Teaching to the Test? Identifying Linguistic Demands of State Assessments

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Peggy Agee, SLPD
Objectives

Participants will be able to …

• identify developmental progression of children's comprehension of derivational and inflectional morphemes

• identify the vocabulary demands of the academic curriculum.

• analyze released test items for syntactic, morphologic, and semantic complexity.
• The general curriculum is the curriculum adopted by the school for all children from preschool through secondary school.

Virginia Standards of Learning (SOL)
Common Core State Standards (Oregon)
Curriculum Frameworks (Mass, Nev, others)
High Stakes Assessments

• Required by No Child Left Behind
  – Students must pass assessments in English/Language Arts, Math, and Science for schools to meet Adequate Yearly Progress (AYP)

• 100% of students must pass state assessments by 2014
Vocabulary Growth
(Marzano, 2004; Pence and Justice, 2004)

• Students need to encounter new vocabulary in context repeatedly
  – Average child - needs 15 exposures for a new word to become automatic
  – Child with language impairment - needs 50 – 100 exposures
Marzano’s meta-analysis of research regarding growth of academic vocabulary

- Grade 1: 2,703 – 26,000 words
- Grade 7: 4,760 – 51,000 words
- Grade 12: 17,000 – 45,000 words (Marzano, 2004)

Regardless of study, Students must master a minimum of 1000 new words per year for 12 years!
Morphology and Syntax

Effects on Linguistic Complexity
Morphology

How do learners gain morphologically more complex words?

• Children learn to *inflect* words in primary language development (birth to five)

• Children learn to *derive* words in later language development (school age)
Inflected Forms

Constructed by adding morphemes which change the form of the word, but not the meaning

Morphemes used for

- comparison (-er, -est) bigger, largest
- plurality (-s, -es) dogs, watches
- tense (-ed, -ing, en) jumped, running, eaten
- possession (-s) boy’s
More About “Inflections”

- Addition of inflectional morpheme will result in a “new word” belonging to the same grammatical class as the “old” word (for example: jump, jumps, jumping are all verbs)

- Inflected forms can also be internal word changes: ate, drove, children, geese, seen
“Inflections” Continued

- Adding an **auxiliary verb** shows:
  - Mood (can, should, would, may, might)
  - Tense
    - Future (*will* + verb)
    - Present progressive (*is, am, are* + *verb ing*)
    - Past progressive (*was, were* + *verb ing*)
    - Future progressive (*will be* + *verb ing*)
    - Present perfect (*have, has* + *verben OR verbed*)
    - Past perfect (*had* + *verben OR verbed*)
    - Future perfect (*will have* + *verben OR verbed*)
Derived Forms

Constructed by adding a prefix or a suffix, creating new word (derived form)

Derived form differs in:

- Form
- Meaning, and/or
- Grammatical class

Derived form, example:

- run (verb) + *er* = runner (noun)
- drive (verb) + *able* = drivable (adjective)
## Now Try It Out!

**Sort Words with Inflectional vs. Derivational Morphemes**

<table>
<thead>
<tr>
<th>Inflectional Morphemes</th>
<th>Derivational Morphemes</th>
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<tr>
<td>replay</td>
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Categories of Derived Forms

• *Derived adjectives*
  – Constructed from nouns and verbs (prude to prudish; track to trackable)

• *Derived nominals*
  – Constructed from adjectives or verbs (stable to stability; enrich to enrichment)
Development of Derived Forms

*Derived forms show a hierarchical and progressive development!*

- Derived nominals are more difficult to comprehend than are derived adjectives
- Adolescents outperformed elementary-aged subjects on comprehension of both derived forms

Nippold & Sun (2008)
ON TO SYNTAX. . . . .
The Big Idea

“If a reader cannot derive meaning from individual sentences that make up a text, that is going to be a major obstacle in text-level comprehension.”

Scott (2009)
Structural Features of Sentences Which are “Tough”

- Number of propositions (ideas)
- Number of embeddings
  - Appositive, subordinate clauses, relative clauses, preposition phrases, infinitive phrases
- Order of major sentence elements
- Distance between crucial elements

Thompson & Shapiro (2007)
Propositions

Number of propositions aligns with number of true verbs (i.e. clauses)

(1) The authors of the constitution desired (2) that the branches of government should be responsible to one another (3) and so they created a system of checks and balances at the highest levels (4) which leads to greater confidence in government decisions.
Embeddings

Include:

- **Appositives** = elaboration of the noun
  
  Sally, *my aunt*, is coming to visit.

