

We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,900

Open access books available

186,000

International authors and editors

200M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com



Developing Automaticity in Children with Learning Disabilities: A Functional Perspective

Part Two: Programme Methods and Materials

Charles Potter

Additional information is available at the end of the chapter

<http://dx.doi.org/10.5772/intechopen.72052>

Abstract

This chapter is the second of two chapters in this book to describe an instructional programme based on Luria's theories, which can be used to develop basic skills and automaticity in reading, writing, and spelling. The first chapter focused on the programme's theory, and then described how assessment is used to develop an individual programme relating to both basic skill and fluency needs in reading, writing, and spelling. The process was illustrated with one detailed case study. The results of this case study (Child 1) are presented in the current chapter, together with the results of 13 children exposed to similar fluency-based interventions. The results of six children exposed to one or more systematic variations in programme implementation are then discussed. Case contrast analysis is used to highlight three variables affecting successful programme implementation, namely: consistent and regular exposure to phonological and phonic instruction to provide a foundation of basic skills on which the fluency interventions in the programme can be built; consistent implementation of methods designed to improve both reading fluency, and writing and spelling fluency, to produce the greatest likelihood of positive effects; and consistent support from parents in programme implementation to produce the greatest likelihood of positive effects.

Keywords: reading difficulties, dyslexia, reading fluency, writing and spelling fluency, automaticity, rate of work, analytical phonics, large print, repeated reading, visual tracking, sequential spelling

1. Introduction

The current chapter is the second of two linked chapters that describe a framework for working to develop automaticity in reading, writing, and spelling, based on the work of Luria

[1–3]. The two chapters are presented sequentially in this text, and are intended to be read in successive order.

In the initial chapter, Luria's theories were outlined in relation to the broader literature on automaticity. The initial description was then followed by a case study of an 8-year-old child presenting with difficulties in automaticity in reading, writing, and spelling, in addition to the procedures used for assessment and development of his individual programme.

The current chapter focuses on the methods and materials used to work with Child 1, and how the programme was implemented. Child 1's results are then presented, together with the results of 13 other children with learning difficulties for whom similar methods and materials were applied. Following this, six contrast case studies are discussed, for which there was a unique arrangement of materials and methods used.

At the end of the current chapter, conclusions are drawn and the reader is referred to a resource of low-cost materials for developing automaticity in reading, writing, and spelling. The materials are currently being used by a network of parents, therapists, and teachers in Southern Africa, as well as internationally.

The aim is to highlight key implementation variables in developing automaticity in reading, writing, and spelling, and to provide the reader with access to a teaching resource that is evidence-based, as well as to the theory, types of assessment procedures, methods, and materials linked to particular areas of a fluency-based programme.

2. Resources

Based on the areas of difficulty identified in the previous chapter,¹ the following resources were used to implement the different areas of intervention with Child 1:

Child 1's phonic skills were developed through use of targeted phonic instruction, use of phonically regular reading material, reading skill activity books, and phonic workbooks, and in particular:

- Instruction targeting the particular types of phonic errors identified in Child 1's profile on the Phonic Inventories [4, 5];
- The reading fluency ebook series published through the author's practice [6];
- The foundation level phonic activity books accompanying this series [7]; and
- A series of phonic workbooks published by Modern Curriculum Press [8].

¹Child 1 was an 8-year old boy diagnosed as having a learning disability affecting reading, writing and spelling. His case profile and the assessment procedures used have been described in the previous chapter, to which the reader is referred for detail.

Reading fluency was developed through:

- Regular engagement with the large-print, phonically regular ebooks referred to above; and
- A repetitive paired reading procedure called the 3 × 3 Oral Impress System [9].

Spelling ability was developed through:

- Identification of long and short vowel sounds as used in words and word families based on the errors made by Child 1 in the Phonic Inventories [10, 11];
- Week by week analysis of Child 1's school books to identify the words he would be required to know for classroom usage (e.g. in spelling tests); and
- A methodology for analysing vowel situations in words called the Seven Vowel Phonic Analysis System [12].

Writing and spelling fluency was developed through:

- Colour coding of long and short vowel sounds used in the text of the large-print, phonically regular ebooks referred to above, using the Seven Vowel Phonic Analysis System;
- Copying of sentences and paragraphs, using the colour-coded material drawn from the ebooks;
- Sentence and paragraph dictation, using the colour-coded material drawn from the ebooks;
- Use of computer-based colour coding of vowels and vowel combinations in single syllable and polysyllabic words using a methodology for developing sequential working memory skills called the Targeted Analysis, Revisualisation, and Sequential Spelling Programme [13–16];
- Application of this methodology in a series of graded dictation paragraphs developed by Schonell [17]; and
- Use of sequenced mental imaging and visualisation in descriptive and creative writing [18, 19].

Application of the above phonic analysis and fluency-based procedures was undertaken side by side with the types of activities suggested by Johnson and Myklebust [20] for remediation of disorders of written language, Harris and Smith [21], Harris and Sipay [22], and Spache [23] for developing skills in reading comprehension, and Moffett [24, 25] for using discourse as the basis for developing student-centred language arts curricula at Grade 3 and Grade 4 levels at school.

In summary, Child 1's programme involved a number of different functional activities within a fluency-based model (refer **Table 1** following) in which there were three main areas of intervention, namely (a) language and reading comprehension; (b) reading fluency; and (c) writing and spelling fluency. In each of these areas of intervention there were a number of different components. The programme as a whole was activity-based, and conducted with the aim of developing basic perceptual, language, phonological and phonic skills, as well as automaticity in reading, writing, and spelling.

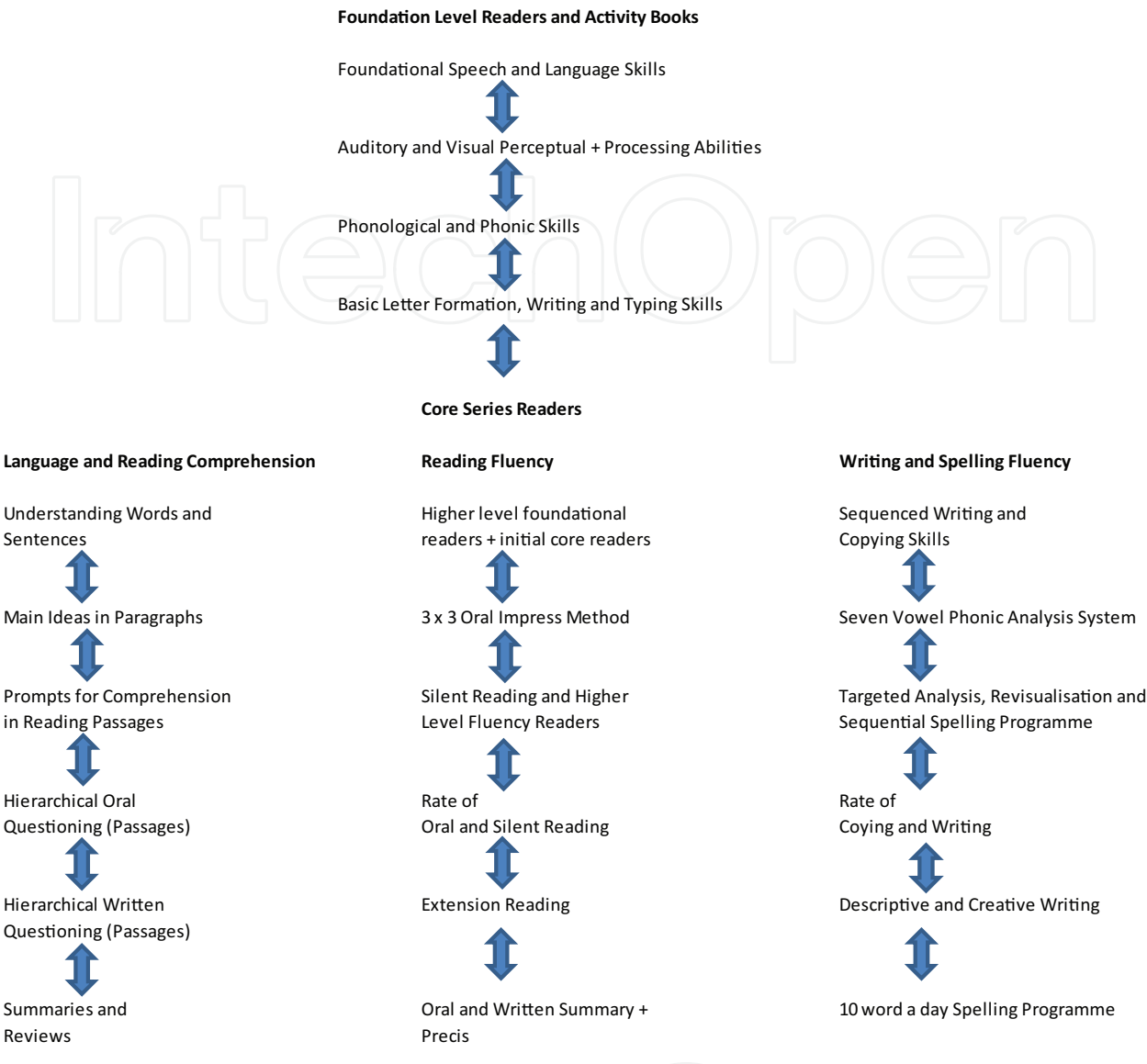


Table 1. Model of areas of intervention and components in the fluency-based programme.

