

Spelling Skills: Development, Assessment and Instructional Strategies

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Overview

- Historical developments
- Characteristics of English orthography
- Critical foundational skills for spelling
- Relationship between reading and spelling
- Stage models of spelling development
- Children with spelling difficulties
- Assessment
- Instruction

Development of spelling skills has attracted much less research attention than reading.

Before Read's (1971) seminal work on children's invented spellings, was broadly held that spelling skills were acquired largely through exposure to text from reading and whole word memorisation.

English orthography seen as far too complex and illogical to teach explicitly.

Instructional practice reflected these beliefs – rote learning weekly spelling lists, minimal attention to actively teaching encoding strategies and specific spelling rules. Problems of skill transfer.

Late 70's to early 90's – shift to naturalistic approach to teaching literacy skills, "whole language" approach.

Now considered too fragmented in its approach. Reliance on incidental learning, absence of systematic, rule based instruction - particularly troublesome for children with reading and spelling difficulties.

Also now recognised that English orthography is not nearly as chaotic as once assumed.

Study of:

- critical foundational skills
- the structural characteristics and embedded rules of English,
- developmental changes in spelling competence
 - better understanding of the difficulties experienced by children with spelling weaknesses
 - changes in methods of assessment
 - emphasis on systematic and explicit rule based intervention

Orthographic characteristics:

English writing system – a 'deep' or 'opaque' alphabetic orthography.

26 letters, 44 phonemes

>30 common digraphs

Most variability in mapping letters to sounds occurs for vowels eg. the sound /ɛ/ can be written as 'a', 'ai', 'ay', 'e', 'ea', 'ei', 'eo'.

Also termed 'morphophonemic' – letter sequences may carry meaning as well as phonetic content.

Explains why some words are spelt as they are eg. heal/health

but, many common phonemes are phonetically inconsistent eg. cars(z)/cats(s)

jumped(t)/hemmed(d)

Contains many derived words from other languages, source dictates spelling features eg. from Greek /k/ → 'ch' as in chaos, psychology; from Latin /k/ → 'c' as in compose, concert.

Critical Processes

Two foundational skills:

1. Phonological Awareness – capacity to segment words into constituent phonemes. Provides insight into the alphabetic system and links between phonemes and graphemes.
2. Knowledge of letter names and sounds – provides clues to associated phoneme (not H,W,Y) & helps to establish secure orthographic representations.

K to mid Y1 - 68% variance in spelling development attributable to letter-sound knowledge and phoneme isolation skill. (Caravolas et al, 2001)

Links between Reading and Spelling

Share the same early predictors but tend to function independently in the early stages of learning. Early on children typically use a phonological strategy for spelling but rely more on visual and contextual clues for reading (Bradley and Bryant, 1980).

Spelling instruction assists reading development in early schooling by encouraging attention to sound structure of words (Berninger et al, 1998).

Exposure to print later assists spelling by helping to consolidate orthographic representations.

By around age 8 years correlations between reading and spelling are much stronger ($r = .89$ to $.92$) as strategy use becomes more integrated (Westwood, 2005).

Spelling presents more exacting demands on phonological skills than reading. Helps to explain the persistence of spelling difficulties.

Stages of Spelling Development

Widely held that children progress through a number of developmental stages in the course of becoming competent spellers (Gentry, 1987; Ehri, 1989, 1997)

Each stage characterised by use of qualitatively different skills. Stages not age fixed and speed at which children master skills is heavily influenced by the quality of instruction.

Pre-phonetic stage (3 to 5 years)

- Mostly random strings of capital letters , sometimes numbers
- Don't yet understand that letters are used to represent sounds in words
- Written form is typically thought to represent a word's meaning ie. 'whale' should be spelt with more letters than 'mosquito'

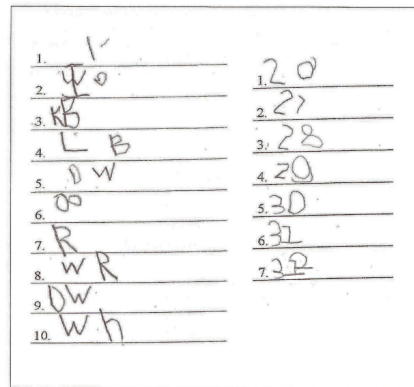


Figure 1.1: Examples of typical pre-phonetic spelling attempts

Semi-phonetic stage (4 to 6 years)

