

## USING A DICTIONARY: ITS INFLUENCE ON CHILDREN'S READING, SPELLING, AND PHONOLOGY

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*The developing use of a dictionary has the potential to provide self-teaching opportunities to improve reading, spelling and general phonological skills. Children's dictionary use was examined in two studies to find out patterns of use, skill and frequency of use and the relationships between these and reading, spelling and phonological development. In the first study 39 poor readers were compared with two groups of average readers, one consisting of 39 younger average readers of the same reading age and the other group of 31 average readers matched by age. In the second study 241 children (7–11 years) were divided on the basis of being above or below 9 years in age to examine developmental change. In both studies levels of non-verbal IQ were controlled between groups. Tests of reading vocabulary, spelling, non-word reading and speed and accuracy in looking up words in a dictionary were given. Examining dictionary skills in poor readers showed that they were significantly slower and less accurate in looking up words in a dictionary than their age peers who were average readers. Patterns of dictionary use varied with age with younger readers being three times more likely to give first preference to using a dictionary to look up spellings, whereas older reader expressed a preference that was much more evenly divided between checking spelling and looking up for meaning. Poor readers were much closer to their age peers in pattern of use. Self-rated frequency of dictionary use correlated significantly with spelling skill only in the younger readers. Persuading younger children to use a dictionary more could develop their spelling skills, possibly by encouraging them to be more proactive.*

Despite a burgeoning literature on children's developing reading and spelling, there has been relatively little research so far on the existing or the potential role of the dictionary<sup>1</sup> in furthering this development. The skilled reader and speller uses the dictionary primarily either to find a word's meaning or to check its spelling. This pattern of use is probably currently changing due to a shift away from writing by hand to touch typing. Those using word processing are perhaps less likely to look up spellings due

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to the computer-controlled correction of spelling errors. Little is known about how the developing reader uses a dictionary. There are considerations such as whether the young reader has the necessary componential cognitive skills (e.g., Beech, 1989) to use a dictionary and in turn whether using a dictionary confers any benefits on those developing skills. The present questionnaire-based study compares primary school children's own reported use of a dictionary with their actual skill in accessing items in a dictionary in the context of reading disability and then reading development.

A child's use of a dictionary in the early part of developing spelling skills involves several aspects. First, the child needs to have knowledge of the alphabet and the sequence of the alphabet in order to locate precisely the word in the dictionary. Knowledge of the alphabet appears to develop early and learning the alphabet has implications for later literacy and phonological development. Johnston, Anderson, and Holligan (1996) chose 4-year-old children who were non-readers and showed that they learned about the alphabet before showing explicit phonemic awareness. Meyer, Wood, Hart, and Felton (1998) found that those in a large sample of kindergartners who could recite the alphabet perfectly were also faster at rapid naming of stimuli. McBride-Chang (1999) demonstrated that letter-sound and letter-name knowledge in kindergarten subsequently predicted both alphabetic sequencing and reading by the middle of Grade 1. Thus the acquisition of alphabetic knowledge appears to come fairly quickly and is an important element for subsequent reading. In terms of dictionary use, it is a necessary element.

A second aspect is that young spellers need to be able to break down words they want to spell into their constituent phonemic sounds. It is now well established that children who have difficulties with this have subsequent problems in reading and spelling (e.g., Adams, 1990; Wagner et al., 1997). A third facet is that the articulatory loop (e.g., Baddeley & Hitch, 1974) probably has a role to play to rehearse the phonemic sequence in parallel with accessing the word. Another aspect, which probably develops later, is knowledge of morphological structure and the ability to construct a spelling from the building blocks that are offered by more advanced dictionary entries.

Children using a dictionary to check spelling who have developed a rudimentary grasp of reading probably can access regularly

spelled words relatively easily. However as they become more skilled, paradoxically they may be less likely to want to look up a regularly spelled word. They might be more likely to look up an irregularly spelled word that they are trying to write. Perhaps they consider that there is something odd about its spelling and they want to check their hypothesis about how they think it should be spelled. Although, at college level Tenney (1980) compared writing linked with visually presented spellings with listening to the spellings and found similar performance in the two conditions. Also, weak spellers appear to be very poor at telling if a word “looks right” (Moseley, 1997). Given the difficulty in accessing irregularly spelled words (e.g., *choir*), dictionaries facilitating access on the basis of a word’s sounds have been developed to alleviate this problem (e.g., Moseley, 1995).