Implicit in the model presented in **Table 1** is the assumption that the processes of reading, writing, and spelling need to be linked to processes of phonological and perceptual development, language development, and comprehension. At least one fluency-based activity involving repetition was undertaken in each therapy session as a means of developing automaticity in these functional areas, as well as the linkages between the brain areas used in reading, writing, and spelling, on which automaticity is based.

3. Programme implementation

Child 1’s programme was implemented in hourly sessions, with two components (e.g. an activity based on a language and comprehension area component followed by a writing and

spelling fluency activity; or a reading fluency activity followed by a writing and spelling fluency activity) being covered within the hour. As indicated earlier in this chapter, the reading fluency material was drawn from a resource of 80 graded, large-print, phonically based ebooks written by the author². These were used both as material for developing reading fluency [26], as well as for activities designed to develop writing and spelling fluency [27, 28], with phonic analysis forming an essential component in both these areas of the programme. The reading fluency as well as the writing and spelling fluency activities and methods were then reinforced by being implemented at home³.

As English is a relatively complex written language system, both reading fluency and writing and spelling fluency, were developed through two linked strategies. On the one hand, fluency-based methods were used which aimed to develop automaticity through repetition, while at the same time phonic analysis was undertaken as the basis for developing alphabetic and word attack skills. This was done using a seven vowel phonic analysis system designed to simplify the phonic rules, while at the same time lessening the orthographic constraints applying in English text. The use of seven as opposed to five vowels was based on indications from Perfetti and McCutchen's work [29–32] and Perfetti et al.'s research in China [33] of a universal phonic principle which is applied across both shallow and more opaque as well as pictographically based orthographies, as soon as the phonological basis of a particular written language system is mastered by the child.

As English orthography is complex, opaque, and takes longer to grasp than more transparent orthographies [34], the author's aim was to make English orthography transparent through consistent use of a phonic analysis system which was consistent, easy to explain, and easy for Child 1 to master and then apply. Use of seven vowels removed many of the inconsistencies and constraints implicit in the tasks of learning to read, copy, write, and spell using the English language, with which Child 1 was experiencing difficulty. As the large-print reading materials in the practice's database had been written based on phonic principles, they could be used as the basis for both the reading fluency as well as the writing and spelling areas of intervention. The ebooks were thus used both in therapy, and were also made available by email to Child 1's parents so that sufficient repetition could be provided on a daily basis for automaticity to develop.

Theoretically, these areas of intervention and components in Child 1's programme reflected the previous contributions of Orton and Gillingham [35–37], Fernald [38], and the Spaldings [39–41], as well as the particular contributions of Sister Mary Caroline on the vowel combinations useful in phonic analysis [42]. The emphasis on linking the development of reading and

²There are currently more than 80 ebooks in the data base of the author's practice The resource is being added to steadily, and the material is made available at low cost to others who wish to use it. Manuals for the reading, writing and spelling methods used with these materials are also made available by email to parents, teachers and therapists in the network of programme users. See <http://www.charlespotter.org>

³The author sent 11 ebooks to Child 1's mother by email over the period between March 2014 and June 2016. These materials were used on a regular basis for both reading fluency work conducted four times a week as well as for writing and spelling fluency activities conducted by the author as an integral part of therapy sessions. The Seven Vowel Phonic Analysis System was also used by Child 1 to learn for his weekly spelling tests at school.

orthography shared commonalities with the models proposed by Frith [43, 44], Ehri [45], and Wolf and her colleagues [46, 47]. The emphasis on developing automaticity through paired reading was based on similar assumptions to the work of Heckelman [48–50] and Laberge and Samuels [51], as well as the approaches described by Topping [52–55].

The techniques used for developing automaticity through combined use of repetitive paired reading and visual tracking in the 3×3 Oral Impress Method, the emphasis on developing writing and spelling automaticity through repetitive phonic analysis using the Seven Vowel Phonic Analysis System, and the emphasis on the development of sequentialisation and working memory skills through use of graded sentence and paragraph dictation passages in the Targeted Analysis, Revisualisation, and Sequential Spelling Programme reflected the author's own contributions. Each of these would appear from the literature to be unique.

It is important to stress that in addition to fluency-based activities, work was also undertaken during therapy sessions with Child 1 in areas of language and comprehension, drawing on the types of exercises suggested by Johnson and Myklebust [56], Harris and Smith [57], Spache [58], Harris and Sipay [59], as well as Moffett [60, 61]. The programme as a whole can thus be described as both fluency-based as well as language and comprehension-based. The two fluency-based areas of intervention (reading, and writing and spelling fluency) were conceptualised as activity-based and hierarchical, while the language and comprehension area was conceptualised as more eclectic, with skills requiring intervention determined both by initial assessment, as well as by clinical teaching. Each area of intervention in therapy was undertaken using simple, low-cost material [62]. In addition, phonically based reading material from the practice's database was made available by email to Child 1's mother to support her reinforcement of the fluency-based activities implemented as an integral part of each therapy session.

4. Additional children who have used the same materials and methods

Children's problems vary, and no one size fits all. There is, however, sufficient breadth of graded, phonically based material in the database of the author's practice to develop fluency-based programmes for children of different ages and with different pre-test levels of reading, writing, spelling, and sequential spelling skill. These materials have thus also been used by the parents of other children in the author's practice diagnosed as having learning disabilities manifesting in difficulties with reading, writing, and spelling, as well as fluency-based difficulties.

As a number of additional children have used the same database of materials, as well as similar methods for developing reading, writing, and spelling fluency, an opportunity sample of 19 other children was selected from the files of children with whom similar fluency-based programmes had been implemented during the years 2014, 2015, and 2016. The selection of the sample was purposive. Criteria for inclusion were that each child had been diagnosed with a learning disability affecting reading, writing, and spelling, had fluency-based difficulties, and would be exposed to work in all three areas of intervention of the fluency-based programme presented in **Table 1**.

As the programmes developed for all of these children had similar aims and were based on the same assumptions as Child 1's individual programme, Child 1 was also included in the sample, bringing the total sample size to 20. The pre- and post-test results of all 20 children were then extracted from the practice's records, and tabulated for purposes of analysis.

5. Design of the analysis

The design of the analysis was to first establish a sample of children based on similarity in areas of difficulty and similarity in the principles applied in developing the fluency-based areas of their individual programmes [63, 64]. This sample was then grouped in terms of similarities and differences in programme inputs [65], in terms what was actually done in the therapy setting with each child [66].

The children's physical and computer files were first examined on a case by case basis. Difference in programme inputs was then used as a categorisation variable. This enabled certain case studies to be aggregated in terms of similarities in programme interventions received by the children, and certain case studies to be contrasted [67–69] on the basis of differences in programme interventions received by the children.

For purposes of analysis, the results of the initial sample of 20 children were thus partitioned into two groups. Included in the first group were 14 children who had consistent programme implementation involving all 3 areas of intervention in the programme, with regular reinforcement of programme activities from their parents at home. Based on these similarities, the results of these children were then inspected for common trends, and conclusions drawn based on triangulation across case studies.

In the second group were six children on whom one or other systematic variation in programme implementation had taken place. These data were analysed by cross-case analysis, using interpretive ex post facto analysis [70–72].

Overall, it should be noted that both groupings of data were purposive opportunity samples based on evidence drawn from clinical work. This limits generalisability [73, 74]. The analysis was also based on inspection and categorisation of the data as opposed to statistical analysis [75–77], owing to the small numbers of children involved, as well as differences in ages, physical and neurological maturation, date of intake into the practice, number of therapy sessions between pre- and post-testing, and gender within the sample.

There were also differences in initial levels of reading, writing, and spelling ability in the children, as well as variation in demographic variables such as the geographical areas in which the children lived, the schools they attended and how far they had to travel to the author's practice. In addition, there were differences in socio-economic variables such as the types of houses, townhouses, or apartment accommodation in which the children's families lived, whether one or both of their parents worked, and how the families spent their leisure time and holidays. These indicated the need for case study, as opposed to statistical treatment of the data.

However, despite age, maturation, demographic, socio-economic, and gender differences, there was a pervasive commonality across the sample as a whole, in that each child has been diagnosed as having a learning disability with difficulties affecting reading, writing, and spelling, as well as fluency-based difficulties. In addition, the individual programmes for each child were based on sufficiently similar principles and used sufficiently similar materials and methods to form the basis for aggregation and case contrast of results.

