

A CLOSER LOOK AT

spelling

IN THE PRIMARY CLASSROOM

Grace Oakley and Janet Fellowes

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Grace Oakley and Janet Fellowes

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Foundations and theories of spelling development

This book takes a closer look at spelling, the teaching and learning of which is considerably more complex than is often assumed. Research indicates that the ability to spell does not develop naturally through immersion in writing and reading experiences (Farrall, 2012), nor can it be effectively acquired through the rote learning of words. In order to spell well, children need to learn how to strategically use knowledge about phonology, orthography, morphology and etymology. It is also a visual activity that involves the laying down and retrieval of visual representations of words and word parts in the memory. Children also need to learn how to use the metalanguage associated with spelling – words like phoneme, syllable, affixes and morpheme – as this will help them talk and think about spelling strategies. Thus, spelling is a language activity and also a thinking activity. Ideally, it should also be a meaningful activity that is engaged in with a positive attitude.

It would be impossible to learn how to spell every word in the English language separately through memorisation, so children need to learn how the spelling system works and how to make generalisations, and this is best done when integrated with the teaching of phonological awareness, phonics, word study, vocabulary, writing and reading. It takes time to learn how to spell, but good spellers gradually develop automaticity or fluency in spelling high-frequency and known words, which allows them to dedicate their attention to the higher level cognitive processes involved in writing.

In this book we draw on the theoretical and research literature, as well as classroom examples, to explain how to teach primary school-aged children to use multiple strategies to spell. We also consider the assessment of spelling, as well as how to assist those who have difficulties in learning to spell. In doing this, we question the notion that spelling always develops in a predictable, hierarchical sequence, starting with the use of phonology (sounds), through to the use of morphology and etymology (word meanings and origins).

Evidence-based teaching of spelling

Teachers are often asked to use evidence-based approaches in their teaching. In this book, we review what the research says about the teaching of spelling. This research constitutes one important form of evidence, which will help teachers develop sound rationales for their teaching of spelling, and will help them make informed decisions in their day-to-day and moment-by-moment teaching of spelling. We also stress the importance of using assessment data as a form of evidence to enable teachers to accurately target their spelling instruction. As this book is limited in scope and compact in size, we are unable to go into great depth in a number of areas. For this reason, we have provided a comprehensive list of references at the end of the book, that readers can refer to if they wish to learn more about any of the areas discussed.

Does spelling still matter?

Like other elements of literacy, spelling can be seen as a socio-cultural practice (Oakley, 2005). Children need to know that good spelling is a social expectation and a means of clear communication. Good spelling is often regarded as an indicator of people's intelligence and academic ability. The findings of research by Figueredo and Varnhagen (2005) indicate that spelling errors negatively affect readers' perceptions of a writer's ability and of the quality of the writing. Furthermore, there appears to be a public perception that spelling standards in Australia (and in many other English speaking countries) are too

low and perhaps even declining, and this is reflected in newspaper headlines such as those shown in Figure 1.1. NAPLAN results from 2014 indicate that, indeed, many Australian students do not meet the minimum standard in spelling. The results from both Years 3 and 5 indicate that 7.3 per cent of children in Australia were below the (low) minimum standard. This means that many thousands of children are struggling. NAPLAN data shows that Aboriginal children and children in non-metropolitan areas are more likely to be below the minimum standard, as are the children of less educated parents. (See the following website for the full report <http://www.nap.edu.au/verve/_resources/National_Assessment_Program_Literacy_and_Numeracy_national_report_for_2014.pdf>).

Less than a third of Queensland's Year 3 students could correctly spell the words "battery", "daily" and "sneeze" on this year's NAPLAN exams.

The Sunday Mail (Qld)
November 3, 2013

Texting is fostering bad grammar and spelling, researchers claim.

The Telegraph (UK) July 23, 2012

Year 12 students poor at spelling, grammar.

The West Australian March 1, 2013

Figure 1.1

Newspaper headlines about poor spelling standards

Not only is a person's ability to spell used as an indicator of their intelligence, academic ability, credibility, work ethic and attention to detail, but it also impacts negatively on the quality of their written expression. If the spelling is poor the person's writing is likely to be less comprehensible and accurate. In addition, learning how to spell facilitates the learning of vocabulary and reading (Vellutino, Tunmer, Jaccard & Chen, 2007) as all of these components of literacy share similar foundational knowledge. So, contrary to some arguments, children *do* still need to learn to spell, and technological tools such as spellcheckers and predictive text tools have not yet removed this necessity. These issues are elaborated further in this chapter.

Quality of written expression

As already noted, accurate spelling is an important aspect of writing because written text is more difficult to comprehend when it contains words that are misspelt. Furthermore, the inability of people to spell certain words can lead to them avoiding the use of these words in their writing, thus limiting their writing vocabulary to words that they

know how to spell – and this can make their writing uninteresting and lacking in precision. Moreover, when writers have to apply too much cognitive effort to determine the spelling of words, their ability to create clear, creative and coherent texts is hindered; the need to think too hard about spelling means less attention can be paid to other (higher order) processes of writing (Graham & Santangelo, 2014). Research findings by Graham, Harris and Chorzempa (2002) indicate a link between learning to spell and the development of other aspects of writing competency. In their study, additional spelling instruction resulted in greater progress in sentence-writing skills and text production. This may be because greater spelling fluency reduces cognitive load (Sweller, 1988) when composing texts.

Worryingly, difficulties in mastering spelling skills may lead young children to shun writing and develop a fixed mindset that they cannot write, resulting in obstructed writing development (Graham, Harris & Chorzempa, 2002). This leads to difficulties in communicating knowledge in a range of curriculum areas and in out-of-school situations.

