

Spelling: A Window on Language Processing

Louisa Moats, Ed.D.

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Why is spelling important?

- Good spelling is a courtesy to the reader (“the ornament of writing”)
- Many children are not “natural born” spellers
- Learning to spell enhances phonological awareness, word recognition, vocabulary, and writing fluency

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Poor Writers' Characteristics:

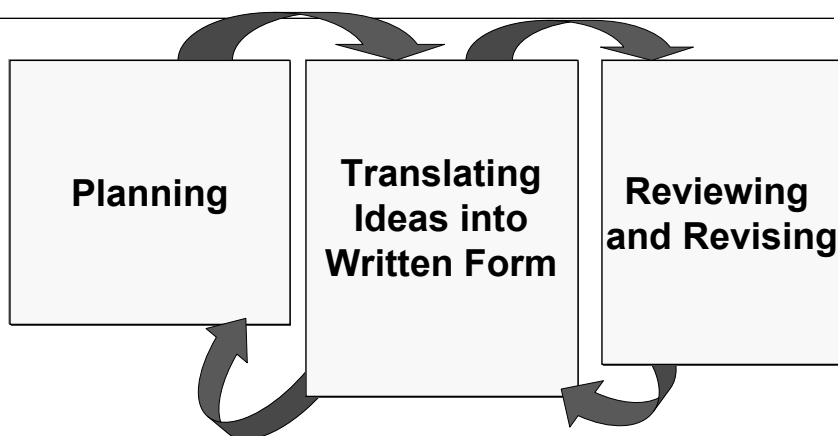
- Primary and significant problems with transcription (spelling, handwriting, punctuation)
- General language deficiencies
- Limitations of working memory – difficulty planning, organizing, retrieving, sorting, “juggling many balls at once”



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Three Recursive Mental Processes in Writing



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Spelling Is a Linguistic Skill

- Reading and spelling development are mediated by phonological awareness
 - (Read, 1971; Chomsky, 1979; Post et al., 1999; Ehri, 1994; Tangel and Blachman, 1995; Sawyer et al., 1999; Cassar, Treiman, et al. 2005)
- Spelling requires awareness of phonemes, syllables, and morphemes, as well as specialized memory for orthographic units

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Spelling is a Linguistic Skill, cont.

- Spelling is highly correlated with reading comprehension (Mehta et al., 2005)

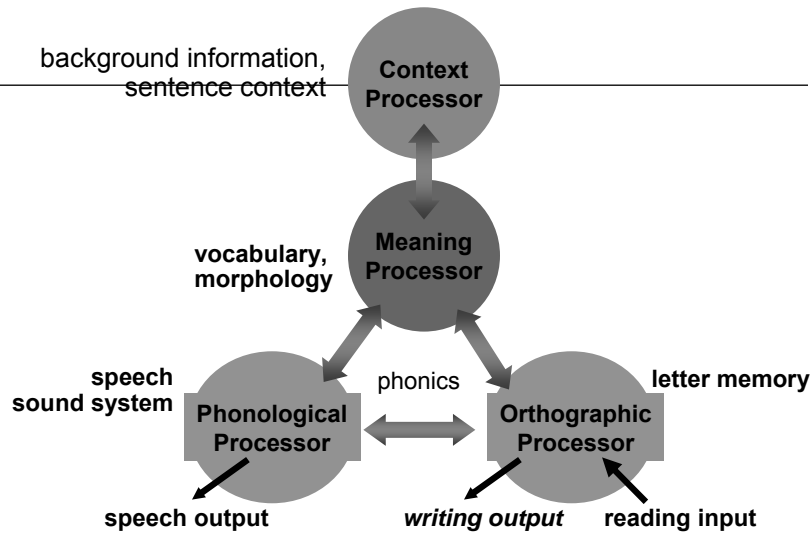
- Methods that emphasize language structure are more effective than rote methods (Graham, 1999; Berninger, 1999)

Joshi, Treiman, Carreker, & Moats (2009, *American Educator*)

