

Fact Sheet 21

LASS Junior and LASS Secondary case studies

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LASS Junior and LASS Secondary case studies

The case studies in the following sections provide an illustrative range of profiles obtained from LASS Junior and LASS Secondary. Many other types of profile are possible, of course, but by studying these particular case studies, teachers should gain insights into interpreting LASS results and deciding on appropriate strategies for learning and teaching. Some of the cases have been reported in full detail. Some have just background information, and in some cases you have little more than the bare LASS profile to go on.

Factors to consider

When considering these profiles teachers should ask themselves:

- a) What special educational needs or learning problems are suggested by the LASS profile?
- b) How does this information fit in with what is already known about this pupil?
- c) What further information would you seek?
- d) What other investigations would you want to carry out?
- e) What possible explanations might account for any difficulties observed?
- f) Outline an education plan for the pupil.

Calculating discrepancy

Discrepancy may be calculated roughly by subtracting the z-scores for the two tests being compared. Where the difference is 0.66 z-scores or greater, this will be statistically significant. Note that this method does not allow for 'regression to the mean', and so where students are more towards the extremes of a distribution (either high or low scores) the calculation will not be as accurate as it will be for students whose abilities lie within the average range. The table below shows the relationship between centile scores, z-scores and conventional standard scores.

Centile Score	z-score	Standard Score
2	-2.0	70
7	-1.66	75
10	-1.33	80
16	-1.0	85
25	-0.66	90
35	-0.3	95
50	0	100
65	+0.3	105
75	+0.66	110
84	+1.0	115
90	+1.33	120
93	+1.66	125
98	+2.0	130

LASS Junior Case Studies

The following case studies provide an illustrative range of profiles obtained from LASS Junior. Many other types of profile are possible, of course, but by studying these particular case studies, teachers should gain insights into interpreting LASS Junior results and deciding on appropriate strategies for learning and teaching.

1. Caroline (10 years 8 months)

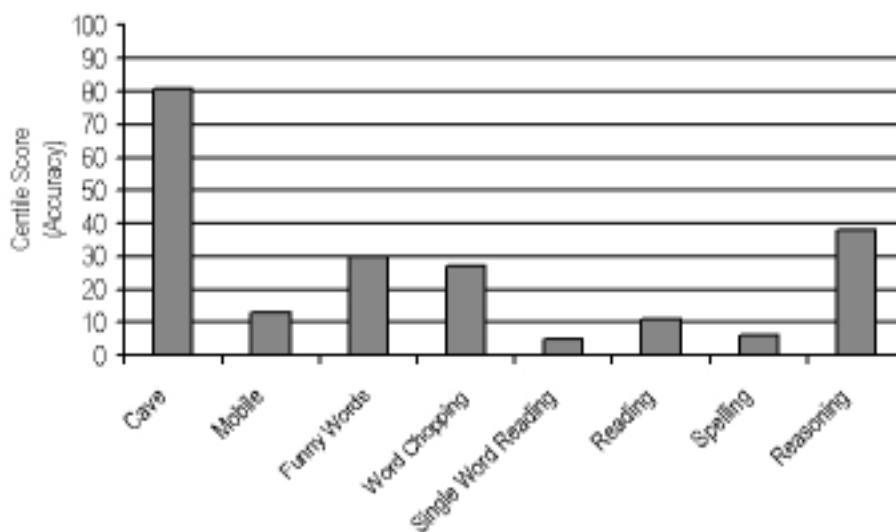
Background

The teacher reported that, at the end of May when the LASS testing was completed, Caroline had been receiving phonic tuition for 3 months. There is a reported history of literacy problems in other members of Caroline’s family. Caroline has a slight lisp. She displays letter and word reversals in her reading and spelling attempts.

A number of tests of Caroline’s literacy and intellectual abilities were carried out on 27th July 2000 when she was aged 9 years 10 months. On the *Vernon Spelling Test* Caroline obtained a score that was equivalent to a spelling age of 7 years 5 months, which was 2 years 5 months behind chronological age levels. On the *Salford A Reading Test* she obtained a score that was equivalent to a reading age level of 7 years 8 months, which was 2 years 2 months below her chronological age. On the *Neale Analysis of Reading Ability* Caroline obtained a reading accuracy score that placed her at the 6 years 7 months level (3 years 3 months behind chronological age levels) and a reading comprehension score that was equivalent to an age level of 6 years 9 months (3 years 1 month below her chronological age). However, on the *British Picture Vocabulary Scale (BPVS)* Caroline achieved a score that was towards the upper end of the average range at the 70th centile and which was equivalent to an age level of 10 years 11 months for this verbal intellectual skill (1 year 1 month ahead of her chronological age).

