

# *Spelling: from words in the head to words on the page*

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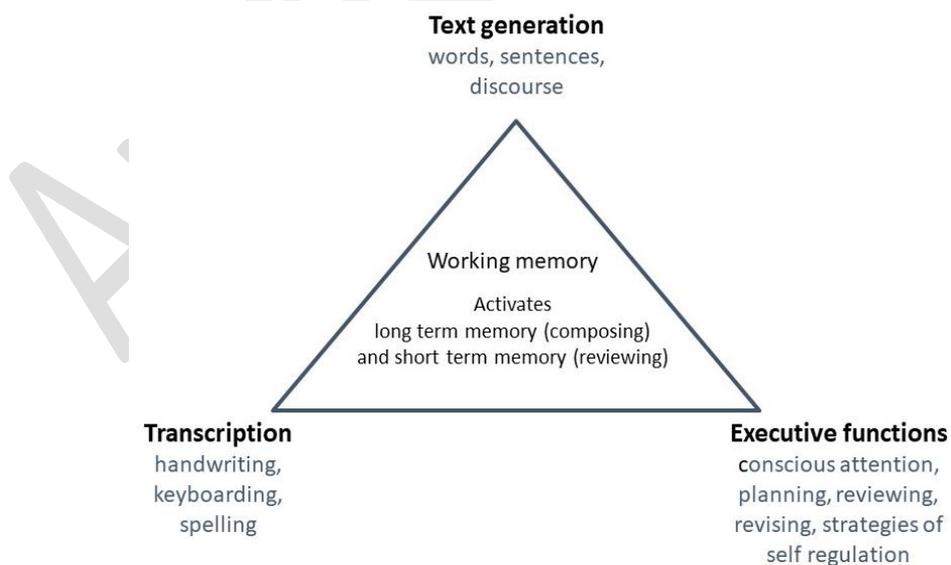
## Spelling: from words in the head to words on the page

Professor Rhona Stainthorp

Institute of Education, University of Reading

The act of spelling is the production of the graphic representations of words in a conventional form. Once people have learnt how to spell this act usually becomes a speedy transcription of the words they wish to produce to create texts: from words in the head to words on the page/screen. This may seem a little tortuous as a definition, but it is important to stress that spelling is not an end in itself. Being able to produce words in an accurate way when writing (i.e. being able to spell them) means that any reader should be able to access the meaning without having to work out which words writers were intending to use. Ability to spell accurately supports people's ability to communicate through the written form. Thus, spelling is a central process of text writing, just as accurate word reading is central to reading comprehension. Spelling is at the service of the text.

It is helpful to begin with a framework in order to contextualise the place of spelling within text writing. A Simple View of Writing<sup>1</sup> (SVW) was proposed, which paralleled the Simple View of Reading<sup>2</sup> (SVR). The SVR proposes that reading is the product of processes that enable the individual words on the page to be identified, and processes that enable the language locked in the words on the page to be understood. According to the SVW, writing is the product of two sets of complex skills: text generation (ideation) and transcription (handwriting/keyboarding and spelling). Text generation involves the generation and organisation of ideas and their translation into internal verbal language, which then has to be transcribed into words on the page. However, this simple view did not capture the complexity of all the processes that have to be orchestrated for writing sufficiently well, so it was expanded into the Not So Simple View<sup>3,4</sup> by the addition of self-regulatory processes and working memory as set out in figure 1.



Working memory is conceptualised as being at the centre of the processes because it is needed for accessing long term memory during the planning and composing phase, and short term memory is needed during the reviewing phase <sup>5</sup>.

Writing is recognised to be one of the most cognitively demanding tasks humans can engage in <sup>6</sup>. Indeed, ideation (text generation) always remains complex and demanding of cognitive resources. However, the transcription skills are capable of being automated to a great extent and when this happens cognitive resources are freed up for the cognitively demanding text generation processes. This means that by gaining control over transcription the quality of the texts can be improved <sup>7 8</sup>.

The transcription processes involve language being produced via hand movements to generate the individual words' orthographic identities: their spelling. When texts are created by handwriting, the motor programme involves the production of the letters by scribing. Writers literally produce the words. Writers can also see the text being created as the hand moves across the page so there is a continuous process of reviewing which supports accurate spelling. When the texts are created via a keyboard, writers must recognise where the letters are on the keyboard and then execute a series of key presses in the correct sequence. Depending on the level of touch-typing skill, writers may or may not see the words appearing on the screen individually.

