Strategic Vocabulary Selection: Choosing Words From Narrative & Informational Texts

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Today's presentation:

- I. Describe reasons for importance of the topic
- II. Review of an empirical comparison of vocabulary in narrative & informational texts from grades 2, 4, & 6
- III. Propose selection criteria for 3 types of academic vocabulary

I. Why this topic is critical

- 1. Hart and Risley (1994): Gap in students' vocabularies on school entry is extensive. With approximately 180,000 words in school texts (Zeno et al. 1995), all words cannot be taught directly. Strategic selection of vocabulary is required if the gap is to be narrowed.

- 2. The topography of American elementary classrooms has changed:

  -Mandates of time spent in reading has meant less time for other subject areas where vocabulary demands can be great.

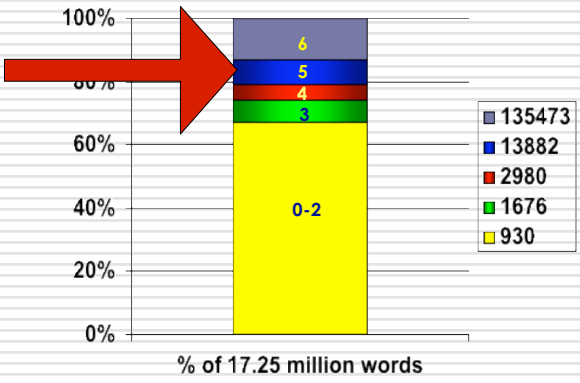
  - With California's mandate (2008 textbooks), much of science and social studies will occur within reading/language arts programs in grades K-3.
  - 80 percent of elementary teachers recently reported spending less than an hour each week teaching science;16 percent reported no science; this compares to an average of 2 hours weekly 7 years ago (Dorph, Goldstein, Lee, Lepori, Schneider, Venkatesan, 2007)

- 3. Reliance on a Core Reading Program: If vocabulary selection is derived mainly from a Core Reading Program, vocabulary instruction can be idiosyncratic.
  - Analyses indicate:
    - 7% overlap in the Zone 3+ vocabulary in two basal reading units (Grade 2)
    - 25% overlap in the Zone 3+ vocabulary in two science units (Grade 2)

II. Empirical Comparison of Vocabulary in Narrative & Informational Texts

- 2,000 contiguous words in the first unit of the same publisher's reading/language arts and science programs (Houghton Mifflin, c2003) included in CA's acceptable list for grades 2,4, & 6.
- All of the unique words (types) were analyzed in each corpus; the focus in this study is on the words that fall in Word Zones 3+ (Hiebert, 2005), NOT in Zones 0-2.

Seven Word Zones



Zeno et al., 1995

Overview of Corpora

	Number of Unique Words	Number of Unique Words in Zones 3+
Narrative Gr. 2	694	295
Science Gr. 2	445	122
Narrative Gr. 4	647	258
Science Gr. 4	616	233
Narrative Gr. 6	558	218
Science Gr. 6	539	201

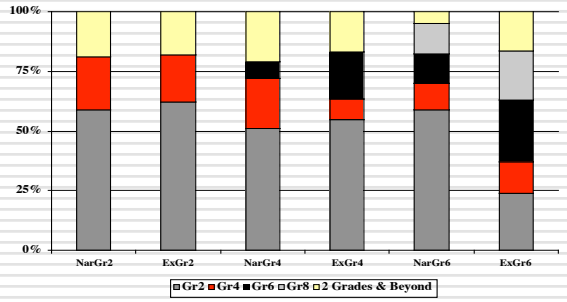
Strategic Vocabulary Selection: A Combination of Criteria

- Knownness: Biemiller's (2005) adaptation of the Living Word Vocabulary
- Frequency of vocabulary in written English, especially of a word's morphological family (Nagy & Anderson, 1984)
- Categorical clusters: Marzano and Marzano's (1988) superclusters recategorized into 12 mega-clusters

Criterion 1: Knownness

- Dale & O'Rourke's (1981) *Living Word Vocabulary* as modified/extended by Biemiller (2005)
- Words are given a grade level designation according to students' performances on a multiple-choice assessment