LASS Junior (*Lucid Assessment System for Schools*) was administered to Caroline in three sessions: *Mobile* and *Spelling* subtests on 15th May 2001; *Word Chopping*, *Single Word Reading* and *Sentence Reading* on 22nd May 2001 and *Cave*, *Funny Words* and *Reasoning* on 29th May 2001. The assessment was carried out in a quiet environment. Caroline’s health was good and she was attentive throughout the assessment sessions.

Figure 1 Caroline’s results



Test results

Test Name	Description	Accuracy Score
Cave	A test of visual memory for objects and spatial positions.	Centile 81 (Above average)
Mobile	An auditory memory test assessing digit span.	Centile 13 (Below average)
Funny Words	A test of phonic decoding skills.	Centile 30 (Low-average)
Word Chopping	A test of syllable and phoneme deletion that identifies poor phonological processing ability.	Centile 27 (Low-average)
Single Word Reading	A test that involves selecting a single word from five options	Centile 5 (Low)
Reading	An adaptive test that involves finding the missing words in sentences.	Centile 11 (Below average)
Spelling	An adaptive test that involves spelling single words.	Centile 6 (Low)
Reasoning	An adaptive test involving matrix puzzles that can be solved by a careful application of logical reasoning, using both visual and verbal strategies.	Centile 38 (Average)

Interpretation of the test results

Reasoning Ability

On the *Reasoning* test, which was an adaptive test in which Caroline attempted to solve a series of matrix puzzles that required careful application of logical reasoning and the use of both visual and verbal strategies, Caroline attained an average score that placed her at centile 38. This score, in combination with the score on the *BPVS* (reported above), indicated that her intellectual abilities are at an average level, although her verbal intellectual abilities may be somewhat superior to her non-verbal skills.

Memory

Two tests of memory, *Cave* and *Mobile*, were administered to Caroline. On the *Cave* test, which provided a measure of her visual short-term memory for objects and their spatial positions, she achieved an above average score that placed her at centile 81. This indicated that her visual short-term memory skills are entirely satisfactory. However, on the *Mobile* test, which assessed her auditory/verbal short-term sequential memory, she obtained a below average score that placed her at centile 13. This latter score indicated that Caroline has a statistically significant deficit in auditory/verbal sequential working memory when her score is compared with her intellectual abilities (both in the *Reasoning* test from the *LASS* tests and with her *BPVS* score).

Phonological Skills

On the *Funny Words* test, which provided a measure of Caroline's phonic decoding skills, she obtained a score that was in the lower part of the average range at centile 30. On the *Word Chopping* test, in which Caroline's phonological processing ability was assessed by asking her to identify the correct result of deleting phonemes or syllables from words, she obtained a score that was in the lower

reaches of the average range at centile 27. Both these diagnostic test scores indicate that Caroline's phonological skills are at a low-average level. These scores are somewhat below the level that would be predicted from her verbal intellectual abilities (*BPVS* score) but this difference was not found to be statistically significant. It is likely that the specific phonics teaching that she has been receiving recently have led to an improvement in these abilities.

Basic Skills

On the *Sentence Reading* test, which is an adaptive test that required Caroline to select the missing words in a series of sentences, she obtained a well below average score that placed her at centile 11. Her *Single Word Reading* test result was low at centile 5. These test results were entirely consistent with the testing carried out in July 2000 which indicated that her reading skills are more than 2 years behind chronological age levels.

On the *Spelling* test, which is an adaptive test in which Caroline had to spell a number of single words that were presented to her in context, she obtained a low score that placed her at centile 6. This was also consistent with the spelling test administered in July 2000, which revealed a 2½ year deficit in Caroline's spelling skills.

Caroline's results in all three of these tests of her literacy skills were statistically significantly below the levels that would be predicted on the basis of her overall intellectual ability (i.e. a composite of her scores on the *Reasoning* subtest of the *LASS* and on the *BPVS*). Her *Spelling* and *Single Word Reading* scores were significantly below her *Reasoning* subtest score.

Conclusions

Evidence from both the *LASS* testing and from the previous administration of the *BPVS* test indicated that Caroline is of overall average intellectual ability. The test results suggest that her verbal intellectual ability is somewhat better than her non-verbal skills, but both these aspects of intelligence testing showed her to be within the average range intellectually. Therefore, the difficulties that Caroline experiences in literacy skills cannot be explained by a lack of intellectual ability.

Diagnostic tests of memory revealed that Caroline's visual memory skills were above average. However, her auditory/verbal sequential short-term memory skills were found to be a statistically significant area of weakness.

Caroline's profile of cognitive strengths and weaknesses in this and the previous testing is consistent with developmental dyslexia. Dyslexia is a form of specific learning difficulty that is usually an inherited condition. Since there is a reported history of literacy problems in Caroline's family, her condition is likely to be of genetic origin.

Caroline's reading and spelling skills were found to be poor. All three of the literacy scores (*Single Word Reading*, *Sentence Reading* and *Spelling*) were clearly within the Threshold of Concern and her *Single Word Reading* score was within the Threshold of Risk. Her *Spelling* score was also on the borderline of the Threshold of Risk and, therefore, should be regarded as an area of very serious weakness. Caroline's reading and spelling scores were all statistically significantly below the level of her intellectual abilities. These difficulties are consistent with the weaknesses in auditory/verbal short-term memory that lie at the root of her dyslexia.