- emerging phonemic awareness and knowledge that sounds can be represented by letters,
- not able to fully apprehend all of the sounds in words, tend to spell only the more salient sounds and often omit vowels,
- knowledge of letter-sound correspondences is incomplete, letter names frequently used to represent both sounds and syllables. Constituent phonemes in liquids (R, L) harder to segment, so used more frequently and are more persistent: 'prk' for park, 'slf' for self.

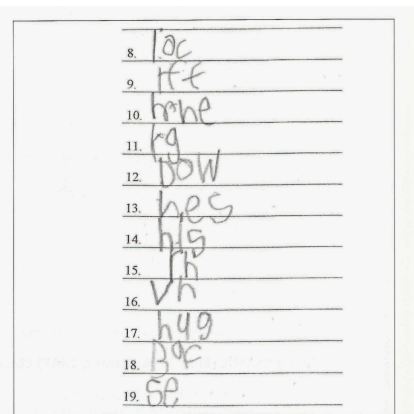




Figure 1.2: An example of semi-phonetic stage spelling

Alphabetic or Phonetic stage (5 to 7 years)


- increasing sensitivity to the phonemic structure of words,
- letter by letter sounding out,
- tendency to regularise irregular words (eg. 'ov' for of, 'hav' for have),
- often insert additional sounds when segmenting (eg. 'wiy' for why),
- some sounds more difficult to segment so often reduce consonant clusters most commonly nasal sounds in final clusters (eg. 'sed' for send, 'wet' for went) and liquids 'r', 'l' (eg 'pup' for plump, 'cap' for cramp),



- sounds with shared articulatory features (p/b, d/ t) are often confused (eg 'sbet for spent),
- common morphographs frequently written phonetically (eg. 'laft' for laughed),
- vowels in unstressed syllables often omitted (eg. 'elfnt' for elephant),
- speech production errors commonly repeated in written form (eg. 'fin' for thing).




18	dag	(back)
19	slap	
20	soft	
21	cum	
22	school	(school)
23	duck	(duck)
24	me nd	
25	Wol	(wall)
26	spat	(sport)
27	Wof	(word)
28	spat	
29	Wof	
30	spat	
31	Wof	(why)
32	insid	(inside)
33	fat	(fall)
34	twig	
35	nit	(night)
36	bat	(boat)
37	thing	(think)
38	spat	(space)
39	top	(talk)
40	Wof	(winter)
41	spat	(speed)
42	punch	(punch)
43	smil	(smile)



By end of phonetic stage:

- understand that regular words can be written accurately through sounding out,
- can identify most sounds in single and some multisyllable words,
- visual features of common words and some letter sequences are stored in memory enabling more rapid retrieval,
- beginnings of the use of analogy for spelling unfamiliar words,
- growing recognition that common morphemes (eg. -ing, -s, -ed) are spelt in a consistent fashion regardless of pronunciation (eg. jumped not 'jump').



Consolidated alphabetic stage (6 to 11 years)

- recurring letter sequences (eg. -able, -tion, -ious, -ight) learned through instruction and practice,
- larger orthographic units consolidated in memory, segmentation strategies become increasingly syllable based,
- begin to internalise more complex rules eg. consonant doubling to preserve short vowel sounds – dig/digging, final vowel deletion with suffixes – make/making,

- number of words stored in 'visual-orthographic' memory enables use of checking strategies to determine if a word looks accurate,
- spelling becomes largely a retrieval process and most familiar words spelt with little cognitive effort.

88. continuous
 89. (spherical) spherical
 90. received
 91. cronological
 92. seperation
 93. catastrophe
 94. complection
 95. incandesant
 96. (lev) leaumonia
 97. pyschiatrist
 98. diaphram
 99. (crisellas) crysellus
 100. chomsta

Figure 1.4: An example of the more sophisticated spelling of a student in the consolidated alphabetic stage

Independence (11+ years)

- competent spelling,
- firm orthographic representations for most used words,
- secure, multiple strategies for attempting unfamiliar words,
- skilled use of self checking strategies,
- common errors still occur e.g. *seperation*, *accomodation*.