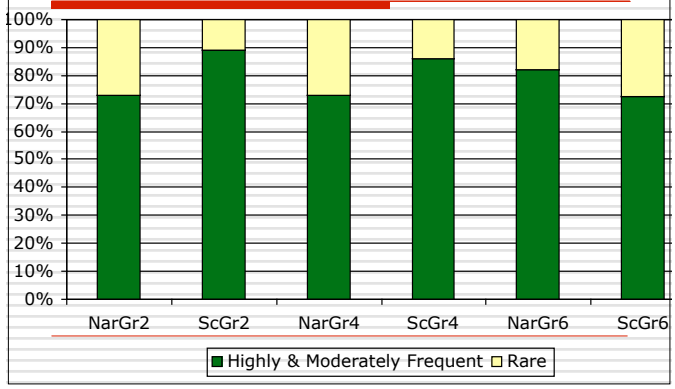
Criterion 1: Knownness



Criterion 2: Morphological Families

- Words from Nagy & Anderson's (1984) categories 0-3 were considered members of a related morphological family. "Meaning of a word can be inferred from the immediate ancestor with reasonable help from context; 'one exposure learning' would be possible"
- Zeno et al.'s database was used to obtain total score for frequency of members in target word's family
  - Example: **sewn: .23**
    - 4 (sew) + sewing (14) + sews (2) = 20
    - **TOTAL: 20.23**

Criterion 2: Morphological Families



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Criterion 3: Categorical Clusters

- Marzano and Marzano's (1988) 61 superclusters based on an analysis of 7,230 word. An additional 600 words have been analyzed.
- I eliminated 3 superclusters: auxiliary/helping verbs, contractions, pronouns as well as proper names of people, words from other languages, abbreviations and numbers
- I then clustered the remaining 58 superclusters into 12 megaclusters.

Category Name	Description	Examples of Clusters
NAMES FOR PEOPLE & ANIMALS	General names having to do with gender, age, occupations, group membership	**Names related to age:** baby, child, grown-up **Military groups:** army, marines, navy, air force **Scientists:** engineer, astronaut, astronomer **Large land animals:** deer, elk, gazelle, horse
PHYSICAL ATTRIBUTES	Features of objects and living things, including size, shape, texture, color	**Small/Large:** little, tiny, huge, enormous, massive **Depth:** deep, shallow, thin, wide **Texture:** hard, soft, rough, bumpy, furry, spongy
FEELINGS & VALUES	Human emotions, traits, values, and attitudes	**Feelings:** Fear, worry, anger, fierceness **Importance/Value:** essential, supreme, desirable **Satisfaction/Dissatisfaction:** delight, regret **Difficulty/Ease:** Easy, comfortable, convenient
BODY & HEALTH	Health, body, clothing, and food of humans	**Disease/Health:** sickness, illness, wellness, health **Head:** face, cheek, chin, forehead, skull **Kinds of clothing:** suit, uniform, costume, outfit **Prepared foods:** noodles, cereal, bread, tortilla
MACHINES & TOOLS	Mechanical and electrical devices, tools, & vehicles and actions involved in use of machines and tools	**General Tools:** drill, lever, hammer, saw, shovel **Engines:** motor, gear, brake, turbine **Vehicles:** car, truck, bus, train, tractor, airplane **Actions in using vehicles:** fly, row, drive, sail
EARTH & SUN	Aspects of the physical universe, including water, soil, landscape, vegetation, weather, temperature, fire, light	**Forms of water:** rain, snow, ice **Land/terrain:** valleys, mountains, forests **Vegetation:** trees, flowers, moss, vine **Storms:** blizzard, rainstorm, tornado, thunder
PLACES & DWELLINGS	Places where people live and do business, including rooms and their furnishings and materials used to make/build these places/dwellings	**Town:** city, village, settlement, suburb, inner city **Dwellings where people live:** house, apartment **Parts of dwellings:** room, kitchen, bedroom **Wooden building material:** lumber, wood, timber
PHYSICAL ACTIONS & MOTION	Actions or motion that are typically human but, sometimes, can be made by animals	**Harming/fighting:** injure, attack, harm, stun **Owning:** lose, discard, abandon, acquire **Running/walking:** stroll, saunter, limp, shuffle
COGNITIVE/ PERCEPTUAL ACTIONS	Cognitive, affective, social, and perceptual actions of humans	**Choosing:** pick, decide, select, judge **Looking:** look, see, watch, behind, glance, gaze **Mouth/Nose:** smell, sniff, sneeze, choke, spit **Money-related:** earn, pay, spend, owe, bet, sell
COMMUN-ICATION	Oral communication, including language and noises/sounds.	**General human:** talk, speak, converse, discuss **Informing:** show, explain, describe, mention **Human noises:** snore, yell, giggle, cry, whisper **Animal noises:** gobble, croak, cluck
ARTS AND ENTERTAIN-MENT	Human endeavors that include literature, arts, and sports	**Types of books:** textbook, catalogue, novel **Specific sports:** football, baseball, basketball **Musical instruments:** piano, drum, trumpet **Plays/movies:** cartoon, movie, scene, stage
SPECIALIZED CONTENT AREAS	Terminology on specialized topics, including mathematics and domains of science (chemistry, electricity)	**Mathematics:** equation, formula, denominator **Chemicals:** Oxygen, helium, nitrogen, phosphate **Molecules/Atoms:** ion, electron, neutron, proton

