

The effect of the Ron Davis programme on the reading ability and psychological functioning of children

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Author's note

This is an abbreviated version of the author's thesis for a master's degree in psychology. The degree was awarded the author in April 2005 by Stellenbosch University (South Africa). She does private tutoring and remedial work at present and has lectured in a temporary capacity at the university.

The purpose of the study was to scientifically prove the claims of the *Davis Dyslexia Association International* that the Davis programme, and especially the *Orientation Counseling* and *Symbol Mastery* techniques, can improve the reading ability and psychological well-being of individuals with dyslexia.

Any information regarding the thesis, for instance the measuring instruments, the demographic questionnaires and other results can be obtained from the author at rene@rene-engelbrecht.co.za or rje@mweb.co.za. Her website is <http://www.rene-engelbrecht.co.za>.

Introduction

*Lots of people are unable to see all kinds of truths
right in front of their eyes* (Koontz, 2003, p.498)

Reading is a developmental task that each child in today's society has to master. From grade 1 up to grade 3 children learn how to read and write fluently, but from grade 4 onwards *learning to read* changes to *reading to learn* (Shaywitz, 2003). Children also have to be able to read for fun. Unfortunately many have problems with reading and writing and run the risk of suffering serious developmental problems, such as low self-esteem as well as anxiety, mood and behavioural problems.

The term *learning disorder* was introduced in the fourth edition of the *Diagnostic and statistical manual of mental disorders* (DSM-IV) of the *American Psychological Association* (APA) and in the text revision (DSM-IV-TR) four diagnostic categories were added (quoted in Sadock & Sadock, 2003). The term *learning disorder* overall refers to deficits in children or adolescents concerning the acquisition of reading, writing, speaking, listening, reasoning and mathematical skills in comparison with other children/adolescents of the same age and the same intellectual capacity. The diagnosis of any learning disorder at present requires the learner's performance regarding the specific disorder to be significantly lower than expected and it has to interfere with academic performance or daily activities.

The DSM-IV-TR (quoted in Sadock & Sadock, 2003) defines *reading disorder* specifically as a reading performance which lies beyond the expected level of performance in comparison with children of the same age, education and intellectual capacity. It interferes significantly with academical success and daily activities, such as reading. If a neurobiological condition or sensory disorder is present, the manifestation of the reading disability is worse than would be expected.

This disorder can be distinguished by the individual's inability to recognise words, slow and inaccurate reading and poor comprehension. Children with a reading disorder make many mistakes when they read out loud and their reading is especially characterised by omissions, additions and distortions. They have problems with the printed as well as the written word. Most of them can copy text just as well as their peers, but they spell very poorly. Other problems include affected sound-discrimination and the correct sequencing of words. They also turn or change around letters due to a poorly established left-right following sequence and cannot recall letter names and/or sounds very well. Most of these children inevitably do not like reading and avoid it as much as possible. They become anxious when they have to execute assignments that entail written or printed language. This disorder causes humiliation, shame and frustration due to the constant failure. The older children get without being diagnosed and receiving intervention, the more they manifest low self-esteem, anger and depression. A reading disorder can usually be diagnosed before grade 2, but some children depend on their memory to hide it, especially if they are highly intelligent. Some succeed in acquiring some measure of knowledge about the printed word in the lower grades, but from grade 3 onwards they struggle keeping up with their peers. A few are only identified in grade 4 and even later. It is possible to diagnose a reading disorder as early as grade 1 and if early intervention is started, the problem can be curtailed before the end of grade 2. More serious cases might however need intervention until they are in high school (Sadock and Sadock 2003). A reading disorder can coincide with a mathematics disorder, a disorder of written expression, an expressive language disorder and also an attention-deficit/hyperactivity disorder (AD/HD), although children who are diagnosed with the latter do not always have a language disorder.

Sadock and Sadock (2003) indicated that 5 percent of American pupils suffer from a reading disorder which clearly seems to be the most prevalent learning disorder. In 1998 the *Committee on Preventing Reading Difficulties in Younger Children* of the *American National Research Council* stated that the educational careers of 25 to 40 percent of American children are at risk because they cannot read well or fast enough (Shaywitz, 2003). Mash and Wolfe (2002) proposed that 40 percent of adolescents with a learning disorder stand the chance of not completing their school careers and adults with this disorder run a greater risk of developing

career and/or social problems. It also pertains to the prevalence of major depression and dysthymic disorder (Sadock & Sadock, 2003).

In South Africa reading problems are reaching alarming proportions (Sylvester, 2001; Williams, 2002). According to research done by the Holman Institute in collaboration with the Independent Examination Board on outcomes-based educational standards in assessment of the system introduced by Curriculum 2005, learners handled oral questions well, but could not cope with the written word. According to Williams (2002) reading problems can be blamed on poor pre-school education, on education not received in the first language and on over-crowded classrooms. Hugo (quoted in Rademeyer, 2004), the national director of the Read Educational Trust (Read) claimed that between 6 and 8 million South-Africans cannot read or write and learners cannot perform academically under these circumstances. Holman (quoted in Sylvester, 2001) said that learning performance is a good predictor of managerial and professional success and serious damage can be done to the efficacy of future professional and managerial manpower in South Africa if something is not done about this situation.

Shaywitz (2003) stated that reading problems are to be found in all nations - it is a universal problem and learning problems have no boundaries. The South African learner with a reading problem then most probably has an even greater problem due to additional factors such as poor pre-school education, education not received in the first language, over-crowded classrooms, and unsatisfactory implementation of Curriculum 2005. Other factors such as poverty and poor resources also have to be taken into account (Dugmore quoted in Brits, 2004a, 2004b, 2004c).

According to Raskind (quoted in Broatch, 2003) the psychological influence that reading problems have on the child can be even more stressful than the academic challenges. Many children with reading problems experience strong feelings of frustration, anger, sadness and shame which can lead to psychological problems such as low self-esteem, as well as behavioural problems such as substance abuse and juvenile delinquency. Williams (2002) lends support to these viewpoints by adding that learners who do not acquire basic reading skills often become destructive in their behaviour. Levine (2002) justly remarked that failure injures the child's psyche or spirit. Even if children with reading problems receive support and encouragement they can still suffer (Broatch, 2003).

Although many experts seem to be in favour of the phonic method as far as language instruction is concerned, there does not seem to be real consensus about the construction of reading-intervention programmes. Shaywitz (2003) is strongly in favour of systematic and explicit phonic instruction. Her opinion is that the holistic method focuses on meaning. She says supporters of this method accept that reading is a natural process, which she denies. According to her it is process which is fraught with difficulties

The *Orton-Gillingham Institute for Multi-Sensory Education* in America focuses on each student's visual, auditory and kinesthetic developmental pathways to maximise mastery and retention (Drake, 1999) but they also use systematic phonic instruction. Stowe (2000), on the other hand, says that there is no such thing as a standard form of intervention and each learner has to be evaluated individually and receive a special customised intervention programme. She adds that too much emphasis should not be placed on explicit phonic instruction, especially not to the exclusion of the holistic concept. The basic viewpoint of Nanci Bell (quoted in Stowe, 2000) is that readers must be able to create visual images in order to understand spoken and written language.

In the midst of all these varying programmes and viewpoints there is Ron Davis's (1997, 2003) *Davis Dyslexia Correction* programme. When Davis refers to *dyslexia* (1997, 2003) it indicates a learning disorder and not only a reading disorder. He uses it as an umbrella term for anything that withholds a child or adult from reaching his/her full potential and it covers reading, writing, mathematical and coordination problems (Lichtman, 2001). That which is different about Davis's approach is the fact that learners are given an orientation point by means of verbal guidance and visualisation, which strongly remind of the techniques used

in Neuro-Linguistic Programming. By means of this orientation point they are then able to focus on the written and spoken word.