Learning to read

Research provides evidence of the link between learning to spell and enhanced reading ability (Conrad, 2008; Ehri, 2000 cited in Moats, 2005; Graham, Harris & Chorzempa, 2002; Hook & Jones, 2002). Many aspects of reading development rely on the same underlying linguistic knowledge and cognitive processes as spelling. In learning to spell, students develop their knowledge and memory of letter–sound relationships and of the orthographic patterns that comprise written words. They rely on the same knowledge for decoding and word recognition when reading. The ability to efficiently associate sounds with letters and clusters of letters leads to rapid and accurate identification of words. Word recognition also requires the ability to break words down by units of meaning (morphemes – base and root words, prefixes, suffixes, etc.), an ability that is part of the development of morphemic knowledge when learning to spell. Other areas of learning to spell that are important to the reading skills of decoding and word recognition include phonological awareness and an understanding of the alphabetic principle. These concepts are explained more fully later in the chapter.

Limitations of word processors and spellcheckers

Technological advances have seen computers become an integral feature of classrooms and homes. Students use them regularly for written composition. Some people believe that because of the availability of spellcheckers in computer word processing programs, and predictive text in mobile devices such as smart phones and some computer programs, it is unnecessary to dedicate too much time to the teaching of spelling.

Spellcheckers can indeed assist with accurate spelling but their efficacy is dependent on the writer already having an adequate spelling ability. For a spellchecker to provide the correct spelling, the misspelt word needs to be a close approximation of the correct spelling. Often a spellchecker will present a list of possibilities and the writer needs to recognise the right spelling from the list presented. Research by Montgomery, Karlan, & Coutinho (2001) highlighted the unreliability of spellcheckers. In a range of spellcheckers tested, they proposed the correct spelling for only 53 per cent of misspelt words. Spellchecker efficiency was greater when the misspellings contained few phonetic errors and a high percentage of correct letter sequences. In instances where the spellchecker provided a list of possibilities for a misspelt word, the first suggestion was correct for only 21.6 per cent of misspellings. In any case, writing is not always the product of word processing. People's everyday activities include writing exercises for which computers are not normally used; for example, writing a shopping list, an exam, a note or a postcard. Of course, since 2001, the accuracy of spellcheckers may have improved but the individual still needs to know which spelling to select, in many cases. However, automatic correction of spellings by word processors has now become common and this means that writers may not even *notice* that they have made a spelling error, and are thus not able to learn from their errors.

It could be argued that spelling does not matter much nowadays because non-conventional spellings are becoming more acceptable, such as the spellings used in text messages and on social media. This is an area that is receiving some research attention and it appears that new spelling conventions are developing for these types of messages. It is also worth noting that research has been carried out on the impact

of text messaging on children's conventional spelling – it seems that text messaging may negatively impact boys' spelling, since boys tend to use the predictive text feature more often than girls do, indicating that they are not thinking about how to spell (Bushnell, Kemp & Martin, 2011). Although much research is still needed in this area, the findings of Bushnell and colleagues may be something for teachers to bear in mind.

Keeping the continued relevance of spelling in mind, we introduce the foundations of spelling and theories of how people learn to spell. Although the word 'development' is occasionally used in this chapter and throughout the book, we wish to emphasise that we conceptualise spelling as a learned, linguistic and cognitive skill which does not naturally develop on its own; it must be *taught* (Adoniou, 2013). Likewise, even with teaching, spelling may not always 'develop' in the sequence that may be expected due to a range of factors such as children's first language background, individual differences, and the ways in which spelling is taught.

Foundations of spelling

Spelling can be seen as a *process* that is necessary for the social practice of writing, and essential to being literate. In alphabetic languages such as English, it involves use of the letters of the alphabet to represent oral language (at the word level) in a written form, and requires knowledge of the structure and properties of language. Effective spellers understand and make use of four kinds of linguistic knowledge, alongside visual and strategic processes:

- **Phonological knowledge** *knowledge of the sound structure of language*
- **Orthographical knowledge** *knowledge of the system of written symbols used to represent spoken language*
- **Morphemic knowledge** *knowledge of morphemes: the smallest parts of words that carry meaning*
- **Etymological knowledge** *knowledge of the origins of words.*

Phonological knowledge

Phonological knowledge, or knowledge about the *sounds* in language, is an important foundation of spelling. In order to learn to spell, children need to become phonologically aware; that is, the ability to hear, identify and manipulate syllables, rhymes and individual sounds (phonemes) in spoken words. In order to spell words using their phonological knowledge, children must be able to segment each word into smaller units (syllables, phonemes or onset and rime) and match these units to appropriate letters or letter combinations (graphemes).

Important to children's phonological knowledge development is the understanding that sentences comprise words, as well as the ability to hear and identify the separate words in sentences. This occurs for most children at about the age of four (Fox, 2011). With this established, the different components of phonological knowledge are often learnt in a relatively predictable sequence (Anthony & Francis, 2005; Fox, 2008), beginning with syllable and rhyme awareness at about the age of four or five, followed by awareness of the initial phonemes in words, the ability with onset–rime and finally phonemic awareness. Table 1.1 provides an outline of each of these components of phonological awareness.

The phonological component	The component involves being able to:
Syllable awareness	<ul style="list-style-type: none"> hear and identify syllables in words; for example, <i>caterpillar</i> = <i>cat</i> – <i>er</i> – <i>pill</i> – <i>ar</i> (4 syllables)
Rhyme awareness	<ul style="list-style-type: none"> recognise when two or more words rhyme produce rhyming words; for example, <i>feed</i>, <i>seed</i> and <i>bead</i> or <i>thank</i> and <i>bank</i>
Awareness of beginning phonemes	<ul style="list-style-type: none"> identify and articulate the initial sounds (phoneme) in words; for example, the initial phoneme in the word 'cat': is /c/
Onset–rime awareness	<ul style="list-style-type: none"> identify and articulate a word or syllable in terms of its initial phoneme and the rest of the word
Phonemic awareness	<ul style="list-style-type: none"> hear and identify the smallest sound units in words (phonemes); for example, <i>dog</i> has three phonemes: /d/ - /o/ - /g/ manipulate (isolate, segment, blend, delete, add or substitute) phonemes in words

