

**PHONOLOGY + PHONICS + MORPHOLOGY + ETYMOLOGY = ORTHOGRAPHY**  
**→FOUR CONVERGING PATHS EN ROUTE TO AUTOMATIC WORD RECOGNITION AND SPELLING←**  
**Nancy Cushen White, Ed.D.**

**Strategies for Struggling Readers**  
 SO-CAL Tri-Counties Branch  
 The International Dyslexia Association

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PHONOLOGY + PHONICS + MORPHOLOGY + ETYMOLOGY = ORTHOGRAPHY  
 →FOUR CONVERGING PATHS EN ROUTE TO READING AND WRITTEN EXPRESSION←

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March 17, 2018  
 Marriott Riverside at the Convention Center  
 Riverside, CA

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**English Orthography  
 Preserves Bits of History**

Richard Venezky—1999—page 4

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\* “English orthography is not a failed phonetic transcription system, invented out of madness or perversity.

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\* Instead, it is a more complex system that preserves bits of history (i.e., etymology), facilitates understanding, and also translates into sound. 2

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**ENGLISH Is a MORPHOPHONEMIC Language**

- English is a morphophonemic language →the pronunciation of polysyllabic words is primarily determined by placement of stress.
- Morphophonemics →interaction between morphological and phonological processes (Venezky, 1999).
- **As the number of syllables changes, the stress shifts—and the pronunciation of individual morphemes (and syllables) will change—but the spelling does not change.**
- As the number of syllables changes, the stress shifts—and the pronunciation of individual morphemes (and syllables) will change.
- **Words with spelling connections have meaning connections.**
- The study of spelling—with a focus on the morphophonemic nature of English—connects even unfamiliar words with a common base to their meanings.

finish finite infinite definite infinitesimal final confine infinitive

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**ENGLISH Is a MORPHOPHONEMIC Language**

infinitive

**infinitive (n.)**

"simple, uninflected form of a verb, expressing its general sense," 1510s, from earlier use as an adjective (mid-15c.), from Late Latin *infinitivus* "unlimited, indefinite," from Latin *infinitus* "not limited" (see **infinite**). "Indefinite" because not restricted by person or number. Related: *Infinitival*; *infinitively*.

late 14c., "eternal, limitless;" also "extremely great in number;" from Old French *infin* "endless, boundless" and directly from Latin *infinitus* "unbounded, unlimited, countless, numberless," from *in-* "not, opposite of" (see *in-* (1)) + *finitus* "defining, definite," from *finis* "end" (see *finish* (v.)). The noun meaning "that which is infinite" is from 1580s.

**finish (v.)**  
 late 14c., "to bring to an end;" mid-15c., "to come to an end" (intransitive), from Old French *finiss-*, present participle stem of *fenir* "stop, finish, come to an end; die" (13c.), from Latin *finire* "to limit, set bounds; put an end to; come to an end," from *finis* "that which divides, a boundary, border," figuratively "a limit, an end, close, conclusion; an extremity, highest point; greatest degree," which is of unknown origin, perhaps related to *figere* "to fasten, fix" (see *fix* (v.)). Meaning "to kill, terminate the existence of" is from 1755.

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**ENGLISH Is a MORPHOPHONEMIC Language**

Elaine Silliman, Ph.D.  
 ASHA Fellow—Board Certified Specialist in Child Language and Language Disorders

◆ **"Spelling is the engine that interconnects new word formation with vocabulary—because English is *morphophonemic*.**

◆ **Therefore, the teaching of spelling *from a morphophonemic framework*, should begin in *kindergarten*."**

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**A thought to ponder...**

**"Until you are willing to be confused about what you already know, what you know will never become wider, bigger or deeper."**

**-Milton Erikson**

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**Bruner's Law**

“We want kids to experience **success and failure as information**—*not* success or failure.”

—Jerome Bruner

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**\*\*Orthography**

Etymology + Morphology + Phonics + Phonology

◆ **Etymology** → *interrelationships* of words with their own origins and with other words that share that origin—through *history*

◆ **Morphology** → sequence and structure of meaningful units—in English *today*

◆ **Phonology** → units of speech that create meaning only when combined

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**A BIG Idea**

❖ Words with spelling connections also have meaning connections.

