Chapter 11 Writing systems
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"Delving Deeper"

What about the word *grapheme*?

Frequently you'll see the word *grapheme* in language descriptions. The "Orthography" chapter of a grammar might list the "graphemes" of its writing system. Usually it's just a synonym for "letter," and there's no reason to use it instead. But from time to time, a linguistic theorist has suggested that graphemes are parallel to phonemes, morphemes, etc. There are many reasons not to use the term to refer to these. One of the most important is that analysis of these units is something the human brain does automatically, but learning to read and write doesn't happen automatically: it must be consciously studied.

Another problem is that it's hard to say what could or should count as a grapheme. Does the English alphabet have 26 or 52 graphemes (counting capitals and lowercase)? What are the graphemes in Indic writing: does each consonant have two graphemes, one when it's by itself and another when it's combined with a following consonant? What are the graphemes in Chinese writing, the complete characters, or the components of each character, or even the separate brushstrokes used in writing them?

In English, are *ee* as in *peak* and *ea* as in *peak* different graphemes? What about *ea* in *read* (present tense) and *read* (past tense)? In French, are *n* and *t* graphemes in *parlent,* which are unpronounced? What about *t* in *vert* [vɛʀ] and *verte* [vɛʀt(ə)]?

The difficulty is that all these considerations are reasonable for different writing systems, but no one criterion fits everything one might be tempted to call a grapheme. So, *grapheme* has become nothing more than a scientific-sounding substitute for "letter" or "character" and isn't a useful term. We could still use *allograph*, though, for conditioned variants of lettershapes, such as the word-final form ς of Greek σ *s*.

Advantages of different types of writing

As you have read in the chapter, a frequent goal of spelling reformers is to achieve one-to-one matches between letters of the alphabet and phonemes of the language. But is this a good idea? Psychologists of reading have found that morphophonemic spelling (as in English and French) offers advantages to readers over purely phonemic spelling.

One advantage is two-sided. If a morpheme is always spelled the same way, it exhibits **constancy** through all its uses: the learner only needs to learn one spelling. Compare these examples:

Conventional spelling	Possible "simplified" spelling	The same, ignoring word stress
photograph	FOEt'graef	foet'graef
photographer	f'TAHgr'fr	f'tahgr'fr
photographic	FOEt'GRAEFik	foet'graefik
combat	k'mBAET	k'mbaet
combat	KAHMBAET	kahmbaet
know	NOE	noe
acknowledge	AEKNAHl'j	aeknahl'j

Moreover, morphophonemic spelling provides **distinctiveness** between morphemes with the same sound. *There*, *their*, and *they're* are spelled differently. So are *to*, *too*, and *two*. In those two cases, though, does it really make a difference? Is anyone confused by seeing a wrong spelling of one of those words? However, with such pairs as *bow* and *beau*, *bow* and *bough*, sometimes it might make a difference.

These observations don't hold only for alphabetic writing. The examples below show some words discovered by opening a small Chinese–English dictionary to random pages. The *pinyin* spellings of the two pairs of words are identical, showing that they have the same pronunciation, but the meanings within the two pairs of words are kept apart by the character spellings.

Chinese	Pinyin	Meaning
汇合	*huìhé*	'join'
会合	*huìhé*	'meet'
鞋带	*xiédài*	shoelace'
携带	*xiédài*	'take along'

Exercise: The decipherment of Linear B

Hundreds of small flat tablets incised with a linear script emerged in the excavations of Knossos, on Crete, and nearby sites. The formatting of the texts suggested that they were economic records regarding disbursement of commodities, management of livestock, and so on. Some pictograms were included, and they looked like they might name the items being listed or counted.

The number of different linear signs was greater than 20, but didn't reach to the hundreds. Which script type is likely to have that number of signs?

It was Alice Kober who noted that some sequences of signs recurred frequently, in patterns like

A B C D E	G H J D K	M D N P E	C H J P K
A B C D F	G H J D L	M D N P F	C H J P L

What could Kober have determined about signs D, E, F, K, L, and P?

