

OR - Knowledge of word spellings helps elementary students learn new vocabulary!

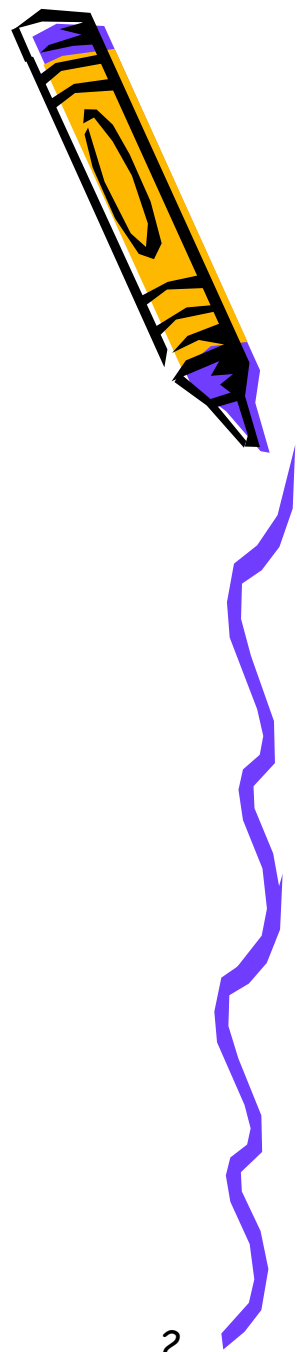


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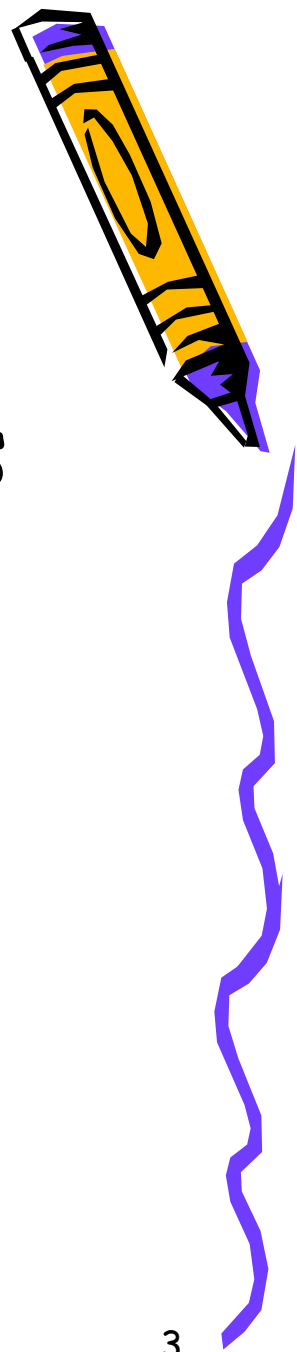


Outline of Presentation

- Background theory and research
 - How written words are stored in memory
 - Impact of written words on speech
- Written words and vocabulary learning
 - Two experiments
 - Implications



Outline of Presentation (Cont'd)



- The "self-teaching" hypothesis and vocabulary learning from context.
 - Mixed methods study
 - Findings and overall implications



Possible Ways to Read Words

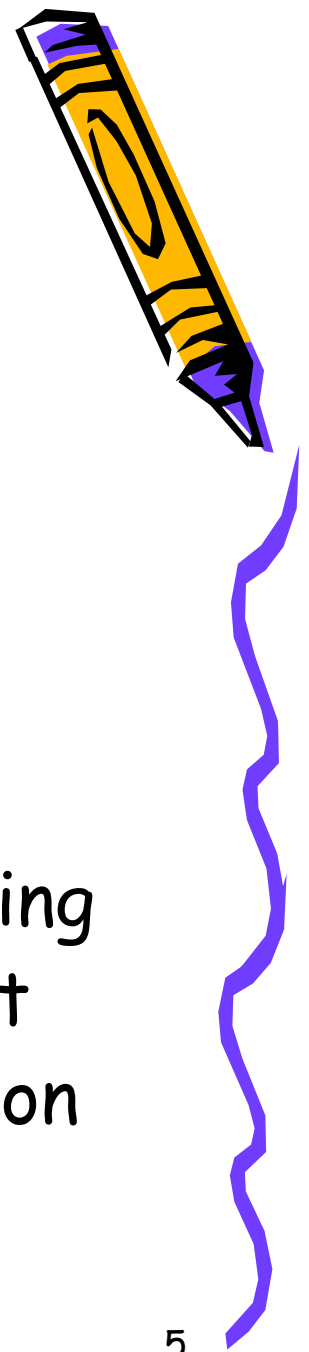


- By Decoding:
 - » Graphemes -> Phonemes
 - » Larger units: syllables, morphemes
- By Analogy: bottle -> throttle
- By Prediction: context & letters
 - At the hospital, the doctors and n.....
- By Memory / Sight

Note: All words when practiced become read by memory



Characteristics of words and processes to read them?



rume

rane

taik

gote

yung

interpossism

subharkible

contorrention

said

was

one

tongue

sugar

ocean

iron

yacht

faster

step

grass

hunger

elbow

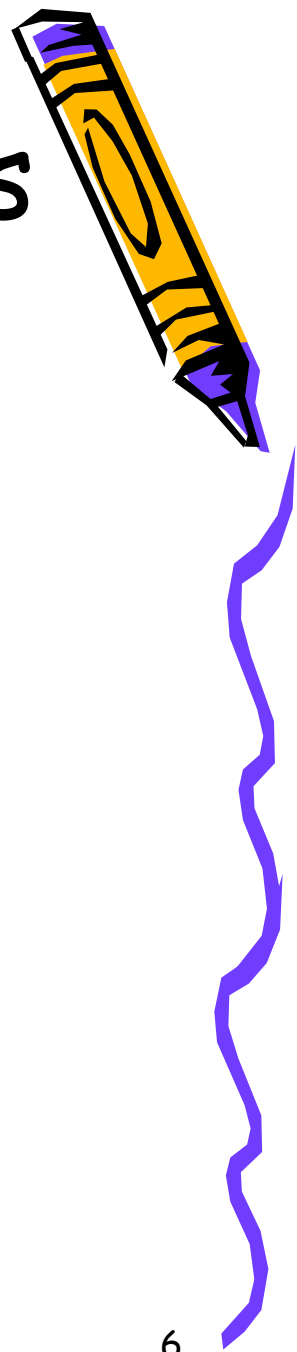
interesting

excellent

contribution



Unfamiliar vs. Familiar Words



UNFAMILIAR WORDS

- By Decoding:
 - » Graphemes -> Phonemes
 - » Larger units: syllables, morphemes
- By Analogy: bottle -> throttle
- By Prediction: context & letters

FAMILIAR WORDS

- By Memory or Sight
- *Note: All words when practiced become read by memory*



Name the color or picture,
ignore the words

Evidence that familiar words are read from memory.

AUTOMATICITY - Stroop Task
Name the color, ignore the
words



RED GREEN BLUE BLACK



AUTOMATICITY - Stroop Task
Name the color, ignore the
words



ROJO VERDE AZUL
NEGRO

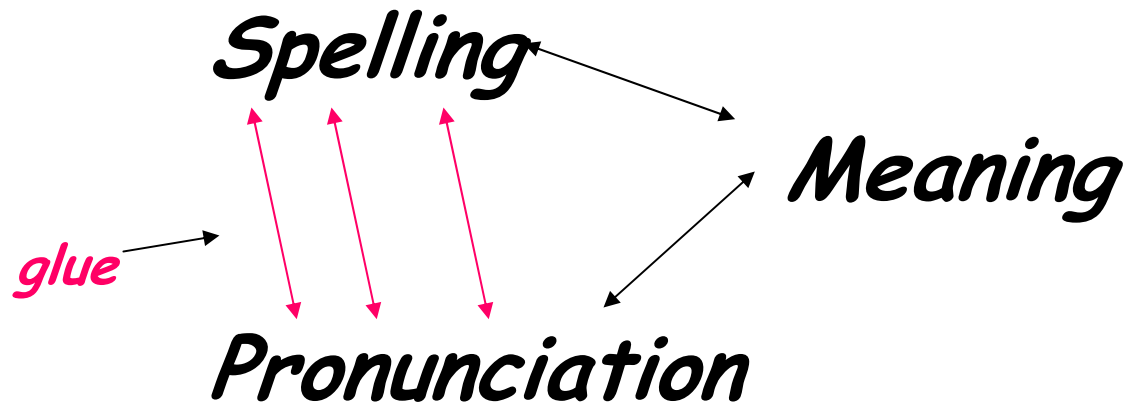


Name the picture, ignore the words



Reading Words from Memory

- Process of forming connections



Knowledge of the grapheme-phoneme system provides the glue connecting spellings to pronunciations in memory

