

The Design of Spelling to Match Needs and Abilities

VALERIE YULE

University of Aberdeen, Scotland

Valerie Yule writes about the importance and timeliness of systematic changes in the spelling of English and considers the wide range of learning needs of language users as well as the traditional assumptions which account for the resistance to spelling change. English spelling, the author suggests, not only makes the achievement of literacy generally difficult but results in the uneven distribution of power and opportunity. She proposes areas for research that could lead to creative and practical ways to resolve these difficulties.

A ten-year-old boy I had been asked to assess for dyslexia was struggling through a reading test unable to score even at the lowest level. In frustration, I tried him on a parallel form, retyped with some of the spelling simplified. "Read that - it has no spelling traps." The boy began cautiously, stumbling as usual; then, however, he picked up and went through the next two levels almost at a gallop.

He looked at me in surprise. "But I could read that!"

Only a few disabled readers respond quite so dramatically and immediately to "spelling, no traps," but I can remember none, in my twenty years in schools and clinics, who could not have listed English spelling among their handicaps. Many learners, who cannot predict whether the next word they read or write will be a booby trap, react as if all print were dangerous.

But the difficulty of English spelling is more than a cause of children's failure in school. Control of the means of communication affects power relationships within societies. The difficulty of writing systems has both shaped and been shaped by social forces, and changes in orthographies can accompany social and political changes (Fishman, 1974). Historically, difficult systems of hieroglyphs or ideographs have been elite prerogatives, often linked to the sacred and mysterious. The Phoenician traders and the democratic Greeks, however, introduced the simple alphabetical principle of letter-sound correspondence, so that everyone could learn to read and write. In contrast, the Sino-Korean mandarins of the sixteenth century feared that an easy alphabet would threaten the elite's monopoly on literacy and suppressed a Korean alphabet (*hangul*) once its royal sponsor died. Officially re-established after World War II, *hangul* has been a factor in Korea's leap

278

Second, immigrants to English-speaking countries can be marked out for ridicule and lower-status jobs because, even if well-educated, they may be unable to use their literate vocabulary adequately in speech, and even if fluent speakers, they may fail to learn to read or write. This is because spoken English cannot be learned easily from print, nor written English from speech. Observation of methods used in Britain for teaching English as a second language shows how today's emphasis on the spoken language is dodging the need for simultaneous literacy.

Third, English spelling is socially divisive in ways that are seldom recognized, even by the radical left. Without the extra hurdle of spelling, America's estimated 10 million illiterate adults and Britain's 2 million-as well as the high proportion of students who leave school semiliterate despite ten years of expensive schooling - might have a better chance to share in the social and economic opportunities available through education.

Fourth, English spelling has always been recognized as a burden for most young learners unless

they have good visual memories. Many children have a head start toward literacy because they come from literate homes, with clues to the purposes and strategies of reading. They begin school with health and development unimpaired, and they attend schools which have relatively few problems with funding, disruptive behavior, low expectations of students, stressed staff, or high staff turnover. If the difficulty of spelling is their only problem, these children have every chance to cope with it. Even so, some fail and receive disproportionate research attention as "dyslexics." Other countries must contend with dyslexia too, but comparable measures are needed to establish how our spelling may compound the difficulties faced by the learning disabled.

In the case of less privileged children, every accumulated disadvantage adds to their handicap. English spelling may be one additional barrier to education. An estimated 40 percent of minority youth leave school functionally illiterate (National Commission on Excellence in Education, 1983). Many socially disadvantaged children are suspicious of school, doubt their own competence and worth, and quickly reject what seems like mumbo jumbo that is 'not for the likes of them.' They can neither understand nor comply with the need to memorize squiggles on flashcards or learn sound-symbol correspondences that turn out to be grossly unreliable. Cartoonists often depict this irony: in one typical picture a "backward" child stares at "come" and "home" on the blackboard and asks, 'Is English a remedial language?'

"Slow" children may spend almost all their schooldays as "dependent" readers, restricted to the sort of trivial early reading books that English spelling makes necessary. Meanwhile, their classmates who can read independently, that is, who can work out how to read new words by themselves, increase their knowledge and widen horizons by "real" reading at home and school.

Even children's dictionaries handicap a child whose spoken vocabulary is poor. A survey of 104 children's word-books and dictionaries in print showed that only 11 gave any guide to pronunciation. The publishers recognize that phonetic symbols in adult dictionaries are too difficult for children, but they do not offer any form of consistent spelling as a key to speech (as in Japanese *furigama*). These word-books give no clues for new words.

All school learners are further disadvantaged. The problem of English spelling affects the *teaching* of reading itself, making reading a bonanza area for research

281

and causing fashions to come and go because none solve the problem. Two contrasting attempts to surmount the barrier of our spelling system both result in beginners' reading books that are stilted in style, limited in vocabulary, and trivial in content. The old-style 'phonics' approach, relating symbols to sounds, either limited early reading vocabulary to "regular" words or required repetition of the same texts until whole books might be known by heart to learn all the spelling patterns. The 'Look-and-Say' approach tries to avoid spelling altogether in the early stages, but visual rote-learning of whole words requires constant repetition of "controlled" vocabulary; publishers have proudly advertised that a series of four books may contain only sixteen words. Standard phrases were "Jump, jump, jump!" then "Look, look, look!" and now they are "Stop, stop, stop!" and "Help, help, help!" (Yule, 1983). Both introductions to literacy can result in mechanical forms of reading, careless of meaning.

Today children can obtain their entertainment from television, and they can no longer be forced to learn by punishment as in the past. To attract them, beginning reading books may be so jazzed up with pictures that often tell the story better than the minimal print, that some children learn to read only the pictures. Instead of making spelling easier, publishers have simplified the text, vocabulary, syntax, and thought, first for beginners' books, then on to upper elementary texts.

Now even some secondary and university texts suffer from less print on their pages and less content in the print.

