

# 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



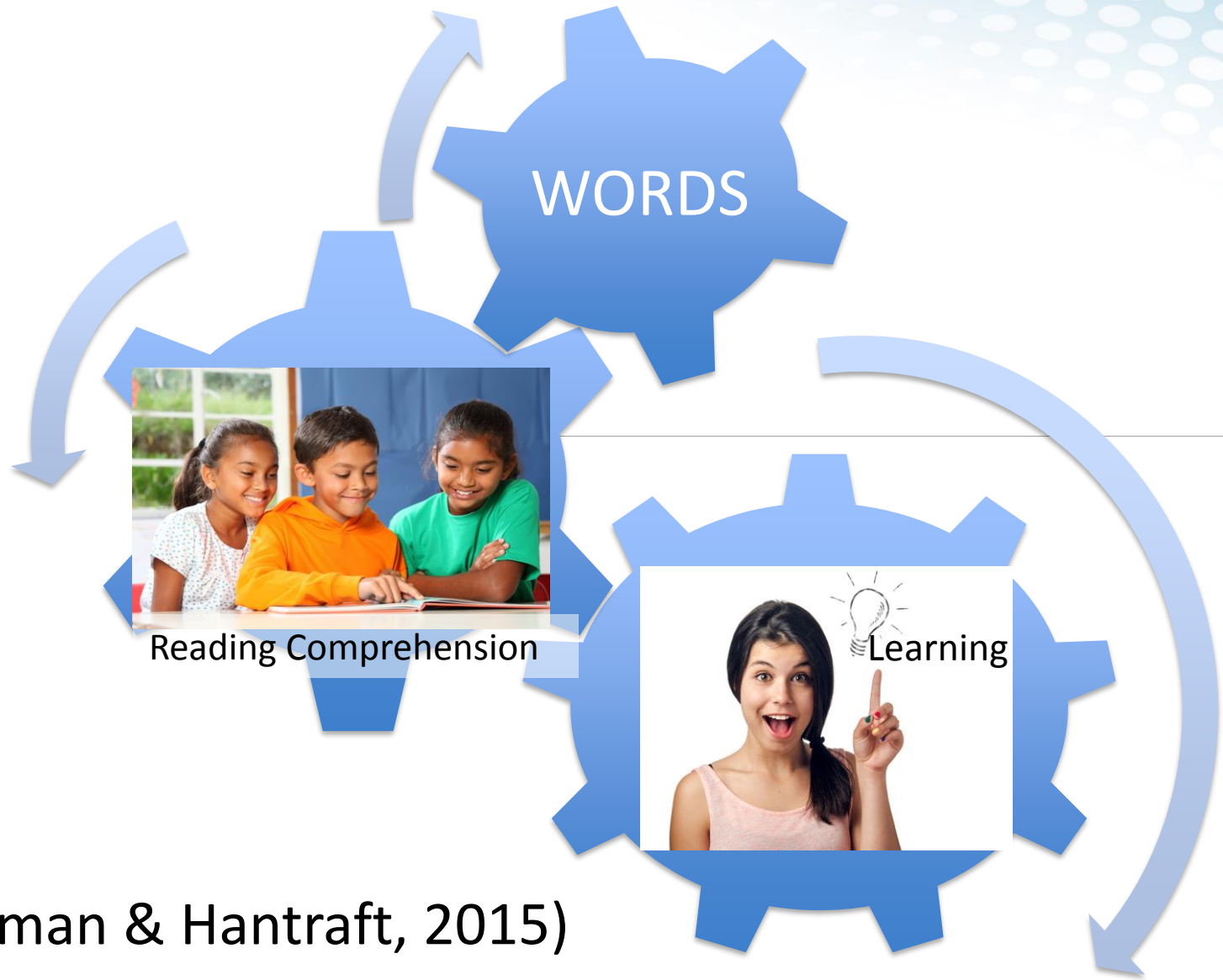
# Overview

- Why vocabulary is important
- Vocabulary development
- Vocabulary struggles
- Strategies for assessing vocabulary
- Introduction to the Test of Semantic Reasoning



# Importance of Vocabulary





(Silverman & Hantraft, 2015)





At risk traditional methods



Perform poorly academically

(Loftus et al., 2010)