- **Expanded prepositional phrases** = phrase initiated by preposition
  
  I’m going to the store *for chips and crackers* now.

- **Relative clauses** = clause initiated by pronoun (who, whose, that)
  
  I like the scarf *that you are wearing* with that suit.

- **Other subordinate clauses** = adverbial clauses initiated by subordinating conjunction (e.g. because, so that, while)
  
  Let’s play a game *while Mom goes* to the store for ice cream.
The clown, a major headliner with Barnum and Bailey Circus, was convicted of shoplifting from many of the department stores which sell jewelry and other expensive accessories.

Red = appositive
Blue = expanded prepositional phrase
Green = expanded relative clause
Does Word Order Help or Interfere with Sentence Comprehension?

- S-V-O  *The boy pushed the girl*

- Look at **passive voice**:
  
  *The boy was pushed by the girl.*
  
  *Apples were gathered from the orchard.*

- Examine a **cleft sentence**:
  
  *It was the ball that John kicked which was stolen.*

- Consider **“left-branching” subordinate clauses**
  
  *When her arguments were not having the desired effect, Mary made no further comments at the meeting.*
Distance Between Crucial Sentence Elements

“The major premise is that, when words intervene between elements that are typically closer together. . . , the reader has to work harder.”

Scott (2009)

One player from the minors that the team signed to a three-year contract yesterday will not attend spring training.
LET’S PRACTICE AS A GROUP
Key:
Green = Participial phrase
Pink = verb form as adjective
Aqua = Derivational morpheme
Blue = dependent clause
Underlined = # of preposition phrases
Purple = gerund
Orange = passive voice
Look for dependant clauses:

• Type
• Frequency
People thought Weihenmayer would put his climbing partners at risk if he attempted to climb Mount Everest because they —

A thought he was not physically strong enough for the climb
B believed he would be unable to help other climbers in need
C knew he would not be aware of his surroundings
D thought he would be unable to keep up with his team
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Reading, Gr 8 (2009)
Look for **prepositional phrases**:  
• Type  
• Frequency  

and **gerunds**
Black bears roam over large territories. What effect would building shopping centers in these territories have on the bears?

F Promote an increase in black bear reproduction
G Stabilize the black bear population
H Reduce the black bears’ habitat
J Introduce a new bear population to the area

Science, Gr 8, 2009
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Science, Gr 8, 2009
Look for passive voice.
This picture shows a radiometer. It is designed to be placed in a sunny window. One side of each thin blade of the radiometer is painted black, and the other side is painted white. The Sun’s rays strike the blades, and the device begins to spin. The device is powered by which kind of energy?

F Wind
G Solar
H Electrical
J Geothermal

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Science, Gr. 8, 2009
Look for **participial phrases** and **verb forms** used as adjectives.
Logan needs to order a cover for his swimming pool. The circular swimming pool has a radius of 17 feet.

Which is closest to the number of square feet needed to completely cover the pool?

Gr 6 Math, 2009
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Gr 6 Math, 2009
Does the use of derivational and inflectional morphemes and syntactic complexity in state assessments match students’ language acquisition?
Analysis of Virginia middle school math assessments revealed (Lewis, 2011)

• Many errors due to conceptual knowledge which includes students’ knowledge of vocabulary
Examples of State Assessment Items

Virginia Standards of Learning Assessments
Nevada Criterion Referenced Tests
New York State Testing Program
Massachusetts Comprehensive Assessments
Oregon Assessment of Knowledge and Skills
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Morphology – G 4 Math

look for derivational morphemes

Millimeters, centimeters, decimeters, meters, and kilometers are metric units used to measure length.

1 centimeter (cm) = 10 millimeters
1 decimeter (dm) = 10 centimeters
1 meter (m) = 10 decimeters
1 kilometer (km) = 1,000 meters

Review Questions:
Find each missing number.

1. 40 cm = ____ mm
2. 200 cm = ____ m
3. 3 km = ____ m
4. 50 cm = ____ dm

(Greenes et al, 2005)
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(Greenes et al, 2005)
He glided forward, his skis making soft whisking sounds in the snow. This certainly was different from city skiing in Duluth, where he would dodge the ragman’s cart or the milkman’s wagon, where the sky was notched with chimney pots belching smoke, where the snow turned sooty as soon as it fell.