Because this book is written in English, we first need to cover the characteristics of the English spelling system, which is one of the most difficult to learn. Understanding the characteristics of the spelling system, leads to rational approaches to teaching spelling. The very nature of English orthography makes for complications in presenting unambiguous information about spelling without simultaneous audio, so the following conventions are used:

- When letters are being discussed they are presented in angled brackets < >:
  - e.g. 'the consonant letter <t>; the vowel letters <oa>.'
- When a word is the item under discussion it is in italics:
  - e.g. '*sit* is made up of the letters <s> <i> <t>.'
- There is not enough space to present a complete account of phonology here, and it would be unreasonable to expect every reader to have expert knowledge of the International Phonetic Alphabet (IPA), which is a system whereby there is a unique unequivocal symbol for every phoneme of all known languages. However, to ensure clarity, when phonemes are being discussed, the IPA symbols are used between slashes / /, and an exemplification from English words given if necessary:
  - e.g. 'the word *sit* is composed of three phonemes, /s/ /ɪ/ /t/ and spelt with the three letters <s> <i> <t>.'
- Some of the IPA symbols are the same as Latin letters and can be used unambiguously for readers of English. However, many phonemes have to be represented by specific IPA symbols:
  - e.g. 'the word *chuck* is composed of three phonemes /tʃ/ /ʌ/ /k/ and spelt with five letters <c> <h> <u> <c> <k>; the phoneme /tʃ/ is represented by the consonant letters <ch>; the phoneme /ʌ/ is represented by the vowel letter <u>; and the phoneme /k/ is represented by the consonant letters <ck>.'

## English orthography

An *orthography* is the accepted way for spelling and writing words in a language. It is the conventional spelling system of that language: a system for making words permanent. Each written language has its own orthography. There are many different ones, but the thing they all share in common is that they use stylised graphic symbols in linear formations. English is an alphabetic orthography where the phonemes of the words are represented by letters. Writing goes along horizontal lines from left to right with the letters being produced in a left to right sequence. This contrasts with Chinese and Japanese writing which is produced traditionally along vertical lines from top to bottom and then going from right to left across the page (though with the advent of computers this is changing). These orthographies use characters to represent whole concepts, they cannot be segmented down into the smaller phonological units of alphabetic writing.

What does it mean to say a language is alphabetic? The solution to the question of how to represent spoken language visually has been solved in alphabetic languages through the invention of *Alphabets*. These orthographies make use of a relatively small set of stylised graphic symbols (letters) which map onto small phonological units: phonemes (sounds) for representing every word. At its simplest children must learn the letter that relates to each specific phoneme and use this code to spell words: e.g. modern Turkish<sup>9</sup>. Unfortunately, for learning to spell in English, the orthography is not simple.

The 26-letter alphabet used in English is the Latin script. It is made up of 26 unique configurations of lines and curves. Though each letter is unique, some are mirror images (or near mirror images) of each other: e.g. b d, p q, s z; and some invert across the horizontal: e.g. h y, f t, n u, m w in some print fonts. When forming the letters by handwriting the motor pattern for each letter is unique. Learning to form the letters fluently is an important skill for spelling because if writers do not know how to form the individual letters their writing is indecipherable. When skilled handwriting is achieved, attention shifts from the physical production of the words to the content and structure of the text<sup>78</sup>. When writing via a keyboard, the position of the letter must be accessed for a press action to be executed. In this case, unlike handwriting, the form of the letter is not the result of a unique configuration of motor movements. Nevertheless, 'automatic' recognition of the letter shapes is necessary. Thus, whichever medium is used for text production, accurate letter knowledge is needed.

Each word has an *orthographic identity* which is the sequence of letters that make up its visual form. Skilled readers and writers have this linked to its phonological (the sound), semantic (the meaning), and syntactic (the grammatical status) identities<sup>10</sup>. When this unique orthographic identity is stored there is word-specific knowledge of that word, which can be accessed directly when writing. The linkage of all four identities is important because in English there are some words that share their phonological identity but not their orthographic semantic or syntactic identities. These words are called *homophonic-heterographs* (sound the same - look different): e.g. *blew* and *blue*. Linking the orthographic identity of the individual words to their semantic and phonological identities enables correct spelling. Orthographic identities include order information. The left-right sequence for

producing the letters is important. For example, *art rat tar* are all composed of the same letters so they could be said to look alike – but the different sequences are different words.