Kober did not live to work out the decipherment fully. Building on her insight and her painstaking work in discovering patterns like those, Michael Ventris made two key discoveries: the tablets from specific sites tended to have the same short sequences of signs (not repeated on tablets from other sites), so maybe those sequences represented the names of the sites. When he tried fitting the modern or Classical names of the sites to the potential names on the tablets, he was shocked to discover that the readings of the signs they yielded could be plugged into words that accompanied pictograms—and spell words that looked like Greek.

This was absolutely impossible according to every understanding of the prehistory of both Greek and the Greek language. Yet it proved to be correct: Linear B recorded an archaic form of Greek, and the historians and comparative philologists just had to revise their understanding of the 2nd millennium BCE.

Answer to Exercise

The patterns strongly suggest that DE, DF, DK, and DL represent four different suffixes that all start with the same sound (probably the same consonant), and that E, F, K, and L probably all start with the same sound (probably the vowel at the end of D). P probably starts with a different consonant and ends with the same vowel as D.

How does reading work in the brain?

Unsurprisingly, reading seems to piggyback on parts of the brain that evolved for other purposes. Specifically, parts of the visual centers can become specialized for identifying written characters, but reading also requires the orchestration of multiple brain "circuits" that process sound and meaning as well as visual information. Clearly, during the 5000 or so years that some people have been writing and reading, no innate "reading ability" can have evolved, especially as literate people haven't reproduced at the expense of non-literate people!

What we can observe directly is what the eyes are doing when we read. At the back of the eye is the retina, which includes cells that are sensitive to various kinds of light and patterning. Only a very small area of the retina, though, the **fovea**, has a sufficient concentration of high-acuity receptor cells to make out the fine detail of written characters. It is big enough to capture about five letters at a time.

But clearly, when we read, we see at least several words at once and immediately know what they say. This is a subjective impression that is accomplished by **saccades**, jumps between **fixations** (stops) of the eyes so that tiny stretches of text, about five to seven letters, can be focused on successively. Those short stretches of text are then stitched together in the reading brain, and it can safely be said that no one is aware of saccades as they are reading.

Here, too, alphabetic writing is not necessarily superior: the fovea can capture at least two Chinese characters at each saccade, or an entire word all at once. Words written abugidally are also more compact than the same words spelled alphabetically, but the individual symbols are more complicated, so more information is accepted per saccade than with an alphabet.

Further Readings

The only two comprehensive histories of writing are nearly half a century old, and each of them is a revision of much earlier originals. David Diringer, *The Alphabet*, is more readable; Hans Jensen, *Sign, Symbol and Script*, is fully documented and more useful for reference. Akira Nakanishi, *Writing Systems of the World*, conveniently offers one-page accounts of the scripts in use today and capsule descriptions of many scripts of the past.

The World's Writing Systems, edited by Peter T. Daniels and William Bright, offers technical accounts of how nearly every writing system in use relates to its language(s). It is admirably summarized by Amalia Gnanadesikan, *The Writing Revolution*.

There are also accessible books on some scripts of the world, including John DeFrancis, *The Chinese Language: Fact and Fantasy*; R. F. Hosking and G. M. Meredith-Owens, *A Handbook of Asian Scripts*; and Joseph Naveh, *Early History of the Alphabet*. Accounts of decipherments and undeciphered scripts are found in Maurice Pope, *The Story of Decipherment* and Andrew Robinson, *Lost Languages*.

The first scientifically written book on writing systems was Isaac Taylor, *The Alphabet*, which publicized the idea that there are three types: logography, syllabary, and alphabet. This idea also powers the first linguistic treatment, I. J. Gelb, *A Study of Writing*. Commendable more recent texts include John DeFrancis, *Visible Speech*, and Henry Rogers, *Writing Systems*. Further detail on the approach used in this chapter will be found in Peter T. Daniels, *An Exploration of Writing*.

Regarding reading, we strongly suggest Stanilav Dehaene's *Reading in the Brain* for a fascinating account.

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