English spelling, therefore, works to negate the advantages of heavy investment in the American and British education systems. In many other countries, all learners, not just the most able, can move faster into personal reading for knowledge and pleasure because they can work out unfamiliar words by themselves with confidence. The report of the Commission on Reading (Anderson, Hiebert, Scott, & Wilkinson, 1985) reviewed studies of practices in the most successful classrooms and recommended that beginners be given simple clues on sound-symbol relationships. But phonics is difficult to teach well with our present spelling, because sound-symbol relationships are unreliable and traditional teaching methods have often been dreary. Few teachers are taught how to understand the spelling system themselves. Consequently, teachers have tended to react skeptically to the recommendations (Brunner quoted by Ziegler, 1985). In Britain, a motion that phonics is essential to the provision of literacy was defeated at a national conference of the United Kingdom Reading Association in 1985. Currently, in the crucial early grades, flashcards and worksheets are usually presented for rote learning while, apart from some mnemonics, cognitive strategies of how to remember and understand are often overlooked. Yet the work of Downing and Leong (1982), Downing (1979a, 1979b), and others emphasizes the importance of cognitive factors in the early learning of literacy.

English spelling can teach children the lesson that the adult world is unreasonable and accepts the unreasonable. Some teachers react by not teaching spelling at all; since many pupils then fail to absorb it by osmosis, their later literacy can be poor. In countries such as Italy or Spain, where rules of spelling systems fit on half a quarto page, the very idea of "learning spelling" seems

unnecessary. Many other causes contribute to literacy problems, and spelling improvement is no panacea-but it is not to be overlooked.

282

Teachers may sometimes be conservative about spelling, since they feel they have a vested interest in the system they have to teach. Some might even be concerned that learning to read could become possible without them; in the United Kingdom a prototype one-hour cartoon video for teenagers and adults, *Teach Yourself to Read*, has found little interest and no backers. Yet if learning literacy were easier, teachers could be freed for real education of literate pupils.

With new electronic information technologies, the matter of spelling, like other issues of power, has taken another turn. Spelling change is now more feasible because it is a simple matter for software programs to transliterate any spelling or apply consistent principles. There is, however, need for caution. A new elite may bolster their power through privileged access to communication technology. Electronic devices make it possible for some to maintain "perfect spelling" without having to master it themselves. Their machines spell for them. Those without access to the technology cannot plug themselves into a dictionary; they must still learn to spell. Spelling could once again become an elite screening device. On the other hand, the ethos of technology has an innate drive for efficiency.

Arguments against the redesign of spelling change over time. Many of the old arguments appear trivial when they are balanced against the need to make English spelling more efficient as an international language and to raise standards of literacy. The less valid claims include the following: a concern for "aesthetics," which as far as spelling is concerned means "familiar is beautiful"; the value of etymology in spelling- although it is more safely found in the dictionary and few can use it (Yule 1980, 1981); the expressed delight in quaint English eccentricity, which

is a Marie Antoinette attitude toward the anomalies in the writing system which handicap millions; an expressed denial that these anomalies do handicap anyone; the rejection of any change because in the nature of things no change can be a panacea; and the argument that past failure to reform ensures failure in the future.

More important arguments underlie these claims. Dislike of change in the status quo is reasonable if there is fear of personal inconvenience and loss of our cultural heritage of print. This is, however, the argument of the "haves" who are already literate. The voices of the "have-nots" cannot be heard. Failure to face the problem of difficult English spelling may also reflect some ambivalence about universal literacy, which could increase competition in the upper grades of employment. But a technological society faces trouble when there is a shortage of skilled, and a surplus of unskilled, personnel. Vocal opposition to spelling change is more muted today, and usually consists of ridicule of "Spel az yoo speak." Public attitudes appear to be a waiting game: who can bell the cat-without disturbing anyone or costing anything.

Change may come because so many interests would benefit. Reforms are possible when they serve the interests of ruling groups to enhance their own efficiency or to make the people more useful or more governable, or when the elite itself has democratic ideals. Changes in the writing system reflect changes in power relationships in society, and powerless groups on the move have often prepared for

283

such changes before they became officially approved and promoted. Education, government, and lexicography may be unlikely to initiate reform, but they will need to ratify it.

Research is also coming closer to providing enough know-how about reading processes to identify which changes might benefit all users and learners of the printed word. One flourishing area of interest is on the deficits of "dyslexics" who fail to learn to read despite educational and intellectual advantages. There is also research on the even larger group of non readers who are dull or socially disadvantaged. There are claims that basic causes of reading problems include confusion, initial inability to understand the task of reading, and rejection of the task (Clay, 1975; Downing & Leong, 1982; Johnston, 1985; Vernon, 1957).

There is one gap: almost no mainstream research investigates whether the writing system itself could be modified to present less confusion and arouse less distress. That is, if the workers cannot be fitted to the tools, could we fit the tools to the needs and abilities of the workers? This principle is applied today to every aspect of communications technology except English spelling.

The Needs of Users and Learners

It has been generally assumed that no orthography could be designed to be optimal for all the demands that are made upon it-by readers and writers, skilled users and learners, the expert and the learning disabled, the native speaker and the second-language learner, for all individual differences, and for machines as well as people. It has been claimed (see, for example, Frith & Frith, 1980; F. Smith, 1972; Stubbs, 1980), although not demonstrated, that skilled readers could not read as fast or as efficiently for meaning if spelling were simple enough and logically consistent enough for learners to learn it easily, or if it represented the spoken language by rules that helped immigrants and foreigners to learn English easily, or if it were snappy and straightforward enough for writers and typists to spell easily, or if it could be programmed by the logical mind of a computer with no need for a built-in dictionary, or if it could be improved so that most of the adult population could be more literate than it is today. This assumption of intrinsic conflict of interests must be tested by researchers in order to identify what particular orthographic

features would be optimal for all needs and whether any commonality of interests could be found to devise a "best-fit" writing system.

Readers need an orthography that enables them to read quickly and accurately with immediate access to meaning. They will resist retraining unless the change is a radical breakthrough, such as a symbol system able to cross languages as Chinese does, but without the disadvantages of Chinese. If spelling were modified specifically for English, readers would also require what is known in technology as backwards compatibility, that is, the new spelling should not render the old inaccessible, and both should coexist during the transition as acceptable alternative spellings, in the same way that dictionaries already list words with alternative spellings. There must be no period of confusion for publishers or readers, and everything that is already in print must remain readable.

