

# On Selecting the Right Words for Vocabulary Instruction

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William E. Nagy, Seattle Pacific  
University

Elfrieda H. Hiebert, University of  
California, Berkeley

# The Process

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1. Begin with prior Handbook chapters on vocabulary
  - 1991 (Vol. 2):
    - Anderson & Nagy: Word meanings
    - Beck & McKeown: Conditions of vocabulary acquisition
  - 2000 (Vol. 3):
    - Nagy & Scott: Vocabulary processes
    - Blachowitz & Fisher: Vocabulary instruction
    - Goswami: Phonological and lexical processes

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2. Review existing collections of papers on vocabulary, including but not limited to: Farstrup & Samuels (in press), Wagner et al. (2006), Hiebert & Kamil (2005), Baumann & Kame'enui (2003) and archival journals (RRQ, JEP in particular)

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### 3. Identify

#### a. Potential foci:

- Morphological awareness
- Oral language
- Genre & Knowledge (i.e., learning vocabulary in content areas)

#### b. Persistent issues in learning/instruction:

- differences in the vocabulary of genres
- vocabulary instruction in the current configuration of American classrooms

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4. Engage in extensive and intensive dialogue, using position papers and shared readings as the point of initiation for a dialogue.

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## 5. Ask a basic question, governed by an assumption:

- At some point, the underlying frameworks and assumptions of research paradigms need to be examined.
- Question: Does the development of a framework or theory belong in a handbook?

# Toward a Theory of Word Selection in Vocabulary Instruction

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# Word choice depends on the reason(s) for teaching words

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- To understand a specific text better
- To learn a specific concept and its label
- To improve comprehension of texts in general
- To increase one's understanding of some aspect of generative word knowledge (e.g., conceptual category, suffixation)
- To improve writing



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# Criteria for Word Choice

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- Frequency
- Distribution
- Familiarity
- Conceptual difficulty
- Utility
- Interconnectivity
- Generativity

# Frequency & Distribution

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## □ *Definitions:*

- Words occur with different frequencies in written language (*frequency*)
- Texts of different genres emphasize different words (*distribution/dispersion*)

# Frequency & Distribution (continued)

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## □ *Databases:*

- Thorndike (1921, 1932, 1941)
- General Service List (West, 1953)
- Kucera-Francis (1967); Carroll, Davies, & Richman (1971): Computer databases make new indexes possible (e.g., dispersion)
- Current databases: Zeno, Ivens, Millard, & Duvvuri (1995); Real-World Task (Adams & Spoehr, 2006)
- Digital databases also make additional analyses possible: Nagy & Anderson's (1984) analysis of morphological families

## Frequency & Distribution (continued)

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### □ *Uses:*

- “Primerese” (Gray, Baruch, & Montgomery, 1940)
- Readability formulas (Klare, 1984)

### □ *Current Developments:*

- Nation and colleagues: Word lists that use dispersion index as well as frequency (e.g., Coxhead, 2000)
- Hiebert (2007): Morphological family frequency and dispersion to create an academic word list for upper elementary grades

# Word Familiarity & Conceptual Difficulty

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## □ *Definitions:*

- *Familiarity:* Ability of individuals to recognize the meaning of a word
- *Conceptual difficulty:* Knowledge of a concept by students at different grade levels
  - 4-point scale (Nagy, Anderson, & Herman, 1987) with category 4 predicting performance
    - 1-3: Known concepts with one-word synonym (e.g., *altercation*=fight) or that can be expressed in a familiar phrase (e.g., *apologize*=to say you're sorry) or unknown concept that can be learned from available experiences & information (e.g., *naïve*)
    - 4: Unknown concept that requires learning of new factual information or a related system of concepts (e.g., *divide* as “boundary between drainage basins” requires information about river systems)

# Word Familiarity & Conceptual Difficulty (continued)

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## □ *Databases:*

- Familiarity: Dale & O'Rourke (1976, 1979)
- Familiarity/Frequency: Johnson & Moe (1983)
- Familiarity: Biemiller's (2006) revision of Living Word Vocabulary

## Word Familiarity & Conceptual Difficulty (continued)

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### *Uses:*

- Word Familiarity in prominent readability formulas: Dale-Chall (1948); Harris-Jacobson (1974); Spache, 1953/1974)
- Three Tiers (Beck, McKeown, & Kucan, 2002):
  - Importance and utility for *mature* language users and across various domains
  - Conceptual understanding: Nagy et al.'s categories 1-3 (“Words for which students understand the general concept but provide precision and specificity in describing the concept”)
  - Instructional potential: Words that can be “worked with” in various ways