Here in the great north woods all was still and white. Beads of ice glistened on bare branches like jewels. The frosted needles of pine and spruce pricked the eggshell sky, and a ghostly moon began to climb over the treetops.

(Cooper et al, 2001)
Reading

look for distance between subject and verb, embeddings, # of propositions

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Here in the great north woods all was still and white. Beads of ice glistened on bare branches like jewels. The frosted needles of pine and spruce pricked the eggshell sky, and a ghostly moon began to climb over the treetops. [2 propositions]

(Cooper et al, 2001)
The founders of our country created a federal system in the United States. They had a deep fear of government that was too powerful. The country had just won independence from the too-powerful British king. They favored a government with limited power. So, they chose a federal system.

(Buckley et al, 2010)
Look for derivational morphemes, verb as an adjective.

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(Buckley et al, 2010)
1. According to the tall tale, what indicates that the bear had left the fish for Jennes?

A. The bear left the fish in Jennes’ shack.

B. The bear batted the fish onto the shore.

C. The bear waved his paw to Jenes.

D. The bear cleaned up the spilled molasses.

“I crept around behind the camp, stuck my head in the window and yelled. He shot through the door like a bullet and headed for the lake. I never saw such an odd gait on a bear before—sort of mixture of running and galloping. And all on three legs. He was holding up the paw daubed with molasses.”
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“I crept around behind the camp, stuck my head in the window and yelled. He shot through the door like a bullet and headed for the lake. I never saw such an odd gait on a bear before—sort of mixture of running and galloping. And all on three legs. He was holding up the paw daubed with molasses.”
2. Reread paragraphs 3 and 4. *Which* of the following phrases provides the best context clue for the word daubed as it is used in paragraph 4?

A. lapped up  
B. smeared all over  
C. headed for the lake  
D. saw such an odd gait
2. Reread paragraphs 3 and 4. Which of the following phrases provides the best context clue for the word daubed as it is used in paragraph 4?

A. lapped up

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7 Jake’s cats eat food from a can. The cats come running into the kitchen when they hear the electric can opener. Now, each time Jake’s mother opens a can of corn, the cats come running. This is an example of —
A learned behavior
B correct behavior
C instinct
D migration
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Alex and Taylor are in separate rooms. Alex has 24 coins and Taylor has 18 coins. Each person knows how many coins the other has. Each boy is to put his coins into groups with the same number of coins in them. They will win the grand prize if the number of groups Alex has matches the number of groups Taylor has.

What is the greatest number of groups Alex could make and still have a chance at winning the grand prize?

A  2  
B  3  
C  6  
D  12
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What is the greatest number of groups Alex could make and still have a chance at winning the grand prize?

A 2
B 3
C 6
D 12
Knowing the meaning of the word fable helps the reader to know that fabled means

A fatal.
B famous.
C faint.
D faithful.
Electricity traveling through a wire is an example of

A a force applied by a simple machine
B energy flowing through the water cycle
C Earth’s gravitational pull on an object
D energy being transferred from place to place
New York Science Grade 4

look for participial phrase, verb as adjective, prepositional phrase

• Electricity traveling through a wire is an example of

A a force applied by a simple machine
B energy flowing through the water cycle
C Earth’s gravitational pull on an object
D energy being transferred from place to place
INTERVENTION STRATEGIES

With thanks to graduate students
Kelsey Turner, Alli Chaplin
INTERVENTIONS:
VOCABULARY AND MORPHOLOGY
Vocabulary Instruction

• Students’ comprehension will increase by $\frac{1}{3}$ when vocabulary instruction focuses on specific words important to content as opposed to focusing on a high-frequency word list.

• Knowledge of a given vocabulary term deepens over time if a student encounters the word multiple times.
  – Each new encounter enables the student to revise his/her understanding.
    • Marzano, 2004
“Marzano Strategies” – Research based approaches that increase Student Achievement

- Identifying similarities and differences (45% gain)
- Summarizing and note-taking (34% gain)
- Reinforcing effort and providing recognition (29% gain)
- Homework and practice (28% gain)
- Nonlinguistic representation (27% gain)
- Cooperative learning (27% gain)
- Setting objectives and providing feedback (23% gain)
- Generating and testing hypothesis (23% gain)
- Questions, cues, and advance organizers (22% gain)
Marzano’s Similarities and Differences (45% gain)

