The study of the use of letters and the rules of spelling a language (p. 456).


A standardized system for writing a specific language. The notion includes a prescribed system of spelling and punctuation.

*Dictionary of Language* (Crystal, 2001, p. 244)

**Orthography** is “the system of marks that make up a printed language. For the English language, orthography includes upper and lower case letters, numerals, and punctuation marks” (p. 245).


**Definitions**

**Orthographic:** the visual representations specific to words (not visual-spatial skills)

**Orthographic coding:** Representing a printed word in memory and accessing the whole word, a letter cluster, or a letter.

**Orthographic image:** Representation of a specific written word in memory.

Orthography
“...the written system of spelling patterns and correspondences between speech and print.”

Relevance to reading and spelling: The spelling system represents phoneme-grapheme correspondences, syllable patterns, and meaningful parts of words (morphemes); it must be decoded for reading and encoded for writing.”


Orthographic mapping:
“...the process readers use to store written words for immediate, effortless retrieval. It is the means by which readers turn unfamiliar written words into familiar, instantaneously accessible sight words” (p. 81).


Ehri’s theory proposes:
• The pronunciations of words are the anchors for written words in memory.
• Readers learn sight words by forming connections between the letters seen in the spellings of words and the sounds of the pronunciations already stored in memory.
• More advanced phonemic skills lead to more detailed analysis of the internal structure of words and the acquisition of increasingly explicit and more fully specified orthographic representations.

Similar constellations of symptoms have been referred to as:
• word blindness (Kussmaul, Hinshelwood, Morgan, Orton)
• visual dyslexia (Johnson & Myklebust, 1968)
• dyseidetic (Boder, 1973)

Orthographic Processing
• quality of orthographic codes
• the speed of accessing those codes
• knowledge of both whole word and subword units

In describing an intelligent 14-year old boy: “He seems to have no power of preserving and storing up the visual impression produced by words - hence the words, though seen, have no significance for him. His visual memory for words is defective or absent; which is equivalent to saying that he is what Kussmaul has termed “word blind.” I may add that the boy is bright and of average intelligence in conversation...The schoolmaster who has taught him for some years says that he would be the smartest lad in the school if the instruction were entirely oral.” (p. 94). Pringle Morgan (1896)

Three Subtypes of Reading Disabilities
Boder (1973) described three subtypes of children with a reading disability:
(a) a dysphonetic group lacking word analysis skills and having difficulty with phonics
(b) a dyseidetic group experiencing problems with whole word gestalts, and
(c) a mixed group.

The Major Question
Spence, Grade 5
Fantastick
Amazing
Colossal
Energizer
Incredible
Hot
Glorious

How can this be a phonological processing problem when the student spells words exactly the way they sound?

Orthographic Dyslexia: The Neglected Subtype
Rhia Roberts
Chapman University
Nancy Mather
University of Arizona

Phonologic deficits have recently received much attention in the study of reading disabilities. In this article, Rhia Roberts and Nancy Mather examine the role of orthographic deficits as another important factor in research and treatment of reading disabilities. They argue persuasively that “orthographic dyslexia” must not be ignored.

Subtype vs. Subcomponent
- Make separable contributions to word recognition and spelling
- Contribute differently to reading and spelling difficulties
- Require different types of intervention

Dyslexia: a disorder at the sublexical (subword) level

Subword Level
- Morphology
- Orthography
- Phonology

Spelling
- Sequencing the sounds in order requires phonological processing, particularly phonemic segmentation
- Recalling the visual elements of words requires orthographic processing. This is critical for the retrieval of predictable letter sequences that cannot be sounded out (e.g., -ght, -tion), as well as the irregular parts of words (e.g., the ai in said).

Poor Orthographic Processing and Reading
- Has trouble remembering sight words
- Continues to sound out words after many exposures
- Confuses low-image words (e.g., of and for)
- Confuses similar-looking letters and words (e.g., on and no)
- Has a slow word perception and reading rate

Poor Orthographic Processing and Spelling
- Has difficulty learning how to form letters
- Reverses letter and numbers
- Has trouble copying
- Spells words the way they sound, not the way they look
- Spells the same word inconsistently
- Violates rules of English spelling
- Has poor spelling into adulthood

Questions to Ask
- What methods have been used to teach reading and spelling?
- How much time does the student spend reading and writing?

Differences in the amount of print exposure affect the development of orthographic processing.

Orthographic processing explains additional differences in reading and spelling development independent of phonological processing.

The Role of Orthography in Dyslexia
N. Mather, Ph.D.

02/24/2018
SWIDA

Questions to Ask
• Has the student had adequate print exposure?
• Are sounds sequenced correctly in most spellings?
• Are spellings more accurate when a phoneme is represented by a single letter grapheme (f) than a multiple letter grapheme (gh or ph)?
• Are spellings more accurate of regular words (nonwords and real words) than of irregular or exception words?