Spelling reform must meet the needs of particular groups. Learners require an orthography that they can learn quickly, easily, and cheaply, with a minimum rate

284

of failure. Writers and keyboard operators require a spelling system that they can encode quickly, accurately, and automatically, without using dictionaries or spelling software. English language-learners require spoken and written languages that are reasonably compatible. Projects involving machine languages would be assisted by algorithms for the transliteration of English.

The able and less able differ in needs. Society suffers if the most able cannot operate at the height of their powers, but it also suffers if the less able are a burden through illiteracy. Failing learners have such a variety of difficulties that the optimum orthography must offer a range of ways of entry to ensure that compensation is possible for specific disabilities.

Abilities to Learn and Use Writing Systems

Research bases for spelling design derive from recent advances in understanding verbal and learning processes in cognitive psychology, neuropsychology, and psycholinguistics (see, for example, Frith, 1980; Henderson, 1982, 1984; Kavanagh & Mattingley, 1972; Kavanagh & Venezky, 1980; Kolars, Wrolstad, & Bouma, 1979; Spiro, Bruce, & Brewer, 1980). The research on what is wrong with those who fail to learn can be re-analyzed to determine what sort of spelling system they could learn.

The Abilities of Skilled Readers

Theories about reading processes often assume a computer model of the brain with specific channels and organized mental lexicons that can be schematized in flowcharts. Understanding brain function, however, may require a view of the brain as an organic network and focusing model. For example, we can read with ease what machines are only beginning to manage, such as unfamiliar print fonts and handwriting, and different sizes and letter-cases. Such issues are addressed by Coltheart, Patterson, and Marshall (1980), Henderson (1982), Kolars (1969),

Marshall (1976), and Morton (1980).

Controversy persists over whether skilled readers use vestigial processing by ear as well as eye, along with prediction from context, up to the point of identifying meaning, or whether they rely entirely on visual analysis of patterns or letter sequences, or whole-word recognition (Barron, 1980; Bradshaw, 1975; Kolars, Palef, & Stelmach, 1980; Strange, 1979). Accumulated evidence suggests that the basic operation in skilled reading is visual recognition of what has become famil-

iar, supplemented by phonic decoding only when it is needed for unfamiliar words. Automatic phonological or analogical processes may back up visual strategies, but they do not act as a drag. Direct reading for meaning at up to 700 words per minute is possible without piecemeal analysis of every feature of every word. What, then, are the essential features registered by the fast reader? Are they whole words or phrases, like photographs, or are they key elements? If so, what are these elements?

Goodman (1970) popularized the description of reading as a "psycholinguistic

guessing game." According to this idea, skilled readers can use all the information that is available in present spelling at different levels-lexical, semantic, phonological, morphemics etymological, graphemic, and possibly others, too. Readers

285

operate the various codes in spelling, like jugglers. P. Smith (1980a) illustrated these different "levels of representation" by showing the possible multiple functions of double consonants. Smith has similarly listed functions of silent final e (1980b, p. 3 5):

Graphemic: shows that a word is not foreign, as in *freeze*.

Graphemic/Phonemic: shows a rule when syllabic liquids are preceded by a consonant, as in *little*.

Phonemic: modifies a preceding vowel or softens c, as in *mate or ice*.

Phonological: predicts a syllable with primary stress, as in *arabesque*.

Lexical: distinguishes homophones, or singular forms from plural, as in *ore/or, raise/rays*.

Etymological: shows early Latin or French derivation, as in *primate*.

No one has yet tested experimentally whether skilled readers actually can or do judge which function a silent e is performing at any given time, or whether so many possible functions may be an advantage, a confusing handicap, or completely useless and beside the point. Hence, Goodman's theories still must be proved.

Another area for empirical research relates to how much readers actually can or do make use of the "deep lexical structure" unimpeded by the "surface" relationships to the spoken language, according to the theory of N. Chomsky and Halle (1968) and C. Chomsky (1970). For example, are the spelling links in *receipt/reception and sign/signal* more useful than 'non-Chomsky' spellings such as *deceive/deception or fly/flies/flight/flew* where the spelling clearly does not represent an underlying "lexical structure"?

Learning to Read

Some teachers, influenced by writers such as Gillooly (1973) and F. Smith (1972), believe that if beginners' strategies include phonics, they will be unable to transfer to fast visual strategy as adults. Observations suggest, however, that most phonics-trained readers do quickly develop visual recognition strategies for what becomes familiar, just as all well-practiced skills become automatic and cut corners. Studies of very young independent readers indicate that once they have decoded a new word by using phonic clues, analogy with recurring spelling patterns, and/or context, visual familiarity becomes their chief mechanism for recognition, still relying on clues of detail. The lesson of the "Look-and-Say" experience has been that most learners sooner or later must find clues about sound-symbol relationships, if not through formal teaching, then from home or their own wits (see, for example, Bradley & Bryant, 1983; Ehri & Wilce, 1985;

Feitelson, 1980).

Introductory initial spelling schemes such as the 'phonemic' Initial Teaching Alphabet (Downing, 1977; Warburton & Southgate, 1969), or Martin's simplification of conventional spelling in the U.S. *Writing to Read* project (Guttinger, 1983; Murphy, n.d.), have generally been set up ad hoc, and findings from individual projects have been controversial. Unfortunately, these schemes have not elucidated the most efficient strategies or spelling for learners. The findings are affected by teaching methods, and research questions have been too narrow in scope.

286

Student teachers sometimes experience what it is like to begin to learn to read when set to learn to read unknown scripts by current teaching methods. They then discover for themselves the difficulty of inconsistent spelling systems (see, for example, Wilson, 1978).

Learning to Write

Frith and Frith (1980) have shown that children use different skills in reading and in writing words. They have also suggested that the ideal spelling for writers might not suit readers: writing may be easier if the spelling is economical, consistent, and directly related to the spoken language, while reading may be easier with complexity, distinctiveness, and variety of spelling. Empirical and cross-cultural validation of this contrast is required.

