

THE WORD RECOGNITION ABILITIES OF PRIMARY SCHOOL PUPILS A PILOT STUDY IN BARBADOS

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The paper focusses on the role of accuracy and automaticity in the development of skilled reading. The developmental phases underlying accurate word recognition are traced, and the argument advanced that for word recognition to be efficient, it must not only be accurate, but it must be automatic, that is, it must be sufficiently economic in terms of memory processing demands, as to permit the reader to concentrate on 'getting meaning.' This theoretical framework is used to carry out a pilot study using a sample of primary pupils in Barbados. ANOVA analyses are used to highlight significant gender differences in performance in terms of accuracy and automaticity. Content analyses highlight the explanatory power and instructional relevance of the 'accuracy' and 'automaticity' concepts to remedial reading instruction. The findings, though discussed in terms of the Barbados data, have implications for other contexts. Implications for further research are suggested.

Introduction

This exploratory study was initiated against the background of considerable public disquiet with respect to the levels of literacy achieved by pupils at the end of the primary stage of schooling. The prevalence of remedial strategies, formalised in terms of remedial training programmes at the Teachers' College, and the policy decision to ensure that each primary school has at least one teacher who has undergone such remedial training, lend credence to the validity of the concerns about standards of basic literacy in Barbados.

This study was therefore designed to provide empirical insights into the problem(s) of basic literacy acquisition, with a view to providing a framework for informed discussion, and perhaps policy and professional action. It focussed on the comparative word recognition performance of pupils in classes 1-4 of the primary school, since these classes fall

substantially within the learning to read stage in a developmental conceptualisation of reading acquisition (Chall 1983).

Reading is a very complex cognitive activity. It was therefore necessary to have a sharp, but limited focus to the study. Word identification was the focus selected, since there was a substantial literature base for the view that such basic competencies underlie the real concern of literacy acquisition, that is, reading for meaning (e.g., Juola et al, 1979; Stanovich, 1991). It is important to keep this limited focus in view when evaluating the outcomes and implications of the study.

Organisation of the Paper

This paper is organised around three major thrusts. Firstly, the theoretical framework which informed the conceptualisation of the study and the interpretation of the data will be presented. This review of the literature will be necessarily highly selective, and to some extent historical, since current developmental trends in word identification are best conceptualised against the backdrop of some of the critical basic research in the field. It will focus primarily on the following concerns:

1. The conceptualisation of the reading process.
2. Speed and accuracy as important criteria for assessing word identification, and the related concern of the role of automaticity in the acquisition of basic literacy skills.

Conceptions of Reading

Models of the reading process can be placed on a theoretical continuum ranging from extremely holistic conceptualisations, such as Goodman's model of reading as a psycholinguistic guessing game, and its expansion to include the transactional and socio-psycholinguistic perspectives (Goodman, 1994), to sub-skills approaches (e.g., Gough, 1984). Holistic or top-down processing models emphasise the constructive nature of reading based on the interaction of the textual, linguistic and learner variables. According to this conceptualisation of the reading process, learning to read should be seen as being as natural as the process of

language acquisition (Scott, 1995). This view of reading therefore de-emphasises, or in some cases even rejects, code-mediated approaches as a means of facilitating the acquisition of reading skills.

At the other end of the continuum, bottom-up, or skill conceptualisations of the reading process emphasise sensitivity to the sound-symbol regularities underlying the graphemic code as essential to reading acquisition, at least for most novice readers. Bottom-up theorists (e.g., Adams, 1990; Samuels, 1994) see such instruction in sound-symbol correspondences as enabling the reader to make use of one of the important characteristics inherent in alphabetic writing systems such as English. In addition, they argue that there is a qualitative difference between learning to read and skilled performance in reading. They therefore see the holistic conception as being more appropriate to skilled reading, and bottom-up conceptions as providing a more appropriate explanation of reading acquisition. It is relevant to note, in this regard, that developmental models of the reading process (e.g., Chall, 1983), typically make a qualitative distinction between learning to read and reading to learn.