### Sounds and spelling

Spoken language is composed of vowel phonemes and consonant phonemes, with more consonants than vowels. Spoken English has 44 phonemes, with the number varying slightly depending on the individual regional accents (both within and between countries). There is considerable variation of accent in spoken English within countries where English is the dominant language. However, there is no variation in spelling within countries, though there is between countries: e.g. *colour* in British English but *color* in American English. Accent is not represented in spelling, only generalised phonology. For example, the word meaning ‘the thing one gets into to wash oneself’ is <bath> but this is pronounced as /b æθ/ (short vowel) or /b α:θ/ (long vowel) depending on accent.

The 26 letters of the alphabet are used to represent the 44 phonemes. There are 24 consonant phonemes and 20 vowel phonemes, but the alphabet is composed of 21 consonant letters: <b c d f g h j k l m n p q r s t v w x y z> and only 5 vowel letters: <a e i o u>. <y> can sometimes represent a vowel phoneme /ai/ as in *fly*, and sometimes a consonant phoneme /j/ as in *yellow*. The lack of enough vowel letters for English phonemes is the result of an historical ‘borrowing’ of the Latin alphabet to represent the languages of the British Isles over the centuries. Latin had far fewer vowel phonemes so the Romans only needed the small set of vowel letters. Over the centuries the solutions to representing all the English vowel phonemes have been many and various, not consistent or transparent, which makes spelling vowel phonemes in English the most challenging aspect of word spelling.

### Vowel phoneme spelling

In modern English there are six distinct short vowel phonemes, which are usually written with their canonical vowel letters: /æ/ *cat*; /ɛ/ *wet*; /i/ *sit*; /ɒ/ *plot*; /ʌ/ *duck*; and /ʊ/ which is also written using <u> *put*. There is a further indistinct short vowel phoneme called the *schwa* /ə/. This unstressed vowel phoneme is one of the most frequently occurring in continuous speech, but which has no consistent letter to represent it. For example, at the end of *ever* you can hear the sound /ə/, as in /ɛ v ə/ spelt <er>. You hear the same sound at the end of *error*, as in /ɛ r ə/ spelt <or>. Also, the indefinite article *a* is spelt <a>, but generally pronounced as a schwa, particularly in continuous speech.

Given the six distinct short vowels plus the schwa, this leaves a further thirteen longer vowel phonemes which all require representation. In this instance, longer literally means that the sound lasts longer in time: the sound /æ/ in *mad* is shorter than the sound /ei/ in *maid*. In order to represent these vowels, the orthographic device of using more than one letter has been developed. Where letters are used to stand for one sound they must be parsed together and are called a *grapheme* or *digraph*: e.g. <ai> <ea> <oa> <ue> <oo> <al> <er> <ow> <oy>. Some vowel phonemes are represented by three or even four letters graphemes: <air> <eau> <igh> <eigh> <ough>. These examples show that vowel graphemes may be composed of two vowel letters or a vowel letter(s) plus a consonant letter(s). When consonant letters are part of a vowel grapheme they are not sounded. In graphemes composed of two vowel letters, the phoneme represented is usually the longer vowel

phonemes of the first letter if the pair. Children are sometimes taught the spelling rule ‘when two vowels go out walking, the first vowel does the talking’: e.g. *rain, goal*. This can be helpful, but invariably there are exceptions to the rule: e.g. *great, feud, friend*.

The use of the term ‘rule’ in relation to English spelling should be treated with caution. It is more helpful to think of these as patterns which re-occur because there are always exceptions to the ‘rules’<sup>11 12</sup>.

