Morphological Knowledge: Why should SLPs care? How do we assess it? How do we teach it?

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Learning Objectives

Learners will be able to:

- Explain the construct of Morphology
- Describe at least 3 reasons why SLPs should learn about morphology
- Identify 3 tasks that can be used to assess morphological skills in school-age children
- Identify 3 strategies that can be used to teach morphological skills to school-age children

Agenda

- Part I: Introduction and why should SLPs learn about morphological skills in children?
- Part II: How can we assess morphological skills in our classrooms?
- Part III: How can we teach morphological skills to school-age children?
Part I: Why should SLPs care about morphological knowledge in children?

Terminology

- **Morpheme**
  - Mono-morphemic (e.g., play)
  - Multi-morphemic (e.g., playful, plays, replay)

- **Root word or Base word**
  - Free (e.g., play, joy, acid)

- **Bound**
  - Prefix
  - Suffix
  - Inflections

- **Derived words**
  - (e.g., playful, joyful, acidity)

Construct

- **Morphological Knowledge**
  - Relational Knowledge
  - Syntactic Knowledge
  - Distributional Knowledge

- **Morphological Awareness**
  - Metalinguistic skill

*e.g., Tyler & Nagy, 1989*
Morphological Awareness

Morphological awareness is one’s conscious awareness of the morphemic structure of words and their ability to reflect on and manipulate that structure (Carlisle, 1995, p. 194)

Acquisition of Morphological Knowledge

- **Age**
  - Pre-school through school-age years
  - Grade 3-5 important

- **Order**
  - Inflections, compound words, derived words
  - Phonologically transparent and opaque

- **Type**
  - Relational knowledge, syntactic knowledge, distributional knowledge

Anglin, 1993; Carlisle, 2000, 2002; Lewis & Windsor, 1996; Mahony, 1994; Marinelle & Knowles, 2012; Tyler & Napp, 1989; Windsor, 1994; Wyoosaki & Jenkins, 1987

Morphological Awareness & Literacy

- Reading fluency
- Reading accuracy
- Reading comprehension
- Language
- Vocabulary
- Spelling

Bowers, Kirby, & Deacon, 2010; Carlisle, 1996, 2000, 2004; Elbro & Arnback, 1996; Fowler & Liberman, 1995; Goodwin & Ahn, 2010; Ram et al., 2013; Reed, 2008; Singson, Mahoney, & Mann, 2000; Windsor, 2000
Morphological Awareness and Vocabulary

\[ \text{break} + \text{able} = \text{breakable} \]

\[ \text{enjoyable} \]

\[ \text{Payable} \]

Morphological Awareness and Reading

\[ \text{Reading} \]
\[ \text{Comprehension} \]
\[ \text{Vocabulary} \]
\[ \text{Decoding} \]
\[ \text{Morphological Awareness} \]
\[ \text{Phonological Awareness} \]

Triangle model of morphology (Kirby, Bowers & Deacon, 2009)

\[ \text{Meaning} \]
\[ \text{Semantics} \]
\[ \text{Morphology} \]
\[ \text{Orthography} \]
\[ \text{Phonology} \]

\[ \text{Form} \]
Morphological awareness and literacy connection

- Morphemic rules often as a guide to pronunciation of derived words (Goodwin & Ahn, 2010; Kuo and Anderson, 2006)
  - dis + hearten versus dish + earten
  - suggestive versus surviving

- Knowledge about individual morphemes can aid readers to decode longer words and access meaning thereby facilitating comprehension
  - disrespectful

Morphology and Common Core (e.g., Gabig & Zaretsky, 2013)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>KG</td>
<td>Uses the most frequently occurring inflections and affixes (-ed, -s, -re, -un, -ful, -less) as a clue to meaning of an unknown word</td>
</tr>
<tr>
<td>1st grade</td>
<td>Reads words with inflections endings (girls, jumped) Determine or clarify meaning of unknown word, identify frequently occurring root words with inflections</td>
</tr>
<tr>
<td>2nd grade</td>
<td>Decode words with common prefixes &amp; suffixes Use the root word as a clue to the meaning of unknown word</td>
</tr>
<tr>
<td>3rd grade</td>
<td>Identify meaning of most common prefixes and suffixes Use spelling patterns and generalization (e.g., word families)</td>
</tr>
<tr>
<td>4th grade</td>
<td>Use grade appropriate Greek &amp; Latin affixes and roots as clues to meaning (e.g., photograph, autograph)</td>
</tr>
<tr>
<td>5th grade</td>
<td>Use knowledge of morphology to read unfamiliar multisyllabic words, using roots/affixes</td>
</tr>
</tbody>
</table>
SLPs and morphological awareness

- Students need to learn 20-30 new words per day to have the requisite word knowledge to understand academic texts (e.g., Nagy & Anderson, 1984).
- School-age children acquire a significant proportion of their vocabulary through reading, many of which (~60%) are derived words (e.g., Anglin, 1993; Nagy & Anderson, 1984).
- A large majority of the academic words are used in difficult syntactical structures mediated by use of affixes (e.g., Goodwin et al., 2015).