Interaction models (e.g., Rumelhart, 1994), occupy the middle of the continuum. They conceptualise reading as an interaction involving bottom-up as well as top-down processing. According to this view of the reading process, the choice of processing strategy depends on the match between the demands of the materials being read and the cognitive, linguistic and experiential resources of the reader. Thus, if the material is within the reader's prior experience, top-down processing is likely to be emphasised. On the other hand, if the text is difficult or unfamiliar, bottom-up processing is likely to be emphasised.

Speed and Accuracy

A critical research concern has been the nature of the perceptual unit in reading. Some theorists, such as Gough (1984), have advocated the individual letter as the basic perceptual unit in word identification. However, the weight of the evidence tends to suggest units larger than individual letters. These units are called orthographic units. Venezky and Massaro (1979) make a conceptually important distinction between

orthographic regularity and spelling to sound regularity, and pointed out that words may have an irregular spelling pattern but yet be orthographically regular. The critical characteristic of orthographic regularity, from a word identification perspective, is that such awareness sensitises the reader to the allowable patterns within words.

Developmental research on the kinds of reading errors made as pupils acquire reading competence also supports the view that sound-symbol sensitivity is essential to growth in learning to read. Biemiller's (1970) classic study in that reading research paradigm found that pupils typically went through three stages. During stage 1, they tended to make substitutions which matched whole words already taught to them. In short, they tended to use a visual, whole word strategy. During stage 3, their substitutions reflected sensitivity to the orthographic constraints of English. Stage 2 represented a transitional stage in which the strategy used was a no response, suggesting that the pupils were beginning to develop greater sensitivity to orthographic constraints when trying to identify unfamiliar words.

Other early developmental research by Juola et al (1979) also supported the importance of the orthographic unit in word identification. They argue that orthographic chunking facilitates visual search. Such chunking facilitates the processing of the visual data in memory, thereby leaving more cognitive processing space available for focussing on getting meaning. In fact, they found a developmental pattern with respect to visual search tasks based on orthographic units. Kindergarten pupils had slower visual search rates. They terminated the search once the target letter had been found. Most importantly, there were no significant differences between their performance on word, non-word, and pseudo-word displays. In short, their performance was highly suggestive of a letter-by-letter processing approach. Second graders, on the other hand, had higher search rates for words and pseudo-words than for non-words and did not stop as soon as the target letter had been found. Their performance therefore suggested the use of a strategy in which there was the expectation of clustering rather than individual letter processing. Like Biemiller (1970), Juola et al suggested a transition phase at grade 2. They see their developmental research as supporting Huey's (1980) argument that as reading skill increases, reliance on phonemic encoding plays a lesser role in word recognition and that the process becomes more dependent on purely visual codes.

Juel (1983) approached the developmental hypothesis with respect to the developmental trends in the use of mediated word identification from a different, but complementary, angle. Fundamental to his approach is the conceptual distinction between orthographic versatility, that is, the frequency with which specific letters occur in specific positions in a number of different words, and orthographic redundancy, that is, the frequency of occurrence of specific letters in specific words. The distinction made was thus analogous to the type/token distinction made in vocabulary research between counting the number of different words known (cf. orthographic versatility), and counting each instance of a word (cf. orthographic redundancy). Since reading experience would clearly play an important role in orthographic versatility, the hypothesis was that the impact of orthographic redundancy would decrease with age. In other words, word identification would become more holistic with an increase in age and, thus, in reading experience. He also hypothesised that the impact of decodability, that is, letter-sound correspondence regularity, would decrease with age. Both hypotheses were supported.

Samuels (1985) reported other developmental research involving grades 2, 4, 6, and college students, in which the task was to recognise the words presented by means of tachistoscope. Once again, the findings suggested a developmental pattern of component letter processing (grade 2); transitions between component and holistic processing (grade 4); and completely holistic processing (grade 6 and college). The only difference found between the 6th graders and the college students was the greater processing speed of the latter. Samuels further pointed out that whereas both good and poor readers had the same perceptual span, that is, both sets of orders processed the same number of letters in a single fixation, good readers had a higher visual unit performance score than poor readers.