Children would use a dictionary to check the meaning of a word during the course of reading text because the word has not been properly understood within the context of the passage. There are two salient issues here: first, in comparison to looking up a spelling, looking up a meaning would normally be on the basis of having the word already available in the text. On the other hand, in the case of checking a spelling, the actual printed word is not available during dictionary access resulting in a certain amount of guesswork. The word recognition task when looking up word meanings in a dictionary is relatively easier than word recall as the printed word that has to be found is already available as a reference, rather than generated from memory. More generally, recognition is easier than recall (e.g., Sternberg, 1996). Related to this, children who are proficient in phonics should find it easier to generate a likely spelling of the word, providing the spelling structure is standard; but even they will experience problems when their guess at the likely spelling cannot be found in the dictionary. A dictionary would probably be more likely to be used for words of low frequency of usage (within the domain of the child’s vocabulary) and for words that are irregular in spelling, especially where there is some ambiguity in pronunciation. The second issue is related to using the dictionary definition of a word in relation to the passage in which it has been found. This difficulty arises due to trying to understand the word’s dictionary definition and relating this to the context of the passage. This is partly connected with the quality of the dictionary and suitability to the

reader's current vocabulary level (both auditory and sight) and also partly related to the reader's comprehension abilities when reading.

One might expect a positive correlation between skill in dictionary use and reading performance. Because on the one hand, skilled reading will mean easier and faster dictionary access and on the other, reading would be more accomplished if there is the potential skill available of being able to search for a difficult word in a dictionary. Thus the use of a dictionary could be a useful resource to help sustain exposure to print and in turn develop reading skills (e.g., Stanovich & Cunningham, 1992). The same reciprocity argument could be applied to the development of spelling ability. As already outlined, several skills are necessary in order to exploit this information.

The use of the dictionary in school and at home may, alternatively, be perceived to have disadvantages. If children attempt to use a dictionary to an excessive degree there could be too much disruption to the process of reading or writing text. On balance this will depend on whether dictionary use has a positive effect on the child retaining that information. This would be analogous to the adage of "sharpening the saw" whereby preparation time (ability to look up words in this case) could help the main task, in this case the process of reading and writing. Wise and Olson (1995) have developed software in which the child reads text from the screen and is able to target concurrently a difficult word by means of a mouse. They found that if when the word was activated highlighted segments of the word were revealed and then pronounced in order, the children improved in their word recognition and phonic skills relative to a comparison group trained on comprehension strategies. Similarly, if the act of searching for a word in a dictionary while being disruptive, also aids phonic skills, then there could be a potentially beneficial effect. Wise, Ring, and Olson (2000) using similar technology on larger samples found that although phonological training improved phonology over the long term, levels of improvement in word reading were no different 1 or 2 years after training between these phonologically trained children and those trained by reading in context who were able to target words and listen to the spoken response. However, accessing a dictionary is a little more disruptive than these computerised set ups.

Nevertheless the effort involved may serve to establish word spellings and meaning better in memory.

These considerations of the interplay between dictionary use and literacy lead to several questions, which are framed tentatively at this point due to a lack of previous research. The first study is aimed at children who are poor at reading. The problem is whether having poor dictionary skills contribute to poor reading or whether such skills are simply a concomitant of poor reading. A matched group design will not be directly establishing potential causality. However, if a group of children who are below expectation based on age in reading, are matched with a group of younger children matched in reading level, the dictionary skills of the poor readers may be found to lag behind a group of younger children matched in reading level. This would indicate a possible retarding effect due to poor dictionary skills. On the other hand, a lack of difference in dictionary skills between poor readers and younger children matched in reading age would imply indeterminacy on this issue. It is probably not likely that dictionaries are used by most children to such an extent as to have much of an impact on literacy level, but this question is worth exploring. Another aspect to this comparison is whether the approach to dictionary use, (e.g., to look up words more for meanings than spellings) might be different between the two groups. It could be that older readers who are behind in reading are not exactly the same in their approach to reading as their younger counterparts of the same reading age.

