

ENGLISH SPELLING AS A NEAR-OPTIMAL ORTHOGRAPHY*

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It has been traditional in discussions of the spelling system of English to speak disparagingly of its disorganization, capriciousness, randomness, and in general of its almost total unsuitability for representing the spoken language (see e.g. Whitney 1874, Johnson 1948, 1950, and compare the bequest of G. B. Shaw (see Tauber 1963) for the purpose of saving scribal time by helping to invent the best phonetic system for English, to supplant the current inconsistent spelling). Johnson, for example, abuses "the letter-shapes, [which] are such intricate tangles of lines, curlicues, and serifs that swift writing is impossible" (1950:745); complains that "[a]s a result of these discrepancies between alphabet and pronunciation, most letters represent several different sounds" (1948:356), and that "the relationship between symbol and sound is extremely variable" (1948:357). Indeed, he accepts the estimate that, because of "the inclusion of silent letters" in "over 400,000" of "the 604,000 words in the Merriam-Webster unabridged dictionary", and because of the variable symbols and variable sounds of English, "eighty per cent (or about a half million) of the words in English are not spelled phonetically" (1948:358). More recently, however, investigators have become increasingly aware of the regularities in the English spelling system, and of the fact that, in the main, the relationships between spelling and sound, and vice versa, are very regular. In this paper, I will attempt to show that this latter view is closer to reality. As Wijk (1966:8) says, "this impression [of hopeless confusion] is very largely wrong, for the vast majority of English words, about 90 to 95 per cent of the total vocabulary, do in fact follow certain regular patterns in regard to their spelling and pronunciation".

It must surely be recognized, however, that there are irregularly spelled

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words in English (with respect, of course, to their pronunciation), and Wijk points out that the "impression of excessive irregularity ... is very largely due to the fact that so many of the irregular words are to be found among the commonest in the language", and since the commonest words make up a disproportionate share of the running words on a printed page, "one is easily misled into believing that English spelling is far more irregular than it actually is" (1966:9). Similarly, Waldo (1968), who attempts to devise rules for telling "the reader of English which vowel should have the main accent when he reads a word that is new to him" surprisingly finds that "there are rules that cover about 97% of the words" (1968:1). Some other works indicating a high degree of regularity in the spelling-to-sound correspondences are Venezky (1967a, 1967b, 1970), Venezky and Weir (1966), and Chomsky and Halle (1968).

Let us examine some examples of what may seem to be irregularities in the English spelling system, which upon close examination prove to be much more regular than they at first blush might seem to be.

Consider the spellings *f* and *ph* for the sound [f]. Of course, in going from spelling to pronunciation, there is no problem, since we would know immediately in both cases how to pronounce these spelled symbols (except in the rare truly irregular word, e.g. *Stephen*, with [v] for *ph*). It might appear, however, that in hearing the sound [f], we would have no way of knowing whether to spell it *f* or *ph*. First of all, the spelling *ph* is considerably less common than the spelling *f*, so in a word which was unknown, and which contained the sound [f], we might very well predict that that sound would tend to be spelled *f*. This is not necessarily the case, however. In an informal experiment run several times by the author, the words *morphology* and *phonology* were presented each time to about thirty students, most of whom had never encountered either word before. Nevertheless, over 90% of the students spelled these words with *ph*. If the distribution of *ph* and *f* in words pronounced with [f] is truly random and unpredictable, as many of the vehement critics of English spelling might claim, then no possible rational strategy for spelling unknown examples of such words could be imagined which would produce the nearly unanimous result of *ph*, that is, the rarer overall of the two possibilities, in these words. Clearly, there is something about the structure of these words which gives the speller a clue as to their correct spelling. Indeed, it is the case in English that in words borrowed from Greek, the sound [f] is spelled *ph*. Of course, most English speakers do not know which words come from Greek and which do not; but this regularity about English spelling would usually be learned as a regularity about words with certain types of structure: for example, almost all words consisting of two parts, each of which occurs in other words, and which are separated by [-o-], belong to this class—e.g. *hydroelectric*. So of a word in this class whose meaning we may not know, like

hydrophyte, containing the sound [f], we will nevertheless know that it is spelled with *ph*, not *f*. Indeed this very word was correctly spelled by the winner of a recent national spelling bee, who admitted to never having encountered it before. This is just one example of how our knowledge of the language as speakers of it also gives us clues how to spell words.