❖ The meaning of a word is the sum of its parts:

- ◆ 80% of derived words mean what their parts suggest —IF multiple meanings of the base elements are taken into account.

❖ Both denotation and connotation must be considered.

❖ Students who understand language structure notice and use these links in meaning.

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**Denotation and Connotation  
NOT THE SAME**

- ❖ BOTH Denotation AND Connotation must be considered, but they are **NOT THE SAME**.
- ❖ Denotation → refers to *literal, primary* meaning
- ❖ Connotation → refers to other characteristics *suggested or implied*
  - ◆ A word like <mother> **denotes** "a woman who is a parent" but **connotes** qualities such as protection and affection.

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**Another BIG Idea**

- ❖ Words with spelling connections also have meaning connections.
- ❖ We don't know the pronunciation of a base until it surfaces in a word.

11

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**Roots—Base Elements—Stems**

Roots → Etymological or Morphological?

- ❖ Strictly historical term (diachronic)
- ❖ Currently used as exclusively etymological
- ❖ Etymological source of the base element

12

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**Roots-Base Elements-Stems**

EXAMPLES OF ROOTS

- The **root** of <ugly> is the Old Norse <uggligr> which means "to be feared."
- The **root** of <gregarious> is the Latin <gregem> which means "flock."

13

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**Another BIG Idea**

- ❖ Words with spelling connections also have meaning connections.
- ❖ The meanings of specific words need to be taught in ways that support students in understanding how words are connected semantically and morphologically (Graves, Juel, & Graves, 2004).

14

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**Roots-Base Elements-Stems**

**Eponym** → a word derived from the name of a person

**<ocean>**

- ➔from Latin <oceanus>
- ➔from Greek <okeanos> [of unknown origin]
  - Great river or sea surrounding the disk of the Earth (as opposed to the Mediterranean);
  - Personified* as Oceanus, son of Uranus and Gaia and husband of Tethys.

*In early times, when the only known land masses were Eurasia and Africa, the ocean was an endless river that flowed around them.*

15

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**Roots-Base Elements-Stems**

**Eponym** → a word derived from the name of a person

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⊙ < sandwich > → **The Earl of Sandwich** was a compulsive gambler—who did not want to stop gambling when he was hungry.

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⊙ < atlas > → **Atlas** was a 2<sup>nd</sup>-generation Titan who personified the quality of endurance. He led the Titans in a rebellion against Zeus and was **condemned to bear the heavens upon his shoulders**. Illustrations on covers of early books of maps showed **Atlas holding up the globe**; today a book of maps is called an **atlas**. 16

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**Roots-Base Elements-Stems**

**Toponyms**

**Toponym** → a word derived from the name of a place

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⊙ The root of < fez > is < fez >. This word, meaning cylindrical red headgear with a tassel, is named after the Moroccan city of Fez.

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⊙ Examples of Toponyms:

- < hamburger >
- < cologne >
- < fez >

17

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**Roots-Base Elements-Stems**

**Toponym** → a word derived from the name of a place

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⊙ < la la land >

1. A place or a state of being out of touch with reality
2. A place known for frivolous activities.

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The term < la-la land > is coined from the initials of the city of Los Angeles, home of Hollywood, alluding to the fictitious nature of the movies, sets, etc. 18

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Roots-Base Elements-Stems	
Base Element	
❖ Essential <u>kernel</u> of a word's meaning	
❖ Morphological <u>base</u> of a word	
❖ No inherent historical reference	
❖ Strictly <u>structural</u> connotation	
❖ Spelling of a word as it is today	
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Roots-Base Elements	
Base Element	Root
No inherent historical reference	Strictly historical etymological reference
<u>Morphological base</u> of a word in English	<u>Origin and history</u> of a base
Essential <u>kernel</u> of a word's meaning	Meaning and form <u>through time</u> between a word and its origin
Spelling of a word as it is <u>today</u>	<u>Diachronic</u> —development through history
Strictly <u>structural</u> connotation	Strictly <u>historical</u> reference
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Roots-Base Elements-Stems	
Base Elements	
Free Bases can function as <u>single words</u> independently. will    the    text    she    with    run    warm	
Bound Bases are only words in combination with <u>at least one other element</u> . sponse   ject   rupt   chrone   phys   fer   tain   sci	
Twin Bases have alternative forms. vide-vise   scribe-script   tend-tense   duce-duct   flex-flect o Any or all <u>may</u> appear in the same word family.	
Different Bases derived from the <u>same root</u> : <u>same etymological family</u> — <u>different morphological family</u> face-face-fact-fect → to make    tain-tent-tine-tene → to hold	
21	