The second study explores literacy development in the context of dictionary use. As children get older, improvements would be expected in terms of speed and accuracy in accessing words in a dictionary as a function of development in reading, spelling and phonology skills. More importantly, we might expect a shift in the pattern of dictionary use. When reading is used increasingly for comprehension, rather than concentrating on decoding skills, later dictionary use should shift more toward looking up word meanings. We might also expect to find differences between searching in a dictionary for a heard word (word recall) versus a shown word (word recognition) that might interact with age and ability, such that younger children find that a heard word is more difficult to retrieve.

## Study 1

### Method

#### PARTICIPANTS

Children were selected randomly from several primary schools within the county of Leicestershire, UK. There were 39 poor readers, 39 of the same equivalence in reading but much younger than this first group and 31 of the same chronological age as the poor readers but approximately average in reading ability. Table 1 shows the main characteristics of these three groups. A reading quotient is the reading age divided by chronological age multiplied by 100. Thus a quotient of 100 means that reading development is precisely commensurate with age. Inter-group matching was done so that the younger normal readers matched the older normal readers in terms of reading quotient and the younger normal readers matched the older poor readers in terms of their reading age. Put another way, the poor readers were matched so that they had on average the same level of reading skill as the younger readers and the younger readers were at the same level of reading development in relation to their chronological age as the older normal reading controls. The level of reading quotient was lower in the poor readers compared with the other two groups, so that the maximum level was 88.7, whereas the minimum level in reading quotient for the younger readers and the older age equivalent

**TABLE 1.** Means and Standard Deviations of Poor Readers Relative to Two Control Groups.

Measure	Poor reader		Young reader		Age-matched	
	Mean	SD	Mean	SD	Mean	SD
Age (decimal years)	10.66	.58	8.10**	.67	10.60	.50
Reading quotient	78.7	6.8	104.0**	9.1	103.8**	6.9
Ravens (percentile)	45.38	26.9	52.44	30.8	50.97	24.2
BAS reading age (decimal years)	8.39	.94	8.42	.92	11.01**	.92
Spelling (%)	31.5	13.4	22.2*	11.3	53.5**	15.4
Non-word reading (%)	54.8	23.5	57.7	28.9	85.4**	10.6

*Note.* All cells are based on 39 poor readers, 39 young readers and 31 age-matched readers.

\*\*  $p < .001$  and \*  $p < .01$  = significant difference between either of the control groups and the poor readers by  $t$ -test.

groups were 91.5 and 92.6, respectively. The poor readers ranged between 15 to 50 months behind in reading age, whereas the maximum lag was 9 months for the two other groups. In order to have a group of “normal” readers it would have been unrepresentative to have a cut off too close to the mean, as this would have produced two groups of above average readers. There were 19 males and 20 females in the poor reader group, 18 males and 21 females in the younger group and 13 males and 18 females in the age-matched group.

#### TEST MATERIALS AND PROCEDURE

The following measures of literacy were taken:

*British Abilities Scales (BAS) reading test.* This test, devised by Elliot (1983), is designed to measure reading vocabulary. It has 90 words that are initially short and regularly spelled, gradually becoming longer and more irregular as the test progresses. The child read each word aloud. The BAS score was converted to the reading quotient, already described. The words initially will be within sight vocabulary, but a point will come when they become less familiar. At increasingly frequent points the children may have to leave a word unnamed or try to continue by using only the first two strategies of phonics or analogy, or possibly a more complex structural analysis. Reading quotient was calculated on the basis of this test, as described previously.

*Children’s spelling test.* This test was given to groups of children. It was constructed specifically for the study and involved the completion of 50 partially spelled words, for instance: “n\_ise” (din). The task is to fill the gap, in this particular example, to put *o* in the gap. The first 8 words consisted of pictures as clues along with the partial word. The rest had clue words next to them. There was no negative scoring. The score was converted to a percentage correct. The test is similar in construction to an adult version, the Spelling Component Test (Coren, 1989), and like Cohen’s test has the advantage that it can be applied in a group context. This test has high internal reliability as shown in a sample of 241 children (described in Study 2) with Cronbach’s alpha of 0.96.