The spelling slips of good spellers under stress, as in the examination papers studied by Wing and Baddeley (1980) and the common spelling errors listed in those perennial best-sellers, handbooks for 'awful spellers,' may reflect the "natural" spelling of adults. Both show the principles and shortcuts that come easily and also those spellings which cause such universal difficulty they might well be eliminated. The sum of evidence about how writers would *like* to spell suggests that words in our 'mental lexicons' may be stored in a different form from the way we spell them when we are taking care. Another important question in any spelling change is whether the graphomotor habits of writers accustomed to present spelling would be more difficult to modify than the visual recognition habits of readers.

Studies of young writers' "natural" spellings show that their early economy and use of broad sound-symbol relationships differ from the greater detail and finer auditory discrimination in most phonemic spelling reforms devised by adults (C. Chomsky, 1977; Paul, 1976; Read, 1971), as when "Tom *drov to th epot bicos he wontid a cach a plan th plan mad a fosd ladig*" represents "Tom drove to the airport because he wanted to catch a plane. The plane made a forced landing."

Baron, Treiman, Wilf, and Kellman (1980) suggest that individuals may process text in different ways, regardless of teaching. If some people are naturally alphabetic 'Phoenician' types, and others are "Chinese"- better at visual logo symbols-then the ideal orthography must suit both types.

How English Spelling is Changing

Living languages change, and English spelling shows a drift that may point the way to reforms. In those instances when dictionaries give alternative spellings, popular choice now indicates a shift away from previous "status spelling" (Veblen, 1899/1925)- the idea that choosing the more difficult and unreasonable spellings was proof of good education. Writers today are more likely to prefer spellings such as *jail, silvan, tabu, develop, lackey, frenzy, and fetish* over *gaol, sylvan, taboo, developer lacquey, phrenzy, and fetiche*. Most of the spelling changes since Johnson's dictionary of 1775 have been omissions of surplus letters, as from *actour, musick, or subtile*.

Newly invented words are now less likely to contain non functional silent letters.

English words that are adopted into foreign languages tend to be streamlined and given simple rather than complex spellings for vowel phonemes, as in "Franglais." Advertising often uses alternative spellings (Jaquith, 1976; Mazurkiewicz, 1983).

287

Businesses draw attention by spellings that are novel without offending mass sensibilities. Jaquith found that 70 percent of his sample of commercial respellings were shortenings on recognizable principles. He concluded that the reasons for shortening were to make brand names more readable at a glance by the widest possible public, including the barely literate. The fact that we read advertising spelling with ease, even when it offends us, shows that "spelling sets" can be switched.

The designs of shorthand systems take account of writers' intuitive tendencies. They are therefore worth noting, even though they differ from conventional scripts, because they omit and condense details that must be replaced to represent the full word.

More words are now being pronounced as they are spelled, particularly among 4i outgroups' who are now less intimidated by the 'ingroups' and their monopoly of private passwords (Kerek, 1976). And so the spelling *shindig* is pronounced as *shindig not shindy*, and *schism* is pronounced as *schism not sizm*. Indeed, it may be easier to amend the spoken rather than the written version of some anomalously spelled words.

Gross-Cultural Studies of Spelling

We are surprisingly parochial in our theories about cognitive processes in literacy, which are based almost entirely on research in English. Yet what is needed for use of the English spelling system may not be essential for all other orthographies. Comparisons are still hampered by measurement problems (see, for example, Downing, 1973; Kavanagh & Venezky, 1980), but other writing systems provide natural laboratories around the world. Their basic unit may be the word, the syllable, the phoneme, or various combinations (see, for example, Haas, 1983; Sampson, 1985), and orthographies may or may not fit the characteristics of their language, so that they can set different learning problems (Wang, 1981).

Dozens of new orthographies have been invented in recent times for illiterate societies, often by Americans and Britons (see, for example, Grimes & Gordon, 1980; Nida, 1964; Smalley, 1964). We can learn from other countries' experiences of the design, introduction, transition, and consequences of new systems of reform (Fishman, 1974), for every argument against English spelling improvement has also arisen somewhere else. Yet there is, to my knowledge, no major study in English of these experiences in other countries.

The great variety of script and language-script relationships provides natural laboratories for learning to read. For example, Freire's (1974, pp. 48-57) method of teaching literacy is to teach twenty words that are important to Hispanic people's lives and that contain all the spelling symbols and phonemes of the spoken language. Learners then combine letters in order to read and write as they wish. This teaching method is impossible for English, because there are so many possible letter-phoneme combinations.

Our expectations for achievement in English literacy might rise if we could find the match between language and writing that would make possible the highest achievement for the able, and the widest extent of mass literacy, at **minimum** cost. Makita (1968) has claimed a 99 percent literacy rate in Japan. Smalley (1964)

contrasted the learning of English spelling with the learning of other orthographies, as reported by missionaries who observed that "after three or four weeks of study, a bright child can read anything which is put before him, whether the vocabulary is beyond his age or not" (p. 42). Bilinguals have been reported to have greater difficulty with English spelling, and even to be "dyslexic" in English but not in their other script.

Two findings seem clear. First, orthographies that seem ideal in theory often turn out not to be ideal in practice. Modifications may be made for historical reasons and sometimes with perverse results, but often because they may make the scripts more practicable or acceptable in real life (see, for example, Smalley, 1964).

Second, humans are quite flexible in adapting to new orthographies, once they have mastered the hardest task of first learning to read. Readers in some languages may master both roman and native scripts; in others, such as Japanese and Korean, there are indigenous digraphia. Three Serbo-Croatian dialects share two alphabets, and readers appear to switch set automatically to either roman or cyrillic alphabet, despite the fact that the two alphabets contain different letters with the same sounds, the same letters pronounced differently, and letters unique to themselves (Lukatela & Turvey, 1980). Australians accept both American and English spellings.

A literate person can learn new spelling systems quickly if the systems are consistent, even though symbols may have different spoken referents in the new language. The relative ease of learning depends upon the particular orthography: the spelling rules can vary from a few lines for Indonesian, for example, to sets of spelling books, or indeed, the complete dictionary for English or Chinese. This capacity to switch "spelling set" is similar to the way we can switch automatically to read handwriting, type fonts, and letter-cases. It is crucial to the practicability of modifying English spelling without inconveniencing the literate.