Phonemic awareness

Phonemic awareness is the most sophisticated of the components of phonological knowledge. It requires that children be able to hear and clearly articulate each of the individual phonemes that comprise words and that they develop the ability to manipulate phonemes in words in different ways. This includes being able to:

- **Isolate phonemes** Identify one phoneme in a word.
What is the first (middle or last) sound in the word, 'dog'?
- **Blend phonemes** Listen to separately spoken phonemes and then blend them to pronounce the word.
What word is... /sh/ – /or/ – /t/?
- **Segment phonemes** Break a word into separate phonemes.
Say the sounds of the word 'house' slowly? How many sounds are there?
- **Delete phonemes** Remove one phoneme in a word to make a new word.
What word do you make if you take /s/ away from the beginning of the word 'snail'?
- **Substitute phonemes** Change one phoneme to another phoneme to make a new word.
The word is 'big'. Change /g/ to /n/. What is the new word?

To spell words, children use their phonemic knowledge and their understanding of letter–sound associations. This process is sometimes described as phonetic spelling or 'sounding out' to spell and is typical of children in the early stages of spelling development (Westwood, 2008). It involves the child first segmenting a word into its individual phonemes and choosing a letter or letter combination (grapheme) to represent each phoneme.

Children's early phonological awareness development can be supported without reference to letters or written words; nursery rhymes, songs, stories and games that focus on the sounds in words are effective. However, children's phonemic awareness development is accelerated when teaching in this area is combined with learning about letters and about sound-to-letter associations and when children regularly engage with written language experiences (Anthony & Francis, 2005; The National Reading Panel, 2000). In fact, these additional literacy experiences are necessary for most children to achieve more than minimal levels of phonemic awareness (Anthony & Francis, 2005).

Phonological awareness, along with working memory, is fundamental to children's spelling competency. It is also significant to the spelling ability of older children but, in the case of older children, is one of a number of factors that impact spelling (Stage & Wagner, 1992). To progress as spellers, children need to be able to draw on additional areas of word knowledge and deal with larger units of sound in words. For instance, they need to be able to use knowledge of syllable patterns and of prefixes and suffixes to spell larger, more complex words.

Orthographic knowledge

While phonological knowledge is about awareness of the sound structure of spoken language, orthographic knowledge is about awareness of the symbols (letters) used to represent spoken language in written form. In its simplest form it is knowledge of the single letters used to represent the individual sounds of words. However, also important to the achievement of spelling fluency is knowledge of the groups of letters that represent phonemes or other smaller parts of words as well as knowledge of the rules that govern the arrangement of letters in written English. Orthographic knowledge is stored in memory. Together with phonological knowledge (and morphemic knowledge, which is addressed later), orthographic knowledge is used to spell both familiar and unfamiliar words.

The alphabetic system of writing

The use of orthographic knowledge to write words first necessitates an understanding of the **alphabet principle**; that is, an understanding of the concept that oral language can be converted to written language by using alphabet letters (graphemes). Learning to spell is further enhanced when this understanding extends to the realisation that:

- sounds in words are represented by graphemes (letters of the alphabet)
- the left-to-right sequence of letters in a written word represents the sequence of sounds or phonemes in the spoken word
- graphemes are a reasonably uniform representation of sounds.

The 26 letters of the alphabet are used to create graphemes, which in turn are used to represent the phonemes of words. A grapheme

can comprise one or more letters. The development of orthographic knowledge involves learning the graphemes that are routinely used to represent individual sounds in written English, the main ones of which are:

- **Single letter graphemes** Vowels (a, e, i, o, u) or consonants (b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, y, z); for example, the word *cat* comprises three single letter graphemes (consonant – vowel – consonant) each representing a phoneme. Some single letter graphemes can represent more than one phoneme; for example, ‘c’ as in *city* and *cat* or ‘g’ as in *goat* or *giraffe*.
- **Double vowel graphemes** Two vowel letters; for example, /ee/ as in *meet* and /oo/ as in *moon*. The letters, a, i, and u are never doubled in English orthography (except perhaps when it is a name originating from another language).
- **Double consonant graphemes** Two consonant letters; for example, ‘gg’ as in *wiggle*, ‘tt’ as in *matter* and /mm/ as in *hammer*. The letters h, j, k, q, x, and y are not doubled in English orthography.
- **Digraphs** Two different letters representing a phoneme; for example, /sh/ as in *shop*, /ai/ as in *bait*, /ir/ as in *dirt* or /ow/ as in *clown*. A digraph may also involve the use of a vowel followed by a consonant and a final /e/; for example, ‘a–e’ as in *late* and ‘o–e’ as in *home*. Some digraphs can represent more than one phoneme; for example, /th/ as in *thing* and *that* or /ch/ as in *chicken* and *chivalry* and some phonemes can be represented by more than one digraph such as in the words *mouse*, *cow*.
- **Consonant clusters** Two or three letters representing either two or three phonemes as the case may be but which are blended when pronounced; for example, /bl/ as in *black* and /sct/ as in *scratch*.
- **Trigraphs** Three different letters representing a single phoneme; for example, /dge/ as in *badge*, /igh/ as in *flight*, /eau/ as in *beautiful*.

English orthography, although not consisting entirely of direct phoneme to grapheme associations for all spellings, is a highly regular pattern-based system. Even though some sounds can be represented with a number of different letters or letter combinations, these correspondences are still regular and fixed (Westwood, 2014a).

Components of orthographic knowledge

There are two categories of orthographic knowledge (Apel, 2011; Conrad, Harris & Williams, 2013; Hagiliassis, Pratt, & Johnston, 2006). They are *word-specific orthographic knowledge* and *general orthographic knowledge*, each of which serves a special function when spelling words.