With respect to the developmental research just reviewed, it is particularly interesting to note that although there are differences of detail in the above studies with respect to the grade level at which particular types of processing were found, as well as in the grade allocation at which the transition occurred, the critical point is the consistent finding of a qualitative developmental pattern in terms of visual search strategies ranging from component letter processing (the lowest level), to holistic processing. The developmental research reviewed thus suggests that differential sensitivity of the orthographic

unit could be one of the factors contributing to the poorer visual performance of poor readers. Such research is thus pertinent to this study in that it provides a framework within which performance in terms of sensitivity to orthographic units across class levels may be reviewed.

Automaticity

Closely related to the whole question of the visual unit is the question of automaticity in the processing of the unit. Reading is a cognitive act and, as such, is affected by the processing constraints of short term memory. Samuels' (1994) model suggests that the less attention which has to be overtly paid to the processing of the decoding features, the more reading can be concerned with reading for meaning, since there would be more cognitive processing space available for focussing on meaning. Conversely, the more attention that has to be overtly paid to the processing of the code, the more likely it is that a bottleneck situation would occur in short term memory, thus making reading for meaning less likely.

In short, given the constraints of short term memory, automaticity of processing at the word identification level is a critical and necessary prerequisite for reading for meaning. Thus, Samuels (1979) argues that reading disability is more a function of lack of automaticity than of perception. This conclusion was supported by the fact that poor readers were found to demonstrate behaviours, such as short saccadic eye movements and long eye fixations, which were suggestive of letter-by-letter processing, and thus a long processing time. Building on the earlier work, Ehri (1994) proposed that word recognition abilities develop in three qualitatively different phases—the logographic, the alphabetic, and the orthographic.

In the logographic phase, word recognition is via extraneous cues such as pictures, memorisation, or even a thumb mark on the flash card. Thus, *book* and *look* may be confused because the two *eyes* in the words are being used as the cue. Such logographic processing is clearly unreliable since it is not text constrained.

The next phase, the alphabetic, is conceptualised in two complementary sub-phases. During sub-phase 1, a single letter, usually the initial, tends to be the cue used for word identification purposes. Though the early alphabetic phase represents an advance on the logographic, such processing will still not provide reliable word recognition since, for example, attention is not consistently paid to important features of the word, such as the sequence of the letters comprising the word. During sub-phase 2, however, all the letters and their sequence are attended to, thus making word identification stable. For example, differentiation between similar words is now possible on a reliable basis. The main problem remaining, however, would be that accuracy would be attained at the expense of speed, that is, automaticity.

The major achievement of the final stage, the orthographic, is to promote such automaticity, largely through wide reading experiences. The children use familiar letter groupings in words to engage in processing words in chunks, rather than as individual letters. In short, they use their developing sensitivity to the allowable patterns in words to process the word information more speedily, and ultimately automatically, as defined by Samuels (1994).

Ehri's scheme thus represents an important refinement of the early work reviewed. With reference to this study, it is particularly relevant to note that it underscores the importance of accuracy and automaticity in the development of the word recognition abilities which undergird reading for meaning, by enabling the reader to attend to meaning rather than decoding.

Summary of the Literature

In summary, the research reviewed provides support for the accuracy and speed indices used in this study. Firstly, given the necessary qualitative distinction between reading acquisition and skilled reading, it is clear that word identification is a valid and significant research focus which contributes to insight on skilled reading (Samuels, 1994; Stanovich, 1980). Secondly, the research clearly indicated an important conceptual distinction between accuracy and speed of word identification. The latter was shown to be closely associated with automaticity, a prerequisite for

reading for meaning. In addition, automaticity was shown to be at least partly a function of visual search strategies, with sensitivity to orthographic units tending to facilitate chunking, and thus speedier and more efficient processing. Importantly, reading experience was shown to be an important influence on the development of orthographic sensitivity (Stanovich, 1989). Lastly, but importantly, various strands of evidence were cited to the effect that there seems to be a qualitative pattern in the development of visual search strategies, ranging from letter by letter processing (the lowest) to holistic processing (the highest). These were the important insights used to inform the design and interpretation of the research reported in this paper.