*Non-word reading test.* This was also constructed for the study. It comprised 64 visually presented non-words that gradually increase

in difficulty along the same dimensions. The child had to read aloud each non-word. The non-words were graded in difficulty and ranged between 2 to 6 letters (e.g., *bo* and *rakio*). Testing was discontinued if there was failure on 10 successive items. The maximum possible score of 64 was converted to a percentage. The test is designed to test skill in letter-to-sound translation and blending. Like the spelling test, this was highly reliable ( $\alpha = 0.96$ ).

In addition to these measures of literacy, a non-verbal test of intellect, Raven's Progressive Coloured Matrices (Raven, Court, & Raven, 1982), was administered. This is a well-established and widely used test of intellectual ability. It comprises three sections, each of which consists of 12 problems. These increase in difficulty within and between each section. Each problem is presented in the form of a matrix and the child has to select one of six alternatives. The total score is converted into a percentile with respect to the child's age.

Table 1 shows the means of these tests of literacy and Raven's Matrices. The *t*-test comparisons between the poor readers and the two other groups confirmed the controlled differences between them. Reading quotient is significantly worse only for the poor readers compared with the two control groups, and reading age is significantly worse for the poor readers and the younger readers relative to the chronological age-matched controls.

Unexpectedly, the poor readers were significantly better in spelling than the young readers, but as expected, poor readers were significantly worse than the chronological age control group. There was no significant difference in non-word reading, a test of letter-sound translation skills, between the poor readers and the younger readers, but the poor readers were significantly worse than the same chronological age group. Early studies on this by Beech and Harding (1984) and Treiman and Hirsh-Pasek (1985) found a similar lack of difference in non-word reading when poor readers or those with dyslexia were compared with younger readers of the same reading age. However, subsequent work (e.g., Beech & Awaida, 1992) has found significant differences. See Rack, Snowling, and Olson (1992) for a review and extended discussion.

## SHORT QUESTIONNAIRE AND TEST OF DICTIONARY USE

The children were each asked if they used a dictionary. If the child said "no," he or she was shown a dictionary (that had been out of sight) and asked if they had ever used something like it. If the child still responded that he or she had never used a dictionary, testing finished. Otherwise, questioning continued. The next question was open ended: "When do you use a dictionary? This was coded later into the following categories: to spell a word, to find out a word's meaning, to find the pronunciation, to browse through it and "other" for any other uses. The question was then repeated to see if they used the dictionary for another use, or else other uses were freely volunteered without further solicitation. Then they were asked: "how often do you use a dictionary?" This was similarly coded later into the following: 1) once a month, 2) once a week, 3) once a day, 4) more than once a day. This short questionnaire was followed by a test of dictionary use. This test used the *Ladybird Dictionary* (Nicolls & Wood, 1988). A word was presented, which the child was then required to locate in the dictionary. On each of three trials a words was given orally. (These were *apple*, *leather*, and *small*.) Then in a further three trials printed words were shown (*cheese*, *arrive* and *home*) and were available while the child looked the words up. Timing began as soon as the dictionary was opened and stopped when the correct entry was pointed to. There was a time limit of 2 minutes for each presentation. The dictionary and stopwatch were kept out of sight until they were required for this part of the test.

*Procedure*

The spelling test and the Raven's Matrices were given to groups of approximately six-children, while the remaining tests were given individually. Silence was observed throughout the group testing.

*Results and Discussion*

Differences were found between the three groups in their skill in using a dictionary, but these differences were not a straightforward reflection of differences in reading ability. Table 2 shows the mean reaction times and accuracy in performance in the tests of

**TABLE 2.** Means and Standard Deviations of Poor Readers Relative to the Two Control Groups in Performance Using a Dictionary.

