Goal 3: Notes

GOAL 4

Explain the relationship between sentence diversity and the development of later developing grammatical structures

Difficulty with Grammar is Hallmark of SLI

- Non-mastery of tense and agreement (T/A) marking is a hallmark characteristic of preschool and school-age children with SLI (cf. Leonard, 2014; Oetting & Hadley, 2017; Rice, 2012).
  - Sensitive and specific clinical marker (Rice, Wexler, & Hersberger, 1998)
  - Strong evidence for heritability of grammatical deficits (Bishop et al., 2006; Dale et al., 2008)
- Question underlying SFF: Is it possible to detect grammatical difficulties at younger ages to improve early identification and language outcomes?

Test of Early Grammatical Impairment (TEGI) Elicited Grammar Composite

- 3s probe
  - Here is a pilot. Tell me what a pilot does.
- Past probe (regular & irregular verbs)
  - Here the girl is climbing. Now she’s all done. Tell me what she did.
- DO probe (in questions)
  - Ask the puppet if the kitty/bears like(s) juice.
- BE probe (copula & auxiliary BE in questions & statements)
  - Ask the puppet if the kitty/bears are hungry.
  - The kitty is bears are jumping. What about the kitty?
- TEGI Composite = average of accuracy scores for each probe

Source: rice-wexler-tegi
Differences in Grammatical Abilities?
36 Months

- Girl 1
- Boy 1
- Girl 2
- Boy 2

Child-like vs Adult Sentences

Child-like Sentences
- doggy __ hungry.
- he need _food.
- the juice spill__
- __ him need more?
- doggy __ not eating.

Adult Sentences
- The doggy is hungry.
- He needs food.
- The juice spilled.
- Does he need more?
- The doggy is not eating.

Tense and Agreement

Tense Agreement Productivity (TAP) Score
(Hadley & Short, 2005; Rispoli, Hadley & Holt, 2009; Hadley et al., 2014)

Five Morphemes
- Copula BE
- 3rd person singular present /3s
- Past /ed
- Auxiliary DO
- Auxiliary BE

- Children earn up to 5 points for sufficiently different uses of each T/A morpheme
- Score ranges form 0 to 25

Some uses excluded
- Copula/auxiliary forms contracted to high frequency pronouns (e.g., he’s, it’s, what’s, here’s)
- Repetitions of subject + cop/aux combinations
- Repetitions of verb stems + affixes

TAP Score = 6
(total number of unique uses)
Early Language Assessment and Intervention in a Sentence-Focused Framework
Pamela A. Hadley, PhD, CCC-SLP, University of Illinois at Urbana-Champaign

Tense Agreement Productivity (TAP) Score

<table>
<thead>
<tr>
<th>USE</th>
<th>COP</th>
<th>3s</th>
<th>ed</th>
<th>DO</th>
<th>AUX</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Dad is go/3s look/ed did dog...? baby is sleeping</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd</td>
<td>Dog is fit/3s play/ed e does/n’t fit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd</td>
<td>Baby’s hungry.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th</td>
<td>shoes are</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5th</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TAP Score = 11 (total number of unique uses)

Similarity in TAP Sequence

Hadley & Short (2005); Rispoli, Hadley & Holt (2012)

- Productivity Increase
  - Copula > {‐3s,‐ed, DO} > Aux BE
- Sequence observed for
  - Fast developers
  - Average developers
  - Slow developers
  - Children at risk for SLI
  - Preschoolers with SLI (Gleefelter & Leonard, 2015)

Tense/Agreement Productivity Grows with Sentence Diversity (21 to 30 mos)

Hadley et al., 2014

TEGI Scores at 36 months

TAP Growth Rates predicted TEGI Outcomes

Key finding: Linear and quadratic TAP growth from 21 to 30 months accounted for 47% of the unique variance in TEGI outcomes at age 3.

This shows stability between early growth of T/A morphemes and later accurate use.

Diverse 3rd Person Sentences as Foundation for Tense and Agreement

Diverse child-like sentences

Adult-like sentences with diverse T/A morphemes
**Why Sentence Diversity → Tense and Agreement**

- Sentence diversity creates opportunities for children
- to discover tense/agreement morphemes in the input
- to learn the forms that are specified for different grammatical features (e.g., person, number)
- to practice encoding these grammatical features in their sentence production

---

**Recap: Indirect Effects of Toy Talk Instruction**

Indirect effects on tense and agreement in parent input

*Hadley, Rispoli, & Holt, 2017, JSLHR*

- It's on top → The *egg* is on top.
- It's wobbling → The *castle* is wobbling.

- As parents produced more *noun* subjects in declarative toy talk sentences, they also produced more full *is* forms, \( r = .78, p < .001 \)

- Parent use of full *is* declaratives was also related to children’s 30-month TAP scores, \( r = .29, p < .041 \)

---

**Goal 4: Notes**

- Identify links between early- and later-developing elements of sentence structure.
- Use links to improve the efficiency of early grammatical intervention

---

**The SFF Journey...**

- Identification of links between early- and later-developing elements of sentence structure
- Use of links to improve the efficiency of early grammatical intervention

---

*Hadley, 2006, 2014, 2020; Rispoli, 2019*
Application of the SFF and Toy Talk to ASD

Key finding: naturally-occurring #ToyTalk sentences in caregiver input were associated with increases in #SentenceDiversity for children with ASD, and the effects were stronger when caregiver use of NDBI strategy use improved.