Examples of connections for regularly spelled words

S T O P

/s/-/t/-/a/-/p/

C H E C K

/c/-/E/-/k/

G I G G L E

/g/-/l/-/g/-/L/

B I R D

/b/-/r/-/d/

Examples of connections for irregularly spelled words

I S* L A N D

/ay/-/L/-/ae/-/n/-/d/

S W* O R D

/s/ - /o/ - /r/ - /d/

L I S T* E N

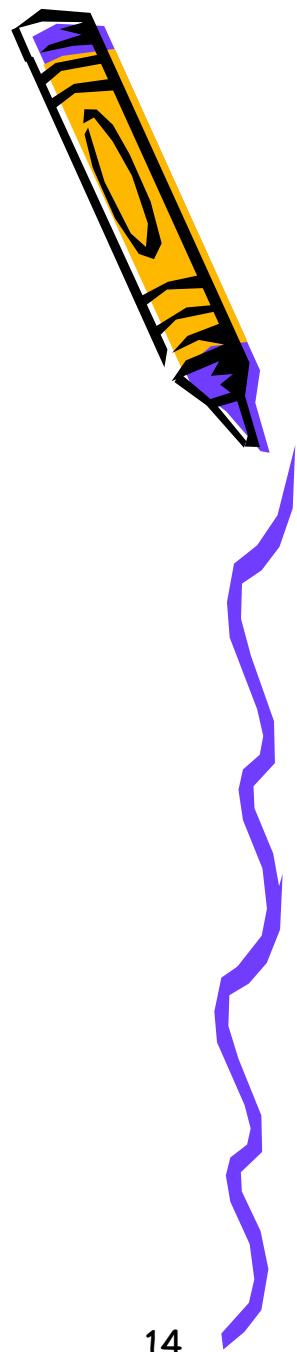
/L/-/I/-/s/-/t/-/e/-/n/

S I G* N

/s/ - /I/ - /n/

Knowledge needed to form connections and secure spellings of words in memory

- Phoneme segmentation
 - To analyze pronunciations into phonemes
- Grapheme-phoneme correspondences
 - (**the glue**)
- Grapho-phonemic mapping skill
 - To connect graphemes to phonemes within specific words



Remembering Specific Letters



- Ehri & Wilce, 1980
- 2nd graders
- Read made-up words naming animals
Example: weeple vs. wheople
- After delay, wrote the words from memory
If saw wh-, never wrote w
If saw w-, never wrote wh-
- Conclude: they stored specific spellings of words in memory; they didn't just decode words to pronounce them and then guess letters to spell them.



Connections for Specific Words are Learned Quickly



- Reitsma (1983)
 - Taught 1st graders to read words
 - Minimum of 4 practice trials to read words from memory
- Share (2004)
 - 1 exposure to words in text for 3rd graders



Memory for targeted letters persisted one month

Spellings of Words Influence Speech

- Spellings glued to pronunciations in memory:
grapheme-phoneme level, syllable level

Influence *number of phonemes* in words

P-I-T-CH has 4 vs. R-I-CH has 3 phonemes

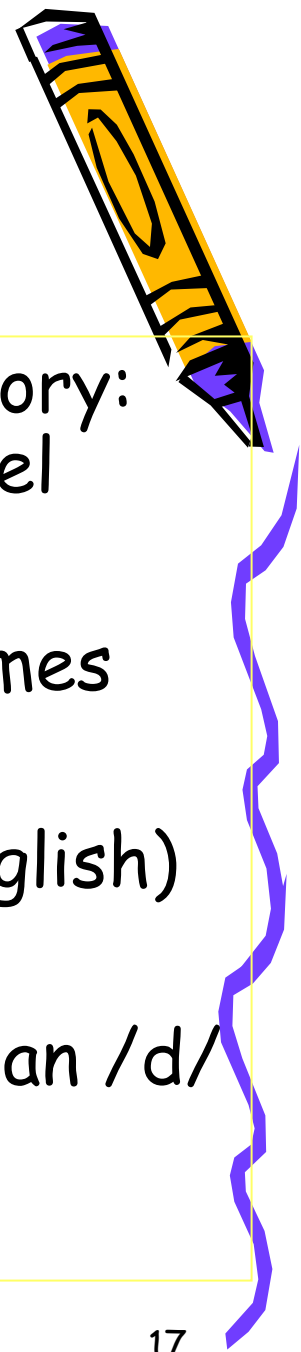
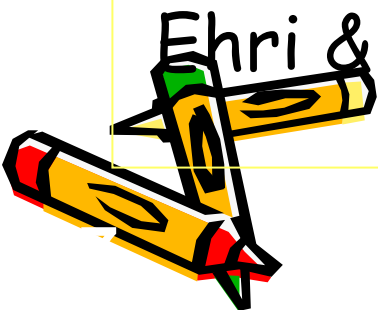
Influence *identity of phonemes* in words

Same middle phoneme /d/ (American English)

LADDER contains /d/

LETTER contains phoneme /t/ rather than /d/

Ehri & Wilce, 1982, 1986



Spellings of Words Influence Speech

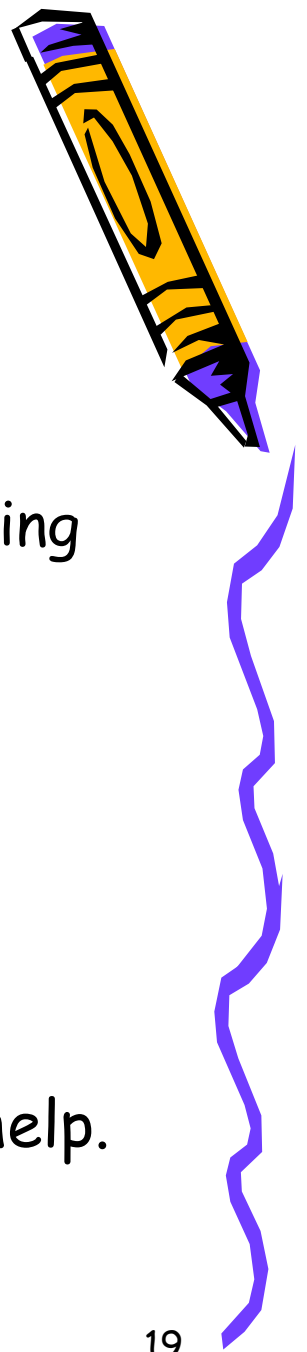


- Main points:
 - Spellings of words do not remain outside on the page when students learn to read and spell words
 - Spellings are retained in memory
 - They become attached to pronunciations in memory
 - As a result, they influence speakers' phonological representations



Vocabulary Learning

- Important goal of instruction in schools
- Purpose of studies
 - Impact of written words on vocabulary learning
 - Impact of knowledge of spellings on word learning
- Prior research:
 - Essence: associating meanings with pronunciations of new words
 - Little attention to spellings
 - In research on vocabulary acquisition
 - In recommendations to teachers
- There is reason to expect that spellings will help.



Overview of First Vocabulary Learning Study



- **Explicit Word Learning Task:**
 - Students rehearsed pronunciations and meanings of new words
- **Procedures:**
 - Initial *study trial*: pronunciations and meanings were introduced
 - Pictures, definitions, clarifying sentences
 - Several *test trials* with feedback followed

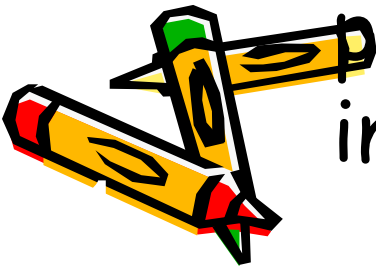
Experimental Manipulation:

- *Treatment condition*: spellings of words were shown during study and feedback periods but NOT when recall of pronunciations was tested
- *Control condition*: same except spellings of words were not shown



Hypothesis and Explanation

- *Hypothesis:* Students will learn the pronunciations and meanings of new words better when they see spellings of the words during study periods than when they do not.
- *Explanation:* Grapheme-phoneme connections will be activated by spellings and will secure pronunciations and meanings of words in memory earlier during learning.



First Experiment

- $N = 20$ 2nd graders, Mean age = 7yrs. 7 months

Pretests

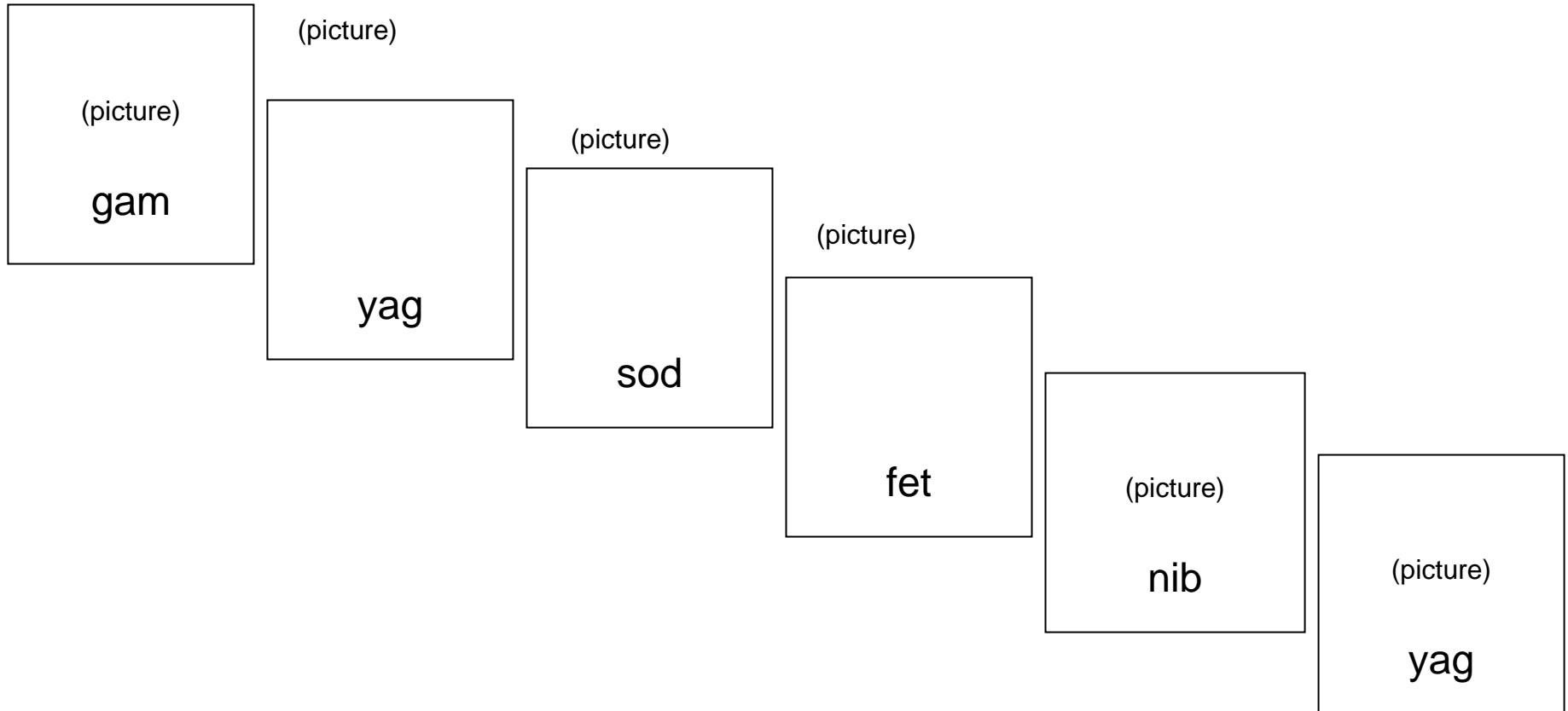
- Woodcock word identification: $M = 2.2$ G.E.
- CVC nonword reading and spelling ($M = 53\%$)