Students who Enter Kindergarten  
with Low Vocabulary



50,000

For academic success,  
12<sup>th</sup> graders need to  
know 50,000 words



(Proctor, Silverman, Harring, & Montecillo, 2012)





(Eide, 2011)

80,000

High-achieving  
12<sup>th</sup> graders know  
80,000 words

(only 4% of students)





# BREADTH VS. DEPTH



**BREADTH**

number of lexical entries  
(predict s decoding)  
(Ouellette & Beers, 2010)

**DEPTH**

semantic  
representations for  
each known word

(predict s  
comprehension)

(Leveldt, Roelofs, & Meyer,  
1999; Walley, Metsala, &  
Garlock, 2003)



**95 - 98%**

percentage of words that must be known for  
a student to comprehend text

(Hu & Nation, 2000)



# Vocabulary Development



# Vocabulary is learned:

First

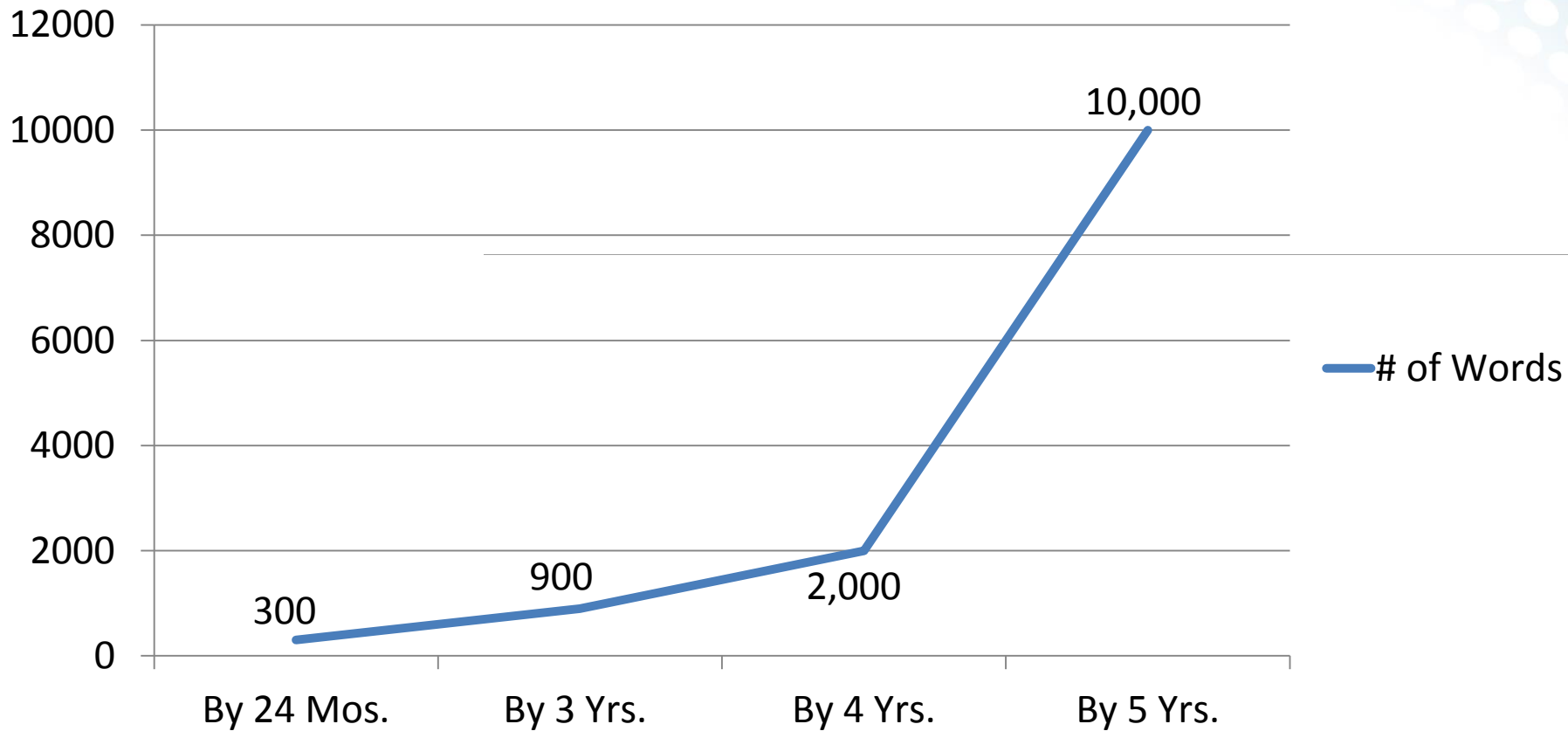


Then



# Receptive Vocabulary

# of Words



# 12 TIMES

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



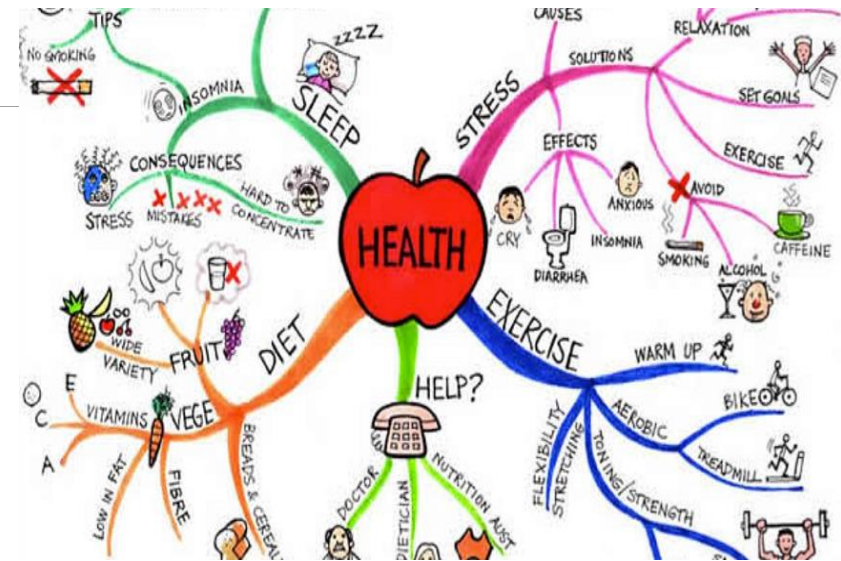
# Two Phases

## Fast Mapping (Breadth)



A child's ability to learn a new word or concept with minimal exposure to it

## Extended Mapping (Depth)





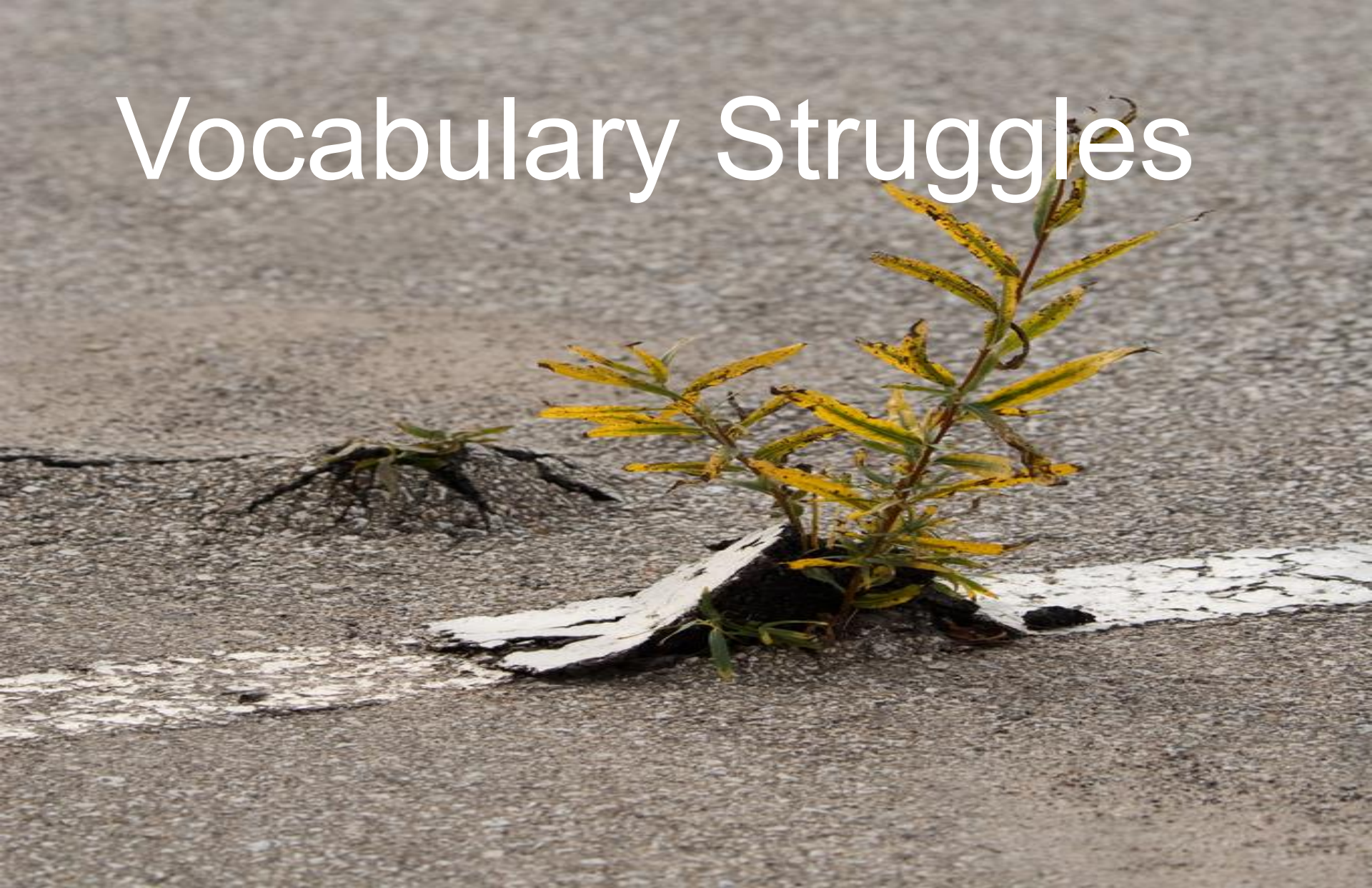