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Earth & Sun

Aspects of the physical universe, including water, soil, landscape, vegetation, weather, temperature, fire, light

Forms of water: rain, snow, ice
Land/terrain: valleys, mountains, forests
Vegetation: trees, flowers, moss, vine
Storms: blizzard, rainstorm, tornado, thunder

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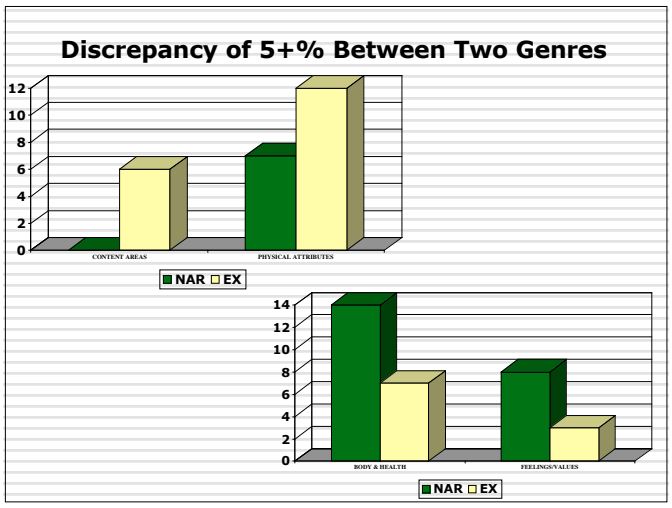

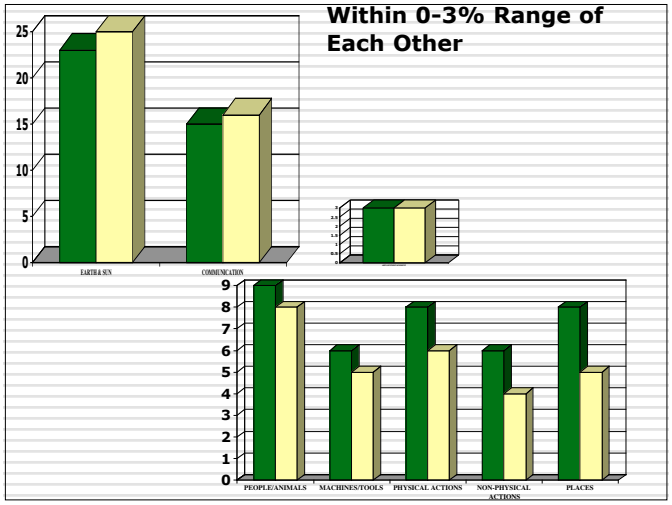

Summary of Findings

- On the indices of knownness and richness of morphological families, Grade 2 informational science texts are less "difficult" than Grade 2 narrative texts.
- On the same indices, Grade 6 informational science texts are more difficult than Grade 6 narrative texts.