Teaching recommendations

In view of the above findings, the following recommendations are made:

Wherever possible, and especially in language work, Caroline needs to receive a structured, multi-sensory approach to work across the curriculum. This will help her to compensate for the cognitive difficulties that underlie her dyslexia, as a multi-sensory approach will enable Caroline to learn by using a combination of verbal, visual and kinaesthetic memory, which can support each other and enable her to learn more effectively.

Caroline's teachers will need to make sure that, whenever possible, she overlearns facts and procedures across the curriculum. Overlearning (i.e. continuing to learn information well beyond the point at which the material would usually be regarded as having been learnt) reinforces learning and prevents much of the forgetting that would otherwise often occur. Caroline will subsequently need to be given plenty of opportunities and encouragement to revise previously taught material. Research has suggested that learning is most effective for dyslexic individuals if they spend approximately two-thirds of their time learning and practising new material and the remaining one-third reviewing previously taught material.

Caroline needs to continue to receive structured phonics tuition with regular practice and revision. For the best results a multi-sensory approach should be taken to this phonics work. Particular care must be taken to progress at Caroline's own pace, giving her plenty of practice and revision and only progressing to the next step when she has thoroughly mastered the present one. Ideally, this learning should be given little and often (e.g. 5 to 10 minutes per day) in a one-to-one situation. Informal tests will be required at regular intervals to check on her retention of this learning and progress adjusted accordingly. Recommended phonics schemes include: *Jolly Phonics*, *Toe By Toe*, *Step By Step*, *Reading Reflex*.

Computer activities would be very useful for Caroline to gain opportunities for enjoyable practice of her phonics work, for example, *WordShark 2L*.

Structured phonics teaching administered at Caroline's own pace should enable her to improve her spelling of regular words that follow phonic rules. However, because of her weakness in auditory/verbal memory she should be taught to use a multisensory method for learning the spellings of irregular words (and also those that follow rules that are covered at a relatively late stage in phonics teaching programs) e.g. the Simultaneous Oral Spelling technique. A computer program could be used to provide her with additional practice of current spelling lists and to revise spellings from previous weeks. *Starspell 2001* is particularly recommended.

Plenty of reading practice including paired reading activities to help Caroline in applying her phonic decoding skills. It is important that Caroline's reading material should be at the appropriate level of difficulty for her ability; her books should contain only about 5% of words that are unfamiliar to her. The *Pause, Prompt and Praise* approach would be a useful approach to use when hearing Caroline read.

Caroline should be encouraged to use a word processor for as much of her written work as possible. Research has shown that word processing is a useful teaching tool that enables dyslexic individuals to improve their written work, noticing errors (e.g. in spelling or punctuation) more easily. Also the ease with which a piece of word processed work can be edited and improved should help Caroline to produce better quality essays and other written work. A talking word processing package would be particularly beneficial for her, for example *Clicker 4*; *Write:Outloud*; *Inclusive Writer*; *Pages*; *KidPix Studio*.

Caroline should practice the cognitive skills in which she has some limitations (i.e. auditory/verbal memory). Some suggestions of suitable games (including computer games) to develop this skill can be found in the enclosed *Auditory/Verbal Memory* information sheets.

Study skills support would give Caroline a number of additional strategies that would help her with her schoolwork. The book recommended as a source for this tuition is *Study Skills: a pupil's survival guide* by Christine Ostler (published by Ammonite Books, 1996).

Caroline has fairly good intellectual potential, but her dyslexic difficulties are causing her to underperform significantly in literacy skills. This underachievement will also almost certainly be affecting her ability to produce adequate work across the curriculum. It is, therefore, recommended that every effort be made by all those concerned with Caroline's education to instigate an appropriate programme of educational provision for her, following the recommendations in this report. She should also be given plenty of opportunities to use the recommended computer programs for the necessary practice and revision that will enable her to begin to compensate for her underlying difficulties. The computer

programs should be used little and often (perhaps 10 to 15 minutes each day). Without the appropriate type of support, delivered now and with sufficient intensity and frequency, Caroline’s attainments will continue to fall behind both her own potential and the attainments of her peers.