Purposes of the Study

The specific research questions of this exploratory study were:

1. What is the overall pattern of performance of the three ability groups in terms of accuracy and speed of word identification?
2. What effect, if any, do the independent variables sex and ability have on performance?
3. To what extent is there cumulative growth in accuracy and speed of recognition across class levels?

Sampling

Logistical realities necessitated cluster sampling. A multi-stage approach was used (Borg & Gall, 1983). Schools were randomly selected based on a sampling ratio of 25% of the total number of schools in Barbados. Care was taken to ensure full parish representation in proportional terms. Appendix 1 gives the breakdown of the schools in the sample by parish. More specific data on the schools have not been given to honour the promise to them of confidentiality.

At each school, a stratified sample of good, average and weak readers from classes 1-4 inclusive, based on teacher judgement, was selected. Each school was therefore represented by 24 pupils. Teachers were encouraged to ensure equal representation of boys and girls across the

various ability bands. Teacher judgement was used to select the pupils since there are no normative reading tests in Barbados. While the limitation of possible subjectivity is acknowledged, a possible advantage of teacher selection would be that such involvement could enhance the acceptability and staff development objectives of the study.

Selecting the Word Sample

A random sample of 25% (55 words) of the Dolch word list constituted the test. The Dolch list was used for two reasons. Firstly, it is widely regarded in the literature as being highly representative of the words pupils encounter in primary reading material in particular. Secondly, the literature (e.g., Juel, 1983) suggested that reading experience exerted an important influence on word identification. The use of a highly frequent set of words was therefore seen as a practical way to control for likely differences in the reading experience of the various ability groups. The use of a non-contextualised test format controlled for context and ensured the validity of the test in terms of the purposes of the study. Practical considerations with respect to the time schools could make available for the testing, in the light of a pilot run done, led to the decision not to use the complete Dolch list of 220 words. Appendix 2 contains the words used in the research.

Testing, Preparation and Administration

All the words were typed in twelve-point pitch on three sheets of paper. The instructions to each student were read from a written script to ensure uniformity in test instructions regarding the nature of the task and how to approach it. The pupils' responses were taped as well as timed using a stop-watch. A research assistant scored the responses by hand as they were given by the testee. This left the researcher free to note pupil behaviours, the miscues made, and to record the time taken by each pupil to complete the test. The research assistant noted the time taken by each pupil as indicated by the researcher. The standard procedure of setting the testee at ease before starting the test was followed. In two cases, the attempt was not successful and those students were not required to do the test.

Methodology

Response latency, that is the time taken to call the words, was the methodology used. Such a methodology has been widely used in the literature (e.g., Gough, 1984). An accuracy score, that is, the time taken for the entire test, was calculated for each testee. The accuracy and speed scores were, thus, the dependent variables of the study.

Limitations

The methodology used only permitted the calculation of the average time taken to call the words. This was obtained by dividing the number of words correctly called by the testee by the time she/he took to complete the entire test. Ideally, the actual time for each word should have been taken. This was not possible with the available instrumentation. It could be argued that the weaker readers were more affected by this limitation given their predisposition to using more or longer pauses between words. In response, however, it needs to be noted that such frequency of pausing is in fact a typical behaviour of such pupils. Thus, the results obtained are not seen as being unduly biased against the weaker readers.

Two limitations related to sampling also need to be noted. Firstly, multi-stage cluster sampling is less accurate than simple random sampling since it contains more sampling error (Borg & Gall, 1983). The subjectivity of teacher selection has already been noted.