Word Learning Conditions

- Taught 2 sets of 6 concrete nouns and meanings
 - One set: spellings of words accompanied learning
 - One set: spellings did not accompany learning
- Examples:
 - Gam - family of whales
 - Cur - a homeless dog
 - Sod - wet, grassy ground
 - Fet - big, fun party
 - Nib - tip of a pen
 - Yag - fake jewelry
 - Keg - a barrel that holds water

Spelling Seen Condition:

Initial study trial: Student heard each word and a defining sentence, saw picture and written word, repeated word and sentence



Spelling Seen Condition

An example:



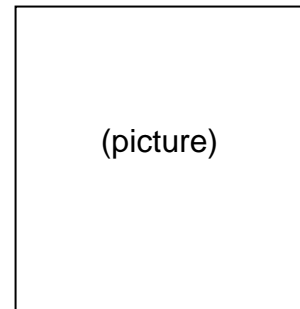
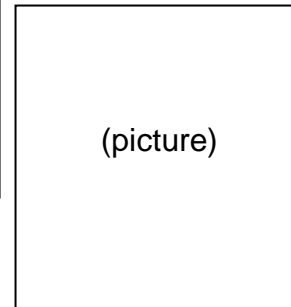
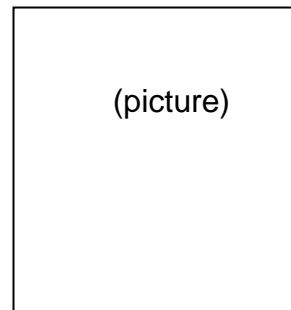
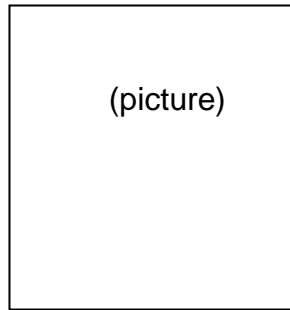
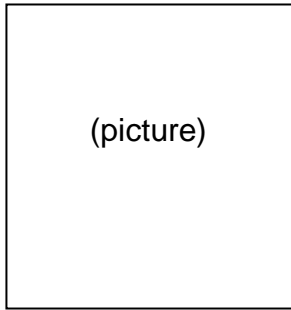
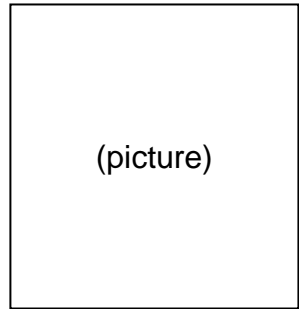
Nib

Spelling Seen Condition:

Pronunciation Recall Test Trial:

Student saw each picture and recalled pronunciation.

Followed by feedback of correct answer.



Spelling Seen Condition:

Definition Recall Test Trial: Student heard and saw each word and recalled its meaning. Followed by feedback of correct answer.

sod

nib

gam

cur

fet

yag

No-Spelling Condition:

- Procedures were the same as in the Spelling Condition

Except:

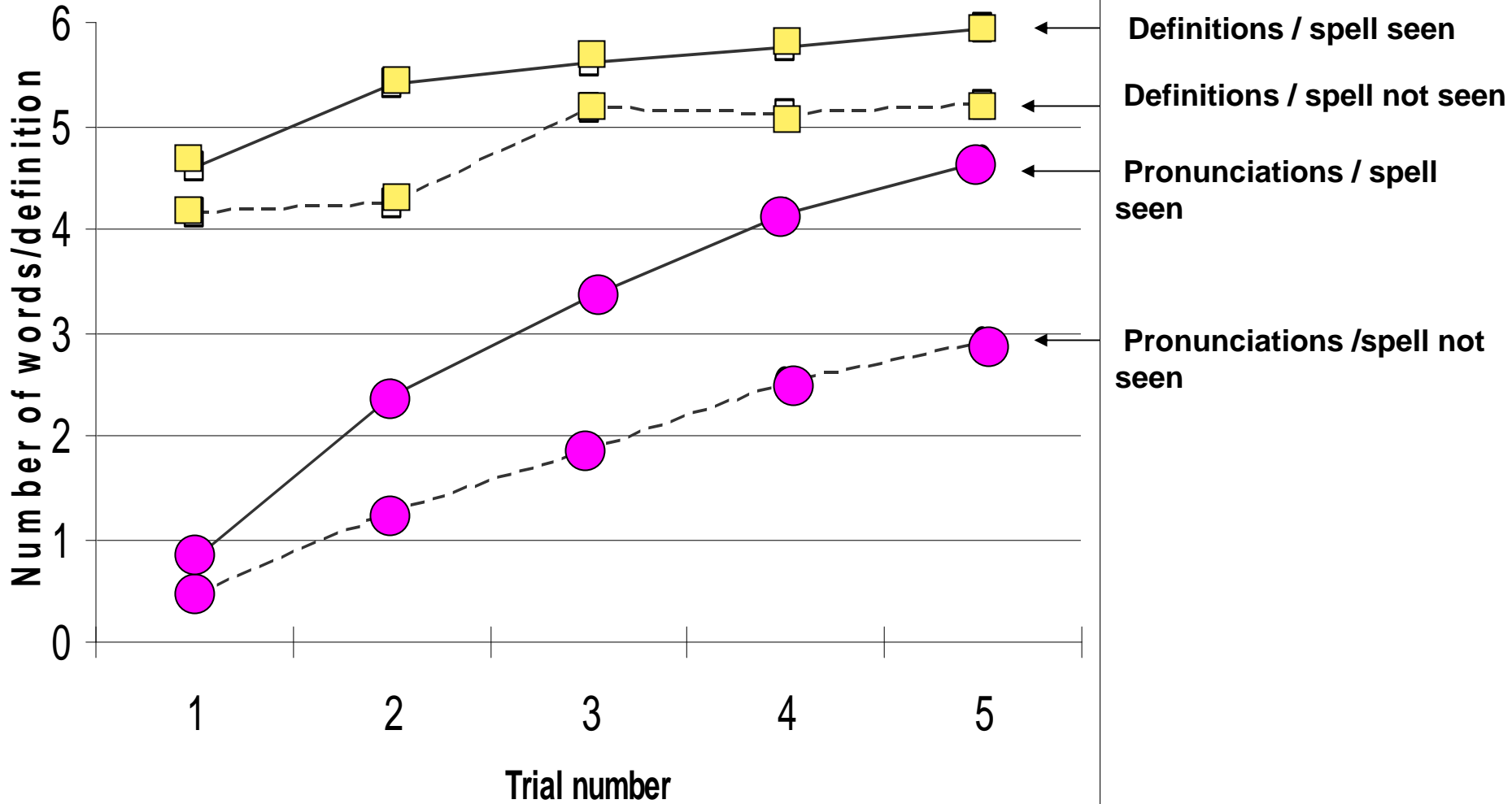
- Spellings of words were never shown
- Students pronounced the words extra times to give equal practice with words