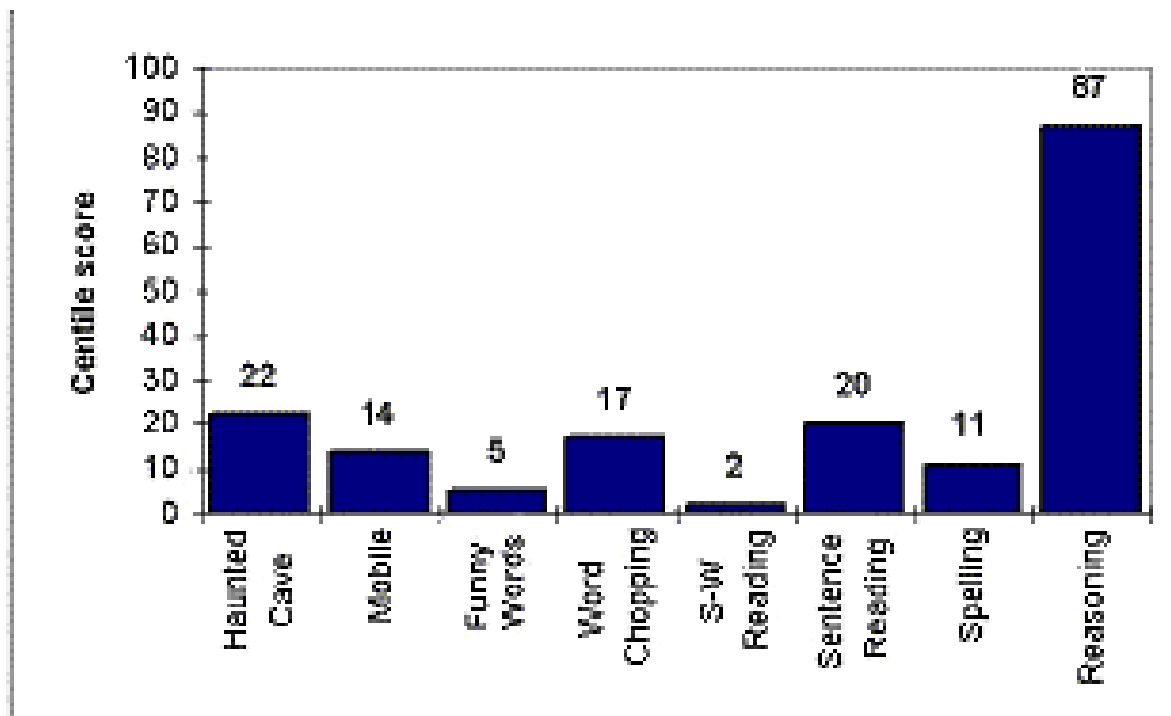
We were provided with no information about Caroline’s schooling. If she is at a state school she should already have been placed on the *Code of Practice on the Identification and Assessment of Special Educational Needs*. Caroline’s level of difficulties indicates that she should be placed at least on Stage 2 of the *Code of Practice* and possibly at Stage 3. Her difficulties are such that if after 4–6 months of intensive help Caroline has not made encouraging levels of progress, a review should be arranged to consider moving her up to the next stage on the Code of Practice at which more intensive support can be provided for her.

2. Tim (8 years 7 months)

Background

Tim was assessed on LASS Junior because his teachers felt that he was not performing up to standard. He was regarded as average in general ability, but his written work was very poor. Tim also had a tendency to be disruptive in the classroom and was frequently on report for misbehaviour, failure to complete work or to hand in homework. He was clumsy, forgetful and slightly hyperactive. Tim’s LASS Junior results are shown in Figure 2.

Figure 2 Tim’s results



Interpretation of test results

The results show that Tim is clearly a very bright pupil (**Reasoning**: centile 87), with poor reading (**Sentence Reading**: centile 20; **Single Word Reading**: centile 2) and very poor **Spelling** (centile 11). There is a highly significant discrepancy between his literacy skills and his intellectual ability, which warrants use of the label ‘specific learning difficulties’. It is likely that teachers have underestimated his intelligence because of his poor literacy skills and failure to display his talents in writing.

Tim has virtually no phonic decoding skills (*Funny Words*: centile 5), and so he is obviously relying on visual strategies to recognise words. Because he is bright he is able to apply intelligent guessing and use of context when reading for meaning, which is why his *Sentence Reading* module result (centile 20) is rather better than might be expected from his *Single Word Reading* score (centile 2). Tim also displays a clear cognitive weakness in auditory memory (*Mobile*: centile 14) and his visual memory is also low in comparison with his intellectual ability (*The Haunted Cave*: centile 22). Phonological abilities are also relatively low (*Word Chopping*: centile 17).

Conclusions and recommendations

These findings of cognitive impairment justify the use of the term ‘dyslexia’ to describe his difficulties. In fact, his problems are fairly severe. Tim’s dyslexia was subsequently confirmed by full psychological assessment. It then transpired that his father also had literacy difficulties and only a few months later (triggered by these revelations) his older brother (age 12½) had also been identified as having dyslexia. Tim had a very unhappy time in the infant department, and it appears that his disruptive behaviour may have been an effect of his undiagnosed learning difficulties. The school immediately put Tim on the Special Educational Needs Register at Stage 3 and arranged for him to receive specialist tuition for his dyslexia twice a week, with daily practice activities.