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**Bound Morphemes**

- ◆ Work as meaningful units ONLY in combination with other morphemes
- ◆ **NEVER** stand alone
- ◆ SUFFIXES
  - Inflectional Suffixes
    - ◇ Grammatical endings
  - Derivational Suffixes
    - ◇ Changes part of speech

22

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**Connecting Vowel Letter**

- *It connects; it's a vowel; it's ONE vowel letter.*
  - ◇ A connecting vowel letter follows a base element within a word.
  - ◇ Only one connecting vowel letter may follow a base element.
    - synonym = syn + onym
    - ◇ Default connecting vowel letter in Latin: <i>  
 -proficient = pro + fice + i + ent
    - Sometimes <u>; occasionally <e>
    - situation = site + u + ate + ion
    - ◇ Default connecting vowel letter in Greek: <o>  
 -thermometer = therm + o + meter
    - psychology = psych + o + loge + y

23

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**Some Little-Known Orthographic Rules**  
*[Examples Below Shared and/or Inspired by Gina Cooke]*

A grapheme **cannot** straddle a morpheme boundary:

- \* There is a consonant digraph <ph> grapheme in <prophet>.
- \* There is **NO** <ph> grapheme in <uphill> or <haphazard>:  
 <up> + <hill>    <hap> + <hazard>
- \* There is a double vowel <ea> grapheme in <heea>.
- \* There is **NO** <ea> grapheme in <creat>:  
 <cre> + <ate>    <pro> + <cre> + <ate>

24

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**Some Little-Known Orthographic Rules**  
*[Examples Below Shared and/or Inspired by Gina Cooke]*

A grapheme cannot straddle a morpheme boundary:  
 There are constraints as to which (and how many) consecutive letters English will allow.

- ◇ <agree> + <ed> → <agreed> [NOT agreeed]
- ◇ <agree> + <ing> → <agreeing>
- ◇ <knee> + <ed> → <kne~~e~~d> [NOT kneeed]  
 The fighter kneed his opponent.
- ◇ <eight + th> → <eighth> [NOT eightth]
- ◇ <full + ly> → <fully> [NOT fullyy]

25

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**ORTHOGRAPHIC CHANGES WHEN ADDING SUFFIXES**  
**SPELLING CONVENTIONS**

**1-1-1 OR DOUBLING RULE**  
 win → winning    refer → referral    grab → grabbing

**SILENT e OR DROP RULE**  
 give → giving    escape → escapee    response → responsive  
 confide → confident    promote → promotion    gene → genius

**BOUND BASES:** st~~e~~re → sterile    fin~~e~~ → finite    pun~~e~~ → punish

**Y OR CHANGE RULE**  
 penny → pennies    fury → furious    stingy → stingiest

26

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**ORTHOGRAPHIC CHANGES WHEN ADDING SUFFIXES**  
*[Examples Below Shared and/or Inspired by Gina Cooke]*

1. A grapheme cannot straddle a morpheme boundary.
2. There are constraints on which (and how many) consecutive letters English will allow.

- <y> and <i> do the same job.
- The <e> in the grapheme <ie> at the end of free base elements (e.g., *tj~~e~~*, *d~~i~~e*) is needed to provide the required three letters to “lexicalize” these words.
- The grapheme <ie> is unnecessary when building something other than a free base element: <tie>  
 <tie> → <ty> + <ing> → <tying>  
 <tie> + <ed> → <tied>

27

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**A \*\*Sample for Illustration**  
 Basic Daily Lesson Plan Format **INTEGRATED** Structured Literacy Lesson  
 Slingerland® Multisensory Structured Language Approach

**LEARNING TO WRITE**  
 1. Learning new letters  
 2. Practicing letters newly learned  
 3. Review of letters previously learned  
 4. Teaching and Practicing letter connections (Cursive)