Summary of word learning events

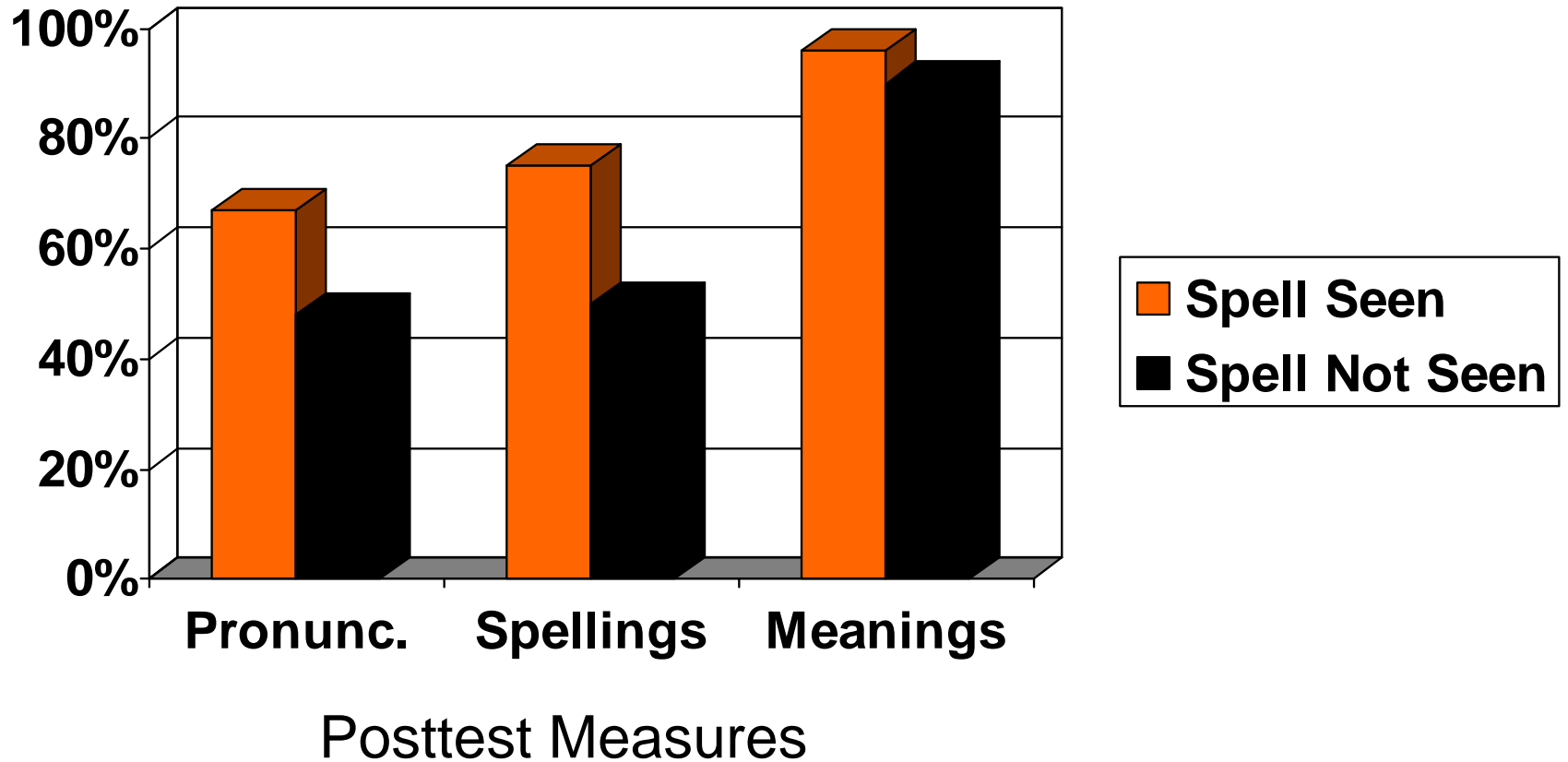
- Each child learned one set of vocabulary words *with spellings* and another set *without spellings*
- During first study trial, words were *introduced*
- All subsequent trials *tested memory* for words
- After recall of each word, *correct answers* were given with or without spellings
- Pronunciation recall trials were *interleaved* with definition recall trials
- Students given maximum of *9 trials* to learn words
- Note: Spellings of words were *not shown* when words were tested, so recall depended upon *having the spellings of words in memory*.

Mean number correct by trial (Study with 2nd graders)



Recall of pronunciations and definitions during the learning trials

Mean Percent Correct on Posttests



Conclusion and Explanation



- ***Conclusion:***

2nd graders learned pronunciations and meanings of vocabulary words better when they were exposed to spellings of the words than when they only practiced speaking the words

- ***Explanation:***

- Grapho-phonemic connections better secured pronunciations of words in memory
- This provided stronger base for attaching meanings earlier during learning



Second Experiment

- $N = 32$ 5th graders, Mean age = 10 yrs. 11 months

Pretests

Reading words & nonwords; spelling words; vocabulary test

Reader Ability Groups (word reading task)

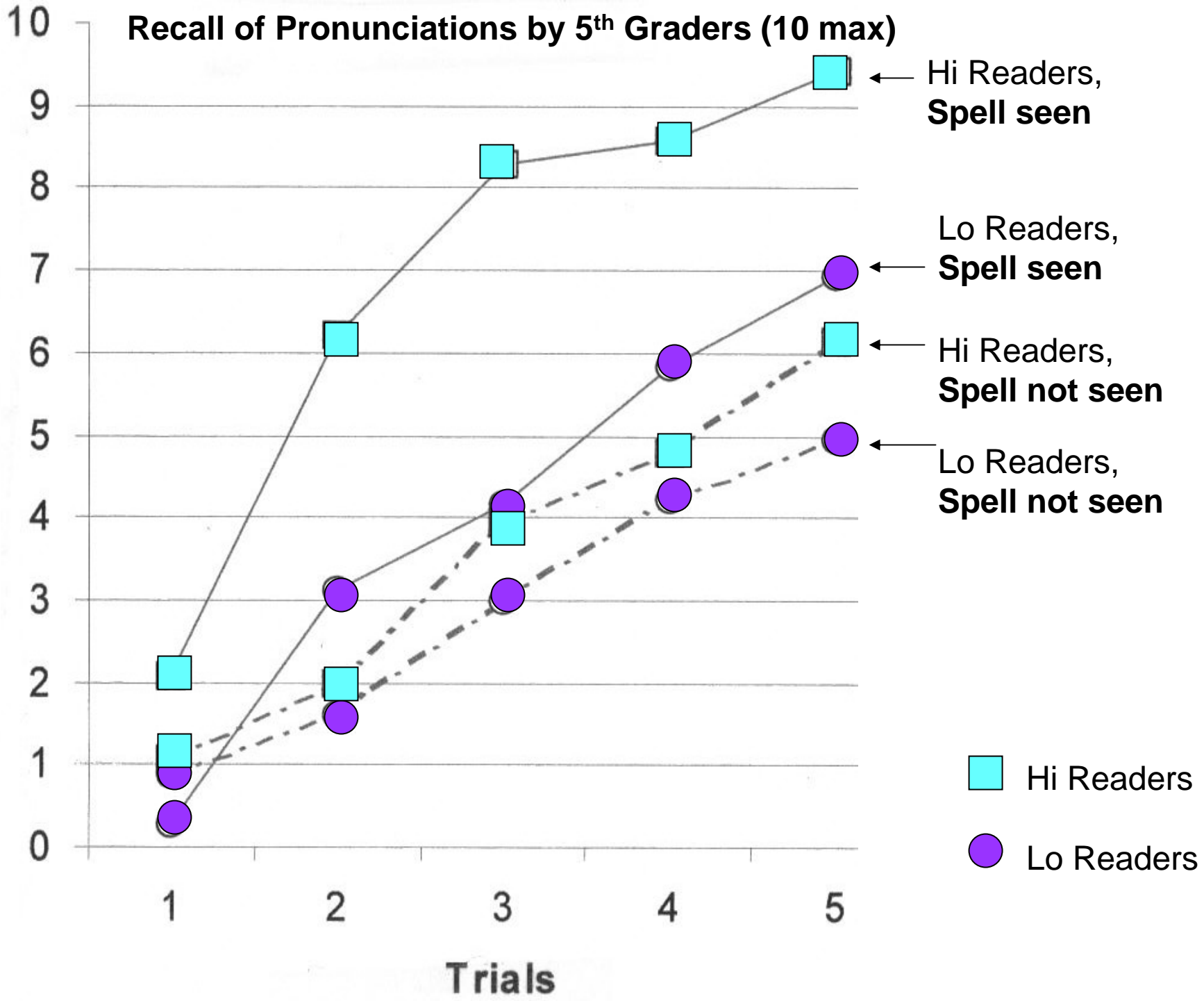
Higher Readers (7.3 GE) vs. Lower Readers (4.6 GE)