According to Davis (1997, 2003) people with a reading problem read in a different way because they see things around them from different orientation points. This ability stands them in good stead in the world of concrete images, but leaves them in the lurch when it comes to interpreting one- or two-dimensional subjects such as writing or print. This makes them "disorientate". Davis worked out how this disorientation could be stabilised when it came to reading for example, and this became the basis of the method that he called *Orientation Counseling*. As soon as the individual has been taught how to stabilise his/her disorientation, multisensory techniques are applied to further the correction of the reading problem. According to anecdotal reports and other information available on the web site <http://www.dyslexia.com> the Davis programme has a success rate of more than 90 percent and it empowers people of all age groups to control their reading problems.

The results of a longitudinal study of five years indicated that the *Davis Learning Strategies*, which are based on Davis's reading programme, can be beneficial to all learners, not only those with a reading disorder (Pfeiffer et al., 2001). Research was done with 86 pre-primary-school learners (standard K-1) in the San Francisco Bay area. The *Davis Learning Strategies* were used to ascertain whether it would benefit the learners regarding their sight-word skills. It was presented as a group activity by the educator who taught these learners sight words by means of focusing and multisensory techniques. The result was that the performance of these learners was significantly better than that of the control group in grade 1 as far as learning 100 sight words were concerned. Not one of these learners were referred for special education within the next two years and the referral of gifted learners in this group was also significantly higher than those from the typical school population. According to the *Davis Dyslexia Association International* there are educators in South Africa who apply these methods although no further information was available.

Davis (1997, 2003) believes that dyslexia (as he refers to it) is the result of a natural gift or talent. It goes hand in hand with imagination and creativity. Problem solving is done by looking at the bigger picture rather than using an analytical step-by-step process. He is, amongst others, supported by Gorman, Cuadros, Land, Scully and Song (2003), Levine (2002), Shaywitz (2003) and Stowe (2000). Levine (2002) remarked that many children with learning problems are inclined to be creative. Gorman et al. (2003) said that individuals with dyslexia are over-represented amongst top artists, scientist and entrepreneurs.

According to Davis individuals with dyslexia predominantly think visually and non-verbally. This intuitive, multisensory way of thinking is for example what caused Einstein to have problems at school but also made him the brilliant mathematician he was. Shaywitz (2003) interviewed a few celebrities with a learning disorder and they bore testimony of the ability they have of thinking in a different way. The well-known creator of TV shows, Stephen J. Cannell, for instance said that he struggles with the written word but sees everything he writes as though it is in movie-form. Charles Schwabb, who brought about a major change in America's financial services, said he can visualise how things will look like at the end of the tunnel. He is also good at conceptualising (Jones, 2003). Gorman et al. (2003) argue that it seems as though people with dyslexia have the ability to think outside the box in an unusual way. Davis's method amongst other things uses the individual's imagination and creativity to overcome his/her learning problems.

Davis's technique (1997, 2003) called *Symbol Mastery* is based on recognised multisensory methods (Miller, 1993; Stowe, 2000), and his *Orientation Counseling* is supported by specific psychological models. According to Hartmann (quoted in Davis, 2003) Davis's programme corresponds with certain principles of neuro-linguistic programming (NLP). Hall and Bodenhamer (2000) said the NLP viewpoint is that the human brain can be programmed like computer software. According to O'Connor and McDermott (quoted in Craft, 2001) people react to their map of reality and not to reality itself. They function and communicate according to this map. NLP is the art of changing this map and not reality. It provides the individual the chance of controlling what is considered to be automatic neurological processing (*What is Neurolinguistic Programming™?*, 1996).

Several NLP processes are based on the use of the imagination. Dilts (1998) proposed that by using the imagination and creating images, a person's neurological functions can be stimulated into a certain direction and self-organising processes can be set off that will automatically and subconsciously start working at the end results imagined.

Perception is the sensory observation of something in the environment and it leads to an internal image of the object (Sternberg, 1999). Sometimes an existing object cannot be perceived and sometimes an object, which does not exist, can be perceived (perceptual illusion). This means that what is perceived by human sensory organs is not necessarily perceived by the mind. The human mind takes the available sensory information and manipulates it in a certain manner to create concepts in the mind of objects and spatial relationships in the environment. Davis (1997, 2003) proposes that orientation mainly has to do with perception. You are orientated when you are aware of your place and position by using all your modalities. If you are aware of the place of something in your environment you can place yourself in the correct spatial relationship with it providing your perceptions are accurate. According to Davis orientation therefore refers to the accurate observation of the environment. Hence the possibility exists that individuals with a reading disorder struggle to read because they disorientate when symbols do not make sense to them. Disorientation leads to the perception of a false reality.

Davis (1997, 2003) pays heed to the fact that there are two ways of conceptualising, namely verbally (by means of symbols) and non-verbally (by means of visual images). Most adults use both in some way or another but the verbal way is acquired and develops together with language development. The language development of children with dyslexia is often slow. Shaywitz (2003) substantiates this. Davis (1997, 2003) comes to the conclusion that the verbal conceptualisation of children with dyslexia develops slowly. Non-verbal thought is an innate characteristic of man and starts being used as soon as a child is born. It however has its limitations. And the problem lies in its construction. It can entail any element of a whole series of human perceptions (colour, form, sound, emotions, the perception of movement and touch, taste and smell). It usually also takes place on a subconscious level. A person can slow it down, but most often it takes place at such a pace that it usually feels as though conclusions and deductions have been made intuitively.

Davis (1997, 2003) says that people with dyslexia mainly think non-verbally. They usually have vivid imaginations and if they do not understand something they "disorientate" in order to be able to look at it from different perspectives in their mind. They learn to disorientate early in life and use it when they receive confusing sensory information or when they are busy with creative problem solving. This is, however, also the foundation of their reading problems. When they "disorientate" their perception of the reading symbols with which they are busy, becomes distorted. Because reading has so many confusing sources, they disorientate spontaneously. This once more corresponds with the NLP point of view that one of mankind's sensory channels of input is distortion, meaning that the human brain sometimes makes shifts when it experiences sensory data by misrepresenting reality (James, 1998). The confusion takes place because there is no image for the symbols. This concerns not only visual but also auditory inputs (Davis, 1997, 2003). Stowe (2000) supports this viewpoint by saying that learners with dyslexia sometimes experience visual confusion that causes them to be unable to discriminate between small differences in letters. According to Shaywitz (2003) learners often struggle with sight words because they are not supported by concrete images.

Many of the other intervention programmes that have been developed to help learners with reading problems and especially the programmes in which the phonic method mainly functions, use intensive training and repetition to strengthen the neural pathways. Hereby reading ability is embedded and made automatic and subconscious. Shaywitz (2003) works on the assumption that practice helps improve the talents of athletes and artists and therefore also helps a person with dyslexia. According to Davis such a person is however trying to improve a talent he/she does not have. He says, to children with dyslexia, drill work and repeated exercises seem like something forced on them and this has them repeating something they precisely do not have. Because they have a different way of thinking these repeated exercises make the reading situation even worse. Repeated exercises wear the child with dyslexia down because he/she disorientates. Davis's

techniques teach individuals how to control their mind and how to orientate. His assumption is that individuals with dyslexia can be taught how to orientate and then they can be shown how to master symbolic information.

A significant aspect of Shaywitz's (2003) intervention programme is what she expects of a successful intervention programme. This entails early intervention and intensive high-quality education which lasts long enough. If a child does not receive intervention at an early stage, he/she will need 150 to 300 hours of intensive study. This means 90 minutes per day for a period of 1 to 3 years. The educator has an influence on the results and has to be well qualified. It is hard work to teach a child with dyslexia and a lot of interaction is needed to keep his/her attention. Gorman et al. (2003) support her opinions.