Data Presentation and Analysis

The data will be presented within the context of various research questions of the study:

- RQ 1: What is the overall pattern of performance of the three ability groups in terms of accuracy and speed of word identification?**

Table 1
Performance of the 3 Ability Groups (Accuracy)

Sex	n	WEAK		AVERAGE			GOOD		
		Mean	SD	n	Mean	SD	n	Mean	SD
Boys	57	35.16	17.26	56	53.59	2.33	52	54.64	0.93
Girls	47	42.98	13.24	51	54.09	1.70	61	54.54	0.87

The main trends indicated in table 1 are:

1. As expected, average and good readers performed at very high levels. In fact, they typically identified 99% of the words presented.
2. The descriptive data indicate that the high word identification performance noted above is typical of both groups.
3. Weak pupils demonstrated severe word identification problems. This is particularly true of the boys. They typically recognised only 64% of the words presented despite the fact that the test was a very basic recognition task, since all the words were highly frequent.
4. There is very wide variability among the weak readers of both sexes. This suggests the need for individualised approaches to remediation and teaching of this ability group.

Table 2
Performance of the 3 Ability Groups (Speed)

Sex	n	WEAK		AVERAGE			GOOD		
		Mean	SD	n	Mean	SD	n	Mean	SD
Boys	57	102.82	76.70	56	33.48	8.20	52	29.22	6.29
Girls	47	72.83	58.15	51	30.86	8.53	61	26.73	6.95

The main trends with respect to table 2 are:

1. The weak readers took much longer to identify the words they knew than did either of the other 2 groups.
2. All 3 ability groups showed much greater variability with respect to speed of word identification than was the case for the number of words identified. This was particularly noticeable with respect to the weak readers, especially boys.

Table 3
**Average Number of Seconds Taken by
 the 3 Ability Groups to Identify Words**

Sex	WEAK		AVERAGE		GOOD	
	n	Mean	n	Mean	n	Mean
Boys	57	2.92	56	0.62	52	0.55
Girls	47	1.69	51	0.57	61	0.49

Table 3 presents the table 2 data in a more readily understood form. The procedure used was to divide the mean time taken by each ability group by the mean accuracy score of the particular ability group. The resulting value provides an indication of the typical time each ability group took to identify the words they got correct.

The data indicate that:

1. Boys who are weak readers typically took four times longer than average readers (boys) and five times longer than good readers to identify the words.
2. Girls who are weak readers typically took three times longer than average and good readers (girls).

In summary, therefore, it can be stated that the general pattern with respect to the overall comparative performance (accuracy as well as speed), was that of two sharply polarised groups. This finding held irrespective of whether the criterion was number of words correctly identified or the time taken to accomplish that task.

RQ2: What effect, if any, do the independent variables sex and ability have on performance?

The combined data from tables 1-3 seemed to support the hypothesis that ability as well as sex were important variables impacting on reading performance, in terms of accuracy and speed of word identification. That hypothesis was tested using a two-factor ANOVA (Table 4 and 5). A .05 confidence level was set.

Table 4
Overall Performance: Ability x Sex (Accuracy)

SOURCE	SS	DF	MS	F	P
Ability	16119.325	2	8059.622	101.444	0.000
Sex	603.239	1	603.239	7.593	0.006
Ability*Sex	1024.653	2	512.327	6.448	0.002
Error	25265.003	318	79.450		

Table 5
Overall Performance: Ability x Sex (Speed)

SOURCE	SS	DF	MS	F	P
Ability	229551.814	2	114775.907	72.668	0.000
Sex	11347.100	1	11347.100	7.184	0.008
Ability*Sex	12631.653	2	6315.800	3.999	0.019
Error	497530.303	315	1579.461		

The data (tables 4 and 5) support the hypothesis that ability and sex exert a significant influence on the accuracy and speed performance individually and, also, in terms of interaction. Post hoc Tukey tests indicated that the differences between good and average readers were not significant with respect to either accuracy or speed. The data therefore confirmed the notion of two polarised groups of pupils with respect to word identification--the weak readers on the one hand and the average and good readers on the other.