# 1,600 WORDS

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

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- 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

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- 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

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- 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

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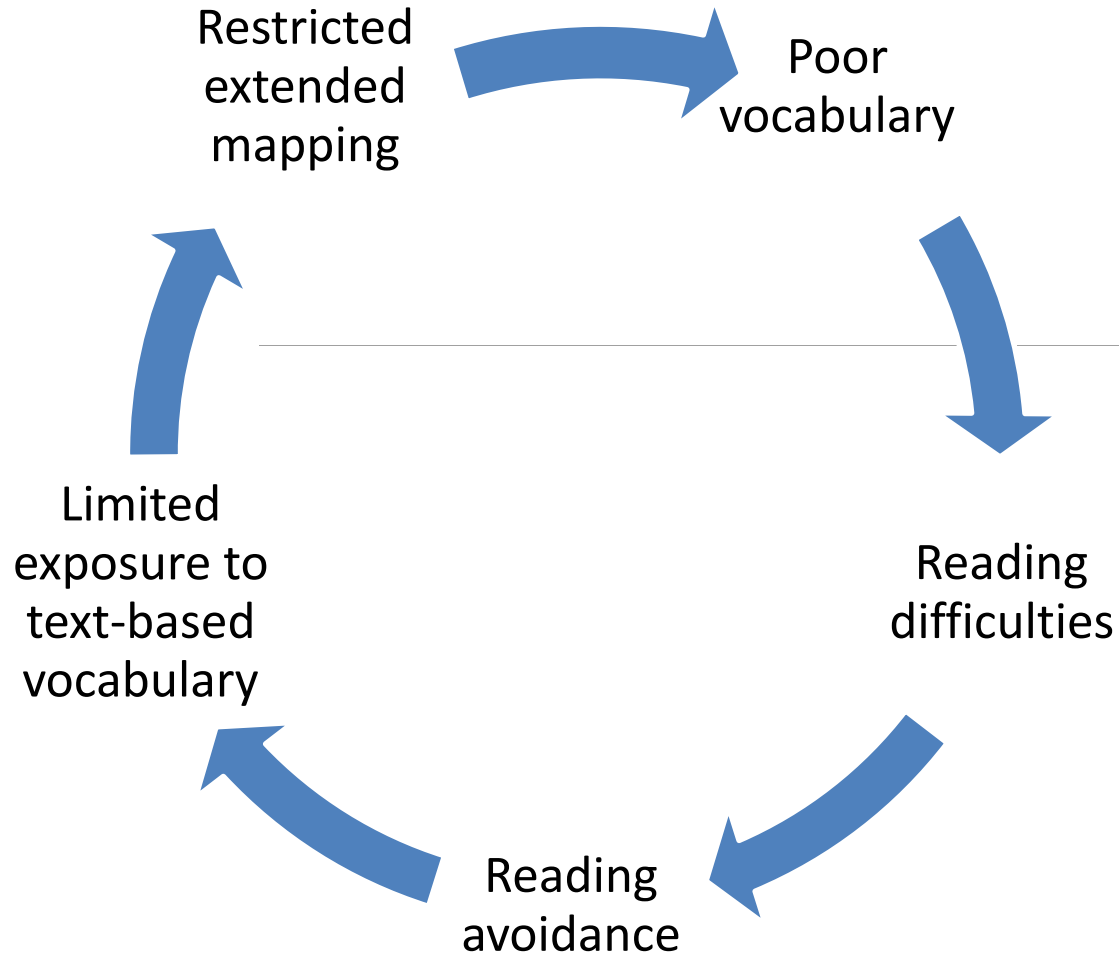
- Linguistically “rich” first graders knew 20,000 words.