Another typical type of complaint concerns the vowel symbols of English, which are each used to spell a variety of different sounds. Thus, the symbol *a* is used to spell the sound [æ] (*rat*), [ē] (*rate*), and [ə] (*carouse*), and more rarely other sounds as well. This looks like a serious problem. But let us look at it carefully. First of all, any vowel which is completely unstressed in English, gets reduced ("slurred", shortened) to "shwa" ([ə]), as in the first syllable of *carouse*, and *a* follows this rule regularly. So we have one case that is regular. Now consider *rat* and *rate*. In these words, as in hundreds like them, there is a simple regularity: the simple vowel is pronounced short ([æ]) if there is no vowel following it in the spelling (*rat*), and pronounced long ([ē]) if there is such a vowel in the spelling (*rate*, *ray*, or *raid*, e.g.). What about words like *pastor*, where a vowel follows, but the pronunciation is short [æ]? Well, we have to modify our rule a little to allow no more than a single consonant between *a* and the next vowel for it to be pronounced long. (We will have to make still other modifications to handle other cases, such as *vanity*, which is regular because of a different overriding principle). We will still have a problem with some words, such as why *father* should be pronounced [-ā-], but there aren't many words with the spelling *a* pronounced [ā], so we could just consider *father* an exception for our purposes. Nevertheless, we have made a lot of headway in trying to state regularities in this aspect of English spelling.

Another example is the spelling *u* which, among others, represents [ə], [yūw], or [ʌ]. We find the pronunciation [ə] if the vowel is unstressed anywhere in the word: *acupuncture* [ækypənktʃər], *rhesus* [rīsəs], etc. It is pronounced [yūw] before a vowel or before exactly one consonant plus a vowel: *annual* [ænyūwel], *mutilate* [myūwtelēyt]. (The [y] is optionally dropped in American pronunciations if the preceding consonant is dental, and the *ū* is stressed: *duty* [dūwtī]). It is pronounced elsewhere as [ʌ] (namely, before a consonant followed by either the end of the word or by another consonant, when stressed): *pun* [pʌn], *muscatel* [masketel]. Again, there are some complications which will require modifications of the rules given, but in the main they account for the pronunciation of words spelled with *u*. Many more examples of such regularities, extensively discussed, will be found in Chomsky and Halle (1968).

So far, we have seen that there are some regularities which hold between spelling and pronunciation. We will now try to find some reasons why there might be some cases where spelling and pronunciation might not be regularly

related. Consider what is spelled with *c* in English. If it is immediately followed by an *h*, it is regularly pronounced [ç] (see Wijk 1966:86–88 for discussion and some exceptions). Otherwise it is pronounced sometimes [k], sometimes [s]. But we have both *k* and *s* already in the English orthography, so why not just use those two letters to spell the [k] and [s] sounds, respectively, and get rid of *c* altogether (or even better, drop the *h* in the *ch* combination, and just use the *c* to represent the [ç] sound)? First of all, we must note that we can predict when *c* is pronounced [s] — before *i*, *e*, or *y* — and when it is pronounced [k] — namely elsewhere, except before *h*. Secondly and most importantly, we have word endings in English such as *-ity*, *-ian*, etc. When we add these to most words, nothing changes in the pronunciation but the added part:

lax	laxity
absurd	absurdity
stupid	stupidity
adverse	adversity;

but if the word ends in *c*, which is pronounced [k] as in *electric*, when we add *-ity* we also change the pronunciation of *c* from [k] to [s] — but this is completely regular; the spelling *c* simply indicates which words have this change before endings like *-ity*. (Cf. *persnickety*, which is spelled with *k* before the *-ety*, which *k* therefore does not get pronounced [s].)

Therefore, the same meaning unit *electric* (by itself) or *electricis* (in *electricity*) gets spelled the same (*electric-*) even though its pronunciation changes. This is very convenient, since it would cause difficulty if the same meaning elements were always being spelled differently in different circumstances to indicate their different pronunciations — rather, we learn the rules of spelling-to-sound correspondence in English, and keep the same spelling for the same meaning elements, regardless of their pronunciation.

It is interesting to note here that Finnish has a virtually completely phonetic orthography, which therefore may have a variety of different spellings for the same morpheme, when it occurs in different environments and thus gets pronounced differently. It has been reported to the author by a native speaker of Finnish who has learned English quite well as a second language that his reading speed in English is much faster than that in Finnish, apparently because the same meaning form may take on different shapes in the Finnish orthography, but much more rarely so in the English orthography, and this makes it easier to read English than Finnish.

Notwithstanding the points made in this paper, it must be recognized by the objective observer that there are irregularities in the English spelling system which could be greatly ameliorated by some kind of spelling reform. Nevertheless, what I hope to have indicated is that spelling reform would be perhaps more pernicious in some regards than the current system if it were

to proceed on a purely phonetic principle — there is, after all, a basis of rhyme and reason behind most of the seeming vagaries of English spelling — and the literate speaker of the language has learned enough about it to have unconsciously-internalized these regularities. As a corollary, teachers of English should concentrate on the true spelling irregularities, and teach the regular aspects as “rules of pronunciation” or the like.

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