Research in Spelling Design

Hundreds of new spelling reforms have been invented for English. Almost all assume unquestioningly that the direction of reform is back to the original alphabetic principle of sound-spelling correspondence, "spelling as you speak." Nevertheless, the theoretical "ideal" may not meet all the competing practical requirements, as shown by experience with the metric system.

All the claims for conventional spelling need careful testing. Proven advantage can then be developed to the utmost. English spelling operates on so many different principles that it is necessary to find out which are of value and which only seem to be:

Should we adopt phonemic spelling, or a standardized and conventionalized representation of the language, or a compromise which combines the advantages of both?

Should words look as distinctive as possible, with many different spelling patterns (Sampson, 1981, 1985), or should visual familiarity be enhanced by reducing the number of different spelling patterns and/or consistently representing units of meaning in words?

Can reading be faster if spelling provides more information than is strictly necessary in order to enhance prediction, or does economy in spelling reduce the amount of visual processing required?

Could conventional spelling be made more consistent by generalizing the most common rules

(Wijk, 1959, 1966) or harder to establish, through selecting those rules found to be most useful?

Do stable spellings for grammatical markers such as plurals and participial endings make it easier to read directly for meaning? (see, for example, McClure, Kalk, & Keenan, 1980).

Is etymology useful if maintained in spelling, or should it remain in dictionaries, where most other languages keep it? (If it is useful in spelling then English spelling should be revised to remove all the mistaken derivations.)

Does representing word meaning by consistent spelling of "morphemic" word elements give learners clues to new vocabulary and possibly aid reading?

This last question relates to the theory of English spelling developed from the work of N. Chomsky and Halle (1968) and C. Chomsky (1970). This theory, however, does not apply to most of the "irregular" words in English, and Downing and Leong (1982) list a series of critiques, but this approach to optimum orthography could still be tested in two ways. First, if the principle were applied so that English spelling more closely represented units of meaning across related words, morphemic spelling might prove to be suitable for the English language just as syllabic spelling is for the structure of Japanese (see Klima, 1972, on some linguistic aspects; Eisenberg & Becker, 1982, on semantic strategies in reading). Principles for representing the spoken language could be modified with consistent rules that identified morphemes and grammatical markers. Tests could determine whether readers could then read more directly for meaning, and whether learners and foreigners could more easily identify the meaning and pronunciation of new vocabulary and more readily use reasoning, rather than blind memorization, to spell. The introductory spelling of Martin's (Guttinger, 1983) *Writing to Read* scheme illustrates one possible strategy. Children write first, without making the distinction between "short" and "long" vowels that is shown by diacritics in their earliest reading. Constant access to normal reading books aids their immediate informal transition to conventional spelling.

A second line of inquiry inspired by N. Chomsky and Halle (1968) concerns whether an underlying spelling structure aids reading better than a variety of surface *visual* distinctions, reversing their idea of a "deep lexical structure" underlying surface *phonological* variation. The real "deep structure" might be an "idea of the word" in the mind, so to speak, that underlies all forms of its expression: "surface" visual elaboration, as well as articulation and auditory comprehension. Then, if surface clutter in the spelling of words were identified and removed, spelling itself might come closer to this basic "idea of the word." Spelling might then consist only of letters useful in indicating meaning or pronunciation. Readers can test this notion of surplus by checking how many people can replace all the deleted letters in sixteen common words: *recomend, gardian, remernberd, unparaleld, professr, disapoint, miniture, acomodate, tecnicly, mischivus, gage, ocasion, iliterat, mycology, sovren, disiplin*. Etymology helps few -indeed for four of these words the original spelling is closer to the cut words-and subjects often put extra letters in the wrong places.

290

Adjustment to orthographic Change

Some experiments in reading English text that is mutilated or otherwise transformed have

shown the immediate effect of different types of spelling modification (for example, Kolers & Perkins, 1975; Towner, Lamb, & Polen, 1975). Kolers and Perkins have shown how normal reading rates may be regained even after some bizarre reversals and rotations. Beech (1983) found that normal rates can be reached in one session for a regularized version of present spelling. Omitting surplus letters in words causes less visual disturbance than changing them, Removal of superfluous letters from 15 percent of words in text-even up to 30 percent was found to make no significant difference to adults' immediate reading speed or comprehension, although readers' immediate responses were slower for rule-based "morphophonemic" spelling and slowest for pure phonemic (Yule & Greentree, in press). Findings from related experiments also suggest that "what can't be identified will not be missed," and that "surplus stripping" could be a help to spelling for writers and learners (Yule, unpublished research). The next step for experiment is to test whether practice with 'streamlined" spelling would enhance skilled readers' efficiency above present levels with conventional spelling, by removing visual "noise" and misleading cues.

Needed Research

In summary, then, some crucial questions for research concern identification of the best possible match of spelling to fit the nature of the English language, and the possibility of universal literacy, with or without a supplementary demotic version or initial learning orthography. Research can determine whether fluency and comprehension rates in a modified spelling could surpass normal efficiency.

A revised English spelling system could maximize all the routes to learning to read that research finds useful and could more consistently represent structural linguistic principles. Future research on literacy could take note of findings about human abilities and needs that could help to indicate the optimum features for spelling for English. Laboratory studies could extend their work to consecutive text and silent reading beyond the focus on single-word experiments that may not be measuring quite the same processes. Studies of the learning disabled could be concerned with discovering the features of spelling that could help them.

Spelling must be investigated in terms of human capacities, needs, and feelings, rather than devised according to some abstract ideal that takes no account of these factors - whether that ideal be perfect correspondence of sound and symbol, representation of deep structure, morphemes or visible word origins, direct reading of logographs for meaning, or simply the belief that British "muddling through" has achieved mystically satisfactory results in language.