Word-specific orthographic knowledge

Word-specific orthographic knowledge refers to the collection of spellings of words and word parts which has been retained in an individual's memory. Spelling familiar words (or familiar word parts) simply involves their automatic retrieval from memory. Word-specific knowledge may also assist with the spelling of unfamiliar words where there is an analogy to other familiar words (or other familiar word parts) which becomes a guide to the achievement of correct spelling. Writing fluency is enhanced with the growth of word-specific orthographic knowledge; the greater the instinctive ability to spell, the fewer the pauses required to arrive at correct spelling.

General orthographic knowledge

General orthographic knowledge refers to the general rules and patterns that govern English spelling. General orthographic knowledge encompasses:

- how letters or letter patterns are used to represent speech sounds in writing
- knowledge of letter patterns and recurring letter patterns
- rules for the positioning of certain graphemes in words (for example, 'ck' can be used at the end of a syllable (*clock*, *cracker*) but not at the beginning)
- knowledge of which letters regularly combine with or follow other letters
- certain letter combinations which frequently appear in written words (eg, 'ing' 'ight')
- the frequency of certain letter combinations in different words

- how the spelling of a word is influenced by its meaning (for example, use of *horse* or *hoarse* depends on the context of the sentence in which it is written).

General orthographic knowledge is utilised to spell unfamiliar words. The more developed the general orthographic knowledge, the more likely that unfamiliar words are spelt accurately.

Morphological knowledge

Morphological knowledge refers to an individual's understanding of morphemes and how they can be used to form words. Morphemes are the parts of words that carry distinctive meaning; for example, the word *unhappy* is made up of two morphemes – *happy* and *un* and the word *unladylike* has three morphemes – *un*, *lady* and *like*. If these words are further divided, some of the parts will not retain any meaning and would not therefore be morphemes. Each of the words *trust* and *technique* have only one morpheme; although *technique* has two syllables, it is a single morpheme because it cannot be broken down into meaningful smaller parts in English.

Spelling competency is enhanced when writers know and understand morphemes and morphological principles and can use them to assist in spelling words. The spelling of longer words usually requires an ability to identify and assemble the component morphemes. There are two types of morphemes – *free* (independent) morphemes and *bound* (dependent) morphemes.

Free morphemes

Free morphemes are those that can function as stand-alone words. The free morpheme is highlighted in each of the following words:

trusting (**trust** + *ing*)

sadness (**sad** + *ness*)

unhelpful (*un* + **help** + *ful*)

trust, *sad* and *help* are words and are therefore free morphemes

Compound words are built from free morphemes – take, for example, *wheelbarrow*, *breakfast*, *eyesight* and *grasshopper* – two words or free morphemes come together to make one new word.

Bound morphemes

Bound morphemes, when added to words, alter their meaning or create new words. They are not words themselves and cannot occur independently. Bound morphemes include prefixes (eg, re-, dis-, trans-,) which are added to the beginning of words and suffixes (eg, -able, -ance, -less, -ly, -tion) which are added to the ends of words. The word to which a prefix or suffix is added is referred to as the base word. The spelling of prefixes and suffixes always remains the same but in some instances the addition of a suffix requires that certain changes be made to the spelling of the base word; for instance, the word *happy* – adding -ly to create *happily* involves changing the ‘y’ in *happy* to an ‘i’. Table 1.2 contains examples of prefixes and suffixes and how they can be added to words to change their meanings.

Table 1.2 Affixes		
Prefix	Meaning	Examples
anti-	against, opposite	<i>anticlockwise, antidote</i>
pre-	before	<i>prepaid, prerequisite</i>
un-	not	<i>unfair, undone, unequal, undo</i>
Suffix	Meaning	Examples
-ment	changes the word from a verb to a noun	<i>development, argument</i>
-ly, -ally	changes the word from an adjective to an adverb	<i>happily, briefly, basically</i>
-ion	changes the word from a verb to a noun	<i>protection, decision</i>

An *inflection* is a specific type of suffix which when added to a word creates a different version or form of that word. Inflections include -s, -es, -ed, and -ing, -er, and -est. Adding an inflection to a word results in only minimal change to the meaning of that word but it modifies the word in terms of its number (singular/plural) tense (past/present). The examples in Table 1.3 illustrate this point.

Table 1.3 Inflected endings					
	-s (-es)	-ed	-ing	-er	-est
<i>trust</i>	<i>trusts</i>	<i>trusted</i>	<i>trusting</i>		
<i>slip</i>	<i>slips</i>	<i>slipped</i>	<i>slipping</i>		
<i>perish</i>	<i>perishes</i>	<i>perished</i>	<i>perishing</i>		
<i>funny</i>				<i>funnier</i>	<i>funniest</i>
<i>sad</i>				<i>sadder</i>	<i>saddest</i>

Again, the spelling of the base word *funny* and *sad* is modified.

English has a large number of morphologically complex words for which oral and written morphological knowledge plays a strong role in determining their spelling. This has been well demonstrated through research. For example, Bowers and Kirby (2010) in their review of the evidence about the effects of morphological instruction on learning to spell (as well as on other areas of literacy) concluded that morphological instruction was indeed essential to children's spelling development. Research by Deacon, Kirby and Casselman-Bell (2009) similarly demonstrated the existence of a robust and long lasting relationship between an individual's morphological knowledge and general spelling ability.

Etymological knowledge

Etymological knowledge refers to knowledge about history and origins of words and how this relates to their meaning and spelling. Over time English has been influenced by other languages (particularly Latin, French or Greek) and many words in modern English come from or have their roots in other languages. For instance, the Greek word, 'bio' (life) is the root or stem of the family of English words such as *biography*, *biology*, *biosphere*. Knowing about the origin of these words provides a useful support for spelling them (Ott, 2007). It can help to elucidate the spelling of words that might otherwise seem obscure or challenging (Henry, 2003).