The Davis programme (1997, 2003) normally entails a week of intensive intervention, 6 hours per day. This means about 30 hours. The facilitators are also well trained but the programme is available in both Davis's books, *The gift of dyslexia* and *The gift of learning*, and can be performed by an untrained person if the instructions are followed meticulously.

Fran Thompson (quoted in Stainsby, 2001), president of the *International Dyslexia Association, B. C. Branch*, spoke out against methods that are not scientifically grounded and she recommended that Davis document his more than 90% success rate. Over and above the above-mentioned study about his learning strategies, no other completed studies have been published in a peer-reviewed journal to test whether his *Orientation Counseling*, which forms the core of his programme, do deliver scientifically significant results. When Davis started his programme educators and organisations dealing with dyslexia rejected this innovative approach and were not interested in examining or using his techniques (Marshall 1999).

Since a reading disorder can have such a negative influence on an individual's reading ability, academic performance and psychological functioning and in many instances phonic instruction, which is mostly used as form of intervention, does not always deliver successful results, scientific research of the Davis programme seemed founded. Positive results would mean that individuals with a learning problem as well as learners at risk would at least have an alternative intervention programme at their disposal.

The purpose of this study was to construct a personality profile of the child with a reading problem, to ascertain whether the Davis programme could improve the reading ability of children over a short period of time and, if their reading problems did improve, whether this could have a beneficial effect on their psychological functioning.

Method

Participants

A pretest-posttest, control-group design was used. The method used to obtain participants for the study was to identify a school for children with special educational needs in the Cape Peninsula (South Africa) because the population would then automatically include learners with learning disorders. This would make it easier to exclude certain extraneous variables.

Due to the fact that the research programme was a pilot study, and also since it would be labour-intensive and the population at the school was not very big, the decision was made to select 20 learners (all of them Afrikaans speaking) from grades 5 to 7 as participants – 10 would make out the experimental group and the other 10 the control group. The reason why learners from grade 5 to 7 were chosen was because all of them had already undergone some kind of intervention previously but still were placed in a special school due to their problems. Further criteria were that boys and girls would be included, as far as possible in even numbers, their global intelligence quotient (IQ) had to be 100 or higher, they were not receiving any other form

of intervention at the time of the study, they were not often absent from school and they were not taking any form of medication that could intervene with the programme.

With the aid of educators and school therapists a list of potential candidates was drawn up and out of a possible 100 only 20 met with the criteria. Seven of these candidates were receiving audio and/or transcription aid which meant that they did not have to read or write tests, assignments or examination papers themselves due to the severity of their reading problem.

These participants were then, according to age and gender, randomly assigned to the experimental group and control group. The distribution was skewed with only 6 girls and 14 boys. Therefore 3 girls and 7 boys were assigned to each group. Every second girl/boy on the class lists was assigned to the control group and the others to the experimental group.

Measuring instruments

The following measuring instruments were used:

- *The Standardised ESSI graded Reading and Spelling Tests for Grades 1 to 7* (Esterhuyse, 1997) to test the learners' reading and spelling abilities (standardised for South Africa).
- *The Schonell Silent Reading Test R4 for children up to 14 years* and the *Schonell One-minute Reading Test* (Schonell & Goodacre, 1974). These were used to test the participants' silent-reading comprehension skills as well as their ability to read out loud. Although they have not been standardised for South Africa but for the United Kingdom (UK) they were included since they at least would be useful in providing an indication of improvement or not. They have been translated into Afrikaans and used by South African educators for many years and are regarded as useful instruments.
- The *ASEBA School-Age Forms & Profiles* (Achenbach & Rescorla, 2001), namely the *Child Behavior Checklist for Ages 6-18* (CBCL/6-18), as well as the *Teacher's Report Form for Ages 6-18* (TRF/6-18) were used to measure the nature and extent of emotional, behavioural and concentration problems of the participants.
- Demographic questionnaires had to be answered by parents, educators and participants. These questionnaires were set by the researcher and based on literature about reading problems (Davis, 1997, 2003; Levine, 2002; Mash & Wolfe, 2002; Sadock & Sadock, 2003; Shaywitz, 2003; Stowe, 2000.). The information was used to construct a profile of the child with a reading problem.

Procedure

After consent had been obtained from all parties concerned and the participants assigned to the two groups, the four reading and writing tests were performed by all 20 participants and the parents and educators filled in the two questionnaires, namely the CBCL/6-18 or TRF/6-18 and the demographic questionnaire. The ESSI tests and the Schonell one-minute reading test were applied individually and the Schonell silent reading test was applied in two groups. The reading responses were audiotaped and evaluated by an independent research assistant to control the measurement.

After the testing had been performed members of the experimental group were given the intervention programme, which consisted of certain Davis techniques. Consent was given by the *Davis Dyslexia Association International* to the researcher to use certain Davis techniques provided it be made known that the researcher is not a certified Davis facilitator and that the programme was adapted for the purposes of the study. The techniques were obtained from *The gift of dyslexia* (Davis, 1997) and *The gift of learning* (Davis, 2003). The researcher kept as close to the techniques as possible, namely the *Davis Orientation Counseling* technique and the *Symbol Mastery* technique. In addition Afrikaans readers, magazines, grammar rules and

dictionaries had to be used. The researcher is a qualified educator as well as remedial teacher and familiar with the Davis programme since she has applied it successfully to learners with remedial problems. The research was done as part of her master's degree in psychology at the Stellenbosch University (South Africa).

The first session with individual participants of the experimental group consisted of the *Davis Perceptual Ability Assessment* (an exercise by means of which it can be ascertained whether an individual is a candidate for the programme), structured interviews with the participants by means of the demographic questionnaire, the *Orientation Counseling* (which helps the participant to orientate) and the *Review-* and *Release* procedures (techniques which help the participant to relax and stay focused). All the participants proved to be candidates for the programme and the sample size was thus not affected.

The six other sessions briefly consisted of the following:

- *Fine tuning* (to set the orientation point as well as possible) and *coordination therapy* (exercises that help with left-right coordination).
- Work with dictionaries, different fonts in magazines and readers, and writing exercises.
- *Symbol Mastery*: Working with play dough and remastering the alphabet, punctuation marks, numbers and sight words that cause problems in a multisensory way.
- Reading exercises: The Davis programme uses very specific exercises to help individuals with reading.
- During the last session each participant was told how to maintain the programme at home. They were asked to work at it at least 10 minutes per day. Parents were also advised about this.

After the intervention each member of both groups were retested with the same instruments and the parents and educators had to fill in the CBCL/6-18- and TRF/6-18 again. The purpose was to ascertain whether the reading ability and psychological functioning of the participants of the experimental group had improved in comparison to the control group or not and, if there was an improvement, whether it was scientifically significant.

Since the results proved to be significant the experimental group was tested again 12 weeks after the posttest by means of the same instruments and their parents were again asked to fill in the CBCL/6-18. The educators were not asked to fill in the TRF/6-18 again since the previous data had been compromised due to certain unforeseen factors.

Parents of the control group were informed about the results and those who were interested could attend an information session about the programme.

Data analysis

As far as statistical techniques are concerned, descriptive statistics (averages, histograms and the Shapiro-Wilk test for samples < 50) were used to determine whether there was a normal distribution since the sample was so small. The Shapiro-Wilk test confirmed that the distribution was not normal and therefore non-parametric tests were used to analyse the data, namely the Mann-Whitney U test for two non-related groups (N=20) and the Wilcoxon Signed-Rank test for related groups (n=10 each).

Data were processed by the Centre for Statistical Consultation at Stellenbosch University and a senior research assistant of the Department of Psychology at Stellenbosch University.

Results

Personality profile of the child with a reading disorder

These results, pertaining to the profile of a child with a reading disorder, were obtained from the demographic questionnaires filled in by parents and educators of both groups of participants, the structured interviews held with participants of the experimental group by means of the demographic questionnaire, as well as the CBCL/6-18 and TRF/6-18.