<b>AUDITORY</b>	<b>VISUAL</b>
<p><b>A. Phoneme-Grapheme Practice</b>                      Auditory ↔ Visual = Phoneme ↔ Grapheme</p> <p><b>B. Encoding (segmentation)</b></p> <p><b>C. Spelling</b>                      1. Base Elements + Affixes                      2. Unpredictable Words                      3. Phrases—Sentences—Paragraphs</p> <p><b>D. Dictation</b></p> <p><b>E. GOAL: Independent Writing</b></p>	<p><b>A. Grapheme-Phoneme Practice</b>                      Visual ↔ Auditory = Grapheme ↔ Phoneme</p> <p><b>B. Decoding (blending)</b></p> <p><b>C. Preparation for Reading</b>                      (Pre-Teaching Vocabulary and Syntax—                      words, phrases, grammar, punctuation, etc.)</p> <p><b>D. Reading Connected Text</b>                      (Structured Reading ↔ Studying)</p> <p><b>E. GOAL: Independent Reading</b></p>

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**Derivational Complexity**

Several types of phonological changes can occur between a base or stem and a derivational suffix:

• syllable regrouping	differ ➔ different
• vowel sound change	sane ➔ sanity
• consonant sound change	electric ➔ electricity
• stress alternation	philosophy ➔ philosophical

29

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**How We Remember Words**

◆ Related words are activated in memory when they have meaningful connections and share structural elements at the morpheme level, especially when spelling reveals those connections (Nagy et al, 1989)—even when pronunciation does not:

<fine> = to end; limit; set a boundary

define ➔ finish ➔ finite ➔ infinite ➔ definite ➔ infinity ➔ final ➔ finalize ➔ finality ➔ indefinable ➔ infinitesimal ➔ confine ➔ confinement ➔ infinitive

◆ Awareness of morphemes aids understanding and recall of differences among homophones:

sci ➔ conscious	cise ➔ decision
sponse ➔ response	panser ➔ expansion

30

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**Vowel Sound // Changes**

- ❑ Long vowel // reduced to schwa (or schwi) //:  
 \*define→definition    compete→competition
- ❑ Long vowel // becomes accented short vowel //:  
 extreme→extremity    \*precise→precision  
 profane→profanity
- ❑ Schwa (or schwi) // becomes accented short vowel //:  
 industry→industrious    solid→solidify  
 \*credence→credential    electric→electrician
- ❑ Schwa (or schwi) // becomes accented long vowel //:  
 injure→injurious\*    labor→laborious\*  
 specific→species    separate→separation

31

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**Consonant Phoneme // Changes**

Consonant phonemes change in pronunciation from one form of a word to another:

- ❑ bomb → bombard → bombardier
- ❑ \*crumb → crumble\*\* → <crumb> + <\_le>
- ❑ malign → malignant\*
- ❑ \*sign → signature → signify → signal
- ❑ anxious → anxiety
- ❑ medic → medicine
- ❑ \*definite → definition
- ❑ repress → repression

\*\*<-le> is *sometimes* a suffix

sparkle—twinkle—suckle—speckle—crackle—circle—nestle

32

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**Revisiting Those BIG Ideas**

- ❖ Words with spelling connections also have meaning connections.
- ❖ We don't know the pronunciation of a base until it surfaces in a word.
- ❖ "... denotation of a root will have echoes, however faint, in the meanings of words descended from it.
- ❖ Furthermore, appreciating a word's etymology and the orthographic denotation of its root leads to understanding of *fine nuances of meaning* that can often help in distinguishing it from its synonyms."

Real Spelling

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**Morphophonemics**  
**Phoneme Shifts**

- ◇ English is a morphophonemic language.
  - \*Pronunciation of polysyllabic words is primarily determined by placement of stress.
- ◇ Morphophonemics → interaction between morphological and phonological processes (Venezky, 1999).
  - \* Phonological (pronunciation) changes occur in morphemes (minimal meaningful units) when they combine to form different words
    - + As # of syllables changes, stress shifts—and pronunciation of individual morphemes (and phonemes within) will change.
    - + Words with spelling connections have meaning connections.
    - + The study of spelling—with a focus on the morphophonemic nature of English—connects even unfamiliar words with a common base to their meanings.