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Four Processing Systems



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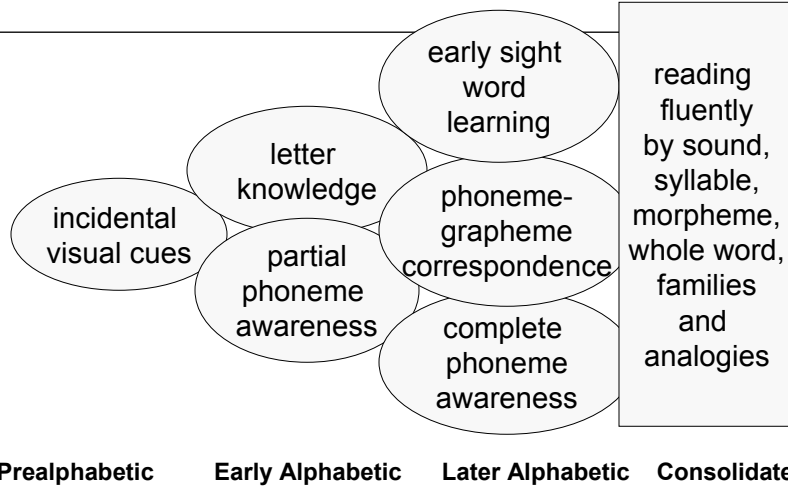
Spelling Error Analysis – Q1

- Where is the student on the continuum of **phonological** skill development?
- (Is the phonological processor doing its job?)
- Will I need to emphasize direct and explicit teaching of phoneme identity and phoneme segmentation?

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Learning to Read Words (Ehri)



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How Are Phonemes Represented?

- Are students recognizing details of speech and representing them with letters?
- Where are they on Ehri's continuum?

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Common Errors of Young Children

Long vowels from letter name.

DA = day, KAM = came, FEL = feel

Short vowels: derived from letter name closest in articulation.

a for /ě/ BAD = bed i for /ǒ/ GIT = got
e for /ĩ/ FES = fish SOGH = sugar
i for /ũ/ KIT = cut

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Nasals omitted before consonants (vowel is nasalized and nasal consonant is “lost” in articulation).

JUP – jump AD = and ED = end

Syllabic consonants /m/ /n/ /l/ /r/

LIDL = little BIGR = bigger OPN = open

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Inflections spelled phonetically (ed, s).

WAKT = walked DAWGZ = dogs

Vowel spellings in phonetic detail.

SOWN = soon GOWT = goat BOE = boy

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Representing affrication of tr and dr.

CHRA = tray CHRIBLS = troubles JRAGN = dragon

Intervocalic flaps shown as D.

LADR = letter
WODR = water

Letter names Y for /w/ and H for /ch/.

YOH = watch YL = will HRH = church

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Persistent Errors of Students with Phonological Processing Weaknesses

Errors indicate imprecise or incomplete phonological codes in memory.

(fuzzy input = inaccurate storage = faulty output)

Developing, Partial PA

- Omission of consonants within consonant blends or clusters. (MIKE/ milk)
- Confusion of consonants because student is unaware of critical features that differentiate them (e.g., voicing, nasality). SGARD (scared)

Partial PA, continued.

- Omission of unaccented syllables.
CIMMON (cinnamon)
- Omission, substitution, or phonetic spellings of inflections (-ed, -s).
FRIGHTINGLY (frightened)

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Partial PA, continued.

- Omission, confusion, or mis-sequencing of nasals (n, m, ng) and liquids (l, r).
CLOREL (color)
- Vowel substitution, based on proximity of articulation.
DRENCK

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Teaching Phonological Skills

- Phoneme identity
 - Reference to mouth
 - Explicit focus on distinguishing features of sound
 - Comparison to other phonemes
- Phoneme segmentation

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Phoneme Segmentation



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pp. 76-77

Phoneme Substitution (Advanced!)

Mick /m/ /n/ thin /n/ /ng/

them /m/ /n/ mink /ĩ/ /ũ/

thick /k/ /n/ thank /a/ /i/

mink /ng/ /l/



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Knowledge of Orthography- Q2

- Are there errors that indicate poor knowledge of or recall of graphemes?
 - Knowing the sounds is not enough!
 - Graphemes are usually more than one letter.
 - Letter patterns must be learned.

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Graphemes

- A letter or letter pattern that spells a phoneme (speech sound).
- Graphemes can be one, two, three, or four letters in English!

1 letter: 'a' as in strap
2 letters: 'ng' as in ring
3 letters: 'tch' as in ditch
4 letters: 'ough' as in through

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Graphemes: Letters and Letter Combinations

Phoneme-Grapheme Correspondence:

/ch/	/ē/	/z/	/d/	/ū/	/d/	/l/	/z/
ch	ee	se	d	oo	d	le	s

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Consonant Grapheme Types

Single letters (including blends): *trap, spend*

Doublets: *puff, hill, lass, fizz*

Digraphs: *chain, shrink, either, phone*

Trigraphs: *wedge, botch*

Silent-letter combinations: *comb, autumn, folk*

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Vowel Grapheme Types

Single Letter Spellings, Long and Short:

ro-bot, ca-pon, mo-ped

Vowel Teams: *east, south, night, blue*

Vowel-r Combinations: *her, bird, fur, car*

Vowel-consonant-e: *cape, kite, cube, rode*

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When I was 4 I had lukemea. I had to sta
at the hosbitl for 2 week's. I had to have
srjre. To have sumthing put in. I had to
get wath thay call a bonemarul and
spinultap. I had ti till I woss 7. I have
bin off cemotrpe for 2 years now. When
I had lukmea I had to get blud test 3
tims a week. Now I go eve 3 monts. I go
to a hosbitl call _____.