Developmental history

According to parents 14 of the 20 participants were born after a full-term pregnancy. Of these 14 children 7 were either born by means of a Caesarean section, suction or forceps and without any other further complications. Of the 6 premature births 5 had taken place by means of a Caesarean section. Reasons given for the premature births were the following: fetal distress, spontaneous delivery and placental problems.

Of the 20 participants 18 had suffered from common children's ailments and diseases, such as ear infections, tonsillitis and allergies, but 2 had had none. There were 11 participants who had some kind of chronic ailment, and one had had meningitis due to measles when he was 8 months old.

As far as developmental pathways are concerned, the participants who did not reach them at a normal stage, were in the minority. According to parents only 2 of the participants did not crawl at all and 4 couples said that their child either had to be forced to crawl, only crawled for a few days before starting to walk or first walked and then started crawling. As far as language development is concerned 6 parents indicated that their child was slow at starting to talk or used baby talk for a long period of time.

In the research group there were only 2 with minor hearing deficits and 8 had to wear glasses, mainly for reading. There were 11 parents who indicated that their child had a history of problems with hyperactivity, attention and concentration.

Family situation

Of the participants 10 came from families with both a biological father and mother. There were 7 divorced families and 3 where either the mother or father had passed away. There were only 2 families where either the father or mother had remarried. In 8 of these instances the child was living with the mother and 2 with the father. The birth distribution of the participants was as follows: 7 were the eldest, 1 a middle-child, 10 the youngest and 2 only-children.

According to the questionnaires there was at least 1 parent, a brother or sister in 14 of these families who also had a learning problem, including concentration problems. This entailed 21 individuals. The distribution according to gender was as follows: 10 males and 11 females.

History of participants' learning problems

According to the questionnaires 19 participants attended a pre-primary school. Of these children 8 plus the child who had not attended a pre-primary school (45 percent of the research group) had not been ready for primary school. The reasons offered by the parents were lack of concentration, emotional problems and anxiety. They had mostly been identified by their educators and their parents. Amongst these 9, 3 had to repeat grade 1, 1 had to repeat grade 2 and 1 grade 6.

Reading problems were noticed in pre-primary school with regards to 6 participants. There were 7 parents who indicated that their child's reading problem had been noticed in grade 1, 2 more in grade 2, 1 in grade 3, 3 in grade 4 and 1 in grade 5.

Typical reading problems these children had, were the following: omission of letters, addition of letters, distortion of words, problems with distinguishing certain written letters, numbers and symbols. Their reading was laborious and with little comprehension. They often avoided reading.

Cognitive psychometric results

According to intelligence tests (the Senior South African Individual Scale Revised – SSAIS-R, and the Junior South African Individual Scale – JSAIS) the verbal average of the group as a whole was 96,65, their non-verbal average 110,15 and their global average 103,15. The results indicated that their ability to remember digits, their coding ability and their verbal scores were under the average of 10 (or 100) but their non-verbal scores were generally above 11 (or 110).

History of social developments

Family, school and other relationships were examined. None of the parents indicated that the relationships within the family was problematic. The usual difficulties between parents, children and siblings existed but not to such a degree that it seemed to differ from any other average family. According to the educators most of the parents were supportive, interested in their child's well-being and they reacted to school correspondence.

There were 10 parents who indicated that their child had many friends and found it easy to start up a friendship, while the other 10 said that their child found it difficult to make friends and had only 1 or 2 friends.

The participants' general behaviour at school was indicated as acceptable to good. One of the participants tended to become aggressive towards other children at school and some of the older boys were sometimes difficult to handle in the class situation.

History of the emotional problems and school motivation of participants

The incidence of emotional problems was determined by means of the interviews with the children themselves and the CBCL/6-18 that the parents had to fill in. There was no specific question about their emotional history in the demographic questionnaire, but the parents' answers to a question about the effect of the learning problem on the child also supplied some information. This indicated that all the participants at one stage or another suffered some emotional trauma due to their problem and furthermore it showed that 7 participants still had emotional problems. The rest said it was better in the special school.

There was also an indication that the reading problem had a very big influence on the participants' motivation regarding their schoolwork, especially while they had still been in the main stream. Only 7 indicated that it did not influence their motivation.

Anxiousness and feelings of inferiority were the most prevalent emotional problems and were indicated by the parents and the participants themselves. Others were the following: aggression, depression, withdrawal, frustration, lack of self-confidence, despondency, negative feelings, self-consciousness and anger.

Strong points, interests and ideals

The continuity of certain themes was striking. Of these participants 13 were interested in sport and 8 of them did extremely well in some kind of sporting event. There were 7 who were either interested or skilled in the use of computers, 6 in mechanical and technical work, 11 were good at art, 11 were interested in animals and nature and 4 showed entrepreneurial skills.

Psychological functioning according to the CBCL/6-18 and the TRF/6-18

The CBCL/6-18- and TRF/6-18 were analysed to ascertain whether there was a certain pattern of behavioural and emotional problems amongst these children. This included anxious/depressed, withdrawn/depressed,

somatic complaints, social problems and complaints, thought problems, attention problems, rule-breaking behaviour and aggressive behaviour. It also indicated to which degree the participants internalised or externalised their problems. According to the answers given by the parents and the educators there were 12 children whose scores did not fall within parameters of normal behaviour.

The emotional problems mostly indicated by the CBCL/6-18 and TRF/6-18 were anxiety and feelings of depression (self-consciousness, lack of self-confidence, feelings of inferiority and negativity). As far as behavioural problems are concerned the following were prevalent: aggression (temper tantrums), rule-breaking behaviour and attention problems (especially impulsivity and attention deficit).

Results of reading and spelling tests

The Mann-Whitney U test was used to ascertain whether the experimental group and the control group could be compared regarding their test scores (see Table 1). All the scores were found to be comparable since there was no significant difference between them. The results were $p = ,29$; $p = ,11$; $p = 1,00$ en $p = ,40$ regarding the Schonell Silent Reading Test, the Schonell One-minute Reading Test, the ESSI Spelling Test and the ESSI Reading Test respectively.

After the experimental group had received the Davis intervention, the Wilcoxon Signed-Rank test was applied to both groups to ascertain whether the intervention had brought about any significant changes (see Table 2). The hypothesis was that the Davis techniques would help improve the reading ability of individuals over a short period of time. Because an improvement had been predicted, the one-way p -value was taken into account and according to these values there had been a significant improvement in the reading ability of the experimental group regarding three of the four tests, the Schonell Silent Reading Test ($p = ,00$), the ESSI Spelling Test ($p = ,01$) and the ESSI Reading Test ($p = ,01$). There had not been a significant improvement as far as the Schonell One-minute Reading Test ($p = ,19$) was concerned. There had been a slight improvement in the raw scores.

The control group showed no significant improvement in any of the three tests in which the experimental group had improved, namely the Schonell Silent Reading Test ($p = ,11$), the ESSI Spelling Test ($p = ,40$) and the ESSI Reading Test ($p = ,25$). Regarding the Schonell One-minute Reading Test this group's raw scores had deteriorated slightly.

Due to the significant improvement the experimental group had shown in three of the four tests they were again tested 12 weeks after the intervention to ascertain whether the improvement had been maintained. All four reading and spelling tests were again applied. Once again the data was analysed by means of the Wilcoxon Signed-Rank test (see Table 3).

There was no significant difference between any of the scores obtained during this follow-up test and the previous retest scores ($p > ,05$), which indicates that the improvements had been maintained.

According to 7 of the participants they had not kept up with the programme in the 12 weeks that followed the intervention, although 3 of them said that they had tried.