6. Results

The pre- and post-test results of the two groups are presented in **Tables 2** and **3**. **Table 2** contains the results of Child 1 and of 13 other children who had been exposed to programme inputs involving focus on language and comprehension, phonological and phonic instruction, reading fluency work, as well as writing and spelling fluency work (i.e. all of the different areas of intervention and components in the fluency-based programme). **Table 3** then presents

Child 1

Pre-test date: March 2014	Pre-test age scores			
Grade at School: 3 Gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 8 yrs. 4 mths	7 yrs. 0 mth	7 yrs. 7 mth	7 yrs. 5 mth	7 yrs. 0 mth
Post-test date: June 2016	Post-test age scores			
Grade at School	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 10 yrs. 8 mths	10 yrs. 1 mth	9 yrs. 10 mth	9 yrs. 7 mth	8 yrs. 10 mth
Number of therapy sessions: 84				
Number of reading fluency books covered: 11				
Number of writing/spelling fluency paragraphs covered: 18				

Child 2

Pre-test date: July 2015	Pre-test age scores			
Grade at School: 4 Gender female	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test 9 yrs. 9 mths	9 yrs. 2 mth	9 yrs. 10 mth	9 yrs. 8 mth	7 yrs. 0 mth
Post-test date	Post-test age scores			
Grade at School	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test 10 yrs. 2 mths	10 yrs. 10 mth	11 yrs. 10 mth	9 yrs. 9 mth	13 yrs. 1 mth
Number of therapy sessions: 22				
Number of reading fluency books covered: 5				
Number of writing/spelling fluency paragraphs covered: 10				

Child 3

Pre-test date: November 2014	Pre-test age scores			
Grade at School: 3 Gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 7 yrs. 7 mth	7 yrs. 4 mth	7 yrs. 3 mth	7 yrs. 0 mth	< 6 yrs. 0 mth
Post-test date: November 2016	Post-test age scores			
Grade at School	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 9 yrs. 7 mth	10 yrs. 8 mth	9 yrs. 10 mth	9 yrs. 4 mths	9 yrs. 6 mth
Number of therapy sessions: 73				
Number of reading fluency books covered: 8				
Number of writing/spelling fluency paragraphs covered: 10				

Child 4

Pre-test date: November 2015	Pre-test age scores			
Grade at School: 5 Gender female	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 11 yrs. 5 mth	10 yrs. 8 mth	9 yrs. 5 mth	10 yrs. 9 mth	9 yrs. 6 mth
Post-test date: July 2016	Post-test age scores			
Grade at School: 6	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test 12 yrs. 1 mth	12 yrs. 9 mth	12 yrs. 1 mth	11 yrs. 1 mth	10 yrs. 9 mth
Number of therapy sessions: 30				
Number of reading fluency books covered: 6				
Number of writing/spelling fluency paragraphs covered: 11				

Child 5

Pre-test date: April 2014	Pre-test age scores			
Grade at School: 7 Gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 14 yrs. 0 mth	8 yrs. 2 mth	8 yrs. 6 mth	6 yrs. 8 mth	6 yrs. 9 mth
Post-test date: November 2016	Post-test age scores			
Grade at School: 9	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 16 yrs. 7 mth	12 yrs. 4 mth	11 yrs. 0 mth	8 yrs. 8 mth	8 yrs. 8 mth
Number of therapy sessions: 121				
Number of reading fluency books covered: 9				
Number of writing/spelling fluency paragraphs covered: 31				

Child 6

Pre-test date: November 2015	Pre-test age scores			
Grade at School: 3 Gender female	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 9 yrs. 7 mth	7 yrs. 9 mth	8 yrs. 3 mth	8 yrs. 4 mth	7 yrs. 0 mth

Post-test date: November 2016	Post-test age scores			
Grade at School: 4	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 10 yrs. 7 mth	10 yrs. 9 mth	9 yrs. 5 mth	8 yrs. 7 mth	8 yrs. 0 mth

Number of therapy sessions: 42

Number of reading fluency books covered: 5

Number of writing/spelling fluency paragraphs covered: 15

Child 7

Pre-test date October 2015	Pre-test age scores			
Grade at School: 2 Gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 8 yrs. 11 mth	7 yrs. 7 mth	8 yrs. 3 mth	7 yrs. 3 mth	7 yrs. 3 mth
Post-test date: August 2016	Post-test age scores			
Grade at School: 3	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 9 yrs. 6 mths	9 yrs. 5 mth	9 yrs. 10 mth	8 yrs. 8 mth	8 yrs. 6 mth

Number of therapy sessions: 34

Number of reading fluency books covered: 2

Number of writing/spelling fluency paragraphs covered: 4

Child 8

Pre-test date: June 2014	Pre-test age scores			
Grade at School: 3 Gender female	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 9 yrs. 1 mth	6 yr. 10 mth	7 yrs. 2 mth	5 yrs. 6 mth	< 6 yrs. 0 mth
Post-test date: November 2016	Post-test age scores			
Grade at School: 5	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 11 yrs. 7 mth	8 yrs. 11 mth	8 yrs. 0 mth	7 yrs. 7 mth	7 yrs. 11 mth

Number of therapy sessions: 78

Number of reading fluency books covered: 9

Number of fluency paragraphs covered: 11

Child 9

Pre-test date: March 2016	Pre-test age scores			
Grade at School: 4 Gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 10 yrs. 6 mth	7 yrs. 10 mth	8 yrs. 6 mth	7 yrs. 4 mth	6 yrs. 9 mth
Post-test date: November 2016	Post-test age scores			
Grade at School: 4	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 11 yrs. 3 mth	10 yrs. 0 mth	8 yrs. 11 mth	8 yrs. 2 mth	7 yrs. 11 mth

Number of therapy sessions: 27

Number of reading fluency books covered: 6

Number of fluency paragraphs covered: 8

Child 10

Pre-test date: August 2016	Pre-test age scores			
Grade at School: 2 Gender female	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 8 yrs. 10 mth	8 yrs. 5 mth	7 yrs. 7 mth	7 yrs. 6 mth	< 6 yrs. 0 mth
Post-test date: November 2016	Post-test age scores			
Grade at School: 2	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 9 yrs. 1 mth	9 yrs. 3 mth	9 yrs. 2 mth	8 yrs. 1 mth	8 yrs. 6 mth
Number of therapy sessions: 17				
Number of reading fluency books covered: 3				
Number of fluency paragraphs covered: 6				

Child 11

Pre-test date: October 2015	Pre-test age scores			
Grade at School: 1 Gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 7 yrs. 4 mth	6 yrs. 10 mth	7 yrs. 5 mth	6 yrs. 6 mth	< 6 yrs. 0 mth
Post-test date: November 2016	Post-test age scores			
Grade at School: 2	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 8 yrs. 4 mth	8 yrs. 4 mth	8 yrs. 8 mth	7 yrs. 9 mth	8 yrs. 4 mth
Number of therapy sessions: 29				
Number of reading fluency books covered: 4				
Number of fluency paragraphs covered: 12				

Child 12

Pre-test date: June 2016	Pre-test age scores			
Grade at School: 5 Gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 10 yrs. 8 mth	8 yrs. 5 mth	8 yrs. 3 mth	6 yrs. 9 mth	< 6 yrs. 0 mth
Post-test date: November 2016	Post-test age scores			
Grade at School: 5	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 11 yrs. 4 mth	10 yrs. 1 mth	9 yrs. 10 mth	9 yrs. 6 mth	8 yrs. 10 mth
Number of therapy sessions: 25				
Number of reading fluency books covered: 4				
Number of writing/spelling fluency paragraphs covered: 2				

Child 13

Pre-test date: April 2016	Pre-test age scores			
Grade at School: 5 Gender female	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 8 yrs. 10 mth	8 yrs. 6 mth	8 yrs. 0 mth	6 yrs. 6 mth	6 yrs. 0 mth
Post-test date: November 2016	Post-test age scores			

Grade at School: 5	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 9 yrs. 1mth	9 yrs. 1 mth	9 yrs. 5 mth	7 yrs. 6 mth	7 yrs. 0 mth

Number of therapy sessions: 26

Number of reading fluency books covered: 9

Number of fluency paragraphs covered: 7

Child 14

Pre-test date: October 2015	Pre-test age scores			
Grade at School: 1 Gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 7 yrs. 4 mth	6 yrs. 6 mth	6 yrs. 9 mth	6 yrs. 8 mth	< 6 yrs. 0 mth

Post-test date: November 2016

	Post-test age scores			
Grade at School: 2	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 8 yrs. 4 mth	8 yrs. 7 mth	9 yrs. 2 mth	9 yrs. 7 mth	8 yrs. 6 mth

Number of therapy sessions: 29

Number of reading fluency books covered: 4

Number of fluency paragraphs covered: 17

Note that in **Table 2**, the pre- and post-test scores for each child have been highlighted and also accentuated in larger font size to enable case by case visual inspection of the data for each type of assessment test used, as well as profile interpretation across different areas of the assessment.

Table 2. Pre- and post-test results of children who have worked on phonological and phonic skills, reading fluency, as well as writing and spelling fluency.

Child A: worked in only one of the fluency areas of the programme (reading fluency) owing to need to focus on phonological and phonic difficulties

Pre-test date: June 2016	Pre-test age scores			
Grade at School: 1 Gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 6 yrs. 8 mth	6 yrs. 4 mth	5 yrs. 6 mth	6 yrs. 1 mth	< 6 yrs. 0 mth
Post-test date: November 2016	Post-test age scores			
Grade at School: 1	One word reading	Sentence reading	One word spelling	Sequential Spelling
Age at post-test: 7 yrs. 2 mth	8 yrs. 2 mth	8 yrs. 3 mth	7 yrs. 9 mth	< 6 yrs. 0 mth

Number of therapy sessions: 24

Number of reading fluency books covered: 10

Number of writing/spelling fluency paragraphs covered: 0

Child B: worked in only one of the fluency areas of the programme (reading fluency) owing to need to focus on phonological and phonic difficulties, as well as persistent letter reversals in writing

Pre-test date: December 2015	Pre-test age scores			
Grade at School: 2 Gender male	One word reading	Sentence reading	One word spelling	Sequential Spelling
Age at pre-test: 7 yrs. 6 mth	7 yrs. 4 mth	7 yrs. 2 mth	5 yrs. 5 mth	< 6 yrs. 0 mth

Post-test date: November 2016	Post-test age scores			
Grade at School: 2	One word reading	Sentence reading	One word spelling	Sequential Spelling
Age at post-test: 8 yrs. 2 mth	8 yrs. 6 mth	8 yrs. 11 mth	7 yrs. 9 mth	< 6 yrs. 0 mth

Number of therapy sessions: 41
 Number of reading fluency books covered: 3
 Number of writing/spelling fluency paragraphs covered: 0