Stage Models challenged for failing to capture the complexity of spelling development (Varnhagen et al, 1997; Treiman & Bourassa, 2000; Moats, 2005)

'Overlapping waves' model – development is more variable and adaptive than implied; children may call upon more than one strategy to guide spelling and may produce spellings typical of several stages.

Children with spelling difficulties

- struggle to master the complement of strategies and knowledge needed for accurate spelling,
- weak foundations in phonemic (segmenting sounds) and orthographic (knowledge of letter sequences) awareness,
- spelling attempts often characteristic of semi-phonetic and phonetic stages and are typically non-random

Common errors involve:

- consonant confusions (more likely if the consonants share articulatory features (b→p, t→d, c→g, s→z, f→v)
- vowel substitutions
- consonant cluster reductions
- vowel digraphs
- inflected endings (eg. plural -s, past tense -ed)

Assessment

- indicates level of development
- identifies weaknesses and instructional needs
- monitors effectiveness of intervention

Goal of testing defines the methods used.

Methods

- Standardised tests: South Australian Spelling Test
Dalwood Spelling Test
- Phonological awareness measure: SPAT-R, CTOPP
- Knowledge and ease of retrieval of individual letter-sounds, consonant & vowel digraphs
- Spelling of high frequency words
- Spelling of non-words
- Tangel & Blachman Test (number and accuracy of phonemes represented)
- Observation while writing

Dalwood Spelling Test

A standardised test of spelling achievement for students from K to Year 10. Available in parallel forms. Standard word list format. Administration time of 15 to 30 minutes.

Item Selection

- graded level of difficulty,
- sampling of common orthographic features, following the broadly recognised sequence of skills involved in spelling development.

Scoring Tables

- enable comparison of a student's raw score with the average score of students at the same level of schooling and
- provide an indication of the student's spelling level in year and school term equivalents

Dalwood Spelling Test Form 1

1	set	The book is on the table	set
2	me	They asked me to help them	me
3	is	He is my best friend	is
4	sat	We sat on our chairs	sat
5	my	My mother is at work	my
6	and	We sat and ate at lunchtime	and
7	red	The team wears red t-shirts	red
8	look	You look tired this morning	look
9	if	We will come if you invite us	if
10	hen	The hen laid two eggs	hen
11	rug	We sat on the rug	rug
12	do	They know what to do when it rains	do
13	read	The bird made a nest in the tree	read
14	his	He went inside his house	his
15	ran	He ran in the first race	ran
16	then	They went to the shops and then went home	then
17	hug	I like to hug my mum	hug
18	back	They waited in the back of the room	back
19	slap	He gave his friend a slap on the back	slap
20	soft	These feathers are very soft	soft
21	open	They wanted to come over to play	open
22	school	It is time to go to school	school
23	duck	The duck was swimming in the pond	duck
24	bedroom	I had to tidy my bedroom	bedroom
25	card	They sent her a birthday card	card
26	mend	They helped me mend my broken toy	mend
27	wall	We painted the wall in my bedroom	wall
28	spent	Lots of children play spent on the weekend	spent
29	word	The teacher wrote the word on the blackboard	word
30	spent	They spent all their pocket money	spent
31	why	They asked why the door was open	why
32	inside	They went inside when it started to rain	inside
33	fat	Be careful not to fall down the stairs	fat
34	twig	She broke a twig from the tree	twig
35	right	The moon comes out at night	right
36	boat	The boat sailed across the lake	boat
37	think	We think they will be back soon	think
38	space	Astronauts travel in space	space
39	talk	The baby is already learning to talk	talk
40	winter	Snow falls in winter	winter
41	opened	The plane took off at great speed	opened
42	punch	He tried to punch a hole in the paper	punch
43	smile	We had to smile for the photograph	smile
44	round	A storm led to rain	round
45	storm	The storm caused a lot of damage	storm
46	parade	I had a parade for breakfast	parade
47	chart	The score was shown on a chart	chart
48	wallpaper	We chose some new wallpaper	wallpaper
49	home	The home jumped over the fence	home
50	tusk	The elephant's tusk is sharp and white	tusk