Measure	Poor readers			Young readers			Age-matched		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Time to look up a heard word (sec.)	41.0	19.9	34	48.3	20.4	28	31.7	16.4	31
Time to look up a shown word (sec.)	35.9	18.6	34	47.1	23.6	28	28.4	15.4	31
Accuracy for a heard word (%)	80.3	30.3	39	61.5	38.6	39	93.5	15.9	31
Accuracy for a shown word (%)	71.8	34.7	39	68.4	38.2	39	98.9	6.0	31

dictionary skills for spoken and shown words. A 2-way mixed ANOVA of the three groups by modality (speed of access to a word shown vs. a word heard) showed a highly significant effect for group,  $F(2, 90) = 8.93$ ,  $p < .001$ ,  $\eta_p^2 = 0.166$ , but not for mode nor for the interaction. Comparisons between the groups on speed of access (pooled for mode) by  $t$ -tests set at the 1% level of significance showed significant differences between the age-matched group and the poor readers and between the age-matched group and the younger readers in speed of access, but not between the poor and the young readers. A similar ANOVA on accuracy for dictionary access for groups and mode again showed a highly significant effect for group,  $F(2, 106) = 12.6$ ,  $p < .001$ ,  $\eta_p^2 = 0.192$ , but no effect for mode, nor interaction. Comparisons by  $t$ -test showed significant differences in accuracy of dictionary access between the younger readers and the older average readers and between the poor readers and the average readers of the same age. Such findings do not suggest that poor readers are lagging behind due to poor dictionary skills as they are not significantly less accurate than children of the same reading age who are younger.

There were no significant differences between the groups in self-rated frequency of using a dictionary, as tested by  $t$ -test. Ratings were 2.23, 2.03, and 2.03, for the poor readers, younger readers and the age-matched controls, respectively, representing approximately once a week in dictionary use for all three groups.

The children were asked for their reason for using a dictionary and Table 3 shows that the majority preference for the two control

**TABLE 3.** First and Second Preferences for Dictionary Use.

Group	First preference for dictionary use				Second preference for dictionary use			
	Spelling	Meaning	Other	<i>N</i>	Spelling	Meaning	Other	<i>N</i>
Poor reader	17	18	1	36	2	11	1	14
Young reader	28	8	3	39	3	9	0	12
Age-matched	20	11	0	31	3	17	1	21
Total	65	37	4	106	8	37	2	47

groups, the younger and age-matched readers, was to use a dictionary to find spellings; whereas for the poor readers looking up a word's meaning, was roughly equally as important as checking up a spelling. Those who responded that they had a second use of the dictionary mostly opted for looking up the word's meaning in all three groups. The younger readers have the greatest preference to use the dictionary to check spellings and least preference to look up meanings. The age-matched children also have a greater preference for checking up spellings.

## Study 2

In this next study the development in the use of a dictionary was examined by comparing two groups who were either below or above or equal to the age of 9 years.

### *Participants*

All the data from the children in the first study were used in this next study plus the data from other children who were selected randomly from several primary schools within Leicestershire. The only criterion for selection was the child's age. Data were collected for children aged from 7 through to 11 years. The initial sample size was 270 children. However, due to inequalities on Raven's Matrices between the two main age groups, to be described, this was reduced to 241. The final sample was composed of roughly equal numbers of males and females with an age range of 7 years to 11 years 4 months (mean = 9 years 4 months). These children were also tested on other measures related to reading strategies,

**TABLE 4.** Means and Standard Deviations of Younger and Older Readers.

Measure	Younger readers		Older readers	
	Mean	SD	Mean	SD
Age (decimal years)	8.34	.71	10.55**	.56
Reading quotient	106.7	23.9	103.3	22.4
Ravens (percentile)	58.7	29.6	57.0	27.5
BAS reading age (decimal years)	8.91	2.18	10.86**	2.24
Spelling (%)	27.0	18.9	49.4**	20.2
Non-word reading (%)	55.3	32.4	75.7**	23.2

*Note.* Cells are based on 124 younger readers and 117 older readers.