We need to know what practical steps would be psychologically most effective for implementation, either gradually or by single-stage introduction in pilot schemes, and what factors would influence resistance or openness to novelty and change in language habits. We need to know more about our ability to adapt to changes in spelling -that is, how we can switch set from one spelling mode to another, without detriment to skill in the original mode. What changes are easy, and what might be too difficult? We need to know how literate adults switch spelling preferences and modes, and the degree of conservation necessary to maintain access-

to our heritage of print, and to allow orthographic coexistence during a transition period. A critical question is how to achieve familiarity with the least initial distaste for the novel system. A page of unfamiliar spelling always seems repellent until the reader dives in, like the initial chill of sea-bathing.

Reading and writing efficiency in English also requires a standardized international spelling that can be a "broad-band," conventionalized representation across dialect pronunciations and across oceans. This is a language equivalent to universal conventions for drawing a house or person—unlike a photograph, yet recognized everywhere, as accurate photographs might not be. For example, the spelling of *banana* is the easiest spelling for the word, regardless of different pronunciations of the letter a. The issue of a standardized spelling acceptable for Americans and Britons, for a language with so many internal dialects and their international variations, is soluble by learning from the many other countries with consistent spellings but variety in pronunciations. As with all other spelling issues, the answers must come from research and evidence, not from armchair argument as in the past.

How Change May Come

For international reasons, English must continue to use the roman alphabet. In a first stage, at least, spelling changes would need to be compatible with the present system, so that those currently literate would not be inconvenienced and all that is presently in print would remain accessible during transition. A first step to improving English spelling is to raise public awareness of the fact that the present system has a specifiable structure, and that it is not just a mass of lists that have to be rote-learned by any trick possible. Even teachers of spelling often understand the spelling system only as a collection of hundreds of spelling patterns or ill-assorted rules.

Lecturers may explain the elements from diverse languages, an historical approach of little use to vulnerable beginners. Spelling specialists often teach by visual spelling patterns, since the inconsistencies of sound-symbol relationships may only muddle learners. Some have advised that relating the written to the spoken language is a mistake (Peters, 1984). No wonder no one wants to meddle with the mysterious black box.

Yet the underlying alphabetic structure and modifying morphemic principles can be set out on a single page; the rest is alternative choices or anomalies. The only real trouble area is in the representation of the nineteen or so vowel sounds, particularly the five "long" vowels, *A, E, I, O, U*. Learners shown this basic structure can use their own reasoning to identify what spellings are "sensible" and which are "silly" to them to help them remember it.

There is, of course, a time bomb in this approach to spelling. Once the public can distinguish the system from its anomalies, it may begin to reject the accretions. Fashion, that uncertain mistress, may tip the tastes of trend-setters to slim down rather than to continue elaboration in spelling, as an initial change. Once the fashion has tipped, the conformists then conform.

In the past, spelling research has ignored questions of improvement, and reformers have designed systems without research. Arguments have rested on untested assumptions and assertions. Spelling reformers have sought implementation

292

of their own ideas; they have lobbied for Government commissions or bills; or they have made opinion surveys of lists of words. What is really needed is funding and support for top-grade research and development with pilot experiments, comparable to that provided for other vital elements of communications and technology longer be dismissed as a trivial side issue.

Spelling systems for initial learning are practical laboratories to be studied more carefully, with attention to the improved teaching methods they should make possible. Modified spellings might be tested as aids for poor readers and as pronunciation keys in dictionaries and word-books. They

could be tested to see whether they aid language learners in extending their spoken English.

As research findings clarify spelling questions, dictionaries could test the effect of pronunciation keys which were also listed as acceptable alternative spellings for public use, extending their present range. Then, as in the past, popular usage will be the final determinant of which forms die out and which survive.

Unless English spelling is improved, easier pleasures than literacy will increasingly hold the market. Full literacy might become confined to a narrowing group, and our cultural heritage, except for what can be mediated by television, might again be kept alive by only a few. English spelling might be preserved as a sign of culture at the cost of the culture it represents.

On the other hand, if improved English spelling can make English easier to acquire and use, its position as an international language may be enhanced to the benefit of all, including developing nations. Minorities in English-speaking countries will have more chances to share in the common writing system and, therefore, through better education, increase their opportunities for socioeconomic parity. As a result, minorities will be more able to share and enhance their own literary talents, culture, rich local vocabulary, and varied accents within the common language.

Commerce, industry, and communications will be facilitated by the more efficient input, storage, and Output of information made possible by improved English spelling. The electronic media have the need to transmit visible language in a "user-friendly" form. Sellers of spelling software for offices point to the amount of office . time saved by not consulting dictionaries, although the waste from present spelling goes farther than that. Also, microfiche, - television captions, and news headings are all areas where it is Possible to test "-improved" spelling for efficiency and public acceptability.

New methods of teaching literacy may become possible because an improved English spelling may lend itself more easily to self-directed learning and interactive video. When pupils can read for content with minimal failure, their know]edge, spoken language, and writing skills will improve greatly. These changes could free teachers from what had been tedious instruction.

"Spelling patriots" have argued that the eccentricities of English spelling add an aesthetically pleasing touch of human weakness. But the effects of these quirks have been inhumane. Could an efficient English spelling be inadvertently humanistic by contributing to current trends toward barrenness in design? This might result if the principle that "the elements of communication should be reduced to a necessary minimum" is interpreted so that "necessary" means "absolute." I would claim that the spelling system of a rich language would produce an orthography to please and stimulate the eye, a garden rather than a factory grid.

Conclusion

In this article I have attempted only an overview of this wide and complex subject. Some crucial areas are beyond its scope: the relation of spelling to other features of the writing system, developmental abilities to learn, and non cognitive issues the emotional, social, philosophical, and politico-economic factors that affect people's actual use of their potential abilities to read.

To see where spelling change is likely to come from is to discern emergent power. Power for change may lie with information technology. Improvements in English spelling may conceivably be first introduced by innovative foreign nationals in their commercial dealings to widen their markets. The future lies with those who are flexible and have the energy to remove barriers to progress.

When aristocrats ruled, complexity and elaboration of spelling were signs of a leisured and exclusivist culture. Spelling today is a basic component of modern technology and can possess the effectiveness of the rest of the system when it is matched to the abilities and needs of all its users. Human priorities, universal communication, a cultural heritage open to all, and pragmatic efficiency are signs of democracies, visible in the printed word.