Child C: worked only during therapy sessions as parent was unwilling to work on fluency materials with child at home

Pre-test date: April 2015	Pre-test age scores			
Grade at School: 4 Gender male	One word reading	Sentence reading	One word spelling	Sequential Spelling
Age at pre-test: 10 yrs. 7 mth	8 yrs. 2 mth	7 yrs. 7mth	7 yrs. 9 mth	7 yrs. 2 mth
Post-test date: December 2016	Post-test age scores			
Grade at School: 5	One word reading	Sentence reading	One word spelling	Sequential Spelling
Age at post-test: 12 yrs. 2 mth	8 yrs. 6 mth	8 yrs. 0 mth	8 yrs. 1 mth	8 yrs. 1 mth

Number of therapy sessions: 45
 Number of reading fluency books covered: 3 (working with therapist only)
 Number of writing/spelling fluency paragraphs covered: 20

Child D: slow learning child who has worked well during therapy sessions but inconsistently on reading fluency materials, due to divorce in family, and mother's unwillingness to support the programme with work on reading fluency materials at home

Pre-test date: August 2014	Pre-test age scores			
Grade at School: 4 Gender male	One word reading	Sentence reading	One word spelling	Sequential Spelling
Age at pre-test: 14 yrs. 8 mth	9 yrs. 8 mth	9 yrs. 1mth	9 yrs. 6 mth	9 yrs. 0 mth
Post-test date: December 2016	Post-test age scores			
Grade at School: 6	One word reading	Sentence reading	One word spelling	Sequential Spelling
Age at post-test: 16 yrs. 0 mth	11 yrs. 8 mth	10 yrs. 1 mth	10 yrs. 7 mth	11 yrs. 0 mth

Number of therapy sessions: 74
 Number of reading fluency books covered: 3 (working with therapist only)
 Number of writing/spelling fluency paragraphs covered: 68

Child E: worked in both of the fluency areas of the programme (reading fluency, and writing/spelling fluency using analytical phonics linked to sequential spelling), but not on basic phonic skills and phonic workbooks

Pre-test date: April 2015	Pre-test age scores			
Grade at School: 7 Gender male	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at pre-test: 8 yrs. 10 mth	9 yrs. 7 mth	8 yrs. 6 mth	8 yrs. 0 mth	7 yrs. 6 mth
Post-test date: December 2015	Post-test age scores			
Grade at School: 7	One word reading	Sentence reading	One word spelling	Sequential spelling
Age at post-test: 9 yrs. 1mth	11 yrs. 4 mth	11 yrs. 4 mth	7 yrs. 9 mth	8 yrs. 6 mth

Number of therapy sessions: 29
 Number of reading fluency books covered: 9
 Number of fluency paragraphs covered: 14

Child F: slow learning child who has worked on reading fluency but has not yet had consistent intervention in the writing/sequential spelling area of the programme, owing to the need to focus on developing phonological, phonic and language skills

Pre-test date: November 2013	Pre-test age scores			
Grade at School: 2	Gender male	One word reading	Sentence reading	One word spelling
Age at pre-test: 10 yrs. 0 mth		7 yrs. 7 mth	8 yrs. 6 mth	7 yrs. 8 mth
Post-test date: December 2016	Post-test age scores			
Grade at School: 5		One word reading	Sentence reading	One word spelling
Age at post-test: 13 yrs. 0 mth		11 yrs. 8 mth	10 yrs. 1 mth	9 yrs. 7 mth
Sequential spelling				
7 yrs. 8 mth				
Number of therapy sessions: 97				
Number of reading fluency books covered: 7				
Number of fluency paragraphs covered: 6				

Note that in **Table 3**, the pre- and post-test scores for each child have been highlighted and also accentuated in larger font size to enable ease by case visual inspection of the data for each type of assessment test used, as well as profile interpretation across different areas of the assessment.

Table 3. Case contrasts (pre- and post-test results of children where systematic variations in implementation of the fluency-based programme have occurred).

six case contrasts (the results of six children on whom systematic variation in one or more area of programme implementation has occurred over the past 3 years).

The results presented in **Table 2** indicate a number of common trends indicating improvements made by these children in all areas pre- and post-tested. The results presented in **Table 3**, in contrast, indicate improvements in certain areas of functioning but not in others.

These trends and counter-trends in the data will be discussed in the section following, by linking particular groupings of results to particular intervention areas in the fluency-based programme. The discussion will be structured by first focusing on common trends in the results of the main body of case studies (i.e. the 14 children for whom convergent implementation of our programme has taken place). Divergences will then be highlighted, by focusing on the counter-trends evident in the six case contrasts (i.e. the six children where divergent implementation of the programme has occurred).

7. Discussion

There are limitations in interpretive analysis of case studies, as well as ex post facto analysis of evidence. Claims made on the basis of these types of evidence are limited, and essentially descriptive and exploratory.

Nevertheless, despite the cautions applying to both opportunity sampling and generalisability, a number of trends in the main body of case studies can be highlighted.

7.1. The main body of case studies

It will be evident from **Table 2** that each of the 14 children exposed to all areas of intervention in the programme has made gains in each of the 4 areas tested. However, some of the children have made greater and quicker progress than others. Some children have also required more input in terms of therapy sessions than others, indicating that in many cases, the gains made have been hard to achieve.

For this reason, gains made by these children relative to programme input variables as well as number of therapy sessions are summarised in **Table 4**.

As programme inputs have been similar for all these children, progress made relative to number of therapy sessions has been used to further partition the data, so as to highlight trends in response to the programme.

7.1.1. *Children responding rapidly to treatment*

A number of the children have responded rapidly to intervention in the reading fluency area of the programme (Child 1, Child 4, Child 7, Child 10, Child 11, Child 12, and Child 14) indicated by number of therapy sessions conducted and number of reading fluency books covered. These children all commenced the programme with deficits in one word reading and sentence reading, and have all achieved reading scores within 6 months of chronological age at time of post-testing. The evaluation reports from the children's parents indicate that there have been observable differences in reading fluency, and improvement in the following problems with problems with reading accuracy and fluency which were evident prior to commencement of the programme, in the following areas:

- Word-by-word reading;
- Inaccurate reading of words;
- Incorrect reading of phrases;
- Incorrect phrasing;
- Slow rate of reading;
- Hesitant reading;
- Unconfident reading; and
- Poor reading fluency.

Child 2, Child 11, and Child 14 have also responded to the writing and spelling fluency methods used in the programme rapidly, achieving spelling, and sequential spelling scores either above or at level of within 6 months of chronological age at time of post-testing. Each of these children has also done well in their written work presented at school, as indicated by analysis of their school books and their school reports.

Programme inputs					Programme outputs					
	Phonic workbooks	Reading fluency	Writing and spelling fluency	Language and comprehension	Parent support at home	Word reading gains	Sentence reading gains	Word spelling gains	Sequential spelling gains	Parent fluency rating gains
Child 1	◊	◊	◊	◊	11 bks in 27 mths	37 mths in 27 mths	27 mths in 27 mths	26 mths in 27 mths	22 mths in 27 mths	◆
Child 2	◊	◊	◊	◊	5 bks in 5 mths	20 mths in 5 mths	24 mths in 5 mths	1 mth in 5 mths	73 mths in 5 mths	◆
Child 3	◊	◊	◊	◊	8 bks in 24 mths	40 mths in 24 mths	31 mths in 24 mths	28 mths in 24 mths	42 mths in 24 mths	◆
Child 4	◊	◊	◊	◊	6 bks in 8 mths	25 mths in 8 mths	32 mths in 8 mths	4 mths in 8 mths	15 mths in 8 mths	◆
Child 5	◊	◊	◊	◊	9 bks in 31 mths	50 mths in 31 mths	30 mths in 31 mths	24 mths in 31 mths	23 mths in 31 mths	◆
Child 6	◊	◊	◊	◊	5 bks in 12 mths	36 mths in 12 mths	14 mths in 12 mths	3 mths in 12 mths	12 mths in 12 mths	◆
Child 7	◊	◊	◊	◊	2 bks in 10 mths	22 mths in 10 mths	19 mths in 10 mths	17 mths in 10 mths	15 mths in 10 mths	◆
Child 8	◊	◊	◊	◊	9 bks in 29 mths	25 mths in 29 mths	10 mths in 29 mths	25 mths in 29 mths	23 mths in 15 mths	◆
Child 9	◊	◊	◊	◊	6 bks in 8 mths	26 mths in 8 mths	5 mths in 8 mths	8 mths in 8 mths	14 mths in 8 mths	◆
Child 10	◊	◊	◊	◊	3 bks in 4 mths	8 mths in 4 mths	19 mths in 4 mths	5 mths in 4 mths	30 mths in 4 mths	◆
Child 11	◊	◊	◊	◊	4 bks in 13 mths	18 mths in 13 mths	15 mths in 13 mths	15 mths in 13 mths	28 mths in 13 mths	◆
Child 12	◊	◊	◊	◊	4 bks in 5 mths	20 mths in 5 mths	19 mths in 5 mths	33 mths in 5 mths	34 mths in 5 mths	◆
Child 13	◊	◊	◊	◊	9 bks in 7 mths	7 mths in 7 mths	17 mths in 7 mths	12 mths in 7 mths	12 mths in 7 mths	◆
Child 14	◊	◊	◊	◊	4 bks in 13 mths	25 mths in 13 mths	29 mths in 13 mths	35 mths in 13 mths	39 mths in 13 mths	◆

Note that programme inputs in **Table 4** refer to the different areas of the fluency-based programme implemented with each child. Programme outputs are quantified in terms of gains made by the child in each area of assessment (expressed as gain scores in months relative to the period of time in months spent in therapy between pre- and post-testing). Parents' rating of improvements in fluency is an additional indicator of gains made by each child. Number of months spent in therapy is an indicator of the severity of each child's learning disability.