Word Learning Conditions

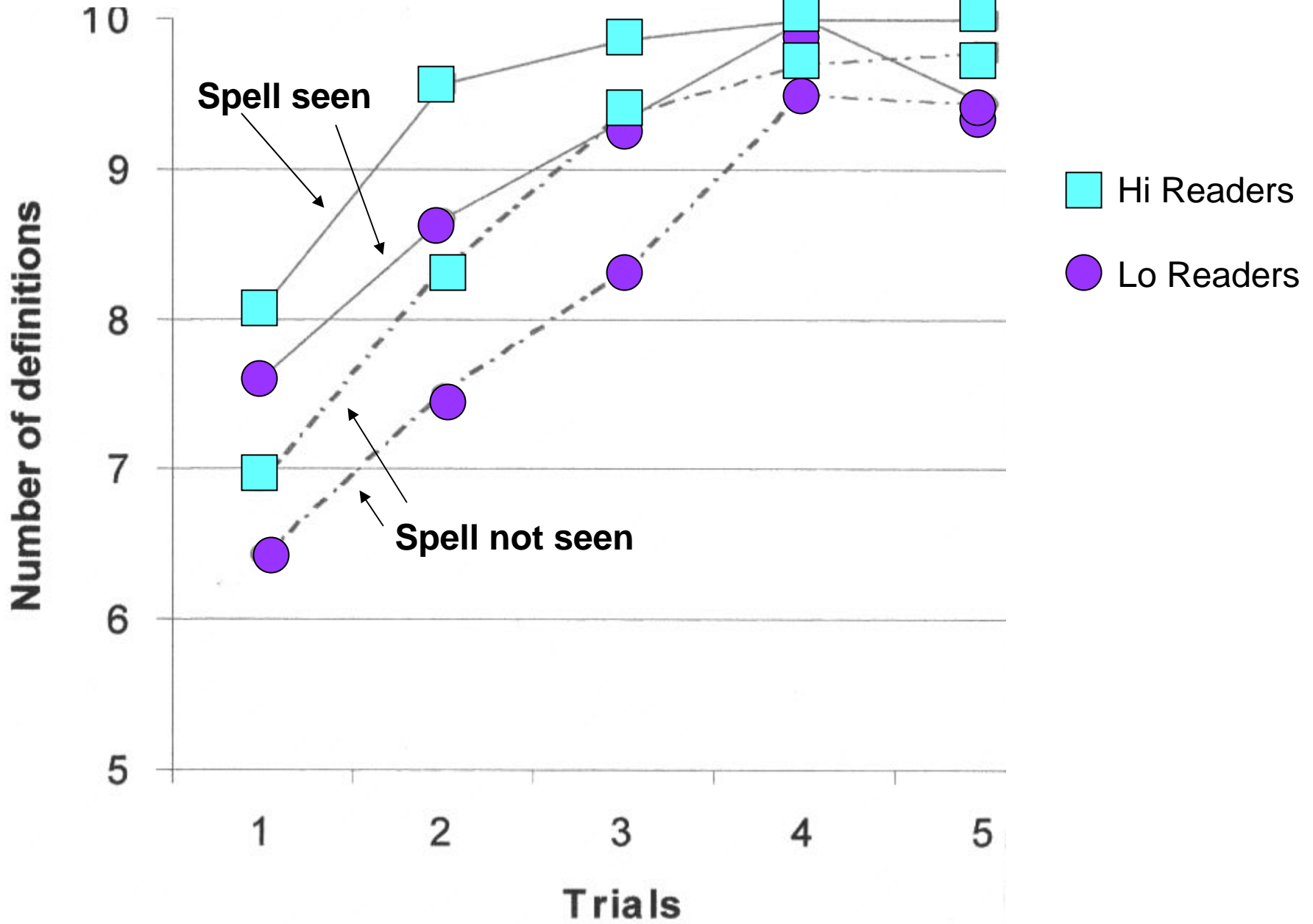
- Taught two sets of 10 concrete nouns and their meanings
 - One set: spellings accompanied word learning
 - One set: spellings did not accompany word learning
 - Maximum of 8 trials to learn words
- Examples:
 - Barrow: a small hill
 - Tandem: a horse-drawn carriage
 - Fribble: a foolish shallow person
 - Tamarack: a big tree found all over America
 - Proboscis: a really big nose

Recall of Pronunciations by 5th Graders (10 max)

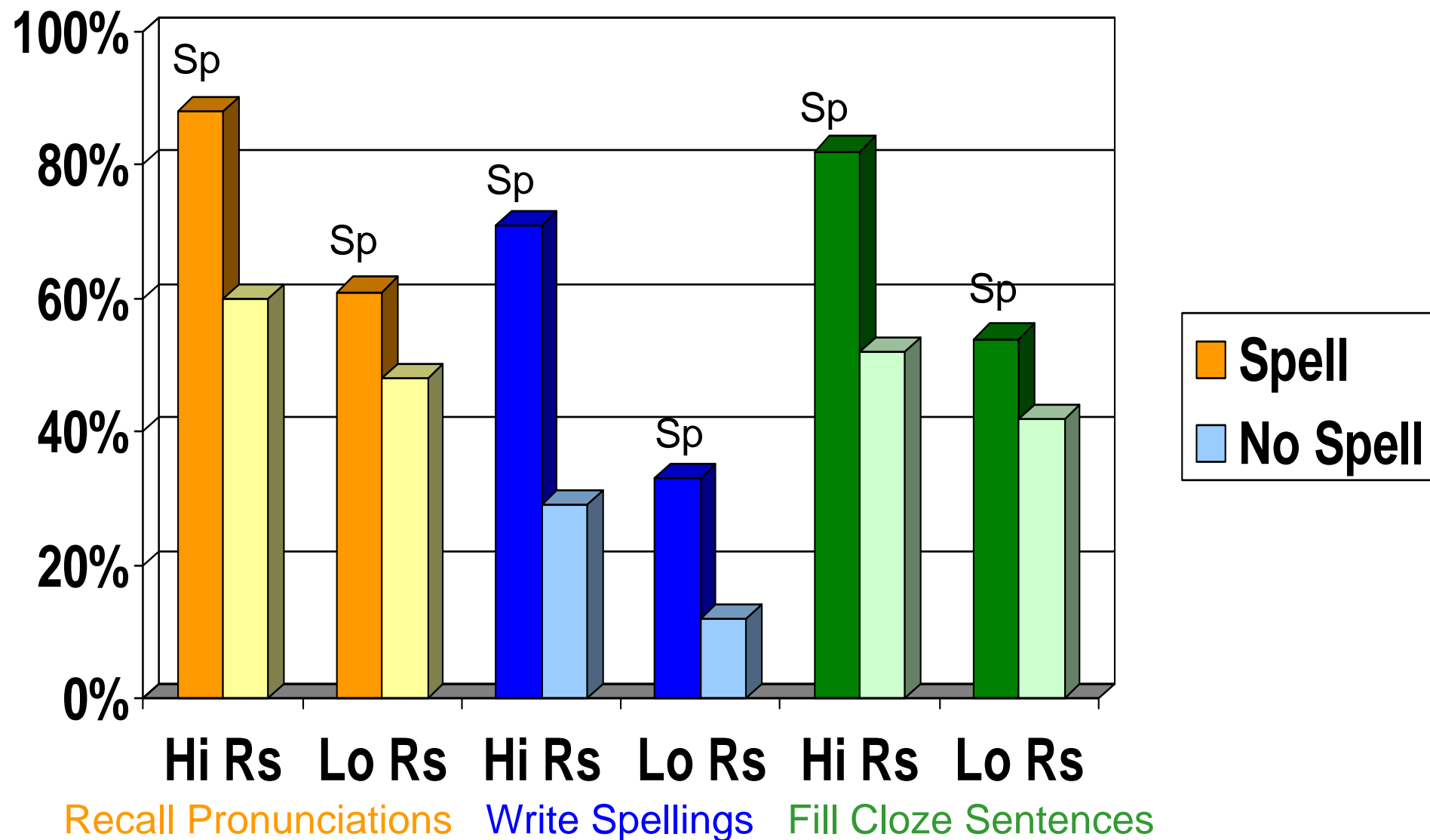
Mean Words Recalled



Recall of Definitions by 5th graders (10 max)



Mean Percent Correct on Posttests



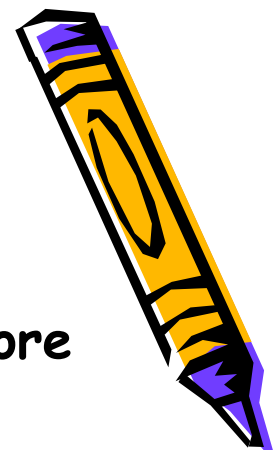
Children's **comments** during test trials when recalling pronunciations of words



- **Naming letters** before recalling pronunciations of words
- After mispronouncing a word and then seeing its spelling, exclaiming "**Oh, I misspelled it!**"
- "**I know there are two E's at the end**" when trying to recall *hicatee* (kind of turtle).



Conclusions



- Seeing spellings helped 5th graders learn the pronunciations and meanings of vocabulary words more than not seeing spellings.
- Students with strong orthographic knowledge benefited more from spellings than students with weak orthographic knowledge
- Matthew Effect: rich getting richer over time
- Explanation: grapho-phonemic connections secured spellings to pronunciations of words along with meanings in memory;
- Effect incidental: no attention to spellings; no decoding required; automatic activation of mapping relations.



Spellings helped both 2nd and 5th graders so effect is not limited developmentally.

Limitations

- Use of a controlled laboratory task to study vocabulary learning
- Subsequent study to extend findings to text reading task
- Modeled after Share (2004) in which self-teaching of orthographic information was studied



Related theory and research

Many researchers of vocabulary acquisition (e.g. Cunningham, 2005; Graves, 2006; Sternberg, 1987) have argued that most vocabulary is learned from written context.