Table 1.4 Examples of English words and their Greek and Latin origins

English words	Root	Meaning
<i>asteroid, astronomy, astronaut</i>	ast (er) [Greek]	star
<i>autograph, graph, grapheme, graphic</i>	graph [Greek]	draw, write
<i>photograph, photogenic, photosynthesis</i>	photos [Greek]	light
<i>telecast, telephone, telescope, telegraph</i>	tele [Greek]	far off
<i>biography, biology, biohazard, biometric</i>	bio [Greek]	life
<i>terrain, territory, terracotta, terrestrial</i>	terr [Latin]	earth
<i>ascribe, script, manuscript</i>	scrib, script [Latin]	write
<i>aquatic, aqueduct, aquamarine, aquarium</i>	aqua [Latin]	water
<i>microscope, micro-organism, microphone</i>	mikros [Latin]	small
<i>unicycle, unicorn, uniform, unity, unite</i>	unus, unius [Latin]	one

Children's spelling competency is enhanced as they become familiar with the meaning and spelling of common Greek and Latin roots as well as groups of English words related to these roots. These words are best dealt with together as word families (related by meaning and spelling).

Towards spelling fluency

Spelling fluency involves a high degree of 'word consciousness', or awareness of such details of language as sounds, letters, syllables, morphemes, grammar and subtleties of meaning (Moats, 2009), well-developed sources of linguistic knowledge and an ability to use a range of strategies for spelling words. Fluent spellers write most words accurately and employ their linguistic knowledge and spelling strategies efficiently to spell unfamiliar words.

Theoretical approaches to spelling

There are several theoretical approaches to the learning and teaching of spelling, each of which can inform teachers' practices. In the next section, we outline and comment on several approaches, starting with stage theory, which has perhaps been the most influential. However, this has been criticised for not fully taking into account individual differences in the development of spelling and for being over-simplistic in some regards.

Stage theory

As noted by Westwood (2005, 2008), teachers and researchers often see learning to spell as a gradual, developmental process. According to this view, children progress fairly predictably through several stages that reflect their understanding of phonological, orthographic, morphological and etymological knowledge in relation to spelling. In addition, stage theory often describes children's ability to use a variety of cognitive strategies that bring into play their knowledge and understandings. Stage theory, which developed from the work of Read (1971) and other researchers in the 1970s and 1980s, has proven

to be extremely useful to teachers in helping them understand how children *typically* learn to spell, and has the advantage of focusing on learners rather than grade-level spelling programmes and one-size-fits-all instructional plans and materials (Schlagal, 2007). Stage theory embraces the idea that children's misspellings are not just random and acknowledges that the analysis of children's spellings can reveal their thinking about spelling. For example, semi-phonetic spellings of words often include plausible letters that represent the sounds that are most salient to the speller, showing that the child is able to identify some sounds in words and match letters to them, even if there is not an exact or conventionally correct match.

As explained later, stage theory does not necessarily provide a full account of how children with diverse needs learn to spell, and tends to 'oversimplify the picture' (Bourassa & Treiman, 2010, p. 182) in that, fine-grained differences in development in each of the linguistic components – phonological, orthographic, morphological and etymological – is not adequately dealt with. Nevertheless, stage theory is generally seen to be useful as it can help teachers conceptualise children's knowledge and understanding and, thus, it can provide a general guide to appropriate teaching for individual children as well as for groups of children with similar needs. It must be emphasised here that spelling development will not usually occur *independent* of teaching; a good deal of instruction in phonological awareness (sounds in words), letter–sound correspondences, English orthography and the morphemic and historical make-up of words needs to be provided. In short, spelling is not 'natural' and will not 'emerge' or 'develop' on its own or be 'caught', but needs to be carefully taught by teachers (Graham & Santangelo, 2014), and thought about and practised by learners. This is not to say that spelling *cannot* be learnt informally and incidentally through teacher modelling and plenty of reading and writing experiences – this is also an essential element of learning to spell, since spelling is a part of literacy and cannot be seen in isolation. Some stage models of spelling are, in fact, integrated models of spelling and reading development, the best known of these being those presented by Ehri (1987) and Frith (1985).

In this chapter, only two spelling stage models are outlined as it is beyond the scope of this book to discuss all of them. The stage models presented in this chapter focus exclusively on spelling. As can be seen in Table 1.1, according to Gentry's model (1982, 2004), there are five stages of spelling development, starting with pre-communicative or pre-phonetic spelling, where children's spelling does not relate to

the sounds in words, up to conventional spelling where correct or conventional spelling is achieved. The phases of spelling development are not discrete because, in many cases, children's spellings will span more than one phase.

Gentry's stages

1 Pre-communicative/pre-phonetic stage

During this stage, children do not demonstrate knowledge of sounds in words and letter–sound correspondences in their spellings. Words are represented using strings of letters and other symbols that bear no relation to conventional spelling (Figure 1.2). However, in this emergent phase it is important for adults to draw children's attentions to letters and sounds, as explained in Chapter 4.

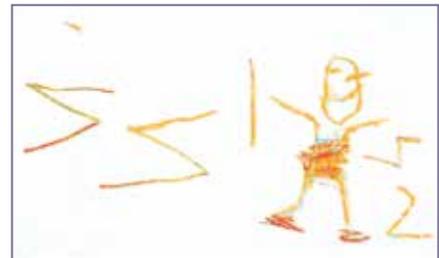


Figure 1.2

Pre-phonetic spelling

2 Semi-phonetic stage

During this stage, children start to represent some of the sounds in words, using plausible graphemes. Often only some of the sounds in words will be represented, and middle sounds such as medial vowel sounds may be missed out (Figure 1.3). Sometimes a sound will be represented by a letter name, for example the word *see* might be represented by a letter C.