Table 4. Analysis of programme inputs and outputs (main body of case studies).

Child 4, Child 7, Child 10, and Child 12, in contrast, have responded well to the reading fluency area of intervention in the programme, but require additional time on task and additional work in writing and spelling areas of the programme. These needs are corroborated by analysis of their school books as well as their school reports.

7.1.2. Children responding less rapidly to treatment

Child 1, Child 3, Child 5, Child 6, and Child 8 have all been involved in working with all areas of the programme for some time, as indicated by the number of therapy sessions and the number of reading fluency books on which they have worked. These children have all made progress, but require further work.

Child 1 left the programme in June 2016 as it was felt that his parents were at that point able to address his continuing difficulties with writing and spelling themselves. Child 3, Child 5, Child 6, and Child 8 will be continuing with the programme in 2017.

7.1.3. Gains made in response to teaching both basic skills and fluency

Where focus has been placed in the programme on teaching both basic skills and training fluency, gains have been made in one word reading, sentence reading, one word spelling, and sequential spelling as measured by tests of dictation. While certain children have responded more rapidly to treatment than others, gains have been made by all children, indicating that both basic skills and fluency are trainable, in both reading and in writing and spelling.

The gains made on psychometric tests have been corroborated by qualitative evidence from parent evaluation questionnaires as well as the children's school reports. All children in the main body of case studies have made progress at school, and their parents have also evaluated the programme positively. Child 1, for example, passed the year well, 8 months after entering the programme. His mother's progress evaluation form also indicated many areas of gain, relative to his fluency skills when he commenced the programme. This is presented as Appendix 1 at the end of this chapter, together with a copy of the evaluation form itself as Appendix 2, should others wish to use it.

7.1.4. Conclusions

Overall, analysis of the main body of case studies would suggest that consistent involvement in fluency-based work is associated with gains in psychometric test scores as well as positive changes in performance at school in all 14 cases presented. On the basis of observable improvement, the parents of all 14 children have evaluated their progress positively.

It is important to stress that all 14 children in the main body of case studies have not only been involved in all areas of intervention in the fluency-based programme, but have also had consistent input both from the therapist and from the child's parents in support of particular components within the programme at home. Fluency in reading has been addressed both in therapy sessions and at home by repetitive paired reading methods, in which paragraphs read are repeated with the order of the person reading being rotated. It has also been addressed

through simultaneous focus on visual tracking. This type of intervention has led to observable effects which have sometimes been achieved quickly, but in the majority of cases have required considerable focus and application. To provide the necessary time on task, the involvement of both therapist and parent has been essential.

Fluency in writing and spelling has been addressed through a variety of methods involving not only training in phonics and basic skills in writing and copying, but also by teaching the child how to analyse words based on phonic analysis of how words work, and then using these skills as the basis for training of working memory for words in sequence. This type of intervention has led to effects which have sometimes been achieved quickly, but in the majority of cases have required considerable time on task.

In developing individual programmes for each of the 14 children, the processes of reading, writing, spelling, and comprehension have been conceptualised as linked on a functional level, with basic phonological and phonic skills initially being taught as a foundation for use in the processes of reading, writing, spelling, and comprehension. The use of repetitive paired reading has then formed the basis for developing reading fluency, while at the same time a seven vowel phonic analysis system has been introduced to provide a metacognitive basis for developing fluency in writing and spelling.

In each case where this type of linked intervention across areas and components has taken place, there has been steady and even progress. There has also been evidence of a backwash effect from application of the methods used in teaching phonic analysis into both proficiency in one word reading ability as well as fluency in reading sequentially, as well as reciprocal effects from use of reading fluency methods into competencies in writing and spelling (and vice versa). The indications would thus be that there is commonality of influence across the different areas of the fluency-based intervention programme described in this chapter.

Following Luria [78–80], the reason for commonality of influence across the different areas and components in the programme would be that the various language, reading, writing, and spelling interventions are dependent on the mediation of speech processes. They would thus be dependent on the development of both phonological and phonic abilities, which would need to be the core skills taught in the language and reading comprehension, the reading fluency, as well as the writing and spelling fluency areas of intervention in the programme, as well as across different components within each of these areas, on a functional level.

In terms of more recent literature, commonality of influence could also be cited as evidence of a common linguistic awareness manifesting in phonological, orthographic, and morphological awareness as suggested by Berninger et al. [81], and of a universal phonic principle manifesting across different orthographies as suggested by Perfetti et al. [82]. Difficulties in developing linguistic awareness and the universal phonic principle would have been assisted, as suggested by McCutchen [83], by introducing metacognitive strategies such as the Seven Vowel Phonic

Analysis System in each of the 14 children's individual programmes. Greater metacognitive control, as opposed to simply increasing encapsulated automaticity, would then have accounted for the backwash effects as well as the steady progress across different areas of the fluency-based programme observed in therapy.

7.2. Case contrast analysis

In addition to the 14 children in the main body of case studies, 6 case studies have been presented in **Table 3** for purposes of case contrast. These are children for whom there has been one or other systematic variation in programme implementation (differences in programme inputs in terms of areas of the programme covered, or differences in parental support at home).

To enable case contrast, gains made by these children relative to programme input variables and number of therapy sessions are summarised in **Table 5**.

It will be evident from **Table 5** that there are differences in terms of programme input indicating that differences in the areas of intervention in the programmes implemented with each child. There has also been uneven progress in terms of the output variables, indicating that each of the six children has not made steady and even progress in terms of gains made on the four assessment tests used to monitor progress made in response to therapy. This would also indicate that the following variables affected successful implementation of the fluency-based intervention programme with these children.

7.2.1. Parental support

Whereas each of the 14 children in the main body of case studies has been exposed to regular parental support involving exposure to repetitive paired reading on the reading fluency ebooks, and have also produced evidence of gains in reading fluency, both Child C and Child D in the contrast group have not had consistent input from their parents at home.

Gains have been made by both children, but their case files indicate that less ground has been covered and that gains would have been greater, had parental support been more consistent.

7.2.2. Exposure to all three areas of intervention in the programme

Whereas each of the 14 children in the main body of case studies has been exposed to all areas of intervention in the fluency-based programme, and have produced evidence of gains in all four sides of the assessment, both Child A and Child B have had difficulties at the phonological and phonic level which have required particular attention. They have thus been exposed to work on language and comprehension, auditory processing, phonological awareness and

Programme inputs					Programme outputs					
	Phonic workbooks	Reading fluency	Writing and spelling Fluency	Language and comprehension	Parent reinforcement at home	Word reading gains	Sentence reading gains	Word spelling gains	Sequential spelling gains	Parent fluency rating gains
Child A	◇	◇		◇	10 bks in 5 mths	20 mths in 5 mths	33 mths in 5 mths	20 mths in 5 mths	0 mths in 5 mths	◆
Child B	◇	◇		◇	3 bks in 11 mths	14 mths in 11 mths	21 mths in 11 mths	26 mths in 11 mths	0 mths in 11 mths	◆
Child C	◇	◇	◇	◇	3 bks in 20 mths	4 mths in 20 mths	5 mths in 20 mths	4 mths in 20 mths	9 mths in 20 mths	Working with therapist only
Child D	◇	◇	◇	◇	3 bks in 28 mths	24 mths in 28 mths	12 mths in 28 mths	13 mths in 28 mths	24 mths in 28 mths	Working with therapist only
Child E		◇	◇	◇	9 bks in 8 mths	21 mths in 8 mths	24 mths in 8 mths	- 3 mths in 8 mths	12 mths in 8 mths	◆
Child F	◇	◇		◇	7 bks in 37 mths	37 mths in 37 mths	17 mths in 37 mths	23 mths in 37 mths	20 mths in 37 mths	◆

Note that programme inputs in **Table 5** refer to the different areas of the fluency-based programme implemented with each child. Programme outputs are quantified in terms of gains made by the child in each area of assessment (expressed as gain scores in months relative to the period of time in months spent in therapy between pre- and post-testing). Parents' rating of improvements in fluency is an additional indicator of gains made by each child. Number of months spent in therapy is an indicator of the severity of each child's learning disability.

Table 5. Analysis of programme inputs and outputs (case contrasts).

phonics as well as consistent work on reading fluency ebooks, and have also had work on basic skills in writing and spelling.

However, neither Child A nor Child B has yet worked on the writing and spelling fluency area of the programme. The assessment data on both children also indicates that neither Child A or Child B has made gains in sequential spelling skills, suggesting that gains in sequential writing and dictation skills are associated with exposure to the writing and spelling fluency area of the programme.

This may seem a trivial and self-evident conclusion. It is an important one, nevertheless, for the reason that all children in the author's practice have been diagnosed as learning disabled against the DSM IV criteria. Certain children can also be described as resistant to treatment, as they have had previous interventions which have not been effective. As both Child A and Child B have had multiple difficulties and can also be described as treatment resistant children, evidence of improvement as well as lack of evidence of improvement would be important indicators.

7.2.3. Consistent exposure to basic phonological and phonic instruction

Whereas all of the 14 children in the main body of case studies have been exposed to all 3 areas of intervention in the fluency-based programme and have produced evidence of gains in all 4 tests used in assessment, Child E was exposed to the language and reading fluency areas and the writing and spelling fluency area of the programme. However, he was not exposed to consistent basic phonological and phonic instruction, as provided by instruction targeting the particular types of errors made on the Phonic Inventories, as well as exposure to reading skill activity books and phonic workbooks.