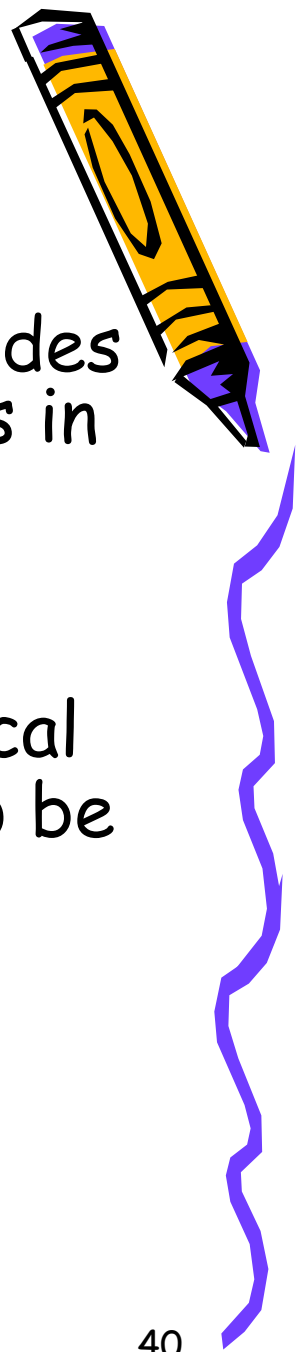
However, readers, especially poor readers, are likely to use context to infer word meanings and guess at unknown words, rather than to attend to the structure of unknown words (Clay, 1993; Tunmer & Chapman, 2002).



Related theory and research

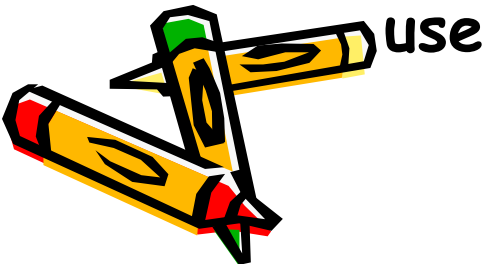
Mapping pronunciations onto spellings provides the "glue" that helps readers store words in memory (Ehri, 1992, 2005).

Contextual guessing is not likely to lead to printed word learning, whereas phonological recoding is since guesses are too likely to be orthographically incorrect (Share, 1995).



Vocabulary Learning from Written Context

- **Silent reading of text:**
 - Students read passages with embedded target words underlined
- **Experimental Manipulation:**
 - *Treatment condition:* students were instructed to orally decode target words when they came to them in text
 - *Control condition:* students were instructed to put a check mark next to words they thought they had seen before
 - Students were interviewed on their strategy use



First Experiment

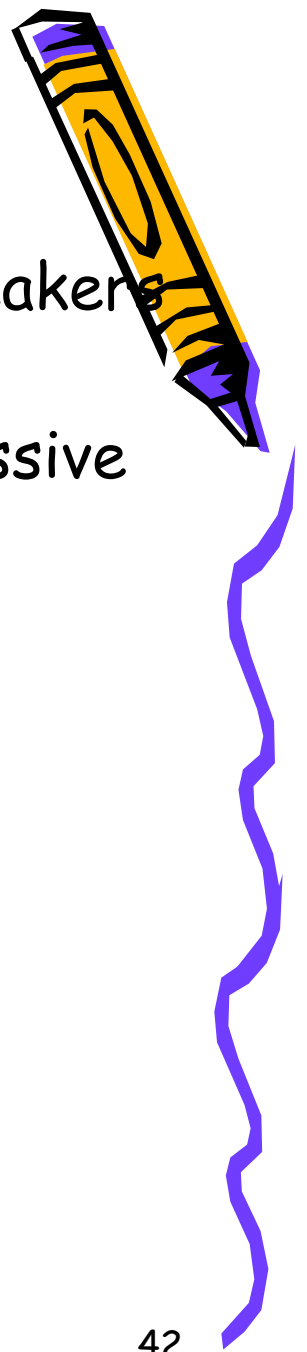
- $N = 62$ 5th graders, Mean age = 10 yrs. 7 months
- Low SES, 89% lunch program; 71% non-native speakers

Pretests

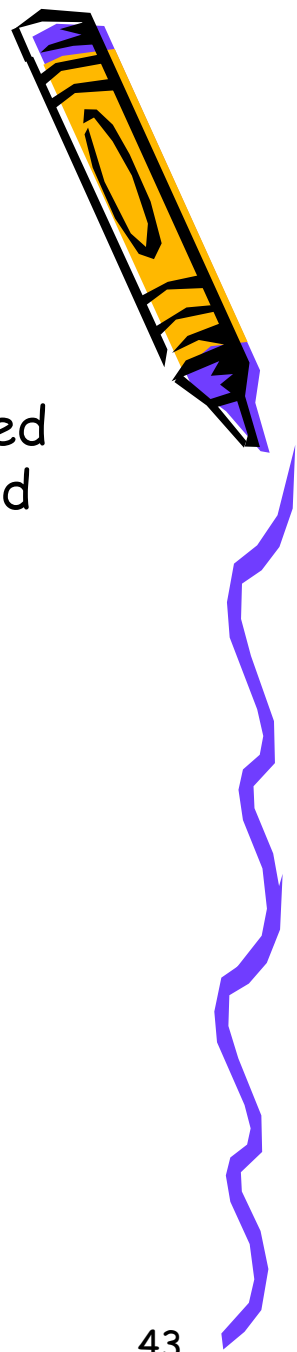
- Reading words & nonwords; spelling words; expressive vocabulary test
- Matched pairs based on word reading score
- Random assignment to experimental/control

Posttests - Immediate and After 1-Week Delay

- Passage retelling (immediate only)
- Synonym prompted word recall
- Word spelling - whole word and per letter
- Multiple choice test



First Experiment (Cont'd)

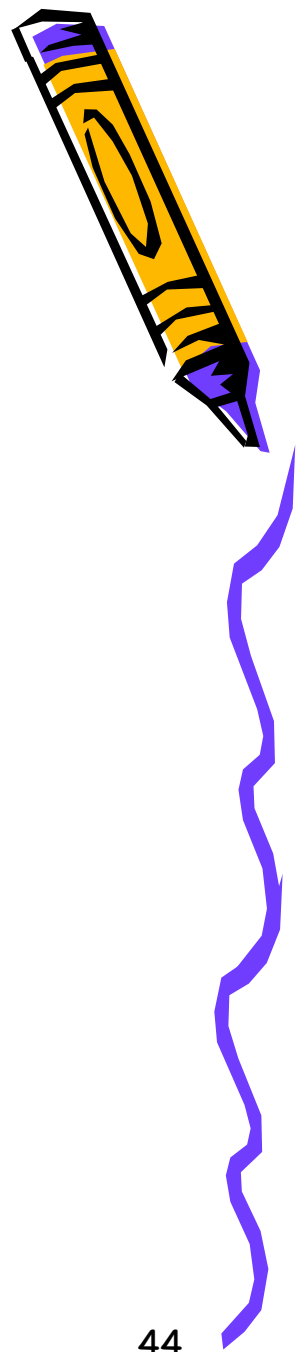


Text Reading Conditions

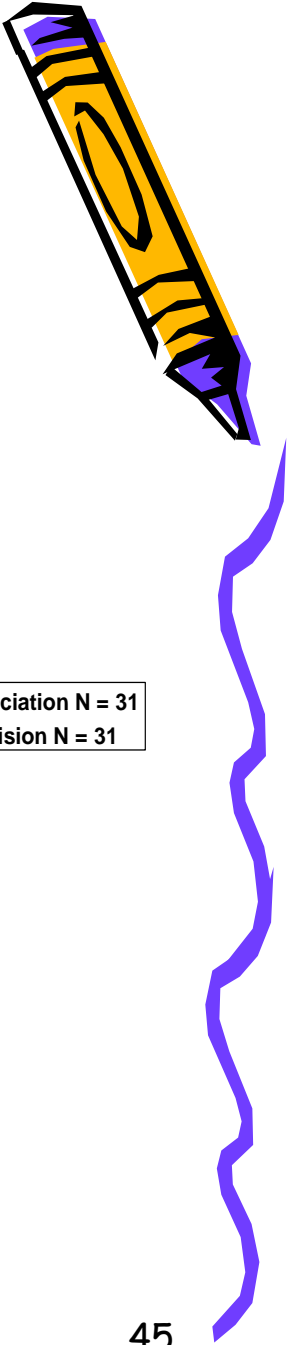
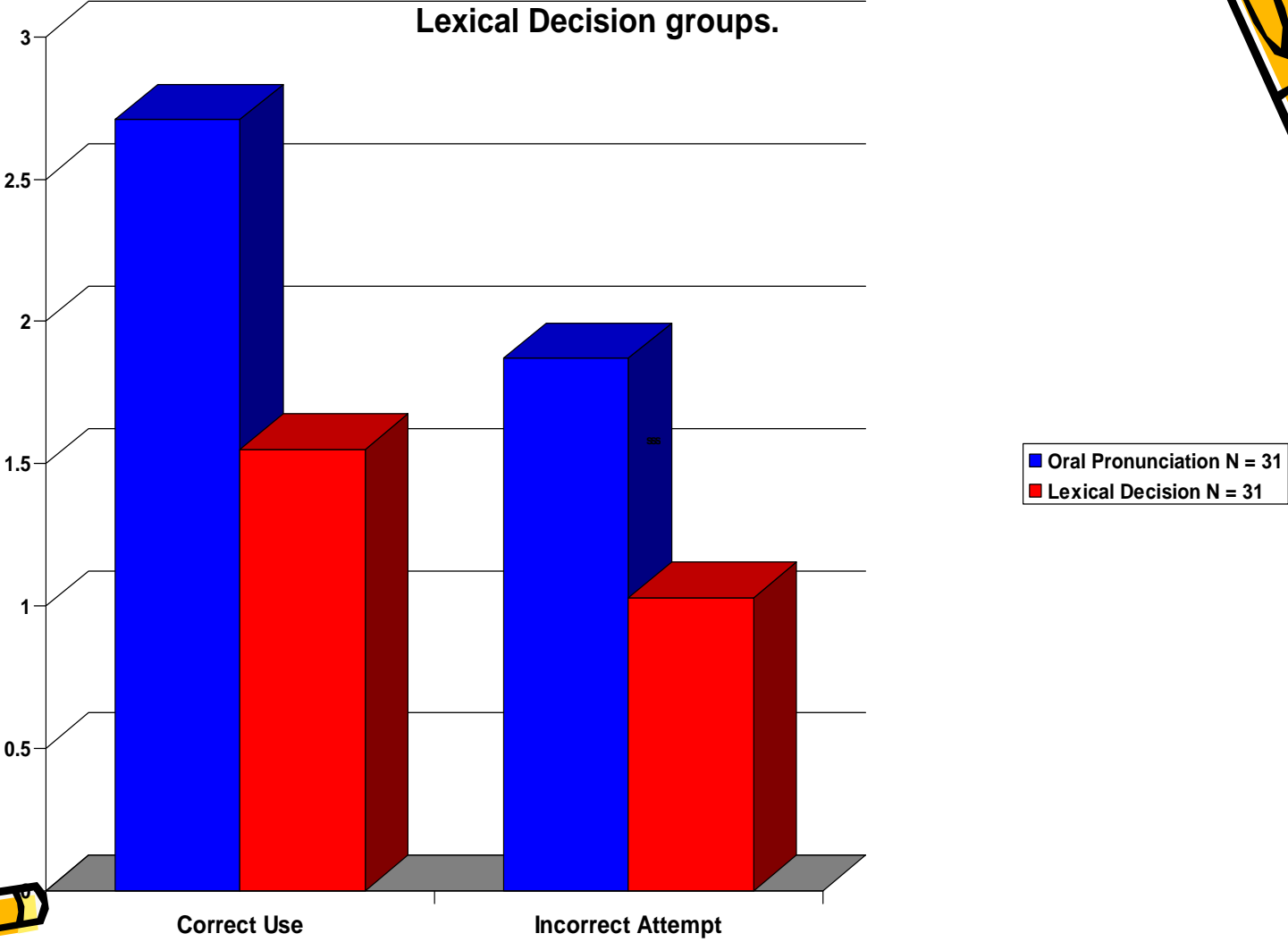
- Read two sets of 4 passages, $M=105$ words, $GL\ 5.1$
- Each contained 1 concrete noun, repeated 3 x, underlined
- Word meanings were made explicit but were not defined directly
- Students read silently
 - Oral pronunciation - experimental
 - Lexical decision - control
 - Words:
 - **Wimple** - a nun's head covering
 - **Mullock** - a pile of trash
 - **Tandem** - a horse-drawn carriage
 - **Gangrel** - a homeless person
 - **Vibrissae** - the whiskers on a cat
 - **Tamarack** - a type of tree
 - **Kerfuffle** - a fuss or fight
 - **Scrivello** - an elephant's tusks