(Moats, 2001)





# It's a Vicious Cycle



# Assessing Vocabulary

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# 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



# Informal Assessment of Vocabulary

**prudent**

[prood-nt]

adjective

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

Process: *Rote memorization of 11<sup>th</sup> grade words to “learn” a 6<sup>th</sup> grade word*



# Classroom Assessment

_____	tangent	a cessation of emotional limits.
_____	tranquil	2) to move off in an unrelated direction
_____	gallows	3) extreme emotion or excitement
_____	reluctantly	4) not fully willing to comply
_____	console	5) exposing to risk for the chance of gain
_____	stagger	6) a long gloomy and depressed state
_____	resentful	7) the main body or branch of a tree
_____	bovine	8) a facial expression of pain or anger
_____	venture	9) a complete release from disturbance
_____	grimace	10) changing direction quickly
_____	oppressive	11) a large wooden structure where criminals were publicly executed
_____	meager	12) to walk at a light mild pace.
_____	contemplation	13) to think about an action repeatedly
_____		14) To cause irritation beyond belief



# Classroom Assessment

The triumvirate group of three said it was unanimous that the man was guilty.

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.

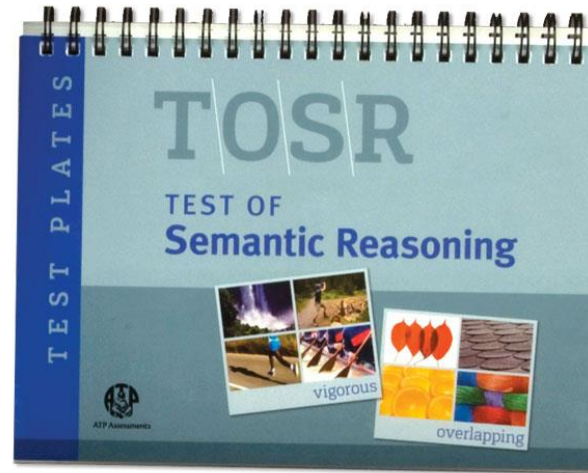
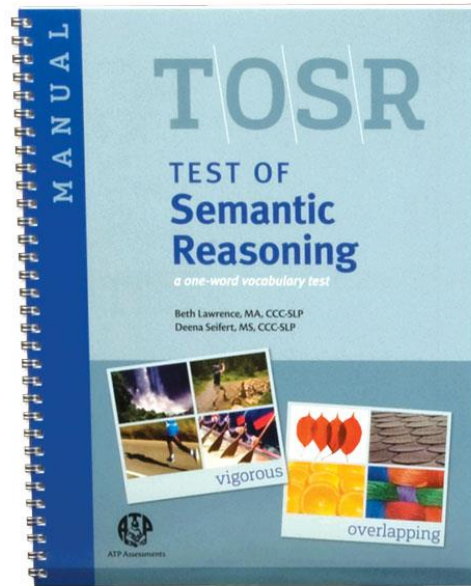
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The graduate chosen to say a monologue.