Child E has not made gains in spelling skills, suggesting that gains in spelling are associated with exposure to basic phonic instruction. The gains made in sequential spelling, in contrast, would appear to be associated with involvement with the sequencing, and the working memory skills taught in the writing and spelling fluency area of the programme.

It is thus important to stress that phonological and phonic abilities would appear to be the core and foundational skills essential to progress in both the reading fluency and the writing and spelling intervention areas of the programme. The evidence from analysis of Child E's results would indicate that phonological and phonic abilities should remain the focus of intervention, even where children are older, or where there are time constraints affecting programme implementation.

7.2.4. Use of the programme with slow learning children

Both Child D and Child F are slow learning children. Each child has made progress on all four sides of the assessment, but each child has required a large number of therapy sessions to support the gains made, suggesting that slow learning children can benefit from exposure to the language, reading fluency, and writing fluency areas of the programme, but require greater support to do so.

Lerner⁴ has suggested that it is important to bear in mind that slow learning children learn, but that this is at a slower rate than many other children. This observation would be corroborated by the author's experience, as well as the experience of other teachers and therapists who have worked with the materials and methods used in the programme.

It has also been the author's observation that certain of the children who have been treated in the practice make gains and can "bank" the skills learned and integrities developed. In other children, deterioration takes place in the absence of repetition, indicating difficulties in long-term memory processes and needs for ongoing work to maintain and consolidate gains made.

8. Summary and evaluation

Vygotsky suggests [84] that higher mental functions such as speech, reading and writing exist as a result of interaction between highly differentiated brain structures. These structures make their own individual specific contributions to the dynamic whole. Luria [85] thus conceptualises brain structures as being dynamic and changing, as lower level functioning evolves to provide a basis for higher level functioning. The structure of mental functions does not remain constant, but is dynamic and systemic, developing the capacity for greater integration through a process of automaticity, in which previously unconnected acts become highly automatized skills.

The fluency-based programme described in this chapter is based on these assumptions. It represents an attempt to operationalise Luria's theories, and to create a resource of low-cost material which can be used to develop basic skills and automaticity in reading, and basic skills and automaticity in writing and spelling. There are a number of different areas and components in the programme, as well as four sides to the assessment process used to establish basic skill and fluency needs, and to monitor the implementation of the programme in practice.

An attempt has been made in this chapter to indicate through one detailed case study how results from assessment can be used to develop an individual programme relating to both basic skill and fluency needs both in reading and in writing and spelling, and to link these needs to a variety of programmatic activities on a functional level. The results of 14 children who have been exposed to all three areas of intervention in the programme have then been presented in tabular format. The evidence presented indicates that each of the children in the main body of case studies has made observable improvement in each of the four sides of the

⁴Comment on slow learning children made by Janet Lerner to the author in 1977.

assessment used to monitor the implementation of the programme. Each of the children has also made observable improvements at school.

The results of six other children have then been presented in similar format as a case contrast group. This evidence has been drawn from the files of children in the practice for whom there has been one or other systematic variation in the way in which the programme has been implemented. Case contrast analysis has then been used to highlight three implementation variables likely to affect the successful implementation of the programme. These variables are:

- Consistent and regular exposure to phonological and phonic instruction to provide a foundation of basic skills on which the fluency interventions in the programme can be built;
- Consistent implementation of methods designed to improve both reading fluency and writing and spelling fluency to produce the greatest likelihood of positive effects; and
- Consistent support from parents in programme implementation to produce the greatest likelihood of positive effects.

There have also been unanticipated outcomes which are of interest. It was never anticipated that the reading fluency materials used in the fluency-based areas of the programme would be acceptable to children of different ages and cultural backgrounds in South Africa, for the reason that the animal characters and settings used in the ebooks were originally developed for use overseas with a child in Holland. As this child had severe learning disabilities which required long-term intervention, it was necessary to write a series of graded reading books which could lead to learning gains, while at the same time maintaining involvement, motivation, and interest [86]. The development of the first series of books then occurred over a 5 year period in the 1990s, with the content of the books being designed to match the interests and humour of this particular child as she got older.

Over the last 5 years since 2012, a large number of additional graded reading books have been written about the same set of animal characters. These reflect a variety of settings, and have been workshopped and used with South African children of different ages, and from different cultural backgrounds, whose parents report that they find them enjoyable. They are also being used by children in England, as well as in other countries adjacent to South Africa, whose parents are reporting that their children are learning to read more fluently, and at the same time enjoying the stories.

Similarly, the writing and spelling methods used in the programme have been developed over a considerable period of time, have been implemented clinically for a number of years, and have over the past 5 years been implemented with an increasing number of children of different ages, and cultural backgrounds. There is an emerging body of research evidence

indicating that other therapists working with children diagnosed as having learning disabilities have used these methods successfully, (for example, see [87–89]). There is also evidence from the network of parents, teachers, therapists, and schools using the materials, that others are able to use these methods successfully at home, in their practices, as well as in the classroom.

There are limitations in both the data and in the aggregative case study analysis presented in this chapter. The author is a clinician running a busy practice, and referrals into the practice are made from other clinicians as well as on the basis of word of mouth. The composition of the sample is thus not only highly selected on the basis of a referral network, but the evidence presented in this chapter has been based on the results of an opportunity sample consisting of those children who have worked on fluency-based individual programmes, using materials drawn from the practice's database.

Nevertheless, despite limitations in sampling as well as limitations applying to conclusions based on ex post facto case analysis and aggregation, the evidence occurring across the different case studies is recurring. Progress made by 14 children working in all three areas of intervention in the fluency-based programme would suggest that the practice's database of materials is at a point in its development where it has been successfully used with children of a variety of ages and backgrounds in South Africa. There is also additional case by case evidence that it can be used successfully with children in other countries⁵.

This conclusion is based on evidence that in addition to gains in reading, spelling and dictation ages, the parents of young children, as well as adolescents report that there have been observable differences in both reading fluency, and writing and spelling fluency, linked to use of the programme's materials and methods. At the same time, their children have also made progress in relation to their learning difficulties at school, as evidenced by increase in marks and improvement in teacher comments and ratings.

The case studies presented in this chapter indicate gains in basic skills as well as gains in fluency associated with consistent use of the programme's materials and its methods,

⁵Children in South Africa, Botswana, Namibia, Mauritius as well as the United Kingdom are currently using the programme's materials and methods.

linking with positive evidence from parent evaluations, analysis of school books, and reports from school. The evidence from contrast case studies would also suggest broad-based difficulties with automaticity in the children with whom the author has worked, with gains made in areas where the programme has been implemented, and lack of gains in areas where there has been inconsistent or erratic implementation, or lack of implementation.

It has not been possible in this chapter to describe the methods used in working with the children in detail, but interested readers are referred to the author's website at <http://www.charlespotter.org> for more information on the fluency-based areas of the programmes used with the children whose results are reported in this chapter, its methodologies, as well as how to access the resource of materials. The interested reader is also referred to a chapter on the theory underpinning the reading fluency area of intervention in the programme, which can be downloaded free of charge by clicking on the following link: <http://www.intechopen.com/articles/show/title/using-phonically-based-e-books-to-develop-reading-fluency>

On the theoretical level, the results presented in this chapter would provide support for the theoretical framework developed by Luria [90–92], who has suggested that automaticity provides the necessary link between basic and more complex mental operations, and between the basic skills involved in reading, writing, and spelling and the integration required for their more complex use. The evidence of commonality of influence across different areas of the programme would also provide support for the notions of a common linguistic awareness suggested by Berninger et al. [93], and of a universal phonic principle suggested by the work of Perfetti et al. [94] and Perfetti and McCutchen [95].

It is tempting to go beyond functional descriptions of the data into clinical evidence from particular case studies which would indicate support for the various hypotheses developed in the literature to account for the phonological, visual, rate of work, procedural learning, and working memory deficits observed by others. This is beyond the scope of the two chapters presented in this book.

Overall, evidence of improvement through exposure to the programme would indicate, in line with the research of others, (for example, see [96–98]), that focused therapy not only produces changes in behaviour, but is also likely to produce changes on a central level. This, in turn, is likely to contribute to improved performance at school. This is not only a phenomenon observed internationally, but also applies in Southern Africa.

A. Appendix 1

READING FLUENCY MATERIALS: EVALUATION FORM

Date of Birth 12.10.2005

Grade at School 3

Date commenced reading fluency programme

Problems with reading accuracy and fluency prior to commencement of programme (tick each of the following if these apply)

- a. Word by word reading ✓
- b. Inaccurate reading of words ✓
- c. Incorrect reading of phrases ✓
- d. Incorrect phrasing ✓
- e. Slow rate of reading ✓
- f. Hesitant reading ✓
- g. Unconfident reading ✓
- h. Poor reading fluency ✓
- i. Poor reading comprehension owing to poor reading fluency. ✓
- j. Poor reading comprehension due to difficulties with language. Not sure

How many months has your child been using the reading fluency materials?

6 Months

How many of the reading fluency ebooks has your child read?

35

We are busy with Tom the Cat's Secret.

Jud the Rat and Tom the Cat.
~~Jud the Rat~~
 Jud the Rat's House
 Tom the Cat tries to trick Jud the Rat
 Tom the Cat's Secret

What type of changes have you noticed since your child started using the reading fluency materials?