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Summary: Categorical Clusters (Criterion 3)

- On majority of 12 megaclusters, informational science and narrative texts have a similar percentage of words. The largest categories in both types of text are Earth/Sun and Communication (e.g., *respond, describe*): 38% (narrative), 41% (info. science)
- 18% of the words in informational science texts come from two categories that are low in narrative texts: content areas and physical attributes (e.g., *texture, size, depth*)
- 22% of the words in narrative texts come from two categories that are low in informational texts: feelings/values and body/health.

III. Criteria for Selecting Different Kinds of Academic Vocabulary

Content Area	Sample Words
Civics	aAbuse of power, campaign, elected representative, geographical representation, individual liberty, Labor Day, national origin, patriotism, school board, Uncle Sam, welfare
English Language Arts	abbreviation, capitalization, e-mail, genre, illustration, learning log, paragraph, reading strategy, table, verb
Geography	billboards, discovery, fall line, harbor, Japan, land clearing, national capital, Pacific rim, rain forest, technology, vegetation region
Mathematics	addend, capacity, equation, gram, improbability, mass, obtuse angle, quotient, sample, unit conversion
Science	bedrock, Earth's axis, gases, inherited characteristic, magnetic attraction, ocean currents, recycle, technology, water capacity

From Marzano (2004)

4 Kinds of Academic Vocabulary

(Hiebert & Lubliner, in press)

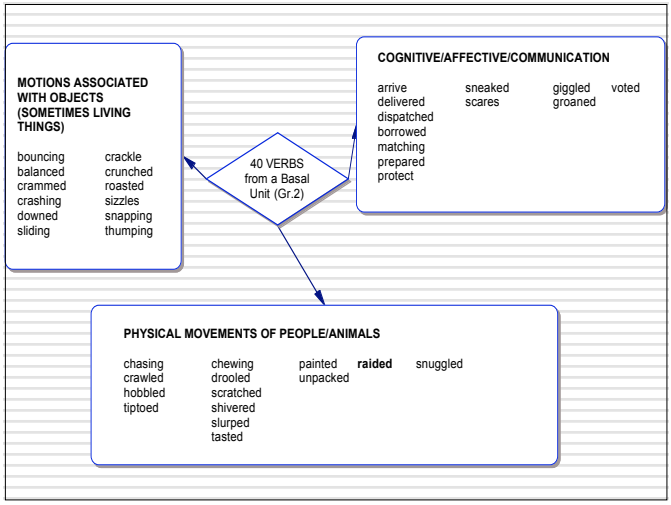
- Literary vocabulary (e.g., *flustered, rambunctious, yelped)*
- Content-specific vocabulary (e.g., *geometry, triangle* in mathematics; *geography*, *navigation* in social studies)
- General academic vocabulary (e.g., *specific, tend, supply*)
- School-task vocabulary (e.g., *learning logs, summarize)*

1. Literary vocabulary

- Has a high proportion of rare vocabulary
- A majority of this rare vocabulary consists of adjectives, verbs, and nouns that are synonyms for known concepts

Database

- From the original database of 6,000 words (Grs. 2, 4, 6 of core reading program), 454 zone 3+ words (distributed evenly across the three grade levels) were examined
- 2 words appeared at more than one grade level: *raided* and *Alaska(n)*
- 40 verbs were taken from each of the approximately 151 words for a grade level



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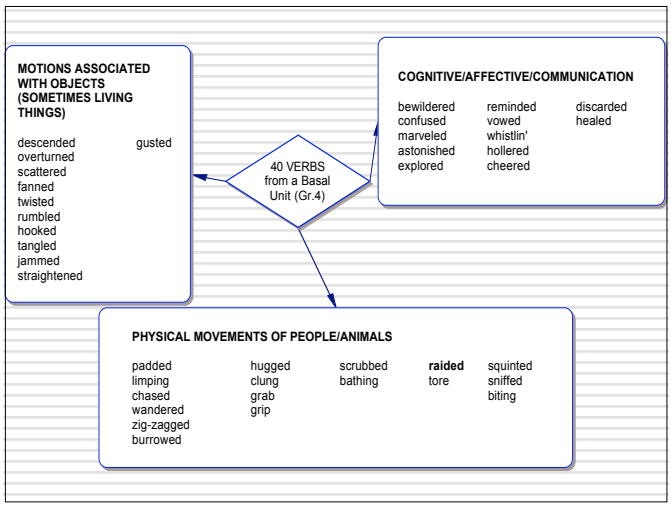