In addition to the graphemes where the letters are parsed together to represent the vowel phonemes, there is a further orthographic pattern for representing long vowel phonemes. This is the *split vowel digraph*, or *marker E*. In the past children may have been taught about the ‘magic E that makes the vowel say its name’: i.e. the vowel represented is long. The orthographic pattern of a split vowel digraph is vowel letter followed by consonant letter, followed by <e> (<-VCE>): e.g. *bide, plane*. This pattern is almost a rule. Unsurprisingly there are exceptions. *Give* and *have* are high frequency words that look as though they obey the rule, but the vowel phoneme is short. The reason for this exception is that there is an orthographic ‘rule’ that overrides the phonological rule: namely English words do not end with <v>. This rule does not hold for neologisms like *spiv* (a word for a petty criminal coined during the 2<sup>nd</sup> World War), abbreviations like *improv*, or many names: *Shiv, Rav*. False split vowel digraphs also occur at the end of some polysyllabic words: e.g. *peregrine, glycerine, crinoline*. These pose challenges for learning to spell. When children are first taught the split vowel digraph rule they may begin to make errors by writing *hav* instead of *have* and *peregrin* instead of *peregrine*. This shows they have learned the ‘rule’ then over applied it. Such errors can be considered positive, but particularly *hav* needs correcting so that an accurate orthographic identity is built up of this high frequency word. If *have* is continuously written as *hav*, the storage of the correct orthographic identity may be compromised leading to errors being produced when writing under stress<sup>13</sup>.

It might be supposed that the device of using digraphs could have solved the problem of representing the larger set of vowel phonemes in a systematic way. But for many historic reasons every vowel phoneme has at least two orthographic representations:

<i>sit crystal</i>	<i>wet head</i>	<i>cat plait</i>	<i>plot swan</i>	<i>duck some</i>
<i>put could</i>	<i>banana father</i>	<i>tree knead</i>	<i>girl learn</i>	<i>calf hard</i>
<i>saw taught</i>	<i>shoe crew</i>	<i>play eight</i>	<i>go sew</i>	<i>sigh my</i>
<i>loud bough</i>	<i>boy coin</i>	<i>fear deer</i>	<i>there their</i>	<i>pure your</i>

This list is not exhaustive, and you might like to play with identifying as many different graphemes of vowel phonemes as you can<sup>12</sup>

### Consonant phoneme spelling

The spelling of consonant phonemes is far less variable and inconsistent than vowel phonemes, but not without hazard. Some consonant phonemes are spelt with a single canonical consonant letter: /p/ ≡ <p>, /b/ ≡ <b>, /t/ ≡ <t>, /d/ ≡ <d>, /g/ ≡ <g>, /n/ ≡ <n>, /l/ ≡ <l>, /r/ ≡ <r>, /j/ ≡ <j>, /h/ ≡ <h>. These mappings are the reverse of the letter-sound mappings that are learned in phonics for reading. However, /p/ /b/ /t/ /d/ /g/ /n/ /l/ /r/ can also be spelt with a geminate – a doubled letter: *clipper rabble latter ladder giggle*

*banner rolled barrel*. Doubling the consonant letter does not change the phoneme represented, but it may have an impact on the preceding vowel phoneme: e.g. *mate matte*.

There are five consonant phonemes that are always spelt with a digraph: /θ/ ≡ <th> *thumb*, /ð/ ≡ <th> *they*, /tʃ/ ≡ <ch> *chocolate*, /ʃ/ ≡ <sh> *ship*, and /ŋ/ ≡ <ng>. Even here there is inconsistency because /ʃ/ can be <ch> as in *chef* or <ti> as in *station*, and /tʃ/ can be <-tch> at the ends of words.

A further characteristic of English orthography relates to positional constraints and the frequency of occurrence of patterns of word spellings. A feature of human learning is that we have a capacity to extract frequency information and statistical properties from the environment in which we are surrounded<sup>14</sup>. We learn about patterns and can use them in our behaviours. Through exposure to print we become sensitive to orthographic patterns and use them in writing. The spelling of the phoneme /tʃ/ illustrates this. The most frequent grapheme for /tʃ/ is <ch>: *chap rich*. The alternative spelling <tch> represents exactly the same phoneme but is subject to positional constraints and never occurs at the beginning of words. When children are learning to spell they show a level of sensitivity to the positional frequency of graphemes and so rarely make errors by placing unpermitted graphemes at the beginnings of words.