J said to me today
 "Mom I can now read
 Jud the Rat has really helped me, maybe I'll even
 get a 617 for reading on my report."
 He is much more confident
 His phonics has improved and so has spelling
 His anxiety levels have decrease
 Overall I have a much happier child.

Any other comments?

Thank you for your help and your quiet calm
 approach it really has worked with J.
 Kemon has also shown remarkable improvement
 I'm looking forward to his report at the
 end of the year

B. Appendix 2

Name of Child.

Date of Birth

Grade at School

Date commenced reading fluency programme.

Problems with reading accuracy and fluency prior to commencement of programme (tick each of the following if these apply)

- a. Word by word reading
- b. Inaccurate reading of words
- c. Incorrect reading of phrases
- d. Incorrect phrasing
- e. Slow rate of reading
- f. Hesitant reading
- g. Unconfident reading
- h. Poor reading fluency
- i. Poor reading comprehension owing to poor reading fluency
- j. Poor reading comprehension due to difficulties with language.

Number of weeks so far on reading fluency programme.

Child's response so far to reading fluency programme (please comment)

- 1. Has your child enjoyed the programme content? YES NO
- 2. Have you noted improvement in reading accuracy since starting the programme? (please specify what you have seen)
- 3. Have you noted improvement in reading fluency since starting the programme? (please specify what you have seen)
- 4. Have you noted improvement in reading hesitancy and/or confidence since starting the programme? (please specify what you have seen)
- 5. Have you noted improvement in reading comprehension since starting the programme? (please specify what you have seen.)
- 6. Any other comments:

Author details

Charles Potter

Address all correspondence to: pottercs@gmail.com

Educational Psychologist in Private Practice, Johannesburg, South Africa

References

- [1] Luria AR. Higher Cortical Functions in Man. London: Tavistock Publications; 1966
- [2] Luria AR. The Working Brain: An Introduction to Neuropsychology. Harmondsworth: Penguin Education; 1973
- [3] Luria AR. Basic Problems of Neurolinguistics. Vol. 73. Berlin: Walter de Gruyter; 1976
- [4] Potter CS. The Phonic Inventories: An Instrument for Establishing the Patterns of Error Made by Children. Johannesburg: Norwood Remedial School. (mimeo); 1979
- [5] Potter CS. Using the Phonic Inventories for Establishing the Patterns of Error Made by Children with Learning Disabilities. Paper Presented at International Conference on Learning Disabilities. SAALED and the Centre for Continuing Medical Education. Johannesburg; University of the Witwatersrand, July. 1979
- [6] Potter CS. Using phonically based E-books to develop reading fluency. In: Gradinarova B, editor. E-Learning–Instructional Design, Organizational Strategy and Management. Rijeka: InTech; 2015. DOI: 10.5772/61607. Available from: <http://www.intechopen.com/books/e-learning-instructional-design-organizational-strategy-and-mmanagement/using-phonically-based-e-books-to-develop-reading-fluency>
- [7] Potter CS. Using phonically based E-books to develop reading fluency. In: Gradinarova B, editor. E-Learning - Instructional Design, Organizational Strategy and Management. Rijeka: InTech; 2015. DOI: 10.5772/61607. Available from: <http://www.intechopen.com/books/e-learning-instructional-design-organizational-strategy-and-management/using-phonically-based-e-books-to-develop-reading-fluency>
- [8] Pearson Curriculum Group. Modern Curriculum Press Phonic Workbooks Levels A, B and C. Saddle River, NJ: Pearsons; 2011
- [9] Potter CS. The 3 x 3 Oral Impress System: A Manual. Electronic copy available from my practice by emailing me at: pottercs@gmail.com; 2012
- [10] Potter CS. The Phonic Inventories: An Instrument for Establishing the Patterns of Error Made by Children. Johannesburg: Norwood Remedial School (mimeo); 1979

- [11] Potter CS. The Phonic Inventories: An Ipsative Instrument for Analysing the Error Patterns of Children. Johannesburg: University of the Witwatersrand, Department of Psychology (mimeo); 1996
- [12] Potter CS. The Seven Vowel Phonic Analysis System: A Manual. Electronic copy available from my practice by emailing me at pottercs@gmail.com; 2014
- [13] Potter CS. The use of the Targeted Revisualisation Programme in the Development of Spelling Capacity. Johannesburg: University of the Witwatersrand: Department of Psychology (mimeo); 2000
- [14] Potter CS. Model of the Sequence of Instruction Followed in the Targeted Spelling, Imagery, Reading and Revisualisation Programme. Johannesburg: University of Witwatersrand; Department of Psychology (mimeo); 2001
- [15] Potter CS. The Targeted Analysis, Revisualisation and Sequential Spelling Programme: A Manual. Electronic copy available from my practice by emailing me at: pottercs@gmail.com; 2016
- [16] Ravenscroft G. Remedial instructional techniques: Assessing the effectiveness of high imagery teaching techniques in the remedial environment. Unpublished Masters Thesis. Johannesburg: University of the Witwatersrand; 2008
- [17] Schonell FJ. Essentials in Teaching and Testing Spelling. London: MacMillan; 1974
- [18] Potter CS. The Use of Targeted Recall Imagery in the Development of Reading Writing and Spelling Ability. Johannesburg: University of Witwatersrand; Department of Psychology (mimeo); 2003
- [19] Potter CS. A Longitudinal Analysis of a Child Taught Using High Imagery Teaching Techniques (A Case Study Report). Johannesburg: University of the Witwatersrand; Department of Psychology (mimeo); 2004
- [20] Johnson DJ, Myklebust HR. Learning Disabilities; Educational Principles and Practices. New York: Grune and Stratton; 1967
- [21] Harris LA, Smith CB. Reading Instruction through Diagnostic Teaching. New York: Holt, Rinehart and Winston; 1972
- [22] Harris AJ, Sipay SR. How to Improve Reading Ability. White Plains, NY: Longman; 1990
- [23] Spache GD. Diagnosing and Correcting Reading Disabilities. Boston, MA: Allyn and Bacon; 1976
- [24] Moffett J. Teaching the Universe of Discourse. Boston, MA: Houghton Mifflin; 1968
- [25] Moffett J. A Student-Centred Language Arts Curriculum Grades K-13. Boston, MA: Houghton Mifflin; 1973

- [26] Potter CS. The 3 x 3 Oral Impress System: A Manual. Electronic copy available from my practice by emailing me at pottercs@gmail.com; 2012
- [27] Potter CS. The Seven Vowel Phonic Analysis System: A Manual. Electronic copy available from my practice by emailing me at pottercs@gmail.com; 2014
- [28] Potter CS. The Targeted Analysis, Revisualisation and Sequential Spelling Programme: A Manual. Electronic copy available from my practice by emailing me at pottercs@gmail.com; 2016
- [29] Perfetti CA, McCutchen D. Speech Processes in Reading. *Speech and Language: Advances in Basic Research and Practice*. Academic Press, New York. Vol. 71982. pp. 237-269
- [30] McCutchen D, Perfetti CA. The visual tongue-twister effect: Phonological activation in silent reading. *Journal of Verbal Learning and Verbal Behavior*. 1982;**21**(6):672-687
- [31] Perfetti CA, McCutchen D. Schooled language competence: Linguistic abilities in reading and writing. *Advances in Applied PsychoLinguistics*. 1987;**2**:105-141
- [32] McCutchen D. "Functional automaticity" in children's writing: A problem of metacognitive control. *Written Communication*. 1988;**5**(3):306-324
- [33] Perfetti CA, Zhang S, Berent I. Reading in English and Chinese: Evidence for a "universal" phonological principle. *Advances in Psychology*. 1992;**94**:227-248
- [34] Seymour PH, Aro M, Erskine JM. Foundation literacy acquisition in European orthographies. *British Journal of Psychology*. 2003;**94**(2):143-174
- [35] Orton ST. Reading, Writing and Speech Problems in Children. Psyclit database, PsycINFO Database Record (c) 2016 APA; 1937
- [36] Gillingham A, Stillman BW. Remedial Training for Children with Specific Disability in Reading, Spelling and Penmanship. The authors; 1946
- [37] Gillingham A, Stillman BW. The Gillingham Manual. Cambridge, MA: Educators; 1997
- [38] Fernald GM. Remedial Techniques in Basic School Subjects. New York and London: McGraw-Hill Book Company; 1943
- [39] Spalding RB. The Writing Road to Reading: A Modern Method of Phonics for Teaching Children to Read. New York: Whiteside and Morrow; 1962
- [40] Spalding RB, DesRoches JR. The Writing Road to Reading. New York: William Morrow; 1986
- [41] Spalding RB, Spalding WT. The Writing Road to Reading: The Spalding Method of Phonics for Teaching Speech, Writing, and Reading. 4185 SW 102nd Avenue, Beaverton, OR 97005: Riggs Institute; 1990
- [42] Caroline SM. Breaking the Sound Barrier: A Phonics Handbook. New York: Macmillan; 1960