Results of the CBCL/6-18 and TRF/6-18

CBCL/6-18

All the data were obtained by means of the computer program Assessment Data Manager Version 5,0 (Achenbach & Rescorla, 1999-2004) and the t-scores were used as raw scores. The Mann-Whitney U test was then used to ascertain whether the experimental group and control group were comparable (see Table 4). The results showed that there were no significant differences between the two groups regarding the 17 subtests ($p > ,05$) except somatic complaints ($p = ,05$). Therefore the two groups were comparable.

After the intervention the Wilcoxon Signed-Rank test was applied to both groups to ascertain whether there had been any significant change regarding the psychological functioning of the participants (see Table 5). The hypothesis was that the Davis techniques would positively contribute to the psychological functioning of individuals with a reading disorder. Because an improvement was predicted, the one-way p -value was taken into account and according to these values there had been a significant improvement in the psychological functioning of the experimental group regarding the following 12 of the 17 sub-tests: anxious/depressed ($p = ,01$), somatic complaints ($p = ,03$), thought problems ($p = ,01$), rule-breaking behaviour ($p = ,03$), aggressive behaviour ($p = ,02$), internalising problems ($p = ,00$), externalising problems ($p = ,01$), total problems ($p = ,00$), affective problems ($p = ,01$), anxiety problems ($p = ,01$), oppositional-defiant problems ($p = ,01$) and behavioural problems ($p = ,03$). They had not significantly improved regarding the following sub-tests: withdrawn/depressed ($p = ,15$), social problems ($p = ,06$), attention problems ($p = ,20$), somatic problems ($p = ,09$) and attention-deficit/hyperactivity problems ($p = ,25$). However, the t -scores of these sub-tests had decreased even though not significantly so.

The control group had improved significantly in three sub-tests, namely anxious/depressed ($p = ,02$), attention problems ($p = ,02$) and attention-deficit/hyperactivity problems ($p = ,00$). This includes two sub-tests in which the experimental group had not significantly improved, namely attention problems ($p = ,20$) and attention-deficit/hyperactivity problems ($p = ,25$).

Due to the fact that the experimental group had improved regarding 12 of the 17 sub-tests the parents of this group were asked to fill in the CBCL/6-18 again 12 weeks after the intervention to ascertain whether the improvements had been maintained. The data were again analysed by means of the Wilcoxon Signed-Rank test (see Table 6).

All the scores indicated that the improvements had been maintained ($p > ,05$) and in seven of the 12 sub-test there had been a further improvement, namely anxious/depressed ($p = ,04$), somatic complaints ($p = ,02$), thought problems ($p = ,04$), internalising of problems ($p = ,03$), total problems ($p = ,01$), affective problems ($p = ,04$) and anxiety problems ($p = ,04$).

In three of the five sub-tests, in which there had not been a significant improvement after the intervention, there was now a significant improvement, namely attention problems ($p = ,04$), somatic problems ($p = ,04$) and attention-deficit/hyperactivity problems ($p = ,03$). In the other two, namely withdrawn/depressed and social problems there was no significant improvement but the t -score averages, in comparison with the pre-test and post-test scores, were better. The scores were respectively: 56,60 - 54,10 - 52,20 and 59,80 - 57,00 - 55,50.

TRF/6-18

The results of the educators' questionnaire (TRF/6-18) were compromised due to the fact that the same educators could not fill in the forms again. This affected the results negatively and only the information of the pre-test questionnaire was used in the construction of the profile and not to test the hypotheses.

Discussion

A profile of the child with a reading disorder

Developmental history

As far as complications during pregnancy and birth are concerned Sadock and Sadock (2003) suggest that pre- and peri-natal problems generally occur in the history of children with a reading disorder. In this group there were only 4 children whose birth was completely without any complications, which could indicate that pregnancy and birth problems do not have to be implicated although it also indicates it cannot be excluded.

Normal children's ailments and diseases can possibly bring about complications. One of the participants for instance had meningitis due to measles when he was 8 months old and brain fluid had to be drained twice. He had also been in a coma for 3 weeks. Even though his mother said that the electroencephalogram (EEG) indicated that there were no brain abnormalities, this trauma cannot be excluded as a contributing factor to his reading disorder. It also has to be kept in mind that 2 participants had had no children's diseases according to their parents.

Although 11 participants had some kind of chronic problem, such as allergies, 9 showed no symptoms. According to Sadock and Sadock (2003) no studies have supported the idea that allergies can cause a reading disorder or contribute to it.

As far as developmental pathways are concerned, the participants who had not reached them in a normal way, formed the minority. Davis (1997, 2003) suggests that many children with dyslexia skip the crawling phase. Shaywitz (2003) also refers to this. There were 6 children who did not experience the crawling phase in a normal way indicating that this might be a contributing factor.

The parents of 6 participants indicated that their child started talking at a late age or used baby talk longer than would be expected. Davis (1997, 2003) and Shaywitz (2003) both point out that children with a reading problem often have delayed language development.

Hearing problems and eye problems are not regarded as causative but can lead to the incorrect diagnosis of a reading disorder if they are not identified beforehand. Sadock and Sadock (2003) said these problems have to be eliminated before any screening tests for a reading disorder can be done. In this group they had already been dealt with.

According to Sadock and Sadock (2003) children with a reading disorder have an above-average chance of also presenting with other behavioural disorders. They particularly mention studies which have indicated that 25 percent of such children also have an attention-deficit/hyperactivity disorder and that a genetic factor might possibly be involved. Davis also supports this approach. There were 11 in the group of 20 participants who had a history of hyperactivity, attention and/or concentration problems. This represents 55 percent of the research group.

Family situation

Most of the family variables were proportionately distributed. No conclusions could therefore be drawn regarding any family matters as factors contributing to a reading disorder. According to the distribution a genetic predisposition to a reading disorder seems to play quite a big part. In 14 of the families there was at least 1 father, mother or sibling with the same learning problem. This entailed 21 individuals. In 6 families there was no history of learning problems. This means that 70 percent of the participants had a family history of a learning problems (particularly a reading problem). According to Sadock and Sadock (2003) studies have shown that 35 to 40 percent of first-degree relatives of children with a learning disorder have a similar disorder and in this study the percentage was much higher.

The distribution according to gender also deserves attention. There were 11 female and 10 male relatives with a reading problem which supports the point of view of many researchers that there are not necessarily more boys than girls with a reading problem. Mash and Wolfe (2002) speculated that girls and boys are most probably equally distributed as far as a reading is concerned, but that the reasons why more boys are referred for special education distort this fact. They said that up to four times more boys than girls are referred because they often exhibit more behavioural problems. The Connecticut Longitudinal Study (Shaywitz, 2003) also showed no significant differences between boys and girls regarding reading problems and stated that school-identification procedures had a lot to do with this fact. Boys are identified more easily.

Furthermore 5 of the 21 relatives with reading problems also presented with concentration problems. This means 23,80 percent and it correlates with the studies referred to by Sadock and Sadock (2003) indicating that 25 percent of children with a reading problem may also have an attention-deficit/hyperactivity disorder.

The present study also examined the careers of parents who indicated that they themselves experienced reading and concentration problems. Amongst 13 of these parents there were 10 who had their own businesses, which possibly could be connected to Davis's (1997, 2003) opinion that someone with dyslexia does not necessarily think step by step but rather sees the bigger picture. Such a way of thinking is important in the world of business. Gorman et al. (2003) also found that there was an over representation of individuals with dyslexia amongst top artists, scientists and business people.

History of participants' learning problems

From the data it can be surmised that 65 percent of the participants already had problems before grade 2. This corresponds with the opinion of Sadock and Sadock (2003). Some children present with these problems at a later stage because they use their memory as well as associations and often also have above-average intelligence. In this way it may only manifest itself in grade 4 or later.