Several studies document a strong link between morphological knowledge and literacy skills including vocabulary, decoding, reading comprehension, sight word reading, and spelling abilities in school-age children (e.g., Apel, Wilson-Fowler, Brimo, & Perin, 2012; Carlisle, 1995; Kirby et al., 2012; Nagy, Berninger & Abbott, 2006; Ram et al., 2013; Windsor, 2000).

Morphological awareness abilities of children in grade 1 accounted for 9.6% and 7.4% of the unique variance on reading and spelling measures respectively, after accounting for phonological awareness (e.g., Wolter, 2009).

- SLPs are a part of the team that works with children with reading, writing and spelling difficulties as well as on vocabulary skills.
- SLPs are also being encouraged to provide services within the classroom as opposed to a pull-out model (push for inclusion).
- SLPs are also encouraged to write goals that have an academic relevance and are aligned with the standards.
- Knowledge about morphological skills in children will help SLPs meet all these goals and more importantly make a difference in children’s literacy skills.
How do we assess morphological skills?
Evidence from research studies

Assessment Tasks
- Criterion Referenced Tasks
- Dynamic assessment Tasks
- Type of morphological knowledge
- Modality of assessment
- Standardized assessment

Assessment: Relational Morphology
- Comes from Task (e.g., Derwing, 1976, Derwing and Baker, 1979)
  - Does farmer come from farm?
  - Does corner come from corn?

- Judgment Task (e.g., Carlisle & Nanavathoy, 1995) Or Word Analysis Task
  (e.g., Rubin, 1988)
  - Is there a little word in teacher that means something like teacher?
  - Is there a little word in corner that means something like corner?

- Judgment Task Variations (e.g., Carlisle, 1995)
  - A person who teaches is a teacher (true/false task)
  - A person who makes dolls is a dollar (true/false)
Assessment: Relational Knowledge

- **Base Production and Suffix Identification task** (Windsor, 2000, p. 54)
  - Target words embedded in a video followed by stimulus sentence and prompt.
  - “Find the smaller related word at the beginning of the word”
  - Identify “the right word ending or suffix”

Assessment: Relational Knowledge

**Variation: Multiple choice written task**

1. *(alertness)*: Regular exercise and good diet helps to improve our alertness.

   alertness
   a) The smaller, related word is ______
   b) There is no smaller, related word.

1. *(alertness)*: Regular exercise and good diet helps to improve our alertness.

   alertness
   a) s
   b) ness
   c) ertness
   d) no suffix
Assessment: Syntactic Knowledge
   a. Production Task
      • “Teach”. Mr. Sam is a very good ____________.
      • “Farm”. My uncle is a ____________
      • “Permit”. His father refused to give ____________
   b. Decomposition Task (Carlisle, 2000)
      • “runner”. How fast can she ________?
      • “Driver”. Children are too young to ________

Assessment: Syntactic Knowledge conti
1. Word Analogy Task (e.g., Nunes, Bryant & Balman, 1976; Kemp, 2006)
   • Combination of Relational and Syntactic Knowledge
      • fate : fateful :: hope: ________(hopeful)
      • alert: alertness :: quick: ________(quickness)

Assessment of Syntactic Knowledge conti.
• Derivational Suffix choice test (University of Washington, 1999)
  A. Real Words
     ✓ Did you hear the ________? (directs, direction, directing, directed)
  B. Real words with improbable suffixes
     ✓ When he got a new puppy, he was no longer dogless, but not “he was in the dogless”.
  C. Non words only
     ✓ The teacher taught us how to ________ long words (jitting, jitting, jitting, jitting)
Assessment: Syntactic Knowledge conti

Multiple-Choice Variation

(crawl) Jennifer doesn’t like insects because they are creepy and ___________.

a) crawly
b) crawled
c) crawler
d) crawls

Assessment: Distributional Knowledge

Lexical decision task (Tyler & Nagy, 1989; McCutchen et al., 2008)

Decide whether the given root word and suffix could be “put together to make a word” by using a yes-no answer

• quiteness
• playness
• preference

Assessment: Distributional Knowledge conti

Variation: Match the columns (Ram et al., 2015)