• Strategies
  – Comparing
    • Similarities and differences between or across things or ideas
    • Graphic organizers (Venn diagrams, matrices)
  – Classifying
    • Grouping things that are alike into categories based on their characteristics
    • Graphic organizers (matrices, webs)
  – Create similes and metaphors
    • Finding relationships between two topics
Compare and contrast

- Eliminate words/phrases that do not belong

<table>
<thead>
<tr>
<th>“The Civil War”</th>
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<tbody>
<tr>
<td>conflict</td>
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<td>colonies</td>
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<td>slavery</td>
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<tr>
<td>secession</td>
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Paraphrasing
(From Ehren, 2010 and others)

• Review a brief scenario with students.
• Ask students to identify key words and identify synonyms.
• Discuss meanings of synonyms.
• Ask students to rewrite (paraphrase) the scenario using the synonyms.
Marzano’s Nonlinguistic Representation
(27% gain)

- Graphic representations
  - Web organizer, time-sequence patterns, cause-effect patterns
- Physical models
- Mental pictures/stories
- Drawing pictures and pictographs
- Engaging in kinesthetic activity
- Gains in vocabulary
  - 37% over using definitions
  - 21% over generating sentences
Definitions? (Marzano, 2004)

Not an effective strategy for learning new vocabulary.

• Purpose of a definition is to identify the *class the word belongs to* and then contrast with other members of its class.
  • A bachelor is a *man* who is *unmarried*.
    – Students’ success with definitions relates to familiarity with definition structure rather than comprehension

• Better to learn to describe words
<table>
<thead>
<tr>
<th>Prefix</th>
<th>Root Word</th>
<th>Suffix</th>
<th>Part of Speech</th>
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**Description:**

**Word History:**

<table>
<thead>
<tr>
<th>Synonym</th>
<th>Antonym</th>
<th>Example</th>
<th>Picture</th>
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</table>

Rate knowledge of the word

1. Have never heard of the word before
2. Have heard of the word, but don’t know what it means
3. Could figure out the word in a sentence
4. Know the word and can explain it
Dealing with Passives

• Nonreversible constructions
  – The Libyan crisis was discussed by Matt Lauer of NBC.

• Present with 3 alternatives – select one with same meaning.
  – The Libyan crisis was discussed by Cooper Anderson of CNN.
  – NBC’s Matt Lauer discussed the Libyan crisis.
  – Matt Lauer said the crisis was tremendously dangerous.

Root Word Strategy
reported by Paul (2007)

• Introduce a root word.
• Discuss meaning of root word.
• Assist students to identify possible inflections and derivations (prefixes and suffixes)
• Discuss how adding each morpheme changes the meaning.
• Challenge students to find roots in textbooks and literature.
• Encourage students to develop and maintain a personal root word dictionary.
Root Word: *spec* (*to see*)

- Inspect
- Spectator
- Spectacle
- Inspection
- Inspector
### Word Investigation

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INTERVENTIONS: SYNTAX
Describing words

Enhance knowledge of parts of speech and engage in word play.

• Poetry: 11-word, 5-line poem

1. One word, the title (noun)
2. Two words, each describing the title (adjectives)
3. Three words, each expressing an action (verbs)
4. Four words phrase, expressing a feeling (start with adjective)
5. One word, synonym for title (noun)

**Flame**

**Hot, bright**

**Burning, raging, spreading**

**Warm on my face**

**Fire**
Building compound and complex sentences

• Provide semantically-related propositions
• Engage students in relating two thoughts
• Then add connectives from deck of conjunction word cards
• Discuss the effect different connectives on meaning
Sentence Variations
(from Paul, 2007 and others)

- Select two simple sentences.
- Connect the two sentences with *and*.
- Discuss the effect on meaning.
- Create a deck of conjunction word cards.
- Draw a card and connect the two sentences with the target conjunction.
- Discuss the change in meaning with each conjunction.
• I walk up the hill. I look at the stars.
• I walk up the hill and I look at the stars.
• I walk up the hill before I look at the stars.
• I walk up the hill after I look at the stars.
• I walk up the hill while I look at the stars.
• I walk up the hill so I can look at the stars.
• I walk up the hill because I can look at the stars.
• I walk up the hill until I can look at the stars.
Evidence of student understanding is revealed when students apply (transfer) knowledge in authentic contexts.

» Tomlinson & McTighe (2006)
References and Resources


Children’s Texts


THANK YOU

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