\*\*  $p < .001$  = significant difference between the two groups by *t*-test.

as part of another study. Two separate groups were analysed based on age with the younger group consisting of those less than or equal to 9.5 years, while all those in the older group had ages greater than 9.5 years. This cut-off age was chosen so as to split the children into approximately equal numbers in each group. The younger group comprised 124 children consisting of 62 males and 62 females and the older group of 117 children had 57 males and 60 females. The performance of the two groups on the major variables is shown in Table 4. The lack of significant effects for reading quotient and performance on the Ravens shows equivalence in reading and nonverbal IQ between the two groups.

### *Procedure and Design*

All children were tested on the same variables described in Study 1. Two groups of children divided by age were compared.

### *Results and Discussion*

In this larger cohort the younger children were significantly worse than the older children on all four measures shown in Table 5, which shows the performance data in accessing a dictionary for both groups of children. A 2-way mixed ANOVA of the two age groups by modality (accuracy for a word shown vs. a word heard) showed a highly significant effect for age,  $F(1, 239) = 50.8$ ,  $p < .001$ ,  $\eta_p^2 = 0.175$ , and a significant interaction,  $F(1, 239) = 5.6$ ,  $p < .05$ ,  $\eta_p^2 = 0.23$ . The older children were no different in

**TABLE 5.** Means, *SDs* and *Ns* of the Younger and Older Groups in Performance Using a Dictionary.

Measure	Younger readers			Older readers		
	Mean	<i>SD</i>	<i>Ns</i>	Mean	<i>SD</i>	<i>Ns</i>
Time to look up a heard word (sec.)	48.4	21.6	95	33.0	18.3	115
Time to look up a shown word (sec.)	48.0	24.4	101	28.4	16.2	114
Accuracy for a heard word (%)	59.7	40.4	124	90.9	21.7	117
Accuracy for a shown word (%)	67.5	38.8	124	90.0	23.7	117

accuracy between the modes, but the younger group found a slight advantage in having the word shown while looking it up. A similar 2-way mixed ANOVA on the speed of dictionary access showed main effects for age,  $F(1, 200) = 964.1$ ,  $p < .001$ ,  $\eta_p^2 = .828$  and mode  $F(1, 200) = 5.92$ ,  $p < .05$ ,  $\eta_p^2 = 0.03$ , with a slight but significant advantage for words being shown. Thus there is a small improvement in accuracy of dictionary performance if the word is available, analogous to a situation where the word is in a text being read and it is being looked up for meaning. Both sets of results show an expected highly significant advantage for age.

The older group's rated frequency of use of a dictionary indicated significantly greater use (1.96 vs. 2.15),  $t(234) = 2.14$ ,  $p < 0.05$ . As in the previous study, these frequencies are equivalent to about once a week. Table 6 shows the patterns of association between measures of dictionary skill and usage and measures of literacy. Speed and accuracy data were derived for this purpose by combining the "heard a word" with the "shown a word" conditions. Broadly speaking higher intercorrelations are found within the older children. However, the self-rated frequency of dictionary usage tended to produce non-significant associations and only correlated significantly with spelling ability for the younger children. Further work would need to examine the alternative hypothesis that those who are good at spelling are more proactive and interested in spelling, so they tend to use a dictionary more. Similarly, speed and accuracy in using a dictionary is strongly related to measures of reading, spelling and non-word reading which could indicate that dictionary usage helps literacy skills. Conversely, speed and accuracy could be enhanced by good literacy skills. In the case of the older children, the lack of relationship with self-rated

**TABLE 6.** Pearson Product Moment Correlations (and *N*s) for Younger (Below the Diagonal) and Older (Above the Diagonal) Children.

Variable	Frequency of dictionary use	Speed of look up	Accuracy of look up	RQ	Reading age	Spelling	Nonword reading
Frequency of dictionary use	—	-.08 (110)	.08 (115)	-.03 (115)	-.05 (115)	.02 (115)	.02 (115)
Speed	-.16 (90)	—	-.51*** (112)	-.53*** (112)	-.57*** (112)	-.60*** (112)	-.56*** (112)
Accuracy	.13 (121)	-.55*** (90)	—	.60*** (117)	.60*** (117)	.54*** (117)	.70*** (117)
Reading Quotient (RQ)	.17 (121)	-.36** (90)	.39*** (124)	—	.97*** (117)	.79*** (117)	.74*** (117)
Reading age (decimal years)	.15 (121)	-.48*** (90)	.50*** (124)	.94*** (124)	—	.85*** (117)	.77*** (117)
Spelling	.25** (121)	-.46*** (90)	.54*** (124)	.78*** (124)	.86*** (124)	—	.72*** (117)
Nonword reading	.10 (121)	-.41*** (90)	.50*** (124)	.68*** (124)	.73*** (124)	.68*** (124)	—