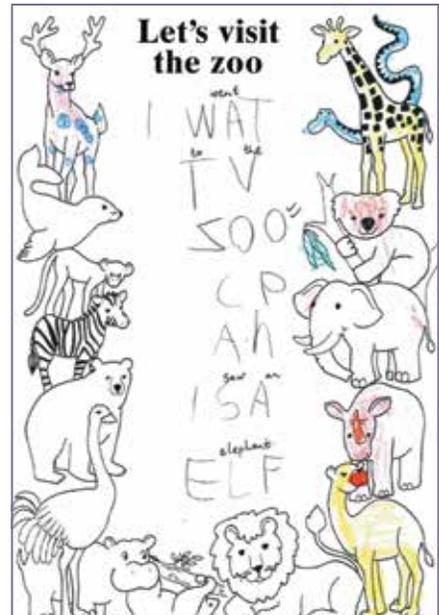


Figure 1.3

Semi-phonetic spelling

3 Phonetic stage

During this stage, children begin to represent every sound in words, indicating that they have become phonologically aware (they can identify or 'hear' each sound in words) and that they know some letter–sound correspondences. Errors may sometimes be made because of mispronunciation of words (Figure 1.4). For example, if a child pronounces the word *drink* as 'jrink', they may spell it that way. However, phonetic spelling is not conventional spelling and does not incorporate knowledge of more complex aspects of English orthography or morphemic knowledge.

hello Dad
are you
coming
wif us
shopping.

Dera mummy thes
pechr is for you

I am Sade wife
BCOS you not
play wife me

Figure 1.4

Examples of
phonetic spelling

4 Transitional stage

During this stage, learners begin to rely less on the sounds in words and pay more attention to orthographic patterns and spelling rules, as well as their knowledge of morphemes. This results in more words being spelt conventionally. However, words can still be misspelt due to incomplete understanding and knowledge (Figure 1.5). Examples of transitional spelling may be 'afternewn' or 'playdow'.

The Alien And The girl
Once there lived a girl
She Had All Ways Dreamed
to go to the MOON!
And meet a Alien juseat
that minit a Rocetsip. AperD

Figure 1.5

Example of
transitional
spellings

5 Conventional spelling

Here, students are able to spell most words conventionally. By this stage, they have control of the phonological, orthographic and morphological knowledge needed to spell efficiently. They also use multiple strategies to spell. Words will occasionally be misspelt.

Words their way stages

According to Bear and colleagues (Bear, Invernizzi, Templeton, & Johnston, 2008), in their well-known *Words their way* materials, spelling is developmental; however, these authors point out that the aim is for children to move towards 'fast, accurate production of words in writing' (p. 3) so that they can focus on higher order processes of writing. Thus, there is considerable focus on the provision of scaffolding through appropriate learning activities, such as word sorts and games, to help children move efficiently through the stages. The aim of promoting fast and accurate spelling of words is underpinned by the recognition that working memory is limited in capacity and can be overloaded when thinking about spelling words – and a lack of spelling fluency can hinder higher level processes such as the generation of ideas (Graham, Harris, & Fink-Chorzempa, 2002).

Bear et al., (2008; 2011) explain that the English spelling system has three layers of orthography: that is, the alphabetic layer (the relationship between sounds and letters); the pattern layer (orthography); and the meaning layer (morphology and etymology). They propose that children's spelling stage can be deduced through the spelling features they 'use but confuse'.

As shown in Table 1.5, Bear and colleagues also propose five broad stages of spelling development. They clearly have many commonalities with those of Gentry.

The emergent stage (ages 0 – 5)

In this phase, children's spellings are essentially pre-phonetic; that is, the marks on the page do not bear much, if any, relationship to sounds in the word represented. As noted above in Gentry's phases, many of the marks made by young children are random scribbles and representational drawings, letter-like writing, and random letters and numerals, although late in the emergent phase, children will be representing some salient sounds in words such as initial consonants.

The letter–name alphabetic stage (ages 5 – 8)

This stage is called the letter–name alphabetic stage because early in the stage, children will often use letter names to represent sounds instead of letter sounds to represent sounds; for example, they might write Y for ‘*why*’ (rather like text spellings). Of course, this assumes that they have been introduced to letter names. In the letter–name alphabetic stage, children’s spellings are largely semi-phonetic. Many of the sounds in words will be represented by appropriate letters, although at the beginning of this phase, vowel sounds will often be omitted and not all consonants will be represented. Towards the end of the stage, many high-frequency words such as *love*, *have* and *the* will be correctly spelt. Silent letters are usually not included in words.

The within-word pattern stage (ages 7 – 10)

Here, children represent all phonemes in words but they will not necessarily use conventional spelling patterns. For example, they might spell *boat* as ‘*bote*’ and *keep* as ‘*keap*’. This is similar to Gentry’s phonetic phase. However, they will have an increasing bank of high-frequency words that they can spell conventionally. They move towards using patterns or chunks of letters in their spellings that represent more than one phoneme.

The syllables and affixes stage (ages 9 – 14)

In this stage of spelling, which is divided into early, middle and late syllables and affixes, students become increasingly competent in using orthographic knowledge. For example, they will learn when to double letters at syllable junctures and whether a base word needs to be modified before adding a suffix.

The derivational patterns stage (ages 10+)

Someone who is in the derivational patterns stage of spelling has control of the use of morphemes in their spelling. In this stage they pay more attention to the relationship between spellings and meaning, with an emphasis on Greek and Latin word roots. Also, the etymology of words is considered. Because English has developed from a variety of languages throughout history, many words from other languages (such as French) have been integrated into the language (some examples of French words include *chef*, *chic* and *collage*).