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>solid</td>
<td>al</td>
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<tr>
<td>ion</td>
<td>ify</td>
</tr>
<tr>
<td>ful</td>
<td></td>
</tr>
</tbody>
</table>
Prompts on the DATMA (Larsen & Nippold, 2007)

1. Tell me what the derived word means?
2. How did you know that [derived word] means [child’s response]
3. Does the derived word have smaller parts?
4. What are those parts?
5. Now can you tell me what the word means?
6. The smaller parts of the derived word are ______ + _______. Now can you tell me the meaning of the derived word?
7. Listen to this sentence and then tell me what ______ means?
8. Which of these 3 choices gives you the meaning of the derived word?

Prompts on the DATMA-M (Rao et al., 2013)

1. Tell me what the derived word means (isolation)
2. Listen to the sentence and tell me what the derived word means (context)
3. How did you know that [derived word] means [child’s response]
4. Does the derived word have smaller parts? What are those parts? Now can you tell me the meaning of the derived word?
5. The smaller parts of the derived word are ______ + _______. Now, can you tell me the meaning of the derived word?
6. The (suffix) in (derived word) means _________. Now can you tell me the meaning of the derived word?
7. Which of these 3 choices gives you the meaning of the derived word?

Standardized Assessment

- CELF-5 (inflections)
- TOLD-P& I 4 (inflections and derivations)
- TOAL-4 (word derivations)
How do we teach morphological skills?
Evidence from research studies

Research Findings

- Several meta-analyses indicate that providing morphological awareness instruction to school-age children significantly improves their language and literacy outcomes (e.g., Bowers et al., 2010, Goodwin & Ahn, 2010, Reed 2008, Carlisle 2010).
- Results from these meta-analyses indicate that explicit instruction in morphological awareness helps improve phonological awareness, vocabulary, reading comprehension, decoding and spelling skills in school-age children with and without language or literacy deficits (e.g., Bowers et al., 2010, Goodwin & Ahn, 2010, Green & Winer, 2011, Reed 2008, Carlisle 2010).
- IT’s WORKING!!

Intervention

Overall Goals:

- To teach children to apply their morphological knowledge to vocabulary, reading, writing and spelling activities.
- To encourage students to use “morphological problem solving” for unfamiliar words in text.
- To promote “word consciousness” among students.
- To help students recognize “patterns” in words.
- To incorporate morphological awareness instruction as a part of larger literacy instruction protocol.
Process of Implementation

- Baseline knowledge
- Purpose
- Goals
- Introduction of concept
- Strategies
- Activities
- Data
- Progress monitoring

Sequence of Intervention [e.g., Green & Wolter, 2011]

1. Introducing morphology and identifying patterns
2. Emphasizing inflectional morphological awareness
3. Emphasizing derivational morphological awareness
4. Building words from morphemes
5. Application: Linking morphological awareness to academic context

IEP goals & Common Core State Standards

- While writing IEP goals in accordance with CCSS use either a standards-referenced or standards-based approach (Blosser et al., 2012)
- 6-step process (Power, deFur & Flynn, 2012)
  1. Review the content standards for the Grade
  2. Determine where the child is performing (PLAFP)
  3. Review the child’s IEP goals, accommodations and modifications
  4. Review the classroom materials and analyze instructional style
  5. Collaborate with teachers
  6. Design and Implement Intervention
Sample IEP goals

- Given specialized instruction, student will explain meanings of target derived words occurring in academic texts by using morphological analysis as a strategy with 80% accuracy across 3 consecutive sessions.
- Given no more than 1 cue, student will identify root words and affixes (by sorting them into different groups) for target academic vocabulary words with 80% accuracy across three consecutive sessions.
- Given a model, student will explain meanings of common prefixes and suffixes with 80% accuracy across three consecutive sessions.
- Given specialized instruction, student will use the correct word endings (inflections) in structured activities with 80% accuracy.

I-SPY

- Goals:
  - To identify “patterns” in words
  - Identify inflections, derived words, compound words
- Create a “detective” theme for your therapy session
- Use “I SPY” to look for smaller words within big words
  e.g., baseball, airplane, plants, joyful

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Word Detective: Reading Passage

(Keil et al., 2013)

“we are going to be working together over the next few sessions to improve your reading. To do that, we are going to play a detective game where we will solve a case each day by reading a cool book and finding and coding clues. In this game, each one of you will be detectives, and we’re all looking for clues as we solve the case. Each time we meet, we’ll have a different case to solve.