How Problems in Phonology and Orthography Affect Spelling
Phonology
• does not put sounds in order
• adds or omits sounds
• represents phonemes with incorrect graphemes
• confuses similarly sounding speech sounds (e.g., /b/ and /p/ - voiced and unvoiced consonant pairs)
• confuses vowel sounds

Orthography
• puts all sounds in the correct sequence but uses incorrect graphemes
• reverses letters (e.g., b and d) and transposes words (e.g., saw and was)
• spells common high frequency words like they sound, not like they look
• regularizes the irregular element of words (e.g., “thay” for they, and “sed” for said)

Methods for Assessing Orthographic Processing
Exception or Irregular Word Reading and Spelling
Regular Words: predictable spelling patterns that conform to English spelling rules
Regular but ambiguous: several possible spellings (e.g., homophones)
Irregular: unpredictable or not rule governed spelling patterns in one or more element of the word

Examples of Exception Words

Spelling
• Sequencing the sounds in order requires phonological awareness, particularly segmentation
• Recalling the visual elements of words requires orthographic awareness. This is critical for predictable letter sequences that cannot be sounded out (e.g., ght, tion) and the irregular parts of words (e.g., the ai in said).

Pseudoword and Irregular Word Spelling

<table>
<thead>
<tr>
<th>Regular Nonwords</th>
<th>Irregular Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>rab</td>
<td>s___d (said)</td>
</tr>
<tr>
<td>bem</td>
<td>th__y (they)</td>
</tr>
<tr>
<td>prig</td>
<td>co__ (comb)</td>
</tr>
<tr>
<td>velt</td>
<td>w_____d (would)</td>
</tr>
<tr>
<td>stam</td>
<td>once</td>
</tr>
</tbody>
</table>
Homophone choice tasks (Olson, Kleigl, Davidson, & Foltz, 1985; Stanovich & West, 1989)

Which is the correct spelling for the flower? rows or rose
Which is related? (rose: flour or flower)

Letter-string choice (Treiman), Circle the one that looks more like a real word (e.g., ffeb, beff)

---

**Pronouncing Nonwords**

Nonword or nonsense word reading is often described as a “phonetic coding” task.

What does it take to pronounce a nonword that has regular grapheme-phoneme correspondence?

Example:

“shomble” (WJ IV Word Attack)

---

**Three Stages of Nonword Reading**

1. **Grapheme parsing:** Convert a letter or letter group into a grapheme string. (Involves orthography)
2. **Phoneme assignment:** Determine what phoneme corresponds to each grapheme. (Involves orthography)
3. **Phoneme blending:** Convert phonemes into a single, unified form. (Involves phoneme manipulation, not orthography).


---

**Spelling involves phonology, orthography, morphology, and semantics**

Knowledge of phonology precedes orthography

---

List a few examples of spelling errors that seem more related to phonology and a few that seem more related to orthography.

<table>
<thead>
<tr>
<th>Phonology</th>
<th>Orthography</th>
</tr>
</thead>
</table>

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**Standardized Assessments of Orthography**
The Role of Orthography in Dyslexia
N. Mather, Ph.D.

Test of Silent Word Reading Fluency-2
(TOSWRF-2) PRO-ED
itdogredsunfell
chaosempathysurrendercostume
it/dog/red/sun/fell/

Nine Subtests
Varies by age level:
Ages 6-7: Signs & Symbols, Grapheme Matching, Homophone Choice, Punctuation
Ages 8-12: Homophone Choice, Punctuation, Abbreviations, Letter Choice, Word Scramble, Sight Spelling

1. Signs and Symbols. The child looks at a series of printed signs and symbols such as a "club" from a deck of cards, an "equal" or a "dollar" sign, or a numeral "9." The child is asked to tell the examiner what each sign signifies.

2. Grapheme Matching. The child is shown a series of rows each of which has five figures. The figures can be objects, signs, letters, or group of letters (e.g., b or e). In each row, two of the five figures are identical. The child is to identify the two identical figures in each row by making a slash through them. The child is given two minutes to complete as many rows as possible.

3. Homophone Choice. Students look at a picture with two or three possible spellings choices (e.g., a picture of a boat or with the spelling choices of oar, ore, and or). The students then circle the word they think is the correct spelling for the picture in each row.

4. Punctuation. The student is given a list of printed sentences that contain no punctuation except for spacing between the words (e.g., where is edward b. brown). The task is for the student to supply the missing punctuation by editing the sentence.

5. Abbreviations. The examiner points to one of several abbreviations printed on a page (e.g., 4.00, Dr., USA) and asks the student to tell or write (depending on which version is given) what the particular abbreviation means.