## Word Familiarity & Conceptual Difficulty (continued)

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### □ *Current Developments:*

- Using familiarity index & students' zone of proximal development: Biemiller (2005; Biemiller & Boote, 2006)

# Tensions

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## □ Genre and criteria

- Nature of rare words in informational & narrative texts: the distinction between Nagy et al.'s (1987) categories 1-3 and 4

## □ Relationships among criteria

- Frequency-familiarity: Individual & family frequencies are excellent predictors of word knowledge (Graves, Ryder, Slater, & Calfee, 1987)
- Frequency-dispersion:
  - Words with high frequencies but low dispersions (e.g., words in mathematics)
  - Frequency-dispersion-polsemy: Words with high frequency and high dispersion indexes are likely to vary considerably in meaning in different content areas.

# Toward a Theory of Word Selection: Interconnectivity in the Internal Lexicon

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William E. Nagy, Seattle Pacific  
University

Elfrieda H. Hiebert, University of  
California, Berkeley

# Interconnectivity in the Internal Lexicon

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A variety of research on human memory has led to a picture of the internal lexicon as being highly interconnected. How has this picture of the internal lexicon impacted (and how might it impact) a theory of word selection?

# Overview

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- Interconnectivity in the internal lexicon
  - Types of evidence
  - Types of connections
  
- Implications of interconnectivity for instruction
  - Reconceptualizing vocabulary instruction as “semantic field development” rather than “teaching individual words”
  - Teaching words in semantically-related groups?

# How interconnected are words in memory?

## Two metaphors for word knowledge

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- (1) Definitions stored in separate file drawers
- (2) A connectionist network – everything is connected to everything else

# A phenomenon to be explained:

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- Speed of access: People can usually select (for either comprehension and production) exactly the right word from their memory of 50,000 words or more in a fraction of a second

# Examples of strands of research on the internal lexicon

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- Word Associations
- Semantic Priming
- Speech errors / slips of the tongue



# Word Associations

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□ Task: Write down (or say) the first word that comes to your mind when you hear...

□ Examples

*chuckle – laugh*

*false – true*

*ham – eggs*

*parachute – jump*

*grind – teeth*

# Word Associations

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- A very long history of research
  - Since the 19<sup>th</sup> century
- Lots of studies
  - 2,315 studies in PsychInfo with “Word Associations” as a descriptor
- Continuing active research
  - 20 studies in Psych Info with “Word Associations” as a descriptor in 2007

# Word Associations

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## Key findings

- ❑ Reasonably consistent patterns
- ❑ Predicts priming
- ❑ Multiple types of relationships
- ❑ Developmental changes  
(syntagmatic-paradigmatic shift)

## Word associations: Types of relationships

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- Co-occurrence (*ancient – history*)
- Form
  - Sound/spelling (*stupid – Cupid*)
  - Morphology (*suspicion – suspect, ability – able*)
- Meaning

# Word associations: Types of relationships

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- Meaning – various relationships
  - Synonymy (*author – writer*)
  - Antonymy (*alive – dead*)
  - Category coordinates (*dog – cat*)
  - Superordinate/subordinate (*dragonfly – insect*)
  - Part/whole (*giraffe – neck*)
  - Cause/effect (*drown – water*)
  - Etc.

# Semantic Priming

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- ❑ Task: Lexical decision or naming
- ❑ Word preceding the target word is either unrelated or related
- ❑ Words preceded by related words are recognized or named faster (priming effect)

# Semantic Priming

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- A reasonably long history of research
  - Since 1971
- Lots of studies
  - 985 studies in PsychInfo with “Semantic Priming” as a descriptor
  - “one of the most studied effects in psycholinguistics” (Ferrand & New, 2004)
- Continuing active research
  - 41 studies in Psych Info with “Semantic Priming” as a descriptor in 2007

# Semantic Priming

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## Key findings

- ❑ Affected by both strength of association and by semantic relatedness
- ❑ Developmental shifts
- ❑ Multiple types of relationships



# Semantic Priming:

## Types of relationships

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- ❑ **Associative relationships**
- ❑ **Non-associative semantic relationships**
  - Non-associated category coordinates  
(*cow – goat, pig – horse*)
  - Instrumental relationships  
(*spoon – dessert, broom – floor*)
  - Indirect relationships (*lion – stripes*)
  - Weak semantic relationships  
(*city – grass*)

## The picture of the internal lexicon that emerges

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- ❑ High degree of interconnectivity
- ❑ Reflects statistical properties of the linguistic environment (frequency, co-occurrence)
- ❑ Multiple types of relationships are represented
- ❑ Not a clear line between semantic knowledge and world knowledge (Chwilla & Kolk, 2005)