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**Morphophonemics**  
**Vowel Phoneme Shifts**

Long Vowel Sound	Short Vowel Sound
*sāne	sănity
vīce	vĭcious
nāture	nătural
telescōpe	telescŏpic
*stūdios	stĭdy
analyze	analy'sis
*abbrŏviate	brŏvity
decīive	decĭsion
fĭnite	fĭnish
cy'clist	bicy'cle

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**The Elusive SCHWA (ə)**

- 1895 from German *schwa*
- Ultimately from Hebrew *shewa*
- “A neutral vowel quality”
- Literally means “emptiness”

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**Accent—Stress Hints**

<p>1. ___ ' ___</p> <p>2. ___ <b>base element</b> ' ___</p> <p>3. ___ ' ___          ___ ' ___</p>	<p>4. ___ ' /sh/ ___</p> <p>5. ___ ' ity          ___ ' ic          ___ ' ial          ___ ' ian          ___ ' ion          ___ ' ious</p>
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\*British English pronunciation variations (e.g., conTROVersy, CONtribute)

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**Accent—Stress Hints  
with examples**

<p>1. ___ ' ___</p> <p>2. ___ <b>base element</b> ' ___          ___ <b>base element</b> ' ___</p> <p>3. ___ ' ___          ___ ' ___</p> <p>4. ___ ' /sh/ ___</p> <p>5. ___ ' ity          ___ ' ic          ___ ' ial          ___ ' ian          ___ ' ion          ___ ' ious</p>	<p><b>spider, scramble, olive, crisis</b></p> <p><b>provide, invert</b></p> <p><b>repellent, committee, referral</b></p> <p><b>cucumber, government, reference</b></p> <p><b>ridiculous, provisional, reciprocal</b></p> <p><b>education, delicious, proficient</b></p> <p><b>responsibility, tenacity, personality</b></p> <p><b>electric, cosmic, authentic, algebraic</b></p> <p><b>familial, radial</b></p> <p><b>Italian, crocodilian, physician</b></p> <p><b>champion, religion, onion</b></p> <p><b>scrumptious, curious, delicious</b></p>
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**SCHWA**

- ◆ Vowel sound in an unstressed (unaccented) syllable
- ◆ Degrees of Schwaness
- ◆ The sound of the schwa is **NOT** the same as the stressed (accented) /ū/ as in /*must*/.
  - ◇ *That would be impossible.*
  - ◇ *Why?*

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Morphophonemics	
invent <u>u</u>	invention <u>n</u>
*electric <u>i</u>	electrician <u>n</u>
mathemat <u>i</u> cian	mathemat <u>i</u> c <u>s</u>
rhetor <u>i</u> c	rhetor <u>i</u> cal
*defin <u>i</u> te	defin <u>e</u> fin <u>i</u> te
spec <u>i</u> fic	spec <u>i</u> es spec <u>i</u> al
solid <u>i</u> fy	solid <u>i</u>
gram <u>m</u> ar	gram <u>m</u> arian
pol <u>i</u> tics	pol <u>i</u> tical
*inspir <u>a</u> tion	inspir <u>e</u>

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**Triple Word Form Theory**  
**Phonology—Orthography-Morphology**  
 (Berninger et al., 2003)

◆ Learning to read and write words is a process of increasing awareness and coordination (integration) of three different types of word forms and their parts:

- Phonological Awareness
- Orthographic Awareness
- Morpheme Awareness.

◆ Multidisciplinary evidence for triple word form theory continues to accumulate.