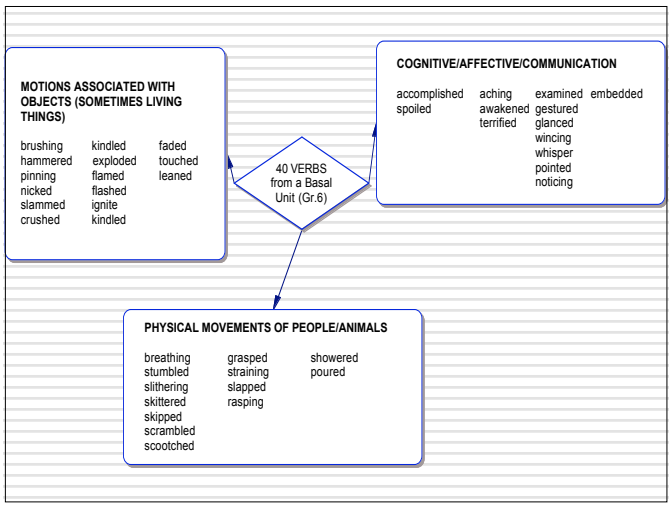

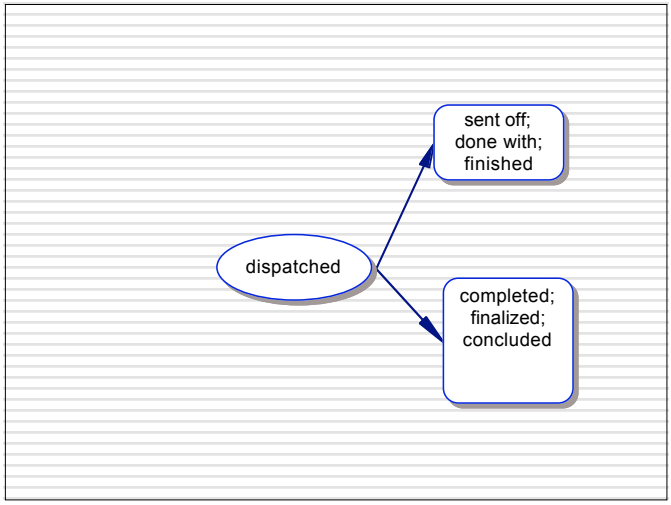

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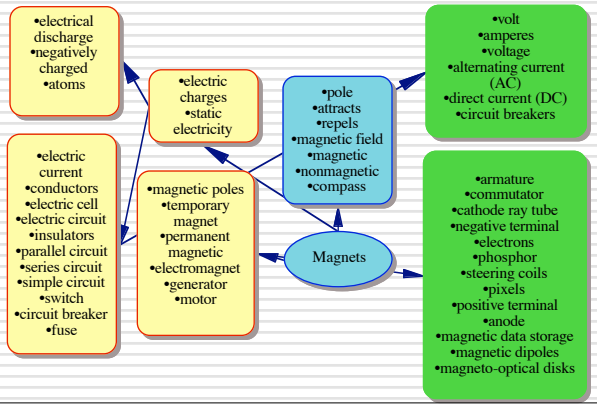
2. Content-specific Vocabulary

- Content-specific: Standard documents provide a focus for content-specific vocabulary. As a result:
  - Consistency in vocabulary across science programs of different publishers is high.
  - Vocabulary on a topic is consistent (cumulative) from grade to grade.
- Database: A unit from the same publisher at grades 2, 4, & 6 illustrates the progressive addition of vocabulary

Content-Specific Vocabulary of Science



Content-specific words

- Require a Multiple Learning Approach:
  - Do it
  - Talk it
  - Read it
  - Write it
    - Pearson, Cervetti, Bravo, Hiebert, & Arya (2005)

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3. General Academic Vocabulary

- Academic Word List (AWL) (Coxhead, 2000): Drawn from university-level textbooks
- Core Academic Word List (CAWL) (Hiebert, 2007): A list for upper-grade elementary students