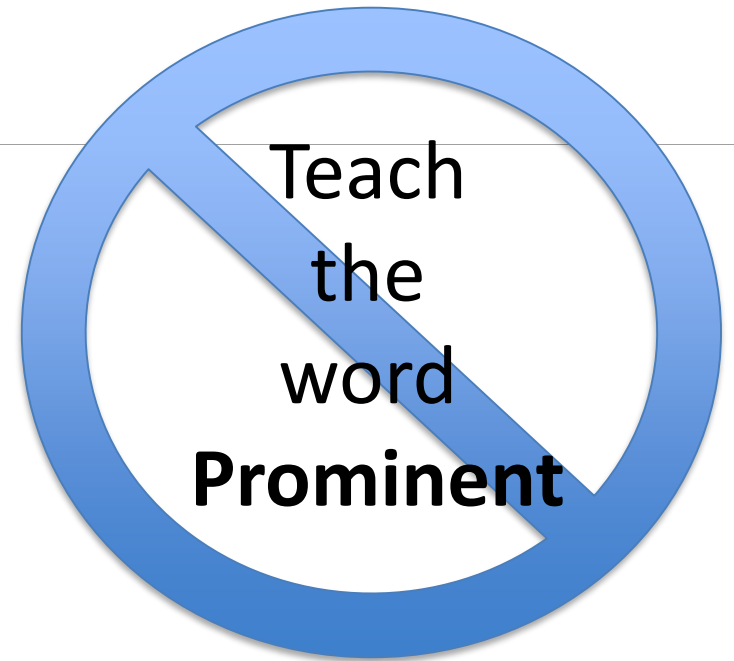


# Test of Semantic Reasoning



# History

## Beth's 20 year SLP Toolbox



# P's Profile

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



# InferCabulary



BONUS CARABINER: 0/

Click all the pictures to learn more about this word. 



We are waiting for the light to change.

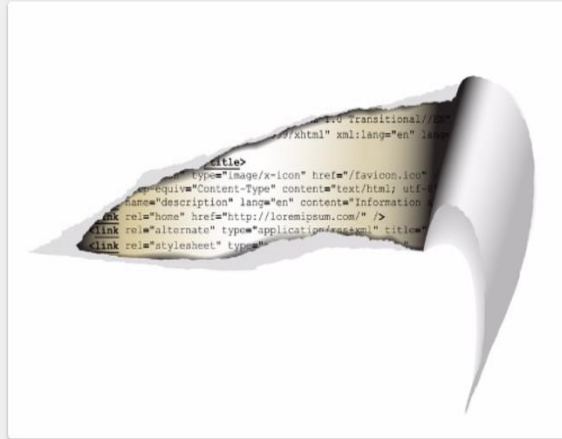
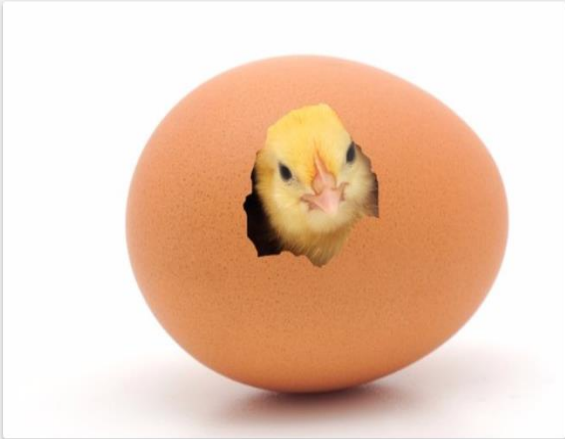



Academic Therapy Publications  
**ATP Assessments**

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# 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 (*Gf*)
  - General Sequential Reasoning (*Gf*)
  - Lexical Knowledge (*Gc*)



# 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.”

Owner, Janice C. C. Lepore, Psy.D. And Associates, LLC