RQ3: To what extent is there cumulative growth in accuracy and speed of recognition across class levels?

Table 6
Performance (Words Identified) Across Class Levels (Boys)

	CLASS 1		CLASS 2		CLASS 3		CLASS 4	
	X	SD	X	SD	X	SD	X	SD
Good Readers	54.23	1.64	54.77	.44	54.86	.36	54.67	.65
Average Readers	52.40	3.62	54.20	1.15	53.57	1.95	54.33	1.16
Weak Readers	23.29	18.47	33.92	16.06	39.14	16.26	37.81	18.02

Table 7
Performance (Words Identified) Across Class Levels (Girls)

	CLASS 1		CLASS 2		CLASS 3		CLASS 4	
	X	SD	X	SD	X	SD	X	SD
Good Readers	54.44	1.05	54.60	.83	54.79	.58	54.43	.85
Average Readers	53.33	2.93	54.08	1.38	54.31	1.03	54.46	.66
Weak Readers	38.46	15.81	46.08	7.24	46.90	14.12	41.73	15.07

Table 8
Performance (Speed of Recognition) Across Class Levels (Boys)

	CLASS 1		CLASS 2		CLASS 3		CLASS 4	
	X	SD	X	SD	X	SD	X	SD
Good Readers	33.08	5.51	29.15	9.99	28.79	10.10	28.67	8.91
Average Readers	39.80	8.54	31.00	5.88	32.93	8.77	29.33	5.30
Weak Readers	92.82	114.0	114.0	78.98	94.64	85.45	107.75	95.49

Table 9
Performance (Speed of Recognition) Across Class Levels (Girls)

	CLASS 1		CLASS 2		CLASS 3		CLASS 4	
	X	SD	X	SD	X	SD	X	SD
Good Readers	30.38	4.79	28.53	8.03	25.79	6.99	22.14	5.19
Average Readers	39.00	9.54	32.50	6.86	27.39	5.09	25.00	5.46
Weak Readers	86.27	63.07	58.92	30.38	53.40	39.21	74.64	52.85

Tables 6-9 indicate that:

1. With respect to the weak readers, the boys recognised fewer words and took much longer than did the girls. This trend applied to each of the class levels.
2. The good readers' performance was good in terms of word recognition as well as speed. This finding applied irrespective of sex.
3. The average readers' word recognition performance was comparable to that of the good readers. However, their speed of recognition was slower.

In addition to the overall pattern indicated by the descriptive data for each ability group, a one-way ANOVA was done to check whether, as was hypothesised, there were significant differences in performance across the four class levels with respect to the two groups (boys and girls). In keeping with convention, only the significant ANOVA results have been given below.

Table 10
Performance re Speed of Recognition
Across Class Levels (Average Boys)

SOURCE	SS	DF	MS	F	P
Between Group	901.987	3	3000.662	5.6	0.002
Within Group	266.095	52	5.117		

Table 11
Performance re Speed of Recognition
Across Class Levels (Good Girls)

SOURCE	SS	DF	MS	F	P
Between Group	567.360	3	189.120	1.657	0.006
Within Group	2233.555	55	5.117		

Table 12
Performance re Speed of Recognition
Across Class Levels (Average Girls)

SOURCE	SS	DF	MS	F	P
Between Group	1430.503	3	476.834	1.657	0.006
Within Group	2136.077	46	47.523		

Since the performance of the weak readers in class 1 was poor, the non-significant ANOVA results for accuracy, as well as speed of recognition, across the four class levels comprising the primary stage of education, underscore the severity of their reading disability with respect to word recognition. With respect to good and average readers, however, the picture is different. Average readers (boys) and both good and average readers (girls) made significant gains in terms of speed of recognition. It should be noted that since these groups started with recognition scores of nearly 100%, the time dimension was the only one on which they could show significant improvement.