New Applications of the SFF and Toy Talk

New application: Brief intervention for parents of toddlers with 5-100 words

- Say the name
- Say it in a sentence (toy talk)

New Applications of the SFF

New application: Brief intervention for parents of toddlers with 5-100 words

- Say the name
- Say it in a sentence (toy talk)

Intransitive “Switch” Verbs

I’m rolling the ball.
The ball is rolling.

He’s turning the wheel.
The wheel is turning.

She spilled the water.
The water spilled.

Noun Subjects and Academic Language

Conversational Interaction
- Lexical features
  - Generic word choice
  - Lexically sparse
  - More high frequency words
- Grammatical features
  - Questions and imperatives
  - Pronominal subjects, referring to present or known participants

Academic Language
- Lexical features
  - Specific word choice
  - Lexically dense
  - More low frequency words
- Grammatical features
  - Declaratives
  - Lexical subjects, nominalizations, and expanded noun phrases (NP)

Toy Talk is a Form of Academic Language

Academic Language
- Lexical features
  - Specific word choice
  - Lexically dense
  - More low frequency words
- Grammatical features
  - Declaratives
  - Lexical subjects, nominalizations, and expanded noun phrases (NP)

- Toy talk sentences increase children’s exposure to literate language.
- This may support children’s transition to the academic language register of classroom instruction and school-based texts.
Early Language Assessment and Intervention in a Sentence-Focused Framework
Pamela A. Hadley, PhD, CCC-SLP, University of Illinois at Urbana-Champaign

Enhanced Milieu Teaching-Sentence Focus (EMT-SF) Randomized Control Trial

- To evaluate the efficacy of EMT-SF intervention, implemented by caregivers, relative to a control condition for 30-month-old toddlers with receptive/expressive delays and their caregivers.

- 18 month intervention, 5 year project
  - Phase 1: vocabulary targets
  - Phase 2: sentence targets
  - Phase 3: decontextualized talk

Overview of EMT-SF Intervention Phases

<table>
<thead>
<tr>
<th>Phase</th>
<th>Intensive EMT</th>
<th>Phase I Sentence-Focused Child Targets</th>
<th>Phase III Decontextualized Talk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>30-36 months</td>
<td>36-42 months</td>
<td>42-48 months</td>
</tr>
<tr>
<td>Frequency</td>
<td>2x / week</td>
<td>1x / week</td>
<td>1x / month</td>
</tr>
<tr>
<td>Duration</td>
<td>3 months</td>
<td>9 months</td>
<td>6 months</td>
</tr>
<tr>
<td>Caregiver Emphasis</td>
<td>Basic EMT Strategies</td>
<td>Fine-tune EMT Strategies Toy Talk</td>
<td>READY Talk Recall past Explain Ask open questions Discuss future Leech, Wei, Harring, &amp; Rowe, 2018</td>
</tr>
<tr>
<td>Child Emphasis</td>
<td>Communication Rate Core vocabulary (object, location &amp; description words)</td>
<td>Action Words Location Sentences Description Sentences Action Sentences</td>
<td></td>
</tr>
</tbody>
</table>

EMT-SF Intervention Targets and Strategies

- REACT Talk
- Vocabulary
- Sentence
- Vocabulary
- Decontextualized Talk
- Comment-worthy moments
- Notice and Say
- Add an Action
- Toy Talk (Move It)
- What about (Contrast)

EMT-SF Outcome Measures

- ClinicalTrials.gov Identifier: NCT03782493
- CELF-P3
- Vocabulary
- Grammar
- Narrative
- TEGI/SPELT
- Bus Story
- 49 months
- 42 months
- 36 months
- 30 months
- Study Entry
- Parent-Child language samples & SDPT at 30, 33, 36, 39, 42, 45, & 49 months

Summary

- Introduced the rationale for the Sentence Focused Framework as an approach to early language assessment and intervention
- Introduced measures of verb diversity, subject diversity, and sentence diversity and presented alternative ways to assess each
- Addressed when sentence-focused treatment targets are appropriate and described toy talk as a language modeling strategy to promote sentence diversity
- Explained the relationship between sentence diversity and the development of later developing grammatical structures

Resources

- For direct links to related publications, visit https://apl.shs.illinois.edu
- For clinically-relevant resources and articles, visit the sentence-focused framework website and blog http://publish.illinois.edu/appliedpsycholinguistics

Kaiser, Roberts, & Hadley, 2018-2023; ClinicalTrials.gov Identifier: NCT03782493

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Utah State University Summer Seminar, June 14, 2022

Selected References


Kaiser, Roberts, & Hadley, 2018-2023; [ClinicalTrials.gov Identifier: NCT03782493](https://clinicaltrials.gov/ct2/show/NCT03782493)

For more information, visit the Early Intervention Research Group at Northwestern

- [Recruitment Flyer](#)