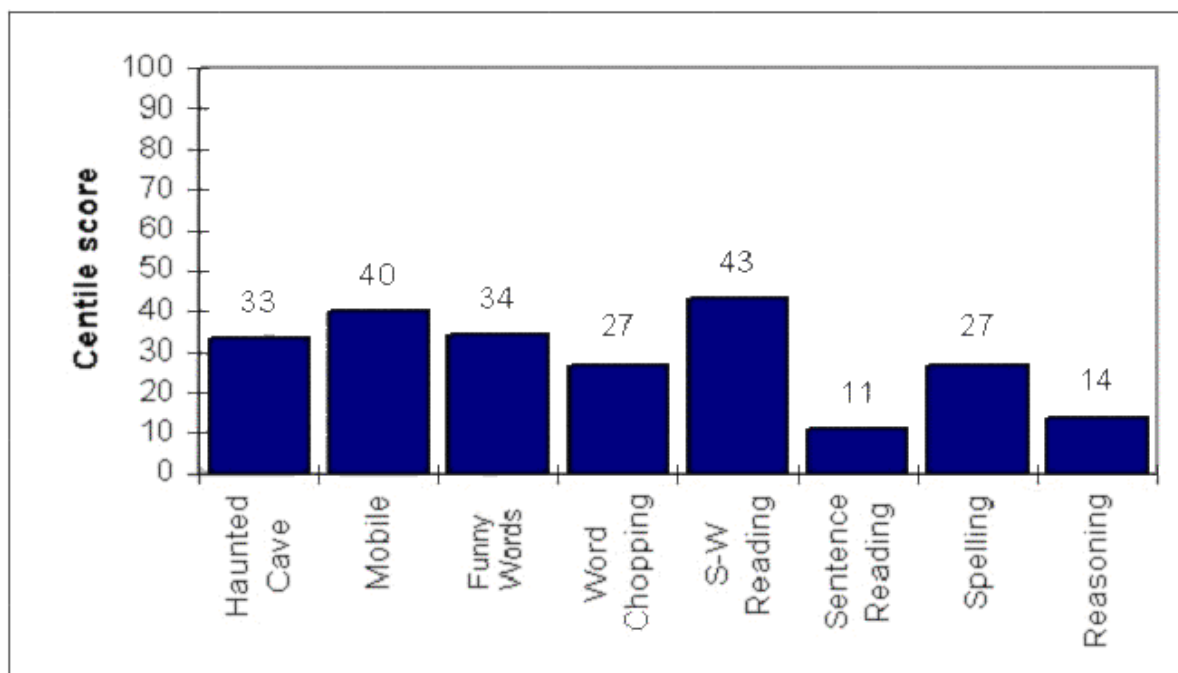
As Tim is bright but has poor reading skills, a short but intensive use of *ClickerPlus* would develop his confidence and skills. He could progress to *Wordbar* and *Inclusive Writer*, which would use his visual strengths to develop reading and spelling skills. *Wordshark3* could be used at home or homework club to help develop his spelling skills.

3. Dani (10 years 2 months)

Background

Her teachers have regarded Dani as a pupil of somewhat below average general ability, and in particular it had been noted that she had immature language skills. She was not on the school’s SEN register. However, her parents have raised the question of whether Dani has dyslexia and so her class teacher administered LASS Junior. The results are shown in Figure 3.

Figure 3 Dani’s results.



Interpretation of test results

With the score on **Reasoning** at the 14th centile it is clear that Dani is rather below average, although it should be remembered that this only assesses non-verbal intelligence. To check Dani's verbal intelligence, a test such as the British Picture Vocabulary Scale (BPVS) could be given.

It is notable that Dani appears to be holding her own in some areas, such as reading accuracy (**Single Word Reading**) and **Spelling**. Her phonic skills (**Funny Words**) are also in the average range, suggesting that decoding has been well taught. Her main problem is with **Sentence Reading** (centile 11), which suggests problems of comprehending text. It is also likely that her poor vocabulary knowledge is affecting her text reading ability. But her diagnostic test results are all in the average to low-average range, so it is unlikely that she has dyslexia.

Conclusions and recommendations

The special educational needs coordinator felt that the level of Dani's difficulties, when considered in the context of her intellectual ability, did not justify a significant amount of additional support. However, she was put on the SEN register at stage 1, and arrangements were made for her to participate in regular shared reading work with pupils from the local college who visited the school to support literacy work every week as part of their community education programme, with the objective of developing her text comprehension ability.

Although Dani is of low intelligence, she has learned to read words, but she has problems with sentences and a limited vocabulary. If she used **ClickerPlus** as her writing tool, she could have grids of words supplemented by pictures, if needed, for new curriculum words. She could have her own talking word book and banks of phrases to stimulate better sentence construction.

