Going Deep: Assessing Vocabulary with the Test of Semantic Reasoning

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Disclosures

• Stacy Frauwirth is the Assessment Project Manager for Academic Therapy Publications

• Beth Lawrence and Deena Seifert are Co-authors and Creators of the TOSR, which is based on the game mode of InferCabulary Pro
Overview

• Why vocabulary is important
• Vocabulary development
• Vocabulary struggles
• Strategies for assessing vocabulary
• Introduction to the Test of Semantic Reasoning
Importance of Vocabulary
Reading Comprehension

Learning

(Silverman & Hantraft, 2015)
Students who Enter Kindergarten with Low Vocabulary

Perform poorly academically

(Loftus et al., 2010)
For academic success, 12th graders need to know **50,000 words**

(Proctor, Silverman, Harring, & Montecillo, 2012)
High-achieving 12\textsuperscript{th} graders know 80,000 words (only 4\% of students) 

(Eide, 2011)
BREADTH VS. DEPTH

- Semantic representations for each known word (predicts comprehension)
  (Leveldt, Roelofs, & Meyer, 1999; Walley, Metsala, & Garlock, 2003)

- Number of lexical entries (predicts decoding)
  (Ouellette & Beers, 2010)
percentage of words that must be known for a student to comprehend text

(Hu & Nation, 2000)
Vocabulary Development
Vocabulary is learned:

First

Then
Receptive Vocabulary

# of Words

- By 24 Mos.: 300 words
- By 3 Yrs.: 900 words
- By 4 Yrs.: 2,000 words
- By 5 Yrs.: 10,000 words
the number of times a word must be encountered before it is fully known

(McKeown, Beck, Omanson, & Pople, 1985)
Sentence Examples

- Stanley cupped his hands together, and Zero stepped on his interwoven fingers. He was able to lift Zero high enough for him to grab the **protruding slab of rock**. - *Holes* by Louis Sachar

- He knew that Crane-man would guess at once—only one thing could give a bag that kind of smooth fullness. Not carrot-tops or chicken bones, **which protruded in odd lumps**. No, the bag was filled with rice. - *A Single Shard* by Linda Sue Park

- From the bull's side, just forward of the flank, **protruded a feathered arrow-end**, which accounted for his savageness. - *The Call of the Wild* by Jack London

- Another flash of lightning lit her face for an instant and Winnie saw an expression there of deep concentration, tip of **tongue protruding**, brows furrowed. - *Tuck Everlasting* by Natalie Babbitt

- An Yi and I leaned forward to hear the boy with **protruding ears** in the row in front of us. - *Red Scarf Girl* by Ji-li Jiang
Two Phases

Fast Mapping
(Breadth)

Extended Mapping
(Depth)

A child’s ability to learn a new word or concept with minimal exposure to it
the number of words—at any given time—a student is in process of learning “deeply”

(Carey & Bartlett, 1978)
Vocabulary Struggles
Who Struggles?

• Low SES

• Student with speech-language disorders and learning disabilities

• Poor phonological awareness
Low Socio-economic Status

- Children from poor families hear 30 million fewer words by age 3 than affluent peers

- That’s 1,500 words per hour fewer

(Hart & Risley, 2003)
Speech-Language Disorders/LD

• Receptive Language deficits

• Language-based learning deficits
Phonological / Vocabulary Relationship

• Phonological processing and vocabulary knowledge work together for reading development

• In typically-developing students each contributes relatively equally to development of reading skills.

• Solid phonological skills cannot compensate for weak vocabulary and vice versa

(Dickinson et al., 2003)
Phonological Intervention

• Phonologically-based interventions for poor readers is now more common in schools

• Not necessarily good vocabulary instruction (if we have even identified that students have a vocabulary problem)
Vocabulary Gap

- Linguistically “poor” first graders knew 5,000 words
- Linguistically “rich” first graders knew 20,000 words.