Consonant phonemes written with consonant digraphs always have one of the letters silent. These patterns often relate to the etymology of the word and discussion of this can be highly motivating for developing children's vocabulary. Examples of silent letters are <b> in <mb> *lamb*, <g> in <gn> *gnaw*, <k> in <kn> *knight*, <w> in <wr> *write*. These patterns are different from the graphemes <th>, <ch> etc. because <mb> <gn> <kn> and <wr> represent phonemes which are usually written with their canonical letter: <m> <n> and <r>.

There are some consonant phonemes that are spelt with their canonical letter, but which also have alternative spellings. For example, the phoneme /s/ is spelt with <s> *sat*, <ss> *lass* or <c> (*cent*); /k/ takes multiple forms: <k> *kit*; <c> *cat*; <ck> *back*; <ch> *choir*; and <que> *opaque*.

These examples of phoneme-grapheme pairings for vowels and consonants show how English spelling is inconsistent and complex. There is a lot to learn about the representation of the phonemes, about patterns, and about individual words. Nevertheless, every phoneme can be identified in a word's orthography. The one exception to this is words with <x> which represents two phonemes /ks/. In phonics programmes children are taught <x> = /ks/ as a blended consonant at the end of words or syllables: e.g. *six*, *expect*.

The phonemic basis of spelling means that it is important for children to become explicitly phonemically aware. They can then identify word structures by segmenting whole words into their component phonemes. Phonemic segmentation for spelling is harder than phoneme blending for reading<sup>15</sup>. If children are able to segment words into component phonemes, and have been taught phoneme-grapheme correspondences (PGCs), they are able to generate readable and plausible spellings of words. The issue is that PGC knowledge is essential but not sufficient because there are too many words that cannot be accurately spelled by application of these correspondences

### **Morphemic aspects of spelling.**

English is called a deep orthography because not only are the sounds represented, but so are aspects of morphology. Morphology is the system of language relating to how words are constructed relative to root meaning and affixes (prefixes and suffixes). Words are units of meaning: *morphemes*, with the morpheme being the smallest grammatical unit of language that has meaning. Prefixes and suffixes are also morphemes because they carry meaning, but not words in their own right. There are two types of affix: *inflectional* affixes and *derivational* affixes.

There are only a few inflectional affixes and they are always suffixes. These express grammatical contrasts but do not change the meaning of words. For example, the expression of the plural in English is via a plural inflexion added to the end of a noun. Phonologically this takes three forms: /s/ /z/ /ɪz/: *cat+/s/*, *dog+/z/*, *horse+/ɪz/*. However, in spelling orthography overrides phonology, so the plural affix is always spelt with the letter <s>: *cats*, *dogs*, *horses*. Children will almost certainly have internalised the phonology of the plural by the time they are becoming literate so they may represent phonology in misspellings such as *dogz* and *horsiz*. One can see how it can be helpful to be taught the plural orthographic pattern to avoid errors.

Verb tenses are also expressed with inflectional suffixes. The past tense for regular weak verbs is formed phonologically by adding an affix: /d/ /t/ /ɪd/: *rain+/d/*, *kiss+/t/*, *want+/ɪd/*. Again in spelling orthography overrides phonology so the past tense marker is almost always spelt <ed> regardless of the phonology. However, you may be frowning at this point because the past tense of the verb to *spell* is here given as <spelt>. It is a delightful aspect of English that the word that relates to spelling itself has an irregular past tense marker of <t> in British English orthography. There are a few other examples of this irregularity: *learnt*, *burnt*, *dreamt*. Although the regular form *learned*, *burned* and *dreamed* is also permitted.

*Derivational* affixes can come at the beginning or the end of a word. There are a large number of derivational affixes, which may modify or change meaning and/or change word class. Here just a few are for exemplification.

An example of a meaning changing affix is the prefix <un-> which reverses the meaning of the root: *undo*. <un-> is a prefix with consistent regular spelling, as are <pre->, <post->, <ante-> and <anti->.

Examples of derivational suffixes that change word class and have a regular spelling are <-ness>, <-ly>, <-less>. The morpheme <-ness> has the effect of changing an adjective into a noun: *glad* → *gladness*; <-ly> turns the adjective into an adverb *glad* → *gladly*; <-less> turns a verb into an adjective *help* → *helpless*, then with the further <-ness> the adjective becomes a noun *helplessness*.