LASS Secondary Case Studies

1. Andrew (14 years 9 months)

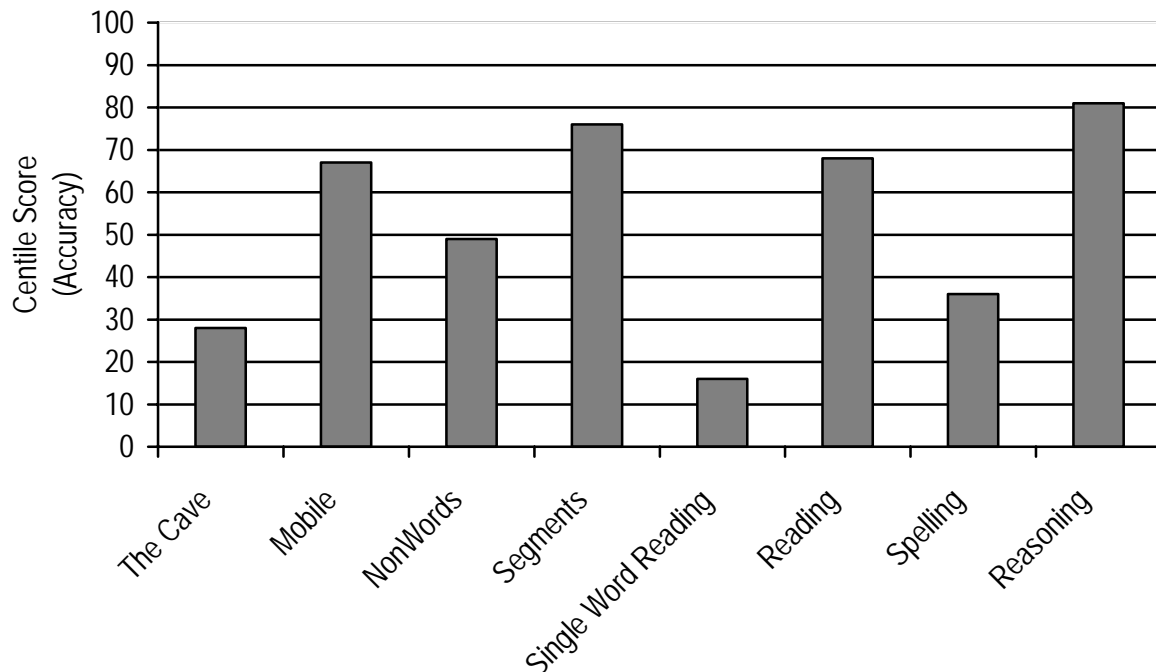
Background

Andrew is a Year 10 pupil who struggles with English and Spanish, although he is described as having made progress recently and achieved some good SATs results. His tutor described his reading aloud and reading comprehension as being weak and his spelling was rated as extremely poor. In addition, Andrew is reported to be rather disorganised and his presentation is poor. Andrew is a friendly pupil who is easily distracted and lacks concentration. He is a slow worker at times and tends to be uninterested in his work, although he generally works well. Andrew is reported to have a normal attitude to the school staff and has friendly relationships with his peers.

Andrew was quiet, attentive and enthusiastic during this testing, which took place in a quiet environment with no-one else present. There were no known circumstances that might have influenced his performance in these tests, e.g. Andrew's attitude, health or levels of test anxiety.

A Behaviour Rating Scale, which was part of the questionnaire that was sent by us to the school, indicated that Andrew's typical levels of attention, social skills, activity and compliance are within normal limits and would not be indicative of attention deficit hyperactivity disorder (AD/HD) or attention deficit disorder (ADD). However, it should be noted that a behaviour rating scale alone is not sufficient evidence to either diagnose or rule out the possibility of these conditions.

Figure 4 Andrew's results



Summary of test results

Test Name	Description	Accuracy Score
The Cave	A test of visual memory for objects and spatial positions.	Centile 28 (Low-average)
Mobile	An auditory memory test assessing digit span.	Centile 67 (Average)
NonWords	A test of phonic decoding skills.	Centile 49 (Average)
Segments	A test of syllable and phoneme deletion that identifies poor phonological processing ability.	Centile 76 (Above average)
Single Word Reading	A test that involves selecting a single word from five options	Centile 16 (Below average)
Reading	An adaptive test that involves finding the missing words in sentences.	Centile 68 (Average)
Spelling	An adaptive test that involves spelling single words.	Centile 36 (Average)
Reasoning	An adaptive test involving matrix puzzles that can be solved by a careful application of logical reasoning, using both visual and verbal strategies.	Centile 81 (Above average)

Interpretation of the test results

Reasoning Ability

On the *Reasoning* test, which was an adaptive test in which Andrew attempted to solve a series of matrix puzzles that required careful application of logical reasoning and the use of both visual and verbal strategies, Andrew achieved an above average score that placed him at centile 81 (i.e. 81% of individuals of Andrew's age would be expected to score below this level and 19% to score above).