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**Romance (Latin) Layer**

Words of Romance origin frequently become affixed (i.e., have prefixes and suffixes). There are bound base elements that work as meaningful units ONLY in combination with other morphemes, and there are free base elements that can stand alone as meaningful units.

press	pressed	pressure	impression
reject	interrupted	concise	decision
transmitting	prevention	sequence	propeller
pulse	repulse	propulsion	science

[Nist, J. (1966). A Structural History of English. NY: St. Martins Press]

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**PHONOLOGY + PHONICS + MORPHOLOGY + ETYMOLOGY = ORTHOGRAPHY**  
**→FOUR CONVERGING PATHS EN ROUTE TO AUTOMATIC WORD RECOGNITION AND SPELLING←**  
**Nancy Cushen White, Ed.D.**

**Latin Layer**

**Derivational → Word-Building**

- ❑ **\*\*Words derived from Latin roots/base elements are most common in content area textbooks.**
- ❑ **Analysis of the number of distinct words in printed school English showed that students encountered over 88,000 “distinct” words in texts through ninth grade (Nagy and Anderson, 1984).**
- ❑ **About half the words in printed texts through ninth grade occur once in a billion words of text or less (e.g., inflate, extinguish, nettle).**

43

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**Latin Layer**  
**Morphological Awareness**

- **\*\*For every word a student learns, there are usually between one and three related words that should be understandable.**
- **\*\*There are degrees of semantic transparency in words**
  - **Apparent:** red → redness
  - **Less Apparent:** apply → appliance
- **\*\*The less morphological awareness a student has, the more distinct words need to be learned.**
- **Semantically transparent words are skewed toward the low end of the frequency distribution to a greater degree than morphologically basic words or semantically opaque words (Nagy and Anderson 1984).**
- **About 60% of the unfamiliar words encountered in the middle school years and beyond are sufficiently transparent—even though they are morphologically complex in structure and meaning—that a reader might be able to infer the meaning of the word (Nagy et al., 1989).**

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**Romance Layer**

**How many words can you think of that share these Latin base elements:**

**<grade-gress> [to step] ?**

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**Romance Layer**

How many words can you think of that share these Latin base elements: *<pense-pend>* [to hang] ?

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**Greek Layer**  
**Scientific and Mathematical Terms**

neurology	apostrophe
physician	catalyst
gyroscope	hypnotize
mythology	anonymity
amorphous	hypothermia
technology	synthesis
hemisphere	stereotype
sympathy	symmetry

47

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**Growth in Phonological, Orthographic and Morphological Awareness in Grades 1 to 6**  
 -Berninger, Abbott, Nagy & Carlisle, 2010-

- Three kinds of morphological awareness show greatest growth in the first three or four grades.
- One kind of morphological awareness—derivation—continues to show substantial growth after fourth grade.
- Studies have shown that morphological awareness makes contributions to academic achievement in several areas:
  - Word Identification—Decoding
  - Reading Comprehension
  - BOTH** Word Identification—Decoding and Comprehension
  - Written Expression, especially Spelling (Berninger et al. 2008)

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**PHONOLOGY + PHONICS + MORPHOLOGY + ETYMOLOGY = ORTHOGRAPHY**  
**→FOUR CONVERGING PATHS EN ROUTE TO AUTOMATIC WORD RECOGNITION AND SPELLING←**  
**Nancy Cushen White, Ed.D.**

**Effects of Morphological Awareness**

- ◆ Well-designed spelling and vocabulary programs make use of morphological structures in word study, making explicit the kind of understanding that good spellers tend to get on their own from seeing words in print.
- ◆ Good spellers and people with larger vocabularies search for and notice in new words letter sequences that can give them clues to meaning (Moats).

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**Why are these words spelled this way?**

commitment  
 committee  
 referral  
 reference  
 illegal  
 accommodate  
 efficacious  
 effective

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**Layers of English**  
*Categorize these words.*

Old English	Latin	Greek
table	syllable	anthropology
extract	constellation	character
symmetry	healthy	perspiration
brown	pterodactyl	mystery
insect	utility	brother
interrupt	joke	illicit
chaos	complement	phantom
survival	eloquent	been

51

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**PHONOLOGY + PHONICS + MORPHOLOGY + ETYMOLOGY = ORTHOGRAPHY**  
**→ FOUR CONVERGING PATHS EN ROUTE TO AUTOMATIC WORD RECOGNITION AND SPELLING ←**  
**Nancy Cushen White, Ed.D.**

<b>Layers of English</b> <i>Categorize these words.</i>		
Old English	Latin	Greek

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**<fide> → “to trust”**

<b>Fidelity</b>
<b>+</b>
<b>Intensity</b>
<b>+</b>
<b>Duration</b>
<b>=</b>
<b>Efficacy</b>

NCW—2015

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