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Teaching Orthographic Skills

1. Language of word origin (Old English, Latin, Greek, French)
2. Phoneme-grapheme correspondence
3. Position-based spellings
4. Letter patterns & syllable types
5. Morphemes

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What Must Be Learned

- Final consonant patterns:
 - c, k, ck
 - -ge, -dge
 - -ch, -tch
 - X, cks

-
- Other consonants
 - qu, squ, digraphs
 - initial and final blends
 - hard/soft c and g
 - final /l/, /r/, /m/, /n/ syllables

-
- Vowel patterns
 - short vowels in closed syllables (WAEGN/wagon)
 - VCe (ALIK/alike)
 - Vowel teams (STA/stay)
 - Open syllables (LAEDE/lady)
 - Vowel-r syllables (HERT/hurt)
 - -Cle, final syllables (PICKEL/pickle)

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-
- High frequency, irregular words and homophones (they, was, been)
 - Contractions (IS'NT/isn't)
 - Unaccented syllables; spellings for schwa (RADEESH/radish)

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■ Syllable juncture:

- Doubling rule (UNWRAPED/unwrapped; HAPPENNING/happening)
- Silent e rule (MOVEING/moving; MISTAKEEN/mistaken)
- Y to I rule (fliers; studies)

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Mapping Graphemes

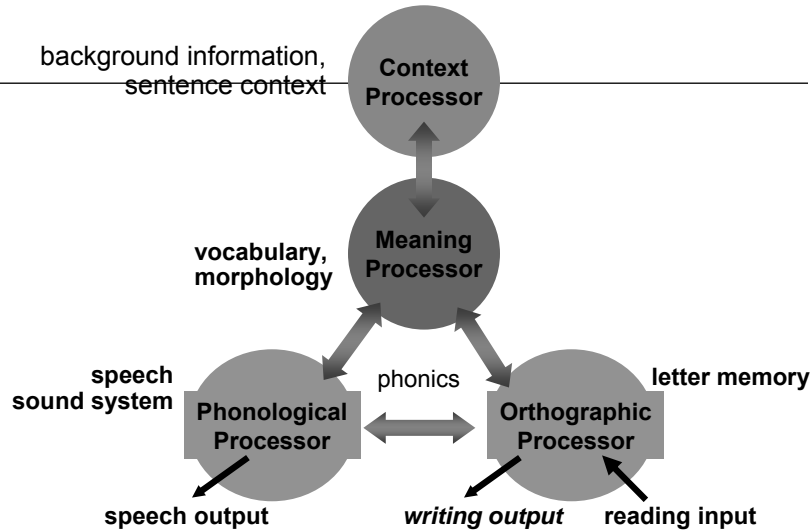


ch **a** **m** **p**

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Four Processing Systems



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Phoneme-Grapheme Mapping¹

- Map each word in the sound boxes.
- Each box stands for one phoneme.
- The first one is done here for you:

ch	o	ck				
----	---	----	--	--	--	--

¹ This technique is developed into a complete word study curriculum:

Grace, K. (2007). *Phonics and Spelling Through Phoneme-Grapheme Mapping*, Longmont, CO: Sopris West Educational Services.

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Spelling with Grapheme Tiles

o	i	ng	sh	ck
ll	r	d	m	s

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Purposes for Word Sorting

- For learning specific, position-based spellings
- For enhancing attention to the relevant details in printed words
- For conceptualizing how the system of correspondences works in English

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Word Sort, Phoneme /ng/

/ng/ = ng	/ng/ = n	No /ng/ sound
sling	finger (fin. ger)	strange

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Word Sort, Phoneme /ng/

/ng/ = ng	/ng/ = n	No /ng/ sound
sling	finger	strange
flung	lanky	flange
sprang	ink	ginger
strength	language	singe
wrong	uncle	sponge

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Syllable Sorting

Closed	Open	VCe
Vowel Team	Vowel-R	-Cle

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Sort These Syllables

ven ev e ea

er eve ceive -gle

per re ning

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Syllable Sorting

Closed ven ev ning	Open e re	VCe eve
Vowel Team ceive ea	Vowel-R er per	-Cle -gle

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What Words?