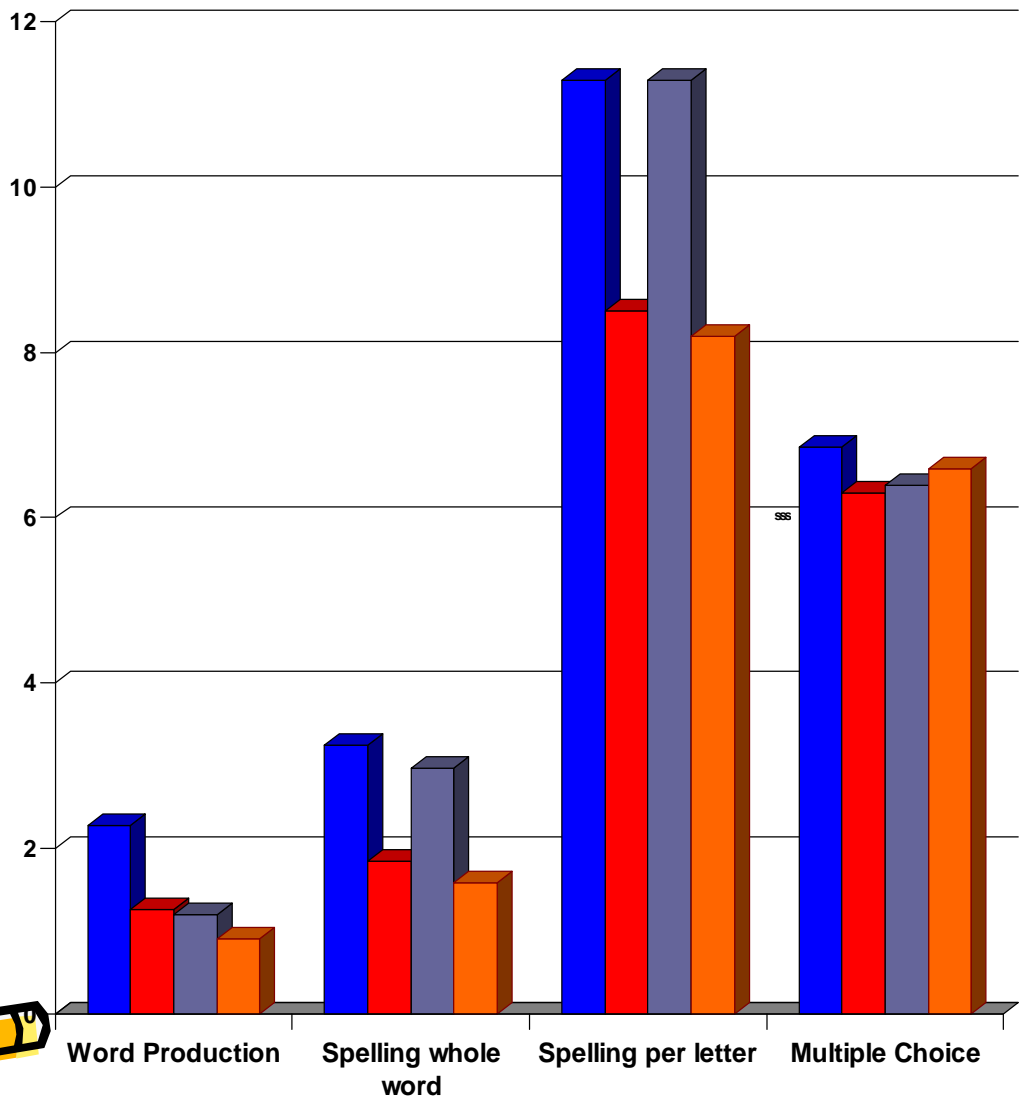
It is important to try and work out differences in a peaceful way instead of getting into a kerfuffle. Of course we do not all get along all of the time, but it is better to try to talk about it than to get into a fight. If you have a kerfuffle, someone could get hurt. You could get suspended from school. If someone makes you feel sad or angry, you need to think of ways to solve the problem and not end up in a kerfuffle with that person. Who knows? If you talk instead of fighting, you might even end up as good friends.



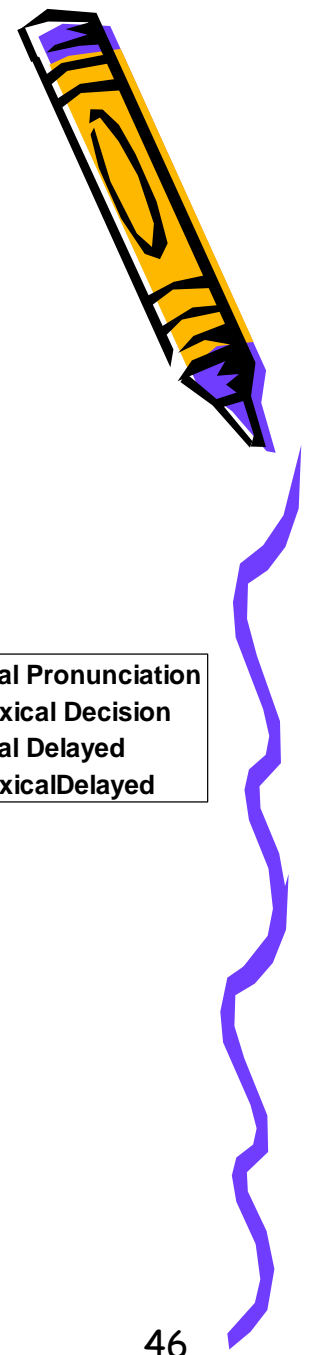
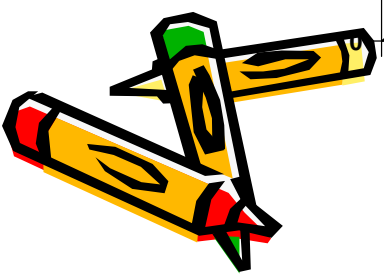
Spontaneous attempts, correct and incorrect, to use target words during text retellings by students in the Oral Pronunciation and Lexical Decision groups.