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

**TABLE 7.** First and Second Preferences for Dictionary Use Divided by Age.

Group	First preference				Second preference			
	Spelling	Meaning	Other	<i>N</i>	Spelling	Meaning	Other	<i>N</i>
Younger readers	84	28	7	119	8	27	5	40
Older readers	59	53	4	116	12	44	3	59
Total	143	81	11	235	20	71	8	99

dictionary use is notable, with the correlations not even approaching marginal significance.

Table 7 shows the first and second preferences for dictionary use by the two age groups. As in the first study, the majority preference for the younger children was for using a dictionary for looking up spellings, with looking up for meaning as the second preference. There was a change with age, with the older children being more split in their preference to use the dictionary between spelling and looking up meaning. It was previously shown that older children use a dictionary significantly more, according to their self-ratings, so their mixed requirements (for spelling and meaning) might be driving this greater use.

### General Discussion

The expected development in the skill of using a dictionary has been demonstrated with older readers being faster to access items and more accurate than their younger counterparts. Similarly, children with reading problems are significantly less efficient when accessing a dictionary compared with their age peers of average reading standard. Dictionaries are unlikely to have had a strong causal impact on reading development for the children in the current study, as dictionaries were not reported to be used sufficiently frequently to account for the estimated rate of acquisition of reading vocabulary. For example, Adams and Huggins (1985) noted that vocabulary expansion is about 3000 words a year. A child would probably need to be referring to a dictionary at least several words a day in order for it to be influential, but only a minority of children were doing this. (Only 21.0% and 25.7% of the younger and older children, respectively, reported using a dictionary at least once a day in the sample.)

A shift in the pattern of dictionary use has been found in that younger readers are three times more likely to express a first preference to use a dictionary to look up a spelling rather than to look up a word's meaning, whereas for older readers the pattern is more evenly split. This partly reflects a corresponding shift to reading for meaning as reading progresses. Chall and colleagues (Chall, 1983; Chall, Jacobs, & Baldwin, 1990) note that at about 4th-grade level (roughly equivalent to the older readers in the present context) there is a change to reading more demanding texts as they adjust to reading to learn. Similarly texts may contain more advanced vocabulary that is not within their own auditory vocabulary. By contrast, earlier materials would (or should) have been within their own vocabulary domain. Another probable reason for the shift in dictionary use with age is that using a conventional dictionary definition to aid understanding of text is difficult to use both for children and adults (e.g., McKeown, 1993; Nist & Olejnik, 1995; Scott & Nagy, 1997). Consequently using definitions from dictionaries to help reading is likely to develop later when reading comprehension improves.

As with any skill, one would expect that the more one practises the better the performance. It has been found that the (self-rated) frequency of use of the dictionary correlates significantly with spelling performance, but not with reading, nor non-word (or phonic) reading for the younger readers. Thus those younger children who said that they used a dictionary frequently were also the better spellers. As this younger group had a much stronger first preference to use dictionaries for checking spelling, than looking up word meanings, a significant connection between dictionary use and spelling rather than reading would be expected. However, the basis of this relationship is less clear. Previous discussion has suggested one intervening factor might be the proactivity of the learner, with those who are more active and interested in learning about spellings being more likely both to use a dictionary more frequently and to develop into better spellers. If this were so, an educational implication would be to encourage weaker spellers to use dictionaries more in order to foster more active learning of spelling. What is perhaps less expected is that the rated frequency of dictionary use seems to have no impact at all in older readers' literacy skills, suggesting that dictionaries may have little importance

in later years even though their self-rated use of dictionaries was significantly more frequent.

### Note

<sup>1</sup>“Dictionary” as used here is referring to the book and not to the cognitive processes related to the internal representation of word units.

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