- even (e.ven)
- ever (ev.er)
- eagle (ea.gle)
- evening (eve.ning)
- receive (re.ceive)
- perceive (per.ceive)

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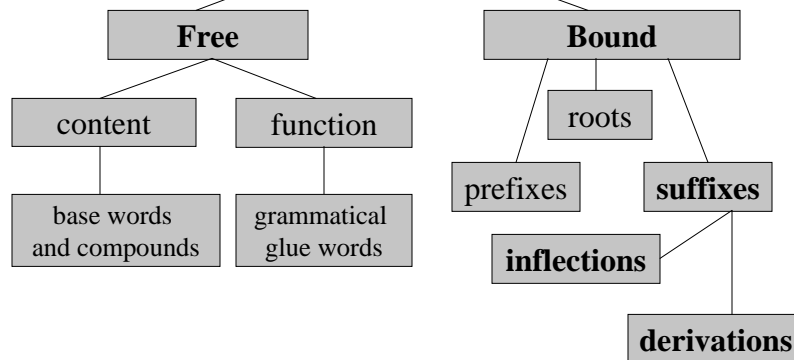
The Next Question: Morphemes

- Morphemes are the smallest meaningful units in language
- They may be just a sound (dogs)
- They may be one syllable or more than one syllable (un, uni)
- They may be words or parts of words, as words are composed of one or more morphemes

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Classes of Morphemes



From LETRS, Module 10

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Two Types of Suffixes

inflections:

- learned early
- do not change a word's part of speech
- a fixed set or class of words
- change tense, number, and degree (-ed, -s, -er)

derivations:

- added to a root (usually from Latin)
- mark part of speech or grammatical role (*compare, comparison, comparative, comparatively*)

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Morphemes in the Historical Layers of English

	Morpheme Structure
Anglo-Saxon	compounds, inflections , base words, suffixes, high frequency words
Latin	prefixes, roots, derivational suffixes, Latin plurals
Greek	combining forms plurals

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Evaluating Morphological Knowledge – Q3

- Past tense inflections (DRAGD/dragged)
- Plural inflections (BEACHIZ/beaches)
- Other inflections (ing, er, est)
(FINIST/finest)
- Recognition of the base word (RED SOX/red socks)
- Possessives and comparatives (IT's/ its)

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Morphological Knowledge, cont.

- Latin roots (REJECT/reject)
- Common prefixes (PERTECTION/protection)
- Assimilated prefixes (CORRELATE/correlate;
AGRESSIVE/aggressive)
- Derivational suffixes (SCARSETY/scarcity)
- Greek combining forms (DIPTHONG/diphthong)

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Past Tense Inflections

	/d/	/t/	/əd/	New Syllable ?
rushed		x		
filled	x			
ended			x	x
mined	x			
asked		x		
invented			x	x

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Past Tense Inflections

	/d/	/t/	/əd/
filled	rushed	ended	
mined	asked	invented	
smiled	crossed	dusted	
blazed	jumped	wilted	

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Morphological Awareness: Blend the Parts Together (orally)

pre – view
dis– pens - er
tele – vis - ion
un – re – vers -- able
inter – nation – al -- ity



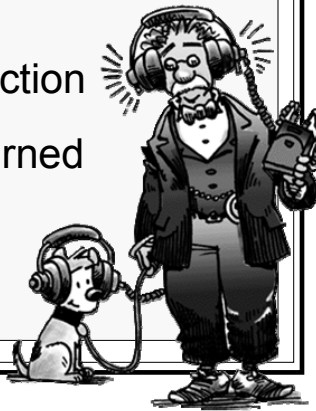
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Start By Manipulating Spoken Words

Listen. Repeat. Take away the suffix and say
the base word:

lovely departing inspection
frighten persistent learned
enchantment heartless
curiosity



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Morphological Awareness: Prefix Substitution

Listen. Repeat. Change the
prefix ____ to ____.

pretend – at
perspire – in
subvert – intro
digraph – tri
irrational -- super



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Exercise: Pare Essentials

Pare down this word by removing prefixes
and suffixes. What base word is left? What
does each affix mean?

incredible

prefix: *in* (not) *cred* (believe) suffix: *ible*

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Pare Essentials

commotion

com (with) mot (move) -tion (n.)

sustainable

sus (under) tain (get) -able (adj.)

illegal

il (not) leg (law) -al (adj.)

premeditated

pre (before) medit (to think) -ate (v.)