Memory

In the *Cave* test, which provided a measure of Andrew's visual short-term memory for objects and their spatial positions, he obtained a score in the lower part of the average range at centile 28. On the *Mobile* test, which assessed Andrew's auditory/verbal short-term sequential memory, he attained an average score at centile 67. These scores indicated that Andrew's short-term auditory/verbal memory skills are satisfactory, although his visual short-term sequential memory skills are markedly below the level that would be predicted on the basis of his above average reasoning skills.

Phonological Skills

Two tests of phonological abilities were administered to Andrew. On the *Segments* test, which provided a measure of his ability to delete phonemes or syllables from words, he achieved an above average score that placed him at the 76th centile. On the *NonWords* test, which assessed his phonic decoding skills, he attained an average score at centile 49. Both of these scores were within the limits that would be expected from Andrew's above average reasoning skills.

Basic Skills

On the *Sentence Reading* test, which is an adaptive test that required Andrew to select the missing words in a series of sentences, he attained an average score at centile 68. On the *Single Word Reading* test, in which he had to select a single word from five options, Andrew obtained a below average score that placed him at centile 16. However, the latter test is not normally distributed (i.e. most individuals will achieve a maximum or near-maximum score in this test – a ceiling effect). Because of this the *Single Word Reading* test usually discriminates quite effectively between the scores of those individuals who are experiencing significant problems with reading, but this is not invariably the case and, therefore, Andrew's score should be interpreted with caution. As, his teacher reported that Andrew's reading skills were weak the *Single Word Reading* test result probably indicates that he is an inaccurate reader but is able to use context intelligently when reading text and, therefore, often manages to gather the gist of what he is reading.

On the *Spelling* test, which is an adaptive test in which Andrew had to spell a number of single words that were presented to him in context, he obtained a score that was within the lower half of the average range at the 36th centile. This score was markedly below the level that would be predicted from Andrew's above average reasoning ability.

Conclusions

Andrew's pattern of results on the *LASS Secondary* tests in combination with his teacher's estimates of his literacy attainments and the information that his work has improved recently is consistent with a profile of a visual form of dyslexia. His reasoning and phonological processing skills were found to be at an above average level and his auditory/verbal sequential short-term memory skills and phonic decoding skills were average. However, his visual sequential short-term memory skills were markedly below the level that would be predicted for an individual of his intellectual potential as measured by the *LASS Reasoning* test score. This weakness in recall of visual information in the order in which it is presented to him almost certainly lies at the root of Andrew's clear weakness in spelling. There were also indications in the *LASS* testing that Andrew's single word reading accuracy is also a marked area of weakness and this is also consistent with the visual short-term memory deficit that lies at the root of visual forms of dyslexia.

Information from Andrew's tutor suggests that he has been able to compensate to some extent for his difficulties. This is consistent with the relatively good score that he attained in the *Sentence Reading* test. However, Andrew's inaccurate single word reading and his weaknesses in spelling indicate that he needs to receive some additional support.

Teaching recommendations

In view of the above findings the following recommendations are made:

NB A number of computer programs and different approaches to learning are recommended; further details of all these can be found in the information sheets enclosed with this report.

- Andrew should be encouraged to use a word processor for as much of his written work as possible. Research has shown that word processing is a useful teaching tool that enables individuals to improve their written work, noticing errors (e.g. in spelling or punctuation) more easily. Also the ease with which a piece of word processed work can be edited and improved should help Andrew to produce better quality essays and other written work. The program *textHELP! Read and Write 5.0* which works alongside other word processing packages and

allows pupils to listen to their work being read back to them is particularly recommended. This program makes it easier for the individual to concentrate on the most important part of the task, i.e. getting ideas on paper, and makes it easier to detect errors.

- It is likely to take Andrew longer than other pupils to complete essays and assessed assignments. Therefore, it is recommended that excessively arduous deadlines are not placed on him which would take valuable time away from his other studying activities or cause unnecessary stress. It may be appropriate for Andrew to be permitted extra time in which to submit assessed work. Allowances should be made for any difficulties with spelling, grammar or problems with essay and/or sentence construction in the marking of his assessed assignments.
- Andrew will need to have regular practice in visual memory skills. Information containing suggestions for games, including computer games, which develop these abilities are included with this report. The games suggested in the information sheets are mostly more appropriate for young children but, with a little thought, the content could be adjusted to make them more appropriate for Andrew. The *Mastering Memory* computer program would be useful for improving Andrew's visual memory skills in an enjoyable way. Further details of this program are included in the information sheets included with this report.
- Study skills support would give Andrew a number of additional strategies that would help him with his schoolwork. The books recommended as a source for this tuition are '*Study Skills: a pupil's survival guide*' by Christine Ostler (published by Ammonite Books, 1996), '*Advanced Study Skills*' by Christine Ostler and Frances Ward (published by SEN Publishers) and '*Use Your Head*' by Tony Buzan (BBC Publications). These books contain a variety of practical strategies and exercises for improving study skills, revision techniques and preparation for examinations that Andrew could be taught and encouraged to use.
- Andrew's dyslexic difficulties should qualify him for special provisions in examinations, otherwise he will be unfairly handicapped in comparison with other candidates. This special provision should consist of extra time in written examinations (15 minutes extra time in each hour is recommended on papers in which Andrew feels he needs this). In most examinations, allowances should be made for any spelling, punctuation or grammatical errors or problems of essay structure and/or sentence construction that are apparent in his answers. However, when spelling, punctuation, grammar and quality of language use are an integral part of the skills being assessed (e.g. in English Language exams), no such allowances should be made.
- Andrew needs some additional support in order to help him to compensate for his dyslexic difficulties and achieve more closely to his full potential. Every effort should, therefore, be made by all those concerned with his education to instigate an appropriate programme of provision for him, following the recommendations in this report.