The ANOVA findings with respect to speed of recognition are interesting in that they serve to reinforce the importance of automaticity as a key variable differentiating between readers of various ability levels. This finding underscores the need for an instructional focus on developing the pupils' speed of recognition with respect to all ability groups.

Content Analyses

Content analyses of the weak readers' responses were done to complement the quantitative picture presented to date. Such analyses could provide data which are more directly useful for diagnostic teaching purposes.

The content analyses of the error patterns of the weak readers support the argument raised earlier of a qualitative difference in instructional needs between the two polarised populations of readers. There was considerable evidence that the weak readers tended to use the individual

letter as the perceptual unit. In short, their perceptual behaviour was suggestive of the lowest developmental stage as discussed earlier in the literature review. This letter focus took various forms, for example, spelling or calling out the individual letters, even with respect to single unit words such as *my*. Such inefficient strategy use suggests a lack of awareness of the orthographic regularities of English (e.g., that every syllable in English contains a vowel), as well as an insensitivity to the orthographic units within words. Inductive teaching of analytic phonics is likely to provide an effective instructional context for promoting such sensitivity, **provided** it takes place in an instructional framework in which continuous reading text rather than isolated workbook drill is the instructional diet. This important caveat regarding phonic instruction is emphasised by Adams' (1990) review of the research dealing with the acquisition of decoding abilities: "It would appear, then, that an early opportunity to do meaningful connected reading, in addition to learning how to decode, is needed to integrate both abilities" (p. 11).

Observation of the weak readers, as well as the pattern of their substitutions also suggested an over-reliance on visual memory as a word recognition strategy. Various pupils made comments such as "I can't remember that word." In addition, the memorisation tended to be based on minimal letter information. Information at the beginning of words was a widely used strategy. The following examples illustrate this point. In each case the test item is given first, and followed, in brackets, by the examples of the incorrect responses given. The examples are from across the various class levels for the weak readers. The asterisk indicates those responses made by several pupils.

Examples

Does (down); pretty (party, play); there (three)*; eight (eleven); first (fist); always (away)* try (truck); may (many, my)*; which (white, when); please (plant); shall (small)*; any (and); what (went); done (don't); always (after); try (true); buy (but); pick (picture); please (play)*; not (now); far (fair)*; try (to); which (with); some (said)*; by (but); today (that).

Discussion

This exploratory study focussed on two aspects of word recognition--accuracy and speed of recognition. It yielded useful instructional insights. The very poor performance of the weak readers, especially the boys, with respect to very high frequency words in primary reading materials, suggests substantial weaknesses in decoding skills and/or sight vocabulary. In addition, the considerable variability with respect to recognition and speed characteristic of their performance, underscores the crucial importance of individualised diagnostic teaching for this group of pupils. Such an approach will have substantial implications for teacher pupil ratios as well as curriculum planning and design for the weak readers. The study also highlighted automaticity as an important discriminative feature of recognition performance, even among the good and average readers. This finding is particularly important given that classroom contact with reading teachers and teacher educators over several years has indicated a tendency to treat accuracy as the focus of word recognition instruction and to under-emphasise speed. An important instructional implication of the study, therefore, is the need to enable pupils to acquire automaticity. This point is developed more fully in the next section.

Contact with teachers and teacher educators in language arts, as well as assessment visits to teachers in training suggest that the main implication of this pilot study is the challenge to devise appropriate instructional strategies. Teacher conceptions of word recognition instruction, as reflected in observed instructional practices, materials and aids used, tend to be restricted in terms of both conceptualisation and emphases. Specifically, word recognition is typically taught via controlled drills on individual words, using flash cards or phonic rules and/or exercises. Such an isolated, decontextualised instructional approach contrasts sharply with what the instructional research in reading suggests. As early as 1965, Goodman showed empirically that the additional contextual, linguistic and syntactic cues in connected text facilitate word identification and recall (i.e., word recognition). The power of the language experience approach as a remedial strategy rests essentially on a similar holistic reading rationale. The current advocacy of whole language approaches to reading instruction in the literature (see themed issue *Reading Teacher* 43, 8, April 1990; Scott, 1995) reflects a similar