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Dividing Words

Syllable	Morpheme
trac-tor	tract-or
po-et-ry	poet-ry
u-ni-cy-cle	uni-cycle
gen-tle	gent-le
un-der-played	under-play-ed

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Part of Speech

Word	Part of Speech	Other Word With Suffix
nation	noun	action, competition
national	adj.	
nationalist		
nationalistically		
nationality		
nationalize		
nationally		
nationhood		

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Chameleon Prefixes

Why is there a doubled letter in one word but not the other?

aggressive

agreeable

irreplaceable

iridescence

immaterial

imagine

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Chameleon Prefixes

Some prefixes change their form to match the root to which they are added:

aggressive = ad + gressive

irreplaceable = in + replaceable

immaterial = in + material

suppress = sub + press

connect = com + nect

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Teach Word Building by Morpheme

co

in

sub

con

contra

uni

**VERT,
VERS**

-ion

-ity

-ible

-ation

-ical

-atile

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A Study of 4th Graders

(Moats, Foorman, & Taylor, 2006)

- High poverty schools in Washington and Houston
- Very little systematic, explicit instruction in writing or writing skills (spelling, etc.)
- Errors on end-of-year writing samples analyzed from linguistic perspective

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Phonological Spelling Errors (79 total in 40 compositions)

(14)-- delete nasal (JUP)

(11)-- delete cons. from
a cluster (AFAID)

(11)-- delete or misplace
liquids /r/ or /l/

(10)-- schwa delete
FRIGHTING

(6)-- final consonant
delete (CA__)

(5)-- vowel substitution
SIKE/seek,
TUCK/took

(1)-- tr/dr TROVE

(2)-- /th/ confusion
ROUTH

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Orthographic Errors

Homophones (24)

there, their, they're
by, buy; to, too
no/know; night/knight
brake/break; hart/heart
will/well; steal/still

High Frequency Words

was, come, in , and, any,
with, went, when, off, of,
then, really, which, they,
said, could, were,
because, woman, say.

The doubling rule.

skipping, steping

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Inflectional Morphology (-ed, -s, -ing)

- **138** errors in spontaneous writing (over 3 per composition on average)
- **81** errors were on the regular past tense form, “ed” spellings – omissions, confusions with other endings, phonetic spellings
- Irregular past tense, plural, comparative, and “ing” tense marker also problematic
- **33 of 40** children made one or more errors;
26 children made more than three errors

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Sentence Formulation Difficulties

- Run-on sentences were prevalent in **19/40** samples; sentence boundaries were not marked
- Ideas linked by *and, then, and then, and so, but, because* – no other conjunctions
- **26/40** contained sentences in which attempts to embed clauses were unsuccessful
- Only 6 children used an adverbial clause correctly

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Do Dyslexic Students Make Unusual Spelling Errors?

- Poor spelling is often familial and in many cases an inherited predisposition mediated by phonological skill (Pennington et al., 1986)
- **HOWEVER**, the error patterns are *not* distinctive (Nelson, 1980; Moats, 1983; Bourassa and Treiman, 2003; Cassar, Treiman, Moats, Pollo, and Kessler, 2005)

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THEREFORE,

- Poor spellers (dyslexics?) encounter the same linguistic challenges that normally progressing children do, but fail to resolve them.
- “What we learn about the sources of these linguistic difficulties and how to overcome them should apply to ALL children”

- Cassar, Treiman, Moats, Pollo, & Kessler, 2005

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Writing Sample, Age 14

Going to ___ had changed my life in many ways. Which one of them is that I can spell better, read and write a lot more. I also met a lot of mean teachers just kidding they are mean but are all nice. Some of the other things are things that the year goes faster. We go to Kilinton for a week and get for people to a room. But that is OK, there is a hot tub and pool and a game room in the hotel next store with a convenience store.

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When we get back we have a science, history, math and lit test after all then we have spring break and now I'm preparing for this test. That's the end goal. It made it easier to prepare for this so as you can see it helped.

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Spelling Lesson Routines

- Phonemic awareness
- Study of grapheme patterns, syllables, morphemes
- Practice: word sorts, word building
- Dictation of words and sentences
- Speed Drills and Proofreading
- Writing!

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Traditional Spelling Practices...

- ~~Having children write unknown words 10 times each in a list;~~
- ~~Selecting spelling words without regard to linguistic pattern;~~
- ~~Giving everyone in a class the same list to memorize;~~
- ~~Viewing spelling as “simple” task.~~

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Edmund Henderson, 1990

“Those who set out to remember every letter of every word will never make it. Those who try to spell by sound will be defeated. Those who learn how to walk through words with sensible expectations, noting sound, pattern and **meaning relationships** will know what to remember, and they will learn to spell English.”

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