(Moats, 2001)
It’s a Vicious Cycle

- Restricted extended mapping
- Poor vocabulary
- Reading difficulties
- Reading avoidance
- Limited exposure to text-based vocabulary
Assessing Vocabulary
Current Methods

– Breadth
– Depth

• Student provides Synonym/Antonym
  – Taxes word-retrieval skills

• Student provides Definition/Explanation
  – Taxes language formulation skills
Breadth of Vocabulary

Student must recognize a single image as representing a concept (assumes they know this context)

- PPVT
- ROWPVT
- Woodcock-Johnson
  - Picture Vocabulary
- WIAT
  - Receptive Vocabulary
- EOWPVT
- Boston Naming Test
- EVT
- CREVT
Depth of Vocabulary

Most standardized language assessments ask students to retrieve information they have about a word and use expressive language to do so.

- WISC
  - Vocabulary/Similarities
- CASL
  - Synonyms/Antonyms/Sentence Completion
- TOLD
  - Relational Vocabulary/Generals
- CELF
  - Word Classes
prudent

[prood-nt]

adjective

Wise or judicious in practical affairs;
sagacious; discreet or circumspect; sober

Process:

Rote memorization of 11th grade words to “learn” a 6th grade word
Classroom Assessment

1) tangent
2) to move off in an unrelated direction
3) tranquil
4) extreme emotion or excitement
gallows
5) not fully willing to comply
reluctantly
6) exposing to risk for the chance of gain
console
7) a long gloomy and depressed state
stagger
8) the main body or branch of a tree
resentful
9) a facial expression of pain or anger
bovine
10) a complete release from disturbance
venture
11) changing direction quickly
grimace
12) to walk at a light mild pace.

13) oppressive
14) meager

15) contemplation

14) To cause irritation beyond belief
Classroom Assessment

29. Use **negate**, **monarch** and **vanity** in THE SAME sentence, clearly demonstrating that you understand the meanings of both words.

   The royal monarch had such vanity that she negated every man to marry because they were not nearly as pretty as her.

30. Use **monologue** and **vacuous** in THE SAME sentence, clearly demonstrating that you understand the meanings of both words.

   The graduate chosen to say a monologue...
Test of Semantic Reasoning
History

Beth’s 20 year SLP Toolbox

Teach the word Prominent
P’s Profile

- ADHD-Combined Type
- Dyslexia
- Sensory integration difficulties
- Mixed Receptive/Expressive Language Disorder
- Performance Quotient – 114
- Verbal Quotient – 86
InferCabulary

We are waiting for the light to change.
Climb Mode

Choose the word that goes with the pictures.

- pouch
- exposed
- sneer
- foreign

Play
Semantic Reasoning

• We determined the term “Semantic Reasoning” would cover the task requirements
  – Inductive Reasoning ($G_f$)
  – General Sequential Reasoning ($G_f$)
  – Lexical Knowledge ($G_c$)
Development

• First round - created a set of 105 items
  – Words Worth Teaching: Closing the Vocabulary Gap (Biemiller, 2009)
  – The Educator’s Word Frequency Guide (Zeno et al., 1995)
  – The American Heritage Word Frequency Book (Carroll et al., 1971)
  – Computational Analysis of Present-Day American English (Kučera & Francis, 1967)
Pilot Study

- Pilot version had 118 items
- Items split into two overlapping forms with 79 items each
- Piloted on a national sample of 376 individuals, 6-0 through 18-11 from April-July, 2015
Standardization

- 90 item model
- Included a ceiling rule
- Normed on a nationally representative sample of 1,117 individuals age 7-0 through 17-11
Reliability

- Cronbach’s Alpha = 0.94 – 0.97
- Test-retest reliability
  - $r(86)=0.94$, $p<0.01$
  - Nearly perfect effect size
  - Increase in scores between first and second administration $t(85)=7.14$, $p=0.001$
Validity

• Correlation between TOSR and ROWPVT-4
  – $r(20) = 0.72$, $p<0.001$
  – Very large effect size

• Matched samples
  – Specific language impairment: $t(34.37)=3.28$, $p=0.002$
  – Learning disability: $t(29.77)=3.34$, $p=0.002$
Comments:

“The TOSR is a unique instrument that helps me discriminate between a students' understanding of words, and their ability to express that understanding verbally. This is a critical piece of information in developing academic support and intervention plans, and in demonstrating the true range of a student's knowledge, skill and ability. It is an invaluable piece of my evaluation toolbox.”

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