rationale. Allington (1983) has shown that if the remedial reader is to progress, she/he needs frequent practice reading connected text at an appropriate interest and difficulty level rather than isolated drills. Careful reflection would indicate that this suggestion is not as paradoxical as it might first seem. Essentially, Allington is simply emphasizing the gestalt principle that the whole (in this case reading) is more than the sum of its constituent parts (i.e., word recognition skills). There is a substantial research base that teaching strategies such as repeated readings (Helfeldt & Henk, 1985; Samuels, 1979) are effective, because they provide the necessary controlled practice which is facilitative to the remedial reader, but do so in real reading contexts rather than via isolated drills. In using the insights from the instructional research, it is important to note the critical points embedded in it. First, mastery of word recognition is a necessary but insufficient basis for fluent reading. Second, automaticity is also essential. Control is a necessary condition for mastery learning. Frequent involvement in real reading is a necessary condition for automaticity.

In summary, the implications for remedial instruction are clear. First, it needs to ensure that the pupils get the necessary controlled practice in the full range of word recognition skills. Authentic reading experiences, not isolated drill, is the instructional context most likely to achieve such a goal. Second, unless decoding skills are consolidated to a level of mastery as well as automaticity, the pupils are likely to move to the next developmental stage (reading to learn) without automatised decoding strategies, and join the ranks of those who can 'bark at print' but do not understand what they read (Chall, 1983). Third, automaticity is essential if the reader is to overcome the processing constraints of short term memory and be able to read to get meaning (Samuels, 1994).

The content analyses of the errors of the weak readers, taken in conjunction with their insensitivity to orthographic information as discussed earlier, paint a picture of the weak readers as having a poor sight vocabulary as well as decoding skills. At this point, it is important to make a conceptual distinction between skills and strategies. Duffy and Roehler (1987) differentiate them as follows: "Strategies are plans readers use flexibly and adaptively depending on the situation," whereas skills are "procedures readers overlearn through repetition so that speed and accuracy are assured everytime the response is called for."

Given the above conceptual distinction, it will not be enough to teach the weak pupils word recognition skills. Instruction must focus on the broader goal of teaching them word recognition strategies. The instruction must be concerned with developing the pupils' metacognitive awareness of what the particular word recognition approach involves. How to use it, when to use it and why it should be used. Such metacognitive awareness would enable the pupils to use their word recognition skills flexibly, that is, according to the nature of the task and their purposes for reading. Achieving such a goal requires frequent reading experiences. The major challenge to remedial instruction in Barbados would thus seem to be the adoption of teaching strategies which reflect the key message of the remedial literature. Learning about reading, for example via isolated drills, has minimal transfer value to actual reading.

Implications for Future Research

This study has strongly suggested the existence of a substantial remedial reading problem across all class levels of the primary school system. Follow-up studies on (a) the coping strategies used by remedial pupils, as well as (b) larger scale research to establish the size and severity of the problem, including aspects such as comprehension which were not focussed on in this exploratory study, would be desirable.

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APPENDIX 1

Distribution Of The Schools In The Sample (By Parish)

PARISH	TOTAL
St. Philip	3
St. Michael	4
St. Peter	1
St. Lucy	1
St. Joseph	1
St. James	2
St. Thomas	1
St. George	1
Christ Church	2
St. Andrew	1

REFORMING A LSC TRAINING PROCEDURES

APPENDIX 2

Dolch Words Used in Test in Order of Presentation

went	eight	my
buy	own	him
any	white	as
did	very	pick
are	today	from
in	so	many
shall	done	play
does	some	as
small	ask	make
sit	what	reed
think	eat	myself
seven	six	which
ten	we	not
a	far	by
work	there	please
pretty	first	away
the	always	kind
grow	good	
up	try	