From the questionnaires and the interaction with the participants it seemed very clear that all of the participants had serious problems with spelling, punctuation marks, the use of capital letters, grammatical construction, written construction of sentences and vocabulary, reading aloud, silent reading, handwriting and pronunciation. But it also indicated that these children had good comprehension when they only had to listen and not read themselves. Their spoken vocabulary was also much better than their reading vocabulary. Shaywitz (2003) supports all these observations. Parents and educators also said that the participants' general knowledge was fair to good and that their knowledge of things they were interested in was above-average, for instance mechanics, computers, art and sport.

Parents indicated that 16 participants had concentration problems, especially concerning schoolwork, and 13 were prone to daydreaming, which are typical characteristics of an attention-deficit disorder. Davis (1997, 2003) refers to this and Sadock and Sadock (2003) mentioned studies which indicated a 25 percent relation between reading problems and attention-deficit/hyperactivity disorder.

There were also indications that 7 of the participants had perceptual motor problems which again reflects upon the reference made by Sadock and Sadock (2003) that left-right confusion might be one of the causes of a reading disorder. Strydom (quoted in Rademeyer, 2004) also calls it a contributing factor and Davis (1997, 2003) specifically mentions it as one of the typical characteristics of an individual with dyslexia and has created his coordination exercises to help overcome it.

According to parents and educators 6 of the participants had mild balance problems which according to Davis (1997, 2003) can also be one of the characteristics of an individual with a reading disorder.

Cognitive psychometric results

All the participants (20) had deficits in their receptive and expressive language skills according to the SSAIS-R and JSAIS. As far as their non-verbal intelligence quotient (IQ) was concerned, only 2 participants' verbal IQ was higher than their non-verbal IQ and a further 3 had more or less the same verbal and non-verbal IQs. Therefore there were 16 participants whose non-verbal IQ was higher than their verbal IQ. Stowe (2000) warns against the interpretation of intelligence tests, since there does not have to be a big difference between the verbal and non-verbal IQ, but the fact that 80 percent of these participants' non-verbal IQ was higher than their verbal IQ was striking. It does raise the question as to what degree Davis's (1997, 2003) view that individuals with dyslexia are non-verbal thinkers rather than verbal thinkers can be connected to this phenomenon. No assumptions could however be made on account of the data presented in this study.

An assumption which could possibly be made is that an individual with a serious reading problems should have severe sub-normal intelligence scores and/or perceptual and motor scores. In this study it was however not the case. This might be connected with Davis's (1997, 2003) idea that individuals with a reading problem only think differently.

History of social development

It was not clear whether the reading disorder of the participants who indicated that they did not befriend others easily (50 percent) had any influence on their interaction with people, although according to their parents it did. It most probably has to do with the emotional influence it has on the child. Woods (quoted in Gorman et al., 2003) said one of the many negative outcomes is that children with dyslexia tend to withdraw from friends and family.

These participants had fewer problems in their present school but indicated that they had had social problems in the main stream. They had been teased, did not get on well with their peers, did not like school and felt inferior.

History of the emotional problems and school motivation of participants

Botha, Van Ede, Louw, Louw and Ferns (1999) and Newman and Newman (2003) have indicated that learners with a learning problem often have emotional problems and this has a direct bearing on the problems that were mentioned by the participants, such as withdrawal, aggression, frustration, fear, anger, feelings of inferiority, sadness and thoughts of suicide. All these problems connect with these participants' evaluation of themselves compared to their peers and the demands regarding academical skills, such as reading, spelling and writing. The fact that some of these participants did not seem to have any emotional problems according to their parents, can probably be ascribed to these children's own specific characteristics and skills, the way in which they accepted themselves, and were accepted and supported by their family, friends and others (Botha et al., 1999). It seems as though a child with a learning disorder does not necessarily have to have serious emotional, behavioural or social problems.

Strong points, interests and ideals

The fact that there was a continuity of certain themes, such as sport, art, mechanical an technical matters, nature and entrepreneurship which was also reflected in their ideals for the future, is narrowly connected to Davis's (1997, 2003) opinion that individuals with dyslexia have particular conceptual and perceptive talents. Once again Shaywitz (2003) and Gorman et al. (2003) indicate that these individuals are well represented in business, finances, visual art and the sciences.

Psychological functioning according to the CBCL/6-18 and the TRF/6-18

The most salient psychological characteristic of the participants pointed out by the parents and educators (CBCL/6-18 and TRF/6-18) was self-consciousness from the subtest anxious/depressed. It was followed by feelings of worthlessness, stress and worry.

The behavioural patterns indicated by the answers to these questionnaires, namely withdrawal, rule-breaking behaviour, telling lies, being argumentative, being moody and impulsive, and having temper tantrums, also connect with research done by Woods (quoted in Gorman et al., 2003) which indicated that children with dyslexia have a much greater chance of leaving school at an early age than those without dyslexia. They also withdraw from family and are prone to committing suicide or becoming imprisoned.

It was also clear that many of these children had problems concentrating. They did not complete tasks, could not sit still, daydreamed, were inattentive, could not await their turn to speak or talked too much. The question could perhaps be asked whether the reading problem gives cause to these problems or vice versa. Once

again it might correspond to Davis's (1997, 2003) opinion that these individuals' way of thinking may lead to concentration problems.

According to the scores of the CBCL/6-18 ten of these participants' psychological functioning was at a clinically diagnosable or borderline level. This means that 50 percent of these children actually were in need of psychotherapy. According to the TRF/6-18 there were fewer numbers, namely 6, but this did however not include 2 of the same children indicated by the parents and brings the number of children with serious problems to 12. This is an indication of how severely the influence of a reading disorder can be on an individual.

Reading and spelling tests

The hypothesis was substantiated that Davis techniques can help individuals over a short period of time to improve their reading ability. According to the Wilcoxon test the experimental group that received the intervention significantly improved in three of the four tests, namely the Schonell Silent Reading Test ($p = .00$), the ESSI Spelling Test ($p = .01$) and the ESSI Reading Test ($p = .01$). Although there was no significant improvement as far as the Schonell One-minute Reading Test was concerned ($p = .19$), the participants reading deficit did not deteriorate (58,50 months – 56,50 months). The control group had not undergone any significant improvements in any of the three tests, namely the Schonell Silent Reading Test ($p = .11$), the ESSI Spelling Test ($p = .40$) and the ESSI Reading Test ($p = .25$) and they deteriorated as far as the Schonell One-minute Reading Test is concerned (42,40 months - 45,80 months). These results must be looked at in view of the fact that the participants were very anxious while the tests were being performed as they wanted to do well.

According to these results the conclusion could therefore be drawn that Davis techniques indeed do have a positive effect on the reading ability of individuals over a short period of time. It has also to be taken into account that the sample was small, that non-parametric testing can lead to a type II error and that the results can thus be regarded as fundamentally important. There were also many variables which could have had a negative impact on the results and they also have to be considered in view of the significance of the improvements the experimental group underwent. They will be briefly discussed.

According to the qualitative information obtained from the parents the participants in the experimental group had more problems than those in the control group. There were 4 (40 percent) of the experimental group's participants who had late language development and only 2 (20 percent) of the control group. Of the experimental group's participants 8 (80 percent) were not ready for school and only 1 (10 percent) of the control group. Furthermore all of the experimental group's participants had been diagnosed with a reading disorder in pre-primary school, grade 1 or grade 2, while 5 (50 percent) of the control group had been identified between grades 3 and 5. Of the experimental groups' participants 9 (90 percent) indicated that they were not very motivated regarding schoolwork while only 5 (50 percent) of the control group made similar statements. Keeping this information in mind the results obtained by the experimental group could most probably be regarded as very significant.

The IQ of most of the participants (16) indicated a big difference between the verbal and non-verbal scores of the participants but the average difference of the experimental group was much bigger than that of the control group (16,20 against 11,20). If such a big difference between the verbal and non-verbal scores could be regarded as a sign of a learning disorder, then the experimental group had a bigger problem than the control group on average and this could also render the results more significant.