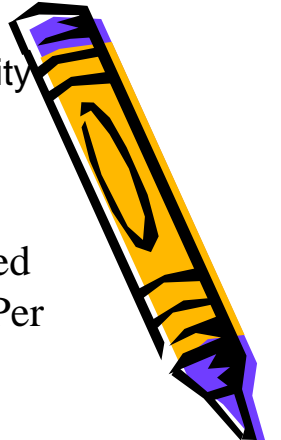
Performance on immediate and delayed word-learning posttests in oral pronunciation (N=31) vs. lexical decision (N=31) conditions



- Oral Pronunciation
- Lexical Decision
- Oral Delayed
- Lexical Delayed



Hierarchical Regression Analyses to Assess the Unique Contribution (R² Change) to Oral Pronunciation Group Posttest Performance Made by Word Reading, Decoding, and Spelling Ability (entered first) and Accurate Target Word Decoding (entered second) or of Accurate Target Word Decoding (entered first) and Word Reading, Decoding, and Spelling Ability (entered second)



	Immediate Word Recall	Immed. Spell Whole Word	Immed. Spell Per Letter	Delayed Spell Whole Word	Delayed Spell Per Letter
1. Word ID, Word Attack, Spelling	.204 ns	.252*	.366**	.234 ns	.204 ns
2. Target word decoding	.137*	.220**	.103*	.221**	.166*
1. Target word decoding	.220**	.365**	.252**	.352**	.272**
2. Word ID, Word Attack, Spelling	.121 ns	.107 ns	.217*	.102 ns	.098 ns



Conclusions



- Attending to words sufficiently to decode them allows students to self teach orthographic information.
- Knowing about words' spellings supports memory for pronunciations.
- When students decode unknown words, they are more likely to try to add them to their vocabulary.



Second "Experiment"

- $N = 32$ 5th graders, Mean age = 10 yrs. 9 months
- Subset of students from Experiment 1 (final 32 students)
- Word reading: Higher-level GE = 5.5; Lower-level GE = 3.5
- 84% non-native speakers



In addition to pre tests, students were asked to report on their word identification strategy use during independent reading:

"When you are reading on your own and come to a word that you don't know, what do you usually do to try to figure out what the word is?"

The children's reported strategies were coded as either "word based", "code based" (Tunmer & Chapman, 2002) or "beyond the text".



Examples of children's self-reported strategies



Word Based

sound it out

look at the letters

break the word
down into smaller
parts

break it into
syllables

spell it out

try to pronounce it

Text Based

guess

look at the picture

covering the word I
don't know and
reading the other
words

read the rest of the
sentence

Beyond the Text

ask my teacher

ask my parents

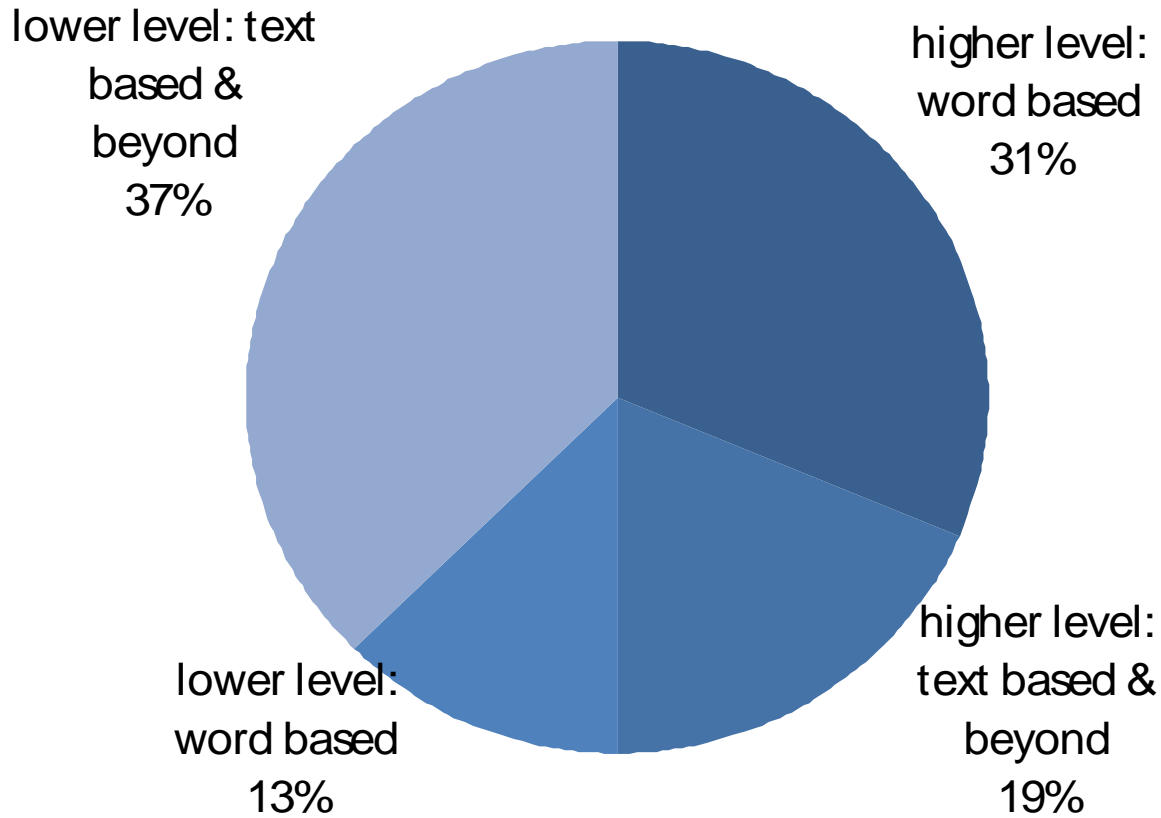
look in a dictionary

use the translator
machine

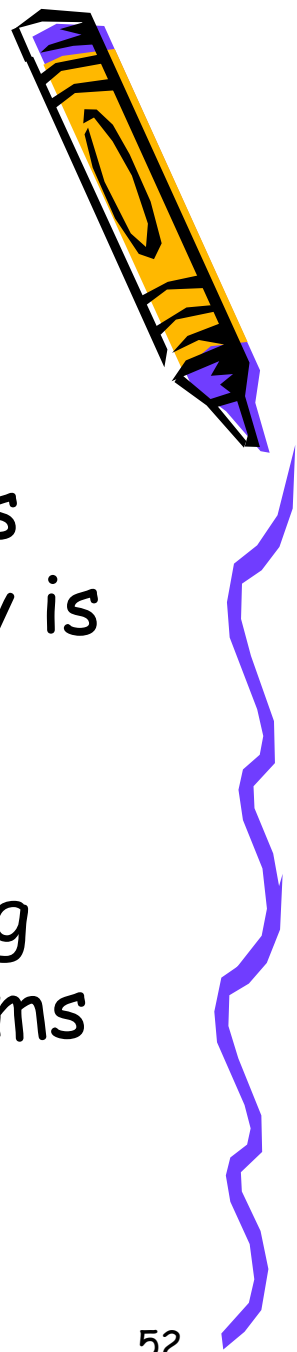


Self-Reported Strategy Use by Reader Level

Higher Level N=16 Lower Level N=16



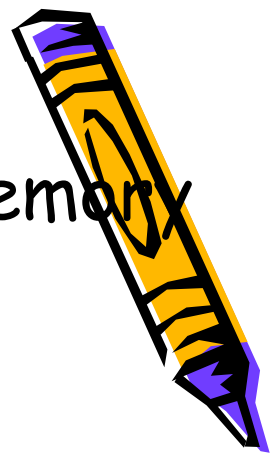
Conclusions



- Orally pronouncing unknown words during text reading aids word recall.
- This is an important finding since it is widely accepted that most vocabulary is learned through written context.
- If students are skipping over or guessing words, rather than attending to words, it is not likely that new terms will be learned.



- Instructing students to orally pronounce unknown words during reading improves memory for spellings.
- This indicates that when children are not instructed to attend to words' spellings, they in fact do not do so sufficiently to decode the words.
- Poor word readers are more likely to report using text and beyond strategies than word-based strategies; can they be self-teaching new words during reading?



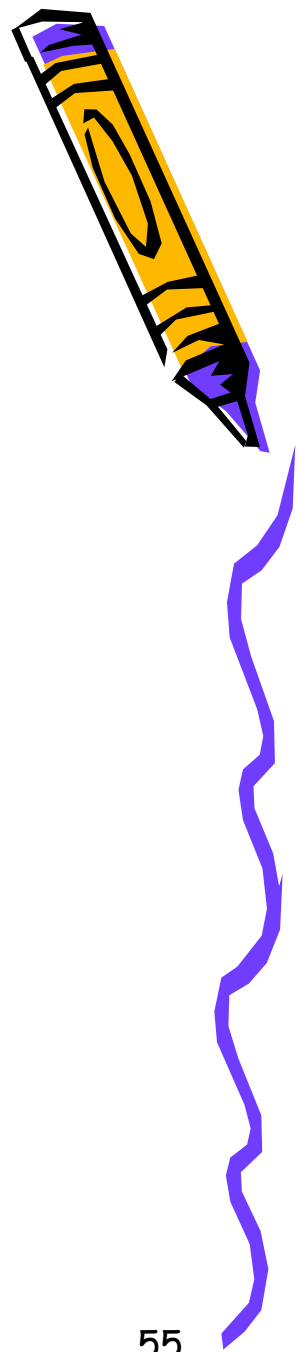
Implications for Vocabulary Instruction and Learning



- *Teachers: Systematic phonics instruction for beginning readers*
- *Teachers: show spellings of new vocabulary words*
- *Students: Strategy of pronouncing spellings of new vocabulary words; do not skip words*
- *Researchers: recognize role of spellings in word memory*



Knowledge of Spellings DOES Help Students Learn New Vocabulary Words



THE END

Thank you for your attention
Questions?