Gentry			Bear et al.		
Stage name	Description of spelling	Example of spelling	Stage name	Description of spelling	Example of spelling
Pre-communicative/pre-phonetic	Children write a string of letters or letter-like marks without understanding letter–sound correspondences.	JENNNL Oo for <i>elephant</i> OLL for <i>mouse</i>	Emergent (ages 0–5)	Children write a string of letters or letter-like marks without understanding letter–sound correspondences.	JENNNLOo for <i>elephant</i> OLL for <i>mouse</i>
Semi-phonetic	Children use letters that represent sounds but not all sounds are represented. Vowels and middle sounds are most likely to be omitted.	LFFT for <i>elephant</i> MS for <i>mouse</i>	Letter-name alphabet – Early (ages 5–8)	Children use letter names to represent sounds as well as common letter sounds. Vowels are often omitted.	LFFT for <i>elephant</i> MS for <i>mouse</i>
Phonetic	All or most sounds in words are generally represented by a feasible letter but spellings will often not be conventional.	ELIFUN for <i>elephant</i> MOWS for <i>mouse</i>	Letter-name – alphabetic – Middle to Late (ages 5–8)	Sounds mostly represented but not generally conventional spellings. A small bank of high frequency conventional spellings has been memorised.	ELIFUN for <i>elephant</i> MOWS for <i>mouse</i>
Transitional	Children rely less on the sounds in words. Visual memory and knowledge of English orthography becomes apparent.	ELIFFANT for <i>elephant</i> MOWSE For <i>mouse</i>	Within word pattern (ages 7–10)	Less reliance on phonology and more attention paid to patterns or orthography.	ELIFFANT for <i>elephant</i> and MOWSE for <i>mouse</i>
			Syllables and affixes (ages 9–14)	Students learn about multisyllabic words and what happens at syllable junctures and when prefixes and suffixes are added to base words.	RIDEING for <i>riding</i> MOUSE for <i>mouse</i> MOUNTIN for <i>mountain</i>

Conventional/ correct	The word is often spelt correctly, and the child uses phonological, orthographic and morphological knowledge strategically.	ELEPHANT MOUSE BENEFIT for <i>benefit</i>	Derivational patterns (10+)	Children use base words and word meanings (morphology) to help them spell – they see commonalities in morphemes between words to help them spell.	BENEFIT for <i>benefit</i> DEFANATELY for <i>definitely</i>
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Moving beyond stage theory

As already stated, stage theory can oversimplify the processes involved in learning to spell. There is evidence that, in fact, children often learn spelling concepts and strategies in parallel (not in a neat sequence), using multiple strategies. These are called *repertoire theories* (Adoniou, 2013). It has been noted by several researchers that children do not tend to learn spelling first by focusing *only* on phonological knowledge, then orthographic, then morphological but, instead, they build and use all three areas of linguistic knowledge from the start (Bourassa & Treiman, 2010), although there may be more emphasis on phonological knowledge in the earlier years. Indeed, the Australian Curriculum states that children as young as Year 1 should: ‘*recognise and know how to use morphemes in word families for example “play” in “played” and “playing”.*’

The theories and models described next may appear complex but will enable teachers to arrive at a fuller understanding of cognitive processes that are involved in learning to spell and the process of spelling. We have not been able to describe the theories and models in great depth but have attempted to provide insight into the linguistic and cognitive complexities involved in spelling.

Overlapping waves theory (OWT)

As already mentioned, spelling involves thinking about and using linguistic knowledge (phonological, orthographic and morphological), as well as using visual representations of words and parts of words, and

parts of words in long-term memory. As such, the overlapping waves theory, which was developed by Siegler (1996), can enlighten teachers with regards to children's spelling development. This theory assumes that cognitive development can be seen as 'a pattern of overlapping waves that represent developmental trajectories of adaptive strategy use' (Sharp, Sinatra, & Reynolds, 2008, p. 206). Unlike stage theory, there is no assumption that there is a straightforward, linear development from less sophisticated to more sophisticated strategy use. The OWT assumes that:

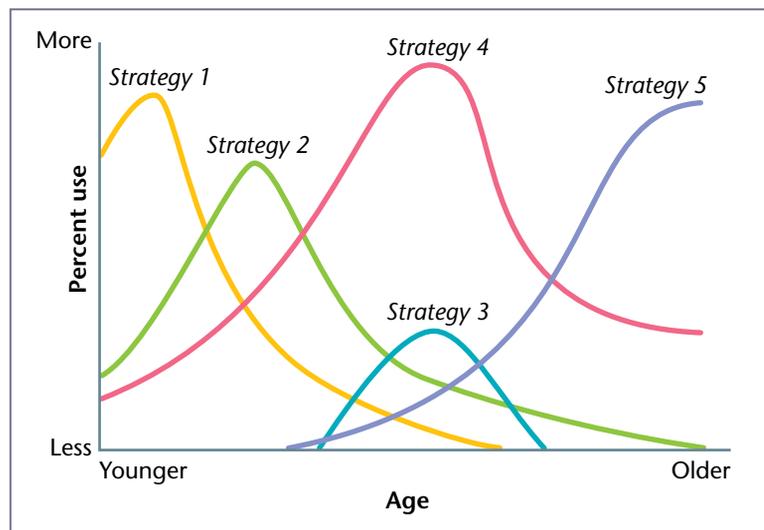
- children think in a variety of ways about most phenomena, so will typically use multiple strategies to solve a problem
- these ways of thinking can coexist or compete with each other
- cognitive development involves changes in the frequency with which these ways of thinking are used, and sees more advanced ways of thinking being used over time.

Siegler does not see cognitive development as something that emerges solely from children's maturation and experiences (such as the teaching received) but as something that is 'goal-driven' and related to particular tasks; it is through trying to achieve particular tasks that children adapt known strategies and try out new strategies to achieve a goal. Thus, overlapping waves of strategy use can be observed, with children gradually discarding older strategies that are not useful and adopting and adapting new strategies that work better for their spelling purposes. Figure 1.6 illustrates the Overlapping Waves Theory of cognitive development.

The OWT acknowledges that, sometimes, old strategies can endure far longer than might be expected (Siegler, 2000), and this can help explain why children sometimes continue to use spelling strategies that might not be the most appropriate, or revert to old ways even though they have learnt newer strategies that might be more appropriate.

Figure 1.6

Overlapping waves theory of cognitive development



To unpack the schematic diagram (Figure 1.6) in terms of spelling, with reference to a particular child, Strategy 1 might be the use of the sound system to spell, Strategy 2 might be the use of visual memory to learn high-frequency words, and Strategy 3 might be the use of analogy and patterns, and so on. According to this theory, it is better to think in terms of overlapping waves rather than stages or phases. The diagram would look slightly different for *each* child.