According to the categorical model there is a natural division between good and poor readers (Mash and Wolfe, 2002; Shaywitz, 2003) but according to the dimensional model reading ability lies on an uninterrupted continuum. Shaywitz is of the opinion that most disorders naturally manifest themselves in degrees although there might be a need to diagnostically refer to certain disorders by labelling them. Individuals with a reading problem are those who find themselves at the bottom part of this continuum. It could be surmised that since

the participants of this study were at the furthest "disability" end of the reading continuum due to the fact that they had to attend a school for learners with special educational needs, and the Davis techniques helped them improve, it might even be more beneficial to those who are still in the main stream. Such an intervention programme could have very positive results as far as inclusive education is concerned.

Shaywitz (2003) says that the older children get, the more difficult it is to help them by means of phonic instruction and it does not have a great influence on their spelling. The Davis method claims to help individuals of any age and the fact that the participants in this study were between 10 and 15 years of age with the majority older than 12 might prove his claim.

One of the prerequisites of the Davis programme is that the intervention must take place in quiet and tranquil surroundings plus a big enough working space. This had not always been the case during the research intervention because it took place either at school or at the participants' homes and rest, quiet and ample space to work was sometimes out of the question. The fact that the participants nevertheless improved could be a further sign of the programme's effectiveness.

Although the Davis programme is supposed to be presented over a period of a week and other techniques are included, this study proved that within less than 14 hours participants improved significantly. It indicates that this programme can deliver positive results in a short period of time which means it is time-efficient and could also be cost-efficient especially compared to Shaywitz's (2003) prerequisites for effective intervention. Even if it does not work for every individual it could at least prove to be of enormous help to many individuals with a reading problem. Not all the participants improved to an equal extent but Davis's claim of 90 percent success is supported by the scores of the Schonell Silent-Reading test. Furthermore 80 percent of the participants improved in the ESSI Reading and Spelling Tests.

Shaywitz (2003) purports that it takes hard work and a lot of interaction to keep the attention of the individual with a reading problem. With the Davis programme it is not hard because the programme is very interactive. The participants had weekly sessions of 2 hours after school and they never complained of boredom or fatigue. There were also very few signs of a lack of concentration, even from those whose parents and educators had indicted that they had problems concentrating.

Psychological tests

The hypothesis was substantiated that Davis techniques can positively contribute to the psychological functioning of individuals with a reading disorder. The results of the retest showed a clear improvement in the psychological functioning of the experimental group's participants and the follow-up test after 12 weeks of no intervention even more so. In 12 of the 17 sub-tests there had been a significant improvement ($p < ,50$) and the t-scores of the other 5 subsequently also dropped even though the improvement was not significant. In the follow-up test the improvement was maintained in 4 of the 12 sub-tests and in the other 7 there had been another improvement. The one-way p -values were taken into account with $p < ,05$. The deduction to be made is that the Davis programme not only improves participants' psychological functioning but that this can be maintained and over time it can even have an escalating positive effect on individuals.

The sub-tests in which the biggest improvement took place were anxious/depressed, somatic complaints, thought problems, problems with aggression, internalising of problems, externalising of problems, total of problems, affective problems, anxiety problems and somatic problems. The sub-tests in which there was a lesser improvement were withdrawn/depressed, social problems, attention problems, rule-breaking problems, attention-deficit problems, oppositional-defiant problems and behavioural problems. Attention and behavioural problems had been some of the most severe psychological difficulties and this improved even though not significantly. Davis has developed specific techniques for attention-deficit/hyperactivity problems which were not used in the study in question because it focused on reading problems.

The control group also improved significantly as far as the subtest anxious/depressed was concerned ($p = .02$) and the possibility that an extraneous variable could have been responsible for this result must be taken into account. There is also the possibility that the mere fact of taking part in the research process could have had a placebo-effect on them and reduced their anxiety.

The fact that the control group significantly improved as far as attention problems ($p = .02$) and attention-deficit/hyperactivity problems ($p = .00$) are concerned while the experimental group did not, might also be ascribed to an extraneous variable since the experimental group's t-scores had also improved although not significantly so.

Brown and Mankowski as well as Brown and Gallagher (quoted in Newman & Newman, 2003) found that children learn from experiencing success and failure when their skills are challenged. The participants learned specific new skills during the course of the programme and this could have contributed to the fact that the CBCL/6-18 results were largely positive. Since they had experienced so much failure previously, the experience of positive outcomes could have contributed to a feeling of self-worth.

The same authors purported that during their first school years (grades 1 to 4) children often discover that their skills do not satisfy the demands of school life and this has a negative influence on their self-image. All the participants in the experimental group had been diagnosed with a reading problem in their first few school years and therefore were exposed to social evaluation at an early age. All of them showed some form of psychological dysfunction which improved significantly after the Davis intervention. According to the CBCL/6-18 pre-test 3 of these participants' scores of the subtests internalising problems and externalising problems were at a clinical level but this returned to normal after the intervention. Only 1 participant was still on the borderline regarding problem externalising after the intervention.

It has to be considered that these positive improvements were due to the fact that these participants had received individual attention, positive feedback and a feeling of achievement. Crooks (quoted in Newman & Newman, 2003) refers to the fact that children can count on feed back from others in the assessment of their abilities and during the intervention there were many such opportunities. Since the Davis programme is applied individually the success could possibly also be attributed to the therapist-learner relationship.

Zambo (2004) has come to the conclusion that it benefits such children if they are spoken to about their dyslectic brain. The information they obtain in this way contributes to better self-esteem. This could have been the case in this study since the participants were informed about the functioning of their brain and that there minds merely functioned in a different way (Levine, 2002).

Conclusion

According to this research programme, there are significant indications that Davis techniques can have a positive influence on individuals' reading abilities and psychological functioning. It would naturally have been better if the sample could have been bigger, but there were practical problems involved in finding a big enough group which also was representative enough. This study however now hopefully forms the foundation for any further research in this field.

If research is to be done it would be recommended that participants be kept unaware of the implications of any testing to be done, especially when working with children who have been exposed to different and many kinds of tests in the past. If they know why they are being tested it causes unnecessary tension which could influence the outcome of the research. The participants in this study were very anxious during the retesting period as they were aware of the fact that the programme's outcome was being tested and they wanted to do well.

It is also important to see to a quiet and calm working environment and a big enough working surface. These are prerequisites of the Davis programme.

Shaywitz (2003) remarked that it is better to let individuals with a reading problem read continuous text instead of using word-recognition tests when testing their ability to read aloud. One of the challenges of this study was to find such a standardised measuring instrument. In America such tests are available but in South Africa there are no truly up-to-date, standardised instruments, except the ESSI Tests, for this purpose. It would most probably have been better if such continuous text could have been used in this study but that would perhaps have created problems regarding reliability and validity.

The research that has been done by Shaywitz (2003) with functional magnetic resonance imaging (fMRI) techniques has indicated that phonic instruction has an influence on the development of the left brain systems and that the supporting developmental pathways in the right hemisphere becomes less prominent. The individual's brain systems then become more comparable to those of accurate and fluent readers. Similar research could possibly be done to determine the influence of Davis techniques on the brain.

The researcher only concentrated on the Davis techniques that have a direct link to reading problems. His other techniques (2003) that are aimed at individuals with AD/HD, mathematical problems and handwriting problems could also be researched. Especially with regard to AD/HD it would be interesting to determine whether the Davis programme can indeed deliver significant results seeing that this study revealed how many participants presented with AD/HD symptoms.

Since the longitudinal study of Pfeiffer et al. (2001) in the USA proved that the *Davis Learning Strategies* can be most beneficial to any child in pre-primary and early primary-school-years it could in South African context be a possible outcome as an alternative method. This could be considered and discussions with the Davis organisation might just prove to be fruitful in the light of the current problems with literacy in the country. For children coming from a place where poor pre-school facilities, poverty and insufficient resources are part of their life this could be a useful alternative.