References

- Anderson, R. C., Hiebert, E. H., Scott, J. A., & Wilkinson, I. A. G. (1985). *Becoming a nation of readers: The report of the Commission on Reading*. Washington, DC: National Institute of Education.
- Baron, J., Treiman, R., Wilf, J., & Kellman, P. (1980). Spelling and reading by rules. In U. Frith (Ed.), *The cognitive psychology of spelling* (pp. 159-194). London: Academic Press.
- Barron, R. (1980). Visual and phonological strategies in reading and spelling. In U. Frith (Ed.), *The cognitive psychology of spelling* (pp. 195-214). London: Academic Press.
- Beech, J. (1983). The effects of spelling change on the adult reader. *Spelling Progress Bulletin*, 23(1), 11-18.
- Bradley, L., & Bryant, P. (1983). Categorizing sounds and learning to read - a causal connection. *Nature*, 301, 419-421.
- Bradshaw, J. (1975). Three interrelated problems in reading. *Memory and Cognition*, 3(2), 123-134.
- Chomsky, C. (1970). Reading, writing, and phonology. *Harvard Educational Review*, 40, 287-309.
- Chomsky, C. (1977). Approaching reading through invented spelling. In L. B. Resnick & P. A. Weaver (Eds.), *Theory and practice of early reading* (Vol. 2, pp. 43-66). Hillsdale, NJ: Erlbaum.
- Chomsky, N., & Halle, M. (1968). *The sound pattern of English*. New York: Harper & Row.
- Clay, M. (1975). *Reading: The patterning of complex behaviour*. Auckland: Heinemann.
- Coltheart, M., Patterson, K., & Marshall, J. C. (Eds.). (1980). *Deep dyslexia*. London: Routledge & Kegan Paul.
- Downing, J. (Ed.). (1973). *Comparative reading*. New York: Macmillan.
- Downing, J. (1977). The probability of reading failure in i.t.a. and t.o. *Reading*, 11(3), 3-12.
- Downing, J. (1979a). *Reading and reasoning*. Edinburgh: Chambers.
- Downing, J. (1979b). Linguistic awareness, English orthography and reading instruction. *Journal of Reading Behavior*, 10, 103-114.
- Downing, J., & Leong, C. K. (Eds.). (1982). *The psychology of reading*. New York: Macmillan.

- Ehri, L. C., & Wilce, L. S. (1985). Movement into reading: Is the first stage of printed word learning visual or phonetic? *Reading Research Quarterly*, 20, 163-179.
- Eisenberg, P., & Becker, C. A. (1982). Semantic context effects in visual word recognition, sentence processing and reading: Evidence for semantic strategies. *Journal of Experimental Psychology: Human Perception and Performance*, 8, 739-756.
- Feitelson, D. (1980). Relating instructional strategies to language idiosyncrasies in Hebrew. In J. F. Kavanagh & R. L. Venezky (Eds.), *Orthography, reading and dyslexia* (pp. 25-34). Baltimore: University Park Press.
- Fishman, J. A. (1974). The sociology of language. In T. A. Sebeok (Ed.), *Current trends in linguistics*, 12, 1750-1760. The Hague: Mouton.
- Fowler, H. W. (1937). *A dictionary of modern English usage* (revised). London: Oxford University Press.
- Freire, P. (1974). *Education in the practice of freedom*. London: Writers & Readers Cooperative.
- Frith, U. (Ed.). (1980). *The cognitive psychology of spelling*. London: Academic Press. Frith, U., & Frith, C. (1980). Relationships between reading and spelling. In J. F. Kavanagh & R. L. Venezky (Eds.), *Orthography, reading, and dyslexia* (pp. 287-296). Baltimore: University Park Press.
- Gillooly, W. B. (1973). The influence of writing system characteristics on learning to read. *Reading Research Quarterly*, 7, 167-199.
- Goodman, K. S. (1970). Reading, a psycholinguistic guessing game. In H. Singer & B. Ruddell (Eds.), *Theoretical models and processes of reading* (pp. 259-272). Newark, DE: International Reading Association.
- Grimes, J. E., & Gordon, R. G. (1980). The design of new orthographies. In J. F. Kavanagh & R. L. Venezky (Eds.), *Orthography, reading, and dyslexia* (pp. 93-104). Baltimore: University Park Press.
- Guttinger, H. I. (1983, July). Paper presented at the meeting of the United Kingdom Reading Association, Worcester, U.K.
- Haas, W. (1983). Determining the level of a script. In F. Coulmas & K. Ehlich (Eds.), *Writing in focus* (pp. 15-30). Berlin: Mouton.
- Henderson, L. (1982). *Orthography and word recognition in reading*. London: Academic Press.
- Henderson, L. (Ed.). (1984). *Orthographies and reading: Perspectives from cognitive psychology, neuropsychology, and linguistics*. London: Erlbaum.
- Jaquith, J. (1976). Digraphia in advertising: The public as guinea pig. *Visible Language*, 10, 295-308.
- Johnson, S. (1983). *A Dictionary of the English language: In which the words are deduced from their originals*. London: Times Books. (Original work published in 1755)
- Johnston, P. H. (1985). Understanding reading difficulty. *Harvard Educational Review*, 55, 153-

Kavanagh, J. F., & Mattingly, I. G. (Eds.). (1972). *Language by ear and by eye: The relationship between speech and reading*. Cambridge: MIT Press.

Kavanagh, J. F., & Venezky, R. L. (Eds.). (1980). *Orthography, reading, and dyslexia*. Baltimore: University Park Press.

Kerek, A. (1976). The phonological relevance of spelling pronunciation. *Visible Language*, 10, 323-338.

Klima, E. (1972). How alphabets might reflect language. In J. F. Kavanagh & I. G. Mattingly (Eds.), *Language by ear and by eye* (pp. 57-80). Cambridge: MIT Press.