Though there is a degree of consistency, not all affixes are regular in spelling. The morpheme, which is affixed to a verb of action to create an agent noun is pronounced /ə/ but it can be spelt <-er> or <-or> (and very infrequently <-ar> or <-ir>). Pupils could learn the specific orthography for every agent noun but there are some orthographic/phonological patterns to help; though there are always exceptions. Verbs ending in a single consonant, a consonant cluster, a consonant digraph or a split vowel

digraph tend to take <-er>: *eater, builder, busker, maker*. Exceptions are *sailor, inventor, supervisor*. Verbs ending in <-ct> and polysyllabic verbs ending in <-ate> and <-it> tend to take <-or>: *actor, educator, editor*. Engaging with affixation supports spelling development and at the same time helps to develop vocabulary and morphological awareness<sup>16 17 18</sup>. Both of which support the development of text writing.

Another example where orthography and morphology interact is with the conditional rules called 'doubling and dropping'. When a suffix is attached to a word which takes the phonological form consonant(s)-short vowel-consonant: e.g. *hop*, the final consonant letter is doubled to 'preserve' the short vowel: *hop, hopping, hopped*. When the vowel in a /CVC/ word is long and spelt with a split vowel digraph, the final <e> is dropped before the affix is added: *hope, hoping, hoped*. Application of the correct rule gives the following patterns: *hop, hopping, hopped* and *hope, hoping, hoped*. Application of the rule incorrectly leads to real words with but wrong meaning → *hop - hoping, hoped* and *hope, hoping, hopped*.

This short account of English orthography shows that it is not possible to learn to spell accurately entirely by the application of PGCs or entirely by learning 'rules' but all this knowledge can be helpful. Orthographic patterns and morphology are also useful. The complex nature of the orthography leads to people implicitly orchestrating different strategies to become fluent spellers<sup>11</sup>. Acknowledging this when teaching is effective.

### How we spell words

One account of how we spell words proposes that there are two routes<sup>19 20 21 22</sup> and a more recent model proposes that people spell through the integration of multiple patterns<sup>14 23 24 25 26</sup>

### A dual route model of word spelling

Dual route models propose a direct route to word spelling called the *addressed* route and a second route called the *assembled* route. A word is said to be spelt by the addressed route when a stored representation with the letters in the correct sequence is accessed and the letters are then written down in serial order. This word-specific pattern is the word's orthographic identity. If this is correct, producing words by this route leads to accurate spelling. This suggests that it is important to establish accurate orthographic identities because incorrect identities lead to incorrect spelling. The greater the number of words stored in this way, the more accurate whole written texts are likely to be.

The question is: how do words get stored? This could be by rote-learning, but it is more likely that an assembled route is established which leads to the creation of the orthographic identity. When a word is spelt by the assembled route the target word is segmented into its component phonemes. These are then mapped onto a sequence of letters or graphemes which are then assembled. The same processes as for the addressed route are used to write down the sequence of letters. In English, spelling a word by this route may lead to phonologically plausible but not necessarily accurate spelling.

In the learning phase of becoming literate the two routes to spelling need to be established. This is not a conscious process but one that is supported through effective teaching and opportunities for practice. Initially children will have very few stored orthographic identities

of words, so they need to use PGCs to generate words. This means they need phoneme-grapheme knowledge. Through repeated application of PGCs, word-specific knowledge is established so words can then be spelt via the addressed route.

### **Integration of multiple patterns (IMP) framework**

In their alternative to the dual route, Treiman and Kessler<sup>26</sup> base their IMP framework on the fact that writing systems include a range of features, and on the capacity of humans for statistical learning. By multiple exposures to words in many different textual contexts they are able to implicitly extract letter patterns: e.g. <ough> *rough, through, bought* which reoccur in words but are not necessarily linked to a stable phonology. They also extract morphological patterns (affixations). This reduces the cognitive demands on establishing word-specific information. Addressed and assembled spellings are incorporated in the IMP framework.