The motivation for this study was not to belittle other methods of intervention regarding individuals with a reading disorder but to prove that the Davis programme is a significant and scientifically valid alternative form of intervention. It could help a large group of individuals to overcome their reading problems which is known to bear down on life as a whole. This should be more than enough reason to allow the Davis programme its rightful place in the educational and scientific community.

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Tables

Table 1

Comparison between the Mann-Whitney U Values of the Experimental Group and Control Group regarding the Four Reading and Spelling Tests (N = 20)

Tests	Experimental group ξ	Control group ξ	Mann-Whitney U	p
Schonell Silent Reading Test	56,30	48,20	36,00	0,29
Schonell One-minute Reading Test	58,50	42,40	29,00	0,11
ESSI Spelling Test	6,50	6,20	50,00	1,00
ESSI Reading Test	7,50	8,20	39,00	0,40

$p < ,05$, two-way value

Table 2

Comparison between the Wilcoxon Signed-Rank Values of the Experimental Group and the Control Group's Four Reading and Spelling Pretests and Retests (N = 20)

Tests	Pretest ξ	Retest ξ	Z	p
EXPERIMENTAL GROUP (n=10)				
Schonell Silent Reading Test	56,30	47,10	-2,81	,00
Schonell One-minute Reading Test	58,50	56,50	-0,89	,19
ESSI Spelling Test	6,50	11,50	-2,54	,01
ESSI Reading Test	7,50	9,80	-2,54	,01
CONTROL GROUP (n=10)				
Schonell Silent Reading Test	48,20	45,70	-1,23	,11
Schonell One-minute Reading Test	42,40	45,80	-2,09	,02
ESSI Spelling Test	6,20	6,30	-0,27	,40
ESSI Reading Test	8,20	8,10	-0,68	,25

$p < ,05$, one-way value

Tabel 3

Comparison between the Wilcoxon Signed-Rank Values of the Experimental Group's Reading and Spelling Retests and Follow-up Tests (n = 10)

Tests	Retest ξ	Follow-up test ξ	Z	p
Schonell Silent Reading Test	47,10	52,50	-1,19	,12
Schonell One-minute Reading Test	56,50	53,60	-0,62	,27
ESSI Spelling Test	11,50	11,70	-1,14	,08
ESSI Reading Test	9,80	10,30	-1,19	,12

$p < ,05$, one-way value

Table 4

Comparison between the Mann-Whitney U Values of the Experimental Group and the Control Group's CBCL/6-18 Pretest (N = 20)

Subtests	Experimental group ξ	Control group ξ	Mann-Whitney U	p
1. Anxious/depressive	61,30	57,50	37,50	,34
2. Withdrawn/depressive	56,60	57,40	47,00	,82
3. Somatic complaints	63,90	56,40	24,50	,05
4. Social problems	59,80	58,80	46,50	,79
5. Thought problems	57,20	57,60	49,50	,97
6. Attention problem	58,10	59,70	39,50	,43
7. Rule-breaking behaviour	53,90	55,90	47,50	,85
8. Aggressive behaviour	60,10	59,80	48,00	,88
9. Internalising problems	61,60	55,20	32,50	,18
10. Externalising problems	57,20	58,40	43,50	,62
11. Problems: Total	58,70	58,20	49,00	,94
12. Affective problems	59,70	59,40	48,00	,88
13. Anxiety problems	59,50	54,80	30,50	,14
14. Somatic problems	60,80	56,10	30,50	,14
15. ADH* problems	58,50	61,20	35,00	,26
16. OD** problems	57,90	59,40	41,50	,52
17. Behavioural problems	55,20	55,80	47,50	,85

Note *ADH = Attention-deficit/hyperactivity; **OD = Oppositional defiant

$p < ,05$, two-way value

Table 5

Comparison between the Results of the Experimental Group and the Control group's CBCL/6-18 Retest according to the Wilcoxon Signed-Rank Values (N = 20)

Subtests	Pretest ξ	Retest ξ	Z	p
EXPERIMENTAL GROUP (n=10)				
1. Anxious/depressive	61,30	55,90	-2,52	,01
2. Withdrawn/depressive	56,60	54,10	-1,05	,15
3. Somatic complaints	63,90	57,60	-1,95	,03
4. Social problems	59,80	57,00	-1,54	,06
5. Thought problems	57,20	53,60	-2,53	,01
6. Attention problem	58,10	56,90	-0,85	,20
7. Rule-breaking behaviour	53,90	52,70	-1,95	,03
8. Aggressive behaviour	60,10	55,80	-2,04	,02
9. Internalising problems	61,60	52,50	-2,69	,00
10. Externalising problems	57,20	50,90	-2,20	,01
11. Problems: Total	58,70	51,90	-2,67	,00
12. Affective problems	59,70	55,40	-2,21	,01
13. Anxiety problems	59,50	53,80	-2,32	,01
14. Somatic problems	60,80	56,70	-1,33	,09
15. ADH* problems	58,50	56,40	-0,68	,25
16. OD** problems	57,90	54,20	-2,32	,01
17. Behavioural problems	55,20	53,00	-1,83	,03
CONTROL GROUP (n=10)				
1. Anxious/depressive	57,50	54,60	-2,03	,02
2. Withdrawn/depressive	57,40	57,20	-0,25	,40
3. Somatic complaints	56,40	54,40	-1,02	,16
4. Social problems	58,80	56,80	-1,36	,09
5. Thought problems	57,60	56,20	-0,68	,25
6. Attention problem	59,70	57,20	-2,05	,02
7. Rule-breaking behaviour	55,90	55,20	-0,24	,41
8. Aggressive behaviour	59,80	59,10	-0,49	,31
9. Internalising problems	55,20	53,00	-0,61	,27
10. Externalising problems	58,40	56,80	-0,77	,22
11. Problems: Total	58,20	56,10	-1,25	,11
12. Affective problems	59,40	56,30	-0,95	,17
13. Anxiety problems	54,80	54,40	-0,68	,25
14. Somatic problems	56,10	53,50	-1,26	,10
15. ADH* problems	61,20	58,80	-2,75	,00
16. OD** problems	59,40	57,80	-0,89	,19
17. Behavioural problems	55,80	56,50	-0,49	,31

Note *ADH = Attention-deficit/hyperactivity; **OD = Oppositional defiant
 $p < ,05$, one-way value

Table 6

Comparison between the Results of the Experimental Group's CBCL/6-18 Retest and the CBCL/6-18 Follow-up Test according to the Wilcoxon Signed-Rank Test (n = 10)

Subtests	Retest ξ	Follow-up test ξ	Z	p
1. Anxious/depressive	55,90	52,10	-1,753	,04
2. Withdrawn/depressive	54,10	52,20	-1,403	,08
3. Somatic complaints	57,60	52,50	-2,023	,02
4. Social problems	57,00	55,50	-0,850	,20
5. Thought problems	53,60	50,80	-1,753	,04
6. Attention problem	56,90	54,00	-1,781	,04
7. Rule-breaking behaviour	52,70	52,00	-0,594	,28
8. Aggressive behaviour	55,80	54,40	-1,084	,14
9. Internalising problems	52,50	47,30	-1,863	,03
10. Externalising problems	50,90	48,50	-1,687	,05
11. Problems: Total	51,90	46,20	-2,405	,01
12. Affective problems	55,40	51,40	-1,778	,04
13. Anxiety problems	53,80	51,60	-1,841	,04
14. Somatic problems	56,70	52,80	-1,841	,04
15. ADH* problems	56,40	53,70	-1,974	,03
16. OD** problems	54,20	53,90	-0,085	,47
17. Behavioural problems	53,00	52,10	-0,932	,20

Note *ADH = Attention-deficit/hyperactivity; **OD = Oppositional defiant

$p < ,05$, one-way value