# The picture of the internal lexicon that emerges

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## Ability-related differences

- ❑ Better comprehenders are more sensitive to non-associative semantic relations (Nation & Snowling, 1999)
- ❑ Only participants with larger vocabularies showed priming for weaker relationships (Devitto & Burgess, 2004)

Depth of word knowledge is thus associated with extent of interconnectivity

The picture of the internal lexicon that emerges

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## Developmental differences

- Syntagmatic-paradigmatic shift in word associations
  - Younger children tend to favor syntagmatic responses (*dog – bark*)
  - Older children tend to favor paradigmatic responses (*dog – cat*)

There are both qualitative and quantitative changes in relationship among words

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# Implications of interconnectivity for word selection

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- General implication: Reconceptualize vocabulary instruction as “semantic field development” rather than “teaching individual words”
- Specific implication: Teach words in semantically-related groups

# Vocabulary learning as semantic field development

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- “When we acquire a new lexical item, we do not simply tack it on to the end of a list of already-learned items. Rather, the new item has to find its place within the lexicon we have already acquired.... When we learn a new lexeme, we always make at least two gains in precision, not one”
  - - David Crystal (2005, p. 198)

# Teaching words in semantically-related groups

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- Common practice in ESL texts

- Rich vocabulary instruction

Beck, Perfetti, & McKeown (1982), McKeown, Beck, Omanson, & Perfetti (1983), McKeown, Beck, Omanson, & Pople, (1985)

- Cluster-based vocabulary instruction

Marzano & Marzano, 1988

## Teaching words in semantically-related groups: Three oversimplifying assumptions

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- (1) semantic relatedness among instructed words has a *positive* impact on learning
- (2) *semantic* relatedness among instructed words has a positive impact on learning
- (3) semantic relatedness *among instructed words* (as opposed to relatedness between instructed words and words used to explain them) has a positive impact on learning



Does semantic relatedness among instructed words have a *positive* effect on learning?

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- ❑ No advantage of semantic relatedness (Stahl et al. 1992)
- ❑ Interference effect for closely related words (Higa, 1963; Tinkham, 1993, 1997; Waring, 1997)

Does *semantic* relatedness among instructed words have a positive effect on learning?

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- Interference effect for closely related words (Higa, 1963; Tinkham, 1993, 1997; Waring, 1997)
  - Semantically similar words: *tin, bronze, iron, brass, lead, steel*
- Slight advantage for thematically grouped words (Tinkham, 1993, 1997)
  - Thematically related words: *frog, hop, slimy, pond, croak, green*

Does semantic relatedness *among instructed words* have a positive effect on learning?

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- ❑ No advantage of semantic relatedness in rich instruction (Stahl et al. 1992)
- ❑ Proposed explanation: When instruction is rich, relationships among instructed words are a relatively minor benefit compared to relationships between instructed words and the words used to explain and discuss them

## Capitalizing on potential benefits of relatedness while avoiding interference

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- Avoid introducing novel semantically similar words at the same time
  - staggered introduction of related words
  - “multi-level” instruction of related sets
  - “spiral curriculum”
- Aim for variety of relationships rather than on semantic similarity

# Interconnectivity of the internal lexicon as an example of area for a research synthesis

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## Too much research

- ❑ Huge bodies of relevant research
- ❑ Multiple strands of relevant research

## Too little research

- ❑ Insufficient synthesis across strands of research
- ❑ Insufficient bridging research

## Interconnectivity of the internal lexicon as an example of area for a research synthesis

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### A pessimistic take:

- ❑ Learning words in semantically related sets was a simplistic and speculative application of the research

### An optimistic take:

- ❑ Marzano & Marzano (1988) offered sound instructional advice on the basis of a synthesis of multiple research domains, interpreted with good instructional sense

# Marzano & Marzano's (1988) broad interpretation of relatedness

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- ❑ "Establishing a frame of reference for new words"
- ❑ "Teaching words at the experiential level"
- ❑ "Teaching words at the attribute level"
- ❑ "Going beyond the clusters"

# “Going beyond the clusters” (Marzano & Marzano, 1988, pp. 41-42)

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- Temporal: Does the new word remind you of a specific event?
- Spatial: Does the new word remind you of a particular spatial arrangement?
- Frequency: Does the new word remind you of anything that happens over and over?
- Modality: Does the new word remind you of a taste, smell, or sound?



# “Going beyond the clusters,” continued

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- Acoustic: Does the new word have a distinctive sound?
- Visual: Does the new word remind you of an image?
- Affective: Does the new word remind you of an emotion?
- Context: Did you read or hear the word in an unusual situation?
- Verbal: does the new word remind you of interesting information?