### **Learning to spell**

It was thought that spelling developed through a sequence of stages<sup>27 28</sup>: 1) a *pre-communicative stage* when 'writing' would be a sequence of letters with spaces that looked like words but with no relation to phonology; 2) a *semi-phonetic stage* when children began to be aware of relationship between letters and sounds; 3) a *phonetic stage* where all the phonemes of the word would be represented with letters but only those words with regular grapheme-phoneme spelling would be likely to be accurate; 4) a *transitional stage* when children would begin to incorporate common letter patterns and so move away from a dependence on pure phonology and phoneme-grapheme mapping; 5) the *correct stage* when children were able to incorporate multiple sources of knowledge of orthography including morphology, phonology, orthographic patterns and word-specific knowledge. The data source for the demarcation of these stages was from examples of children's errors produced when writing spontaneously.

Though a stage-like development seemed plausible, further research cast doubt on the simplicity of this<sup>29 30 31</sup>. Children's writing showed use of multiple sources of knowledge to generate the spelling of words but for which, as yet they did not have word-specific knowledge. Thus, in the same piece of writing the errors <begeed> for *begged*, <startid> for *started*, <cold> for *could*, and <woh> for *who* might be found; whilst at the same time spelling *wanted, over* and *their* correctly. These errors show awareness of the sound structure of the target word with evidence of knowledge of orthographic patterns and morphology. In their writing, right from the start children use multiple sources of knowledge to generate spellings and this casts doubt on spelling development being stage-like. If children can use phonology, word-specific knowledge, morphology and awareness of orthographic patterns simultaneously then an account of spelling based on the integration of multiple patterns seems to account for more of the behaviour. This points the way to effective teaching providing children information about phonology, orthography and morphology.

### **Teaching spelling**

Much of the early evidence about spelling development came from studying children's writing generated in situations where they were allowed to produce texts 'unhindered' by

direct teaching<sup>32</sup>. However, just as it is now recognised that children find it easier to learn to read if they receive direct instruction, so there is evidence that children learn to spell more accurately if they are explicitly taught. But what should they be taught? The logical conclusion from insights about English orthography and the IMP framework point to children being taught multiple strategies<sup>25 26</sup>.

Since English is an alphabetic orthography, learning phonics for spelling is one obvious strategy. Phonics for spelling means learning PGCs. Children therefore need explicit phoneme awareness and word segmentation skills in order to use their PGC knowledge. Segmentation for spelling is harder than blending for reading and requires a higher degree of accuracy so that each phoneme is identified. This requires supported practice.

Learning phonics provides a good entry into spelling, but it is not enough. Many of the high frequency content words needed to create grammatically accurate meaningful texts are not transparent: e.g. *so, was, be, where, their*. Children need word-specific orthographic identities established of these early on in their literacy education. Generating phonologically plausible but incorrect spellings without feedback on accuracy leads to formation of incorrect orthographic identities. Spelling when writing under pressure may become unstable. Teachers have to find a fine line between feedback ensuring accuracy without demotivating children.

Through exposure to print whilst reading children become sensitive to orthographic patterns. Reading supports spelling development. Through their teaching of text reading and vocabulary teachers can support children's use of multiple strategies for generating word spellings. Having explicit attention drawn to patterns in multiple words helps to establish these, and this then can feed into the extension of word-specific knowledge.

At the beginning of this chapter, the point was made that spelling is at the service of text writing. It is very rare for a sentence to be composed of monomorphemic root words in English, therefore teaching children about affixation in spelling can support writing. Explicit teaching about orthographic patterns and spelling 'rules' relative to affixation is generative and supports spelling development more than simply requiring children to memorise the spelling of words<sup>16 33</sup>. One teaching approach can be to provide children with sets of words which can be divided into subsets based on orthographic features. Through being asked to derive patterns, children can develop insights about orthography and extend their vocabulary.

In the past teaching spelling tended to be based on an assumption that through writing out multiple lists of words children would become competent spellers. The lists might have been composed of words that shared common spelling patterns or words in semantic relationships. The occasional 'rule' would also feature, but the teaching was not strategic. If teachers know about the nature of English orthography and about the strategies adult competent spellers use, then they understand what to teach. They will understand that children need to be taught how to spell words through the operation of multiple strategies. Exposure to print helps to build up orthographic knowledge and vocabulary, but children need multiple opportunities to create texts. They need to spell words in meaningful contexts to build up their ability to spell 'automatically'. Vocabulary continues to grow throughout life so utilisation of phonology, orthography and morphology will always be needed for words that have not yet gained a stored orthographic identity.

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