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Enables examination of the following skills relevant for instructional programming:

- Knowledge of high frequency words (eg. *me, look, come*)?
- Knowledge of letter-sound correspondences.
- Ability to segment regular words with 3, 4, or 5 sounds (eg. items such as *hen, tusk, spent*)?
- Do errors indicate appropriate analysis, but lack of familiarity with the orthographic rules (eg. 'bote' for *boat*, 'tork' for *talk*)?
- Is the student using analysis of sounds or relying more on retrieval strategies? (eg. 'sclooh' for *school*, 'spectalate' for *speculate*).
- Can the student cope with multisyllabic words?
- How sophisticated is the student's knowledge of morphographs and syntactic endings?
- Is the student familiar with unusual words? Is s/he a sophisticated speller (eg. *catastrophe, psychiatrist, chorister*)?

Sample Description:

48 schools - metropolitan, regional and remote

8436 students (49.5% boys, 50.5% - girls)

Kindergarten to Year 6 - 5356 students

Years 7 to 10 - 3080 students

Maternal education levels obtained for all primary school aged students

Testing conducted continuously over four school years from January 2004 to June 2007.

Expected spelling scores by school year and term

Year	Term	Severe Difficulties ¹	Borderline Difficulties ²	Average ³	Above Average ⁴	Superior ⁵
K	1	0	0	1	9	24
	2	0	0	6	14	30
	3	0	4	12	20	35
	4	0	10	18	26	41
1	1	0	15	23	31	46
	2	4	20	28	36	51
	3	9	24	32	41	56
	4	13	29	37	45	60
2	1	17	33	41	49	64
	2	21	36	44	52	68
	3	25	40	48	56	71
	4	28	43	51	59	75

School year and term equivalents

Score	Year	Term
0-3	K	1
4-9	K	2
10-15	K	3
16-21	K	4
22-25	1	1
26-30	1	2
31-34	1	3
35-39	1	4
40-42	2	1
43-46	2	2
47-49	2	3
50-52	2	4
53-55	3	1
56-58	3	2

Test Form Correlations by Years of Schooling

	K	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
$r_{DST1, DST2}$.95	.94	.95	.95	.95	.94	.94	.93	.91	.92	.87

Mean scores were virtually identical for both forms of the test in Kindergarten, Year 1 and Year 10. For all other school years students on average scored one point higher on Form 1 than on Form 2.

Test-Retest Reliability

		First Testing		Second Testing		r_{11}
School	N	Mean	SD	Mean	SD	
K	50	15.2	10.8	15.2	11.1	.95
1	49	40.8	15.7	40.9	16.5	.96
2	40	52.3	14.1	53.5	13.7	.93
3	31	65.7	14.2	67.9	13.2	.97
4	38	78.0	10.6	79.2	10.1	.96
5	44	83.1	9.1	84.2	8.5	.92
6	29	88.9	4.6	89.6	5.1	.93
7	20	78.1	9.0	79.0	11.1	.96
8	16	73.9	11.6	75.8	11.9	.98
9	15	83.0	9.2	84.6	9.9	.91
10	13	85.8	9.3	86.2	9.6	.98

Test forms administered 7 days apart in counterbalanced order within each year grouping.

**Reading and Spelling Difficulties Group:
Correlations between the DST and
South Australian Spelling Test (SAST)**

	DST Form 1	DST Form 2	SAST Form A			
				$r_{DST1,DST2}$	$r_{DST1,SAST1}$	$r_{DST2,SAST1}$
Mean	38.3	38.7	24.0	.93	.81	.78
SD	12.3	12.8	6.3			

N= 118 (88 boys, 30 girls), mean age = 11.0 years

Intervention

- Letter-sound knowledge
- Segmenting skills and strategy training
- Look-say-cover-write-check
- Use of analogy
- Apply knowledge of morphemes
- Checking strategies

Wanzek et al (2006) 19 recent intervention studies – most effective approach for students with spelling difficulties incorporated systematic and explicit instruction in phoneme analysis, morphographic units and spelling rules. Essential: multiple practice opportunities, immediate corrective feedback.