What types of clues will we be looking for? Well, look at your Coding Guide, which will tell you. Can someone please read the different types of clues we’ll be looking for? (Call on a student to read the following words from their Coding Guide:

(V = Visualize, C = Make Connections, and WS = Word Solve) (“p.521)
Word Detective conti..

Word Sorts

- Goal: To facilitate awareness of how morphologically complex words are created.
- Strategy:
  - Identify or create a list of roots, prefixes, suffixes or inflectional endings to be taught.
  - Decide on closed versus open sort
  - Write down all the target words on cards. Ask the student to sort into different piles based on closed or open sort
  - Have a discussion on “rule” for sorting and its implications
  e.g., sort the following words into “prefix” or “not a prefix” category
  
  realize, rewind, recapture, ready and reach

  e.g., Apel & Warfel, 2014; Bowes et al., 2010; Carlisle 2010; Goodwin & Ahn, 2010; Goodwin et al., 2013; Gough & Waber, 2011; Nagy &Towne, 2012; Kirby et al., 2011; Reel 2008.

Morphological Analysis

Righteousness

“We will walk until justice runs down like water and righteousness like a mighty stream”

(Giovanni, 2006, p. 23)

What does righteousness mean?

How can you figure it out?

e.g., Apel & Warfel, 2014; Bowes et al., 2010; Carlisle 2010; Goodwin & Ahn, 2010; Goodwin et al., 2013; Gough & Waber, 2011; Nagy & Towne, 2012; Kirby et al., 2011; Reel 2008.
Word Building Task/ Word Sum/ Word Matrix

Rationale: Facilitate student’s conscious awareness of written morphemes.

Strategy: Give students a list of root words, list of common affixes. Students are required to generate as many words as possible with the root word and affix combinations.

e.g., Make as many new words as you can with the word please

<table>
<thead>
<tr>
<th>root</th>
<th>affix</th>
<th>word</th>
</tr>
</thead>
<tbody>
<tr>
<td>please</td>
<td>re</td>
<td>please</td>
</tr>
<tr>
<td></td>
<td>un</td>
<td>please</td>
</tr>
<tr>
<td></td>
<td>ant</td>
<td>pleaseant</td>
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<td></td>
<td>ure</td>
<td>pleaseure</td>
</tr>
<tr>
<td></td>
<td>ly</td>
<td>pleaseably</td>
</tr>
</tbody>
</table>

Segmenting Tasks

• Similar to segmenting tasks for phonological awareness.

• Goal: To teach students how to break a morphologically complex words into parts.
  - Cat + s = Cats
  - Allow + able = allowable

• Important to: explain why each morpheme is segmented and the fact that segmentation is based on “meaningful units of meaning”

  e.g., Apel & Warfel, 2014; Bowen et al., 2010; Carlisle, 2010; Goodwin & Ahn, 2010; Goodwin et al., 2013; Green & Waber, 2012; Nagy & Berninger, 2012; Kirby et al., 2012; Real, 2008.

Word Relatives/ Word families

<table>
<thead>
<tr>
<th>related</th>
<th>bright</th>
</tr>
</thead>
<tbody>
<tr>
<td>developer</td>
<td>brighter</td>
</tr>
<tr>
<td>develops</td>
<td>brightest</td>
</tr>
<tr>
<td>developed</td>
<td>brightly</td>
</tr>
<tr>
<td>developing</td>
<td>brighten</td>
</tr>
<tr>
<td>developable</td>
<td>brightness</td>
</tr>
<tr>
<td>undevelopable</td>
<td>brighten</td>
</tr>
<tr>
<td>development</td>
<td></td>
</tr>
<tr>
<td>developmentally</td>
<td></td>
</tr>
<tr>
<td>redevelop</td>
<td></td>
</tr>
</tbody>
</table>

  e.g., Apel & Warfel, 2014; Bowen et al., 2010; Carlisle, 2010; Goodwin & Ahn, 2010; Goodwin et al., 2013; Green & Waber, 2012; Nagy & Berninger, 2012; Kirby et al., 2012; Real, 2008.
Semantic Mapping (adapted from Wisconsin Rti Center)

- Sentence from text
- Prefix
- Root
- Suffix

Definition based on word parts

Direct Instruction of Root words and Affixes

- Provide definitions of common root words
- Provide definitions of common prefixes
- Provide definitions of common suffixes

e.g., Apel & Warfel, 2014; Bowers et al., 2010; Carlisle 2010; Goodwin & Ahn, 2010; Goodwin et al., 2013; Green & Webel, 2012; Nagy & Towsvel, 2012; Kirby et al., 2012; Read 2008.

Questions
Learning Objectives

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