Kolers, P. (1969). Reading is only incidentally visual. In K. Goodman & J. Fleming (Eds.), *Psycholinguistics and the teaching of reading* (pp. 8-16). Newark, DE: International Reading Association.

Kolers, P., Paley, S., & Stelmach, L. (1980). Graphemic analysis underlying literacy. *Memory and Cognition*, 8, 322-328.

Kolers, P., & Perkins, D. W. (1975). Spatial and ordinal components of form perception and literacy. *Cognitive Psychology*, 7, 228-267.

Kolers, P., Wrolstad, M., & Bouma, H. (Eds.). (1979). *The processing of visible language*. New York: Plenum Press.

Lukatela, G., & Turvey, M. (1980). Some experiments on the roman and cyrillic alphabets of Serbo-Croatian. In J. F. Kavanagh & R. L. Venezky (Eds.), *Orthography, reading, and dyslexia* (pp. 227-250). Baltimore: University Park Press.

Makita, K. (1968). The rarity of reading disability in Japanese children. *American journal of Orthopsychiatry*, 38, 599-614.

Marshall, J. C. (1976). Neuropsychological aspects of orthographic representation. In R. Wales & E. Walker (Eds.), *New approaches to language mechanisms* (pp. 109-132). Amsterdam: North Holland.

Mazurkiewicz, A. J. (1983). Spellings in commerce. *Spelling Progress Bulletin*, 23(2), 17-20.

McClure, J., Kalk, M., & Keenan, V. (1980). The use of grammatical morphemes by beginning readers. *Journal of Learning Disabilities*, 13, 262-267.

Morton, J. (1980). The logogen model and orthographic structure. In U. Frith (Ed.), *Cognitive processes in spelling* (pp. 117-134). London: Academic Press. Murphy, R. T. (n.d.). *Information sheet on the evaluation of H. Martin's "Writing to Read" project*. Princeton, NJ: Educational Testing Service.

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform*. Washington, DC: U. S. Department of Education. Nida, E. (1964).

Practical limitations to a phonemic alphabet. In W. Smalley (Ed.), *Orthography studies* (pp. 22-

- 30). London: United Bible Societies.
- Paul, R. (1976). Invented spelling in kindergarten. *Young Children*, 31, 195-200.
- Peters, M. (1984). *Spelling, caught or taught?* London: Routledge & Kegan Paul.
- Pitman, Sir J., & St. John, J. (1969). *Alphabets and reading*. London: Pitman.
- Platt, J., Weber, H., & Ho, M. (1984). *The new Englishes*. London: Routledge & Kegan Paul.
- Read, C. (1971). Preschool children's knowledge of English phonology. *Harvard Educational Review*, 1* 1-34.
- Sampson, G. (1981). The advantages of English spelling. *Revista Canaria de Estudios Ingleses* [University of Tenerife], 3, 1-13.
- Sampson, G. (1985). *Writing systems*. London: Hutchinson.
- Scragg, D. G. (1974). *A history of English spelling*. Manchester, Eng.: Manchester University Press.
- Sebeok, T. A. (Ed.). (1963-1976). *Current trends in linguistics*, 1-14. The Hague: Mouton.
- Smalley, W. (Ed.). (1964). *Orthography studies*. London: United Bible Societies.
- Smith, F. (1972). Phonology and orthography, reading and writing. *Elementary English*, 49, 1075-1088.
- Smith, P. (1980a). In defense of conservatism in English orthography. *Visible Language*, 14, 122-136.
- Smith, P. (1980b). Linguistic information in spelling. In U. Frith (Ed.), *Cognitive processes in spelling* (pp. 33-50). London: Academic Press.
- Spiro, R., Bruce, B., & Brewer, W. (1980). *Theoretical issues in reading comprehension*. Hillsdale, NJ: Erlbaum.
- Strange, M. (1979). The effect of orthographic anomalies upon reading behavior. *Journal of Reading Behavior*, 11, 153-161.
- Stubbs, M. (1980). *Language and literacy: The sociolinguistics of reading and writing*. London: Routledge & Kegan Paul.
- Towner, J. C., Lamb, G. S., & Polen, S. B. (1975). The effects of misspellings on reading rate and recall of mature readers. *Acta Symbolica*, 6, 58-66.
- Tune, N. (Ed.). (1982). *Spelling and spelling reform*. Hollywood, CA: Spelling Progress Bulletin.
- Veblen, T. (1925). *Theory of the leisure class*. London: Allen & Unwin. (Original work published in 1899)
- Vernon, M. D. (1957). *Backwardness in reading*. Cambridge, Eng.: Cambridge University Press.
- Wang, W. F. -Y. (1981). Language structure and optimal orthography. In O. S. L. Tzeng & H. Singer (Eds.), *The Perception of Print* (pp. 223-236). Hillsdale, NJ: Erlbaum.

Design of Spelling

VALERIE YULE

- Warburton, F. W., & Southgate, V. (1969). *i.t.a., an independent evaluation*. Edinburgh: Chambers.
- Webster, N. (1847). *An American dictionary of the English language*. Springfield, MA: G. & C. Merriam. (Original work published in 1828)
- Wijk, A. (1959). *Regularized English*. Stockholm: Amlqvist & Wiksell.
- Wijk, A. (1966). *Rules of pronunciation of the English language*. Oxford: Oxford University Press.
- Wilson, P. (1978). No wonder I didn't learn to read until I was about ten. *Reading*, 12(3), 2-9.
- Wing, A. M., & Baddeley, A. D. (1980). Spelling errors in handwriting. In U. Frith (Ed.), *Cognitive processes in spelling*. London: Academic Press.
- Yule, V. (1980, 1981). The etymological argument for spelling reform. *Spelling Progress Bulletin*, 20(4), 4-1 21 (3), 7-9.
- Yule, V. (1983). The hidden curriculum in the content of children's reading books. In B. Gillham (Ed.) *Reading through the curriculum*. London: Heinemann.
- Yule, V., & Greentree, S. (in press). Readers' adaptation to spelling change. *Applied Cognitive Psychology*. (Formerly, *Human Learning*)
- Ziegler, E. (1985, November). Why our children aren't reading. *Reader's Digest*, pp. 86-90.