- [43] Frith U. Beneath the surface of developmental dyslexia. *Surface Dyslexia*. 1985;**32**:301-330
- [44] Frith U. A developmental framework for developmental dyslexia. *Annals of Dyslexia*. 1986;**36**(1):67-81
- [45] Ehri LC. Learning to read words: Theory, findings and issues. *Scientific Studies of Reading*. 2005;**9**:167-188
- [46] Wolf M, Miller L, Donnelly K. Retrieval, automaticity, vocabulary elaboration, orthography (RAVE-O) a comprehensive, fluency-based reading intervention program. *Journal of Learning Disabilities*. 2000;**33**(4):375-386
- [47] Wolf M, Barzillai M, Gottwald S, Miller L, Spencer K, Norton E, Morris R. The RAVE-O intervention: Connecting neuroscience to the classroom. *Mind, Brain, and Education*. 2009;**3**(2):84-93
- [48] Heckelman RG. A neurological impress method of reading instruction. Merced, CA: Merced County Schools Office; 1962
- [49] Heckelman RG. A neurological-impress method of remedial-reading instruction. *Academic Therapy*. 1969;**4**(4):277-282
- [50] Heckelman RG. N.I.M. Revisited. *Academic Therapy*. 1986;**21**(4):411-420
- [51] Laberge D, Samuels JS. Toward a theory of automatic information processing in reading. *Cognitive Psychology*. 1974;**6**(2):293-323
- [52] Topping K. Paired reading: A powerful technique for parent use. *The Reading Teacher*. 1987;**40**(7):608-614
- [53] Topping K. (b). Peer tutored paired reading: Outcome data from ten projects. *Educational Psychology: An International Journal of Experimental Educational Psychology*. 1987;**7**(2):133-145
- [54] Topping K. Peer tutoring and paired reading: Combining two powerful techniques. *The Reading Teacher*. 1989;**42**(7):488-494
- [55] Topping K. Paired Reading, Spelling and Writing: The Handbook for Teachers and Parents. London: Cassell; 1995
- [56] Johnson DJ, Myklebust HR. Learning Disabilities; Educational Principles and Practices. New York: Grune and Stratton; 1967
- [57] Harris LA, Smith CB. Reading Instruction through Diagnostic Teaching. New York: Holt, Rinehart and Winston; 1972
- [58] Spache GD. Diagnosing and Correcting Reading Disabilities. Boston, MA: Allyn and Bacon; 1976
- [59] Harris AJ, Sipay SR. How to Improve Reading Ability. White Plains, NY: Longman; 1990

- [60] Moffett J. *Teaching the Universe of Discourse*. Boston, MA: Houghton Mifflin; 1968
- [61] Moffett J. *A Student-Centred Language Arts Curriculum Grades K-13*. Boston, MA: Houghton Mifflin; 1973
- [62] Potter CS. Using phonically based e-books to develop reading fluency. In: Gradinarova B, editor. *E-Learning–Instructional Design, Organizational Strategy and Management*. Rijeka: InTech; 2015. DOI: 10.5772/61607 Available from: <http://www.intechopen.com/books/e-learning-instructional-design-organizational-strategy-and-management/-using-phonically-based-e-books-to-develop-reading-fluency>
- [63] Cohen L, Manion L. *Research Methods in Education*. 3rd ed. London: Croom Helm; 1989
- [64] Denzin NK. *The Research Act: A Theoretical Introduction to Sociological Methods*. Chicago: Aldine; 1970
- [65] Stufflebeam DL. The CIPP model for program evaluation. In: Guba EG, Lincoln YS, editors. *Effective Evaluation: Improving the Usefulness of Evaluation Results through Responsive and Naturalistic Approaches*. San Francisco, CA: Jossey-Bass; 1981. pp. 117-142. Refer also Wikipedia, Program Evaluation
- [66] Denzin NK. The logic of naturalistic inquiry. In: Denzin NK, editor. *Sociological Methods: A Sourcebook*. New York: McGraw-Hill; 1978. pp. 54-73
- [67] Lucas W. *The Case-Survey Method: Aggregating Case Experience*. Santa Monica, CA: Rand Corporation; 1974
- [68] Lucas W. *The Case-Survey and Alternative Methods for Research Aggregation*. Santa Monica, CA: Rand Corporation; 1974
- [69] Seawright J, Gerring J. Case selection techniques in case study research: A menu of qualitative and quantitative options. *Political Research Quarterly*. 2008;**61**(2):294-308
- [70] Guba EG, Lincoln YS. Epistemological and methodological bases of naturalistic inquiry. In: Madaus GE, Scriven M, Stufflebeam DL, editors. *Evaluation Models: Viewpoints on Educational and Human Services Evaluation*. Kluwer-Nijhoff: Boston, MA; 1983. pp. 311-334
- [71] Neuman WL. *Social Science Methods: Qualitative and Quantitative Methods*. Boston, MA: Allyn and Bacon; 1997
- [72] Potter CS. Programme evaluation. In: Terre Blanche M, Durrheim K, Painter D, editors. *Research in Practice: Applied Methods for the Social Sciences*. 2nd ed. Cape Town: University of Cape Town Press; 2006. pp. 409-428
- [73] Kerlinger FN, Lee HB. *Foundations of Behavioral Research*. New York: Holt, Rinehart and Winston; 1999
- [74] Babbie E. *The Practice of Social Research*. 9th ed. New York: Wadsworth; 2001
- [75] Stake RE. The case study method in social inquiry. In: Madaus GF, Scriven MS, Stufflebeam DL, editors. *Evaluation Models: Viewpoints on Educational and Human Services Evaluation*. Kluwer-Nijhoff: Boston, MA; 1983. pp. 279-286

- [76] Wilson SL. Single case experimental designs. In: Breakwell GM, Hammond S, Fife-Shaw C, editors. *Research Methods in Psychology*. Thousand Oaks, CA: Sage; 1995. pp. 69-84
- [77] Rosenthal R, Rosnow RL. *Essentials of Behavioral Research: Methods and Data Analysis*. 2nd ed. New York: McGraw-Hill; 1991
- [78] Luria AR. *Higher Cortical Functions in Man*. London: Tavistock Publications; 1966
- [79] Luria AR. *The Working Brain: An Introduction to Neuropsychology*. Harmondsworth: Penguin Education; 1973. p. 30
- [80] Luria AR. *Basic Problems of Neurolinguistics*. Vol. 73. Berlin: Walter de Gruyter; 1976
- [81] Berninger VW, Abbott RD, Nagy W, Carlisle J. Growth in phonological, orthographic, and morphological awareness in grades 1 to 6. *Journal of Psycholinguistic Research*. 2010;**39**(2):141-163
- [82] Perfetti CA, Zhang S, Berent I. Reading in English and Chinese: Evidence for a “universal” phonological principle. *Advances in Psychology*. 1992;**94**:227-248
- [83] McCutchen D. “Functional automaticity” in children's writing: A problem of metacognitive control. *Written Communication*. 1988;**5**(3):306-324
- [84] Vygotsky LS. Razvitie vysshikh psikhicheskikh funktsii [Development of the Higher Mental Functions]. Moscow: Publishing House of the R.S.F.S.R. Academy of Pedagogical Sciences; 1960. pp. 384-393
- [85] Luria AR. *Higher Cortical Functions in Man*. London: Tavistock Publications; 1966. pp. 36-37
- [86] Sfetsios N. The use of Mental Imagery in the Treatment of a Child with Severe Learning Disabilities. Honours Research Report. Johannesburg: University of the Witwatersrand, Department of Psychology; 2002
- [87] Els K. The use of Mental Imagery in Improving the English Spelling, Reading and Writing abilities of Grade IV Learners with Learning Disabilities. Honours Research Report. Johannesburg: University of the Witwatersrand, Department of Psychology; 2003
- [88] Els K. The use of mental imagery in improving the simultaneous and successive processing abilities of grade V learners with learning disorders of reading and written expression. Unpublished Masters Thesis. Johannesburg: University of the Witwatersrand; 2005
- [89] Ravenscroft G. Remedial instructional techniques: Assessing the effectiveness of high imagery teaching techniques in the remedial environment. Unpublished Masters Thesis. Johannesburg: University of the Witwatersrand; 2008
- [90] Luria AR. *Higher Cortical Functions in Man*. London: Tavistock Publications; 1966
- [91] Luria AR. *The Working Brain: An Introduction to Neuropsychology*. Harmondsworth: Penguin Education; 1973. p. 30
- [92] Luria AR. *Basic Problems of Neurolinguistics*. Vol. 73. Berlin: Walter de Gruyter; 1976

- [93] Berninger VW, Abbott RD, Nagy W, Carlisle J. Growth in phonological, orthographic, and morphological awareness in grades 1 to 6. *Journal of Psycholinguistic Research*. 2010;**39**(2):141-163
- [94] Perfetti CA, Zhang S, Berent I. Reading in English and Chinese: Evidence for a “universal” phonological principle. *Advances in Psychology*. 1992;**94**:227-248
- [95] Perfetti CA, McCutchen D. Schooled language competence: Linguistic abilities in reading and writing. *Advances in Applied Psycholinguistics*. 1987;**2**:105-141
- [96] Simos PG, Fletcher JM, Bergman E, Breier JJ, Foorman BR, Castillo EM, Davis RN, Fitzgerald M, Papanicolaou AC. Dyslexia-specific brain activation profile becomes normal following successful remedial training. *Neurology*. 2002;**58**(8):1203-1213
- [97] Shaywitz BA, Shaywitz SE, Blachman BA, Pugh KR, Fulbright RK, Skudlarski P, Mencl WE, Constable RT, Holahan JM, Marchione KE, Fletcher JM, Lyon GR, Gore JC. Development of left occipitotemporal systems for skilled reading in children after a phonologically-based intervention. *Biological Psychiatry*. 2004;**55**(9):926-933
- [98] Maurer U, Brem S, Kranz F, Bucher K, Benz R, Halder P, Steinhausen H, Brandeis D. Coarse neural tuning for print peaks when children learn to read. *NeuroImage*. 2006;**33**(2):749-758