Representational-redescription (RR) model

Karmiloff-Smith (1992) proposed a representational-redescription model of cognitive development, which proposes that when children first learn something it is often cognitively represented in an *implicit* way, and only later are *explicit* representations formed. When knowledge is represented at an implicit level by children, they know or can do something but cannot consciously access the knowledge or verbalise it. An example that can be linked to spelling might be the scenario where a child can write or draw the MacDonald 'M' without having any knowledge or understanding about sounds and letters, and without understanding that an 'M' does not just represent a place that sells fries and burgers. The next levels of representation involve the child being able to consciously access knowledge and verbalise it. Here, internal mental representations are made and connections with prior knowledge are formed. Critten, Pine and Messer (2013) have carried out research that links spelling to the representational-redescription model, and have found that many younger children implicitly recognise correct spellings but cannot articulate how and why the spellings are correct. This means that when proofreading or editing their writing, they may well be able to recognise an incorrect spelling but be unable to say what is wrong with it. On the positive side, it means that if children try a few different spellings (as they do in 'Have-A-Go' pads, in which they attempt to spell a word, sometimes several times, before choosing the attempt that looks right), they may be able to recognise the correct spelling attempt.

Connectionist theory

Reed (2012) describes how spelling development can be informed by connectionist theory, which concerns the ways in which people make

cognitive connections or associations between things. Put very simply, this means that the more often a person encounters something (in the context of spelling, this would be a word or a spelling pattern), the stronger the neural connections will be. Connectionist theory would suggest that children should not use invented spellings of words over extended periods because the neural connections formed will make it difficult for them to unlearn the incorrect invented spellings and move on to conventional spellings.

Dual route connectionist theory

According to dual route theories of spelling, there is a lexical route, which postulates that representations of whole words are stored in memory, which spellers can access directly. The other route is the phonological route, whereby the sounds in a word are used to spell. This involves the speller engaging in analysis of the sounds and mapping them to plausible graphemes, and can thus be termed an analytic method of spelling (Houghton & Zorzi, 2003). There are different versions of dual route theories and much research has been conducted to discover the possible mechanisms of the theorised two routes and the relationships between them (Houghton & Zorzi, 2003). According to Houghton and Zorzi, people use both the lexical and phonological routes in spelling. If the two routes about how to spell a word are in agreement, that is the spelling that will be used by the speller. Sometimes, however, there will not be a lexical representation in memory, so only the phonological route will be used. This results in a phonetic spelling or a spelling that is derived from the writer's knowledge about sounds, letters and morphemes, which will often be the correct spelling. This is especially so if the word has a regular, consistent spelling and the speller has a good grasp of the spelling system. Sometimes the two routes will offer up different spellings. In this case, the word offered via the phonological route is more likely to be used by the speller if it is a low-frequency word which may have been memorised but not very well (because of weak neural connections). If it is a higher-frequency word that has been well memorised (with strong neural connections), the lexical route is more likely to be dominant. This model makes a lot of sense and may enlighten teachers when they are attempting to understand how children learn to spell.

Comprehensive model of spelling

We have constructed Figure 1.7 to offer a comprehensive model of spelling, as a result of reviewing and synthesising the research literature. The model shows what we consider to be the two major elements of spelling – firstly, linguistic (phonological, orthographic, morphological and etymological knowledge) – and, secondly, the memorised lexical store of words. Following the dual route connectionist model described earlier, the model illustrates how we see the two major elements interrelating with each other and feeding into spelling practice. Strategic knowledge and application are seen as highly dynamic and dependent on the spelling/writing task at hand and the ways in which the speller is impacted by a range of individual, background and contextual factors (indicated in grey, around the edges in the diagram). Throughout this book we will refer to the various components of this model where relevant.

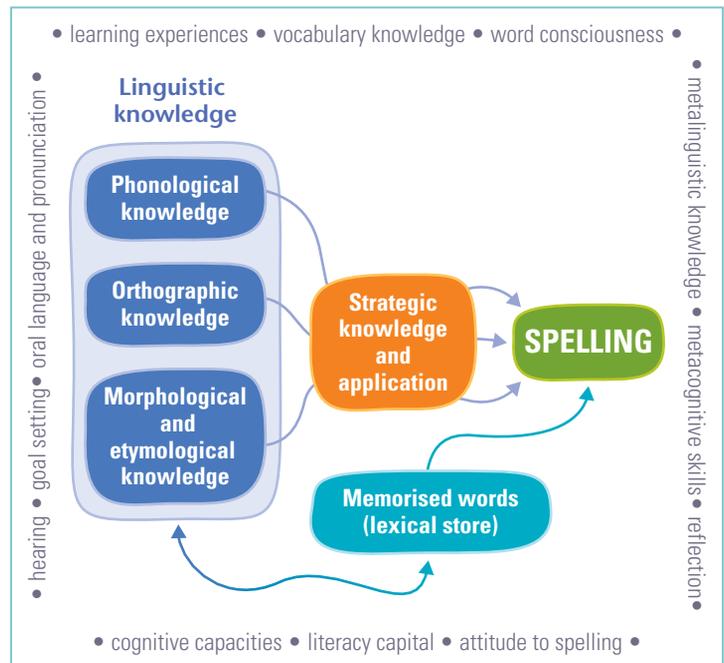


Figure 1.7

Comprehensive model of spelling for educators

In this chapter, the continued relevance and importance of being able to spell has been argued. Being able to spell, which results from effective spelling instruction and motivation to spell, is advantageous to students' literacy ability, particularly their writing competency, and hence their educational progress and life chances. This chapter has also outlined the foundations of spelling, with an emphasis on phonology, orthography, morphology and etymology, as well as the importance of multiple spelling strategies. An outline of several theoretical perspectives on the learning and teaching of spelling, and the processes involved in spelling and a comprehensive, graphic model of spelling, created from a synthesis of the literature, is presented.