D	Example
1.0	a
.9	achieve
.8	adoption
.7	atlas
.6	ace
.5	amplified
.4	alloy
.3	abolition
.2	Afghanistan
.1	Austria-Hungary
.03	adverb

The CAWL: Consists of 400 Morphological Families in 4 sub-lists

Sublist of CAWL	Dispersion Index (X)	Frequency of Morphological Family (X)	#Members Morphological Family (X)
1	.95	209	5.7
2	.92	128	5.4
3	.88	123	5.3
4	.83	114	5.1

Percentages of Word Samples Accounted for by CAWL & AWL

Type of Text	Grade 2		Grade 4		Grade 6	
	CAWL	AWL	CAWL	AWL	CAWL	AWL
Narrative	1.8 (20)	.4 (4)	1.7 (43)	1.8 (7)	1.9 (28)	.6 (11)
Science	2.3 (18)	3.6 (13)	7.1 (65)	3.1 (31)	10.1 (68)	6.8 (55)
Social Studies	4.2 (29)	2.1 (10)	7.9 (51)	4.8 (24)	10.55 (55	5.5 (23)

from Hiebert (2007)

Examples of 3 Morphological Families

charge: 95; charged: 44; charges: 30; charging: 5
affect: 63; affected: 40; affecting: 8; affective: 1; affects: 24; unaffected: 1
oppose: 6; opposed: 18; opposing: 8; opposite: 62; opposition: 15

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References

Badders, W., Bethel, L.J., Fu, V., Peck, D., Sumners, C., & Valentino, C. (2000). *Houghton Mifflin Science DiscoveryWorks (Gr.4)*. Boston, MA: Houghton Mifflin.

Biemiller, A. (2004). Teaching vocabulary in the primary grades: Vocabulary instruction needed. In J. F. Baumann & E. J. Kame'enui (Eds.), *Vocabulary instruction: Research to practice* (pp. 28–40). New York: Guilford.

Cooper, J.D., Pikulski, J.J., Ackerman, P.A., Au, K.H., Chard, D.J., Garcia, G.G., Goldenberg, C.N., Lipson, M.Y., Page, S.E., Templeton, S., Valencia, S.W., & Vogt, M. (2003). *Houghton Mifflin Reading* (Gr. 4). Boston, MA: Houghton Mifflin.

Coxhead, A. (2000). A new academic word list. *TESOL Quarterly, 34*(2) 213-238.

Dale, E., & O'Rourke, J. (1981). *Living word vocabulary*. Chicago: World Book/Childcraft.

Dorph, R., Goldstein, D., Lee, S., Lepori, K., Schneider, S., & Venkatesan, S. (2007). *The status of science education in the Bay Area*. Berkeley, CA: Lawrence Hall of Science, UC-Berkeley.

Hart, B., & Risley, T. R. (2003). The early catastrophe: The 30 million word gap by age 3. *American Educator*, *22*, 4–9.

Hiebert, E. H. (2005). In pursuit of an effective, efficient vocabulary curriculum for elementary students. In E. H. Hiebert & M. L. Kamil (Eds.), *Teaching and learning: Bringing research to practice* (pp. 243–263). Mahwah, NJ: Lawrence Erlbaum.

Hiebert, E.H. (May 2007). *A core academic word list for the middle grades*. Paper presented at the International Reading Association, Toronto, ON.

Pearson, P.D., Cervetti, G., Bravo, M., Hiebert, E.H., & Arya, D.J. (August 16, 2005). *Reading and writing in the service of acquiring scientific knowledge and dispositions: From synergy to identity*. Paper presented at Edmonton Regional Learning Consortium, Edmonton, AB.

Marzano, R. J. (2004). *Building background knowledge for academic achievement.* Alexandria, VA: ASCD.

Marzano, R.J., & Marzano, J.S. (198). *A cluster approach to elementary vocabulary instruction.* Newark, DE: IRA.

Nagy, W.E., & Anderson, R.C. (1984). How many words are there in printed school English? *Reading Research Quarterly, 19*, 304-330.

Zeno, S. M., Ivens, S. H., Millard, R. T., & Duvvuri, R. (1995). *The educator's word frequency guide.* NY: TASA.

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