6. Letter Choice. The student is shown rows of words where one of four letters (p, d, b, or q) is missing from the word (e.g.,_eter where the letter s is missing from the word or sal_ where the letter d is missing from the word). The student is given two minutes to write in the correct letters that will make each one into a real word.
Orthographic Processing and Retrieval

Orthographic processing is the ability to rapidly and accurately form images of individual letters and the spelling patterns of our language in memory. This includes letter form and orientation, common letter combinations, and syllable types. When a typical young reader sounds out a word a few times, he remembers the word as a whole. As skill increases, he notices and stores images of frequently seen letter combinations and patterns (e.g., con, er, tion).

Orthographic retrieval is the ability to retrieve those images from long-term memory, as in spelling. Once the writer has retrieved and written the word, he uses orthographic recognition to see if the word “looks right.” For example, smoke and smoak are both phonically accurate but only one is spelled correctly. Knowing which one is the correct spelling depends on orthographic recognition. Research in reading disabilities has shown correlations among perceptual speed, orthographic processing, sight word acquisition, and reading fluency.

Adapted from a psychoeducational report by Dr. Lynne Jaffe, July 9, 2012

Composites

Overall: Orthographic Ability (OA)

Ages 8-12 and 13-18 Forms have 3 more composites:

Conventions (CO)
Spelling Accuracy (SA)
Spelling Speed (SS)

Subsequently, when the reader encounters one of these letter combinations again, recognition of the image and its sound is activated. A person who has an orthographic weakness is less likely to perceive the patterns; thus, no image is created in long-term memory or the image created is unstable. Subsequently, when he sees a word/word part (even one seen many times before), it does not register as familiar or activate its sound. Consequently, this person depends on sounding words out for recognition, acquires sight words more slowly, and reads less fluently.

English Words and a Traffic Light

Green: Phonically regular words: (e.g., cat, swim)
Yellow: Irregular but frequent patterns (e.g., ight)
Red: Irregular (e.g., once)


**Talk-to-Yourself Chart**  
(Adapted from Benchmark School, Gaskins)

1. The word is _____________.  
2. When I stretch the word, I hear _____ sounds.  
3. There are _____ letters because _______________.  
4. The spelling pattern is _______________.  
5. This is what I know about the vowel:_________________.  
6. Another word I know with the same vowel sound is:_________.  
7. Other words that share this same spelling pattern are:_____________.

---

**Tracing**

- Attention  
- Memory (Orthography)  
- Sound-Symbol Associations  
- Handwriting

---

**Why Tracing is Effective**

1. Requires student to pay attention and look at each letter  
2. Reinforces the connections between the phonemes and graphemes  
3. Student has to write word from memory, not copy

---

**Write-Say Method (based on Fernald)**

- Select word and write it on a card.  
- Pronounce the word and have the student look at and say the word.  
- Have the student pronounce the word while tracing it as many times as needed until he or she can write the word from memory.  
- Have the student write the word correctly 3 times from memory and then file in a word bank.  
- Review the word periodically to ensure the student can read and spell the word with ease.

---

**Principles of Irregular Word Instruction**

1. Introduce one exception (red flag, trickster) word every several lessons. Highlight or color code the irregular element (e.g., said).  
2. Have the student spell the word letter by letter and then say the word.  
3. Gradually increase the rate to several new words each day.  
4. File in a word box and provide systematic review of the words.
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N. Mather, Ph.D.

Spelling Flow List

- Daily testing of a few words
- Keep on list until word is spelled correctly 3 days in a row
- Review weekly. If incorrect, add back to flow list.
- Select words from student’s writing or a high frequency list.

Principles of Spelling Instruction

- Select words at the instructional level
- Concentrate on high-frequency words
- Provide practice and review
- Use multisensory techniques when needed
- Have student practice writing words from memory

Rapid Word Recognition Chart

Chart composed of five rows of 6 irregular words

Time how quickly the student reads the chart.

Count and record number of words read successfully


Rapid Word Recognition Chart

- pretty
- said
- who
- there
- they
- what
- said
- pretty
- there
- who
- what
- they
- there
- who
- they
- said
- pretty
- what
- who
- what
- said
- they
- there
- pretty
- what
- who
- said
<table>
<thead>
<tr>
<th>Common Points of Fluency Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Read while listening to the same material</td>
</tr>
<tr>
<td>- Track print with finger or marker</td>
</tr>
<tr>
<td>- Use high-interest material</td>
</tr>
<tr>
<td>- Can use material at the instructional level</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Repeated Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Designed for children who read slowly despite adequate word recognition (Samuels, 1979).</td>
</tr>
<tr>
<td>- Select a passage from 50 to 100 words long from a book that is slightly above the student's reading level.</td>
</tr>
<tr>
<td>- Have student read the same passage several times.</td>
</tr>
<tr>
<td>- Time the reading and count the number of errors.</td>
</tr>
<tr>
<td>- Record the reading time and the number of words pronounced incorrectly.</td>
</tr>
<tr>
<td>- Use two different color pencils for recording time and errors, or you make the points for time, a circle, and the line for errors an &quot;X&quot; or square.</td>
</tr>
</tbody>
</table>