2. Lee (15 years 4 months)

Background

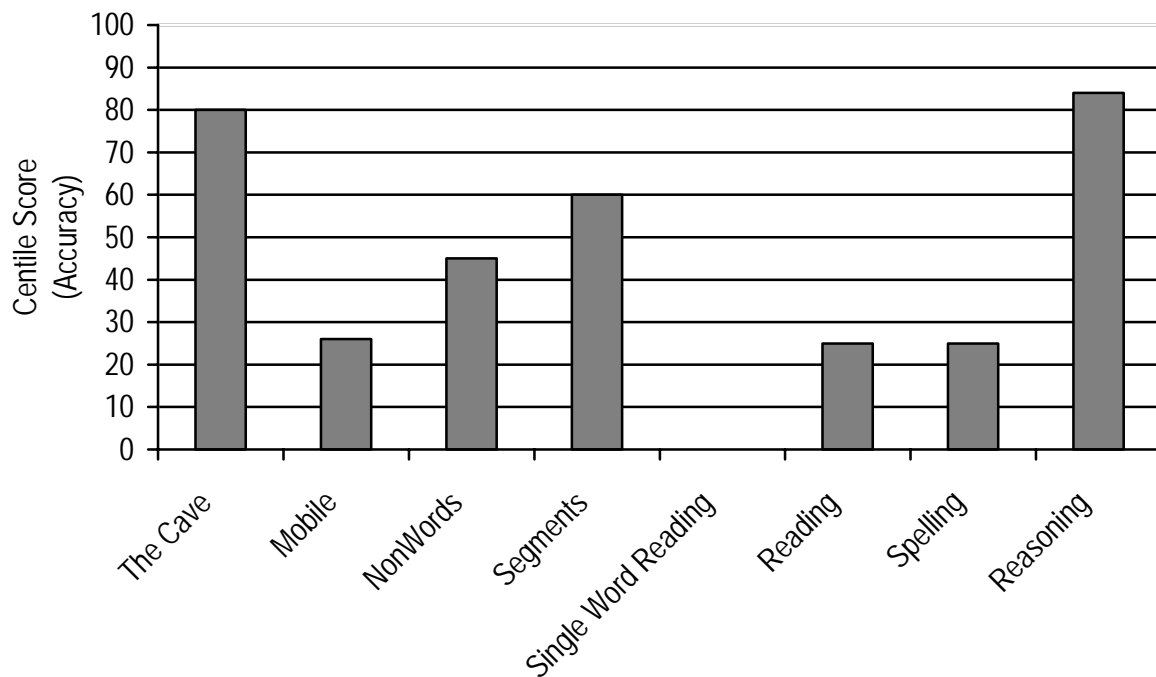
The Head Teacher of Lee's school estimated him to be of above average intelligence. His reading aloud is described as average, although his reading comprehension and spelling were rated as weak. A score on the *Vernon Maths Test*, which was administered at school in June 2001, was quoted. On this test, Lee obtained an age equivalent of 12 years 3 months, which was 3 years 1 month below his chronological age. This score suggests that Lee's arithmetic is weak. Lee is reported to be on the Special Needs Register at Stage 3, although his Head Teacher reported that he receives no specific support. Lee has no medical problems that are known to the school.

Lee is described as being a friendly and competent pupil, although he is uninterested in his work and is disruptive, easily distracted and attention seeking. He has an apprehensive attitude to the adults in school and is friendly and popular with his peers.

A Behaviour Rating Scale completed by his Head Teacher indicated that Lee’s typical levels of attention, activity, social skills are compliance are all within normal limits.

LASS Secondary was administered to Lee as part of a whole class screening on 19th June 2001. The assessment was carried out in a quiet environment with minimal interruptions in a one-to-one situation with the assessor. Lee was quiet, attentive and did not daydream during the testing in which he displayed a determined attitude. However, his responses were slow and almost ponderous. There were no other known circumstances that may have affected Lee’s performance, e.g. his health or levels of test anxiety.

Figure 5 Lee's results



Summary of test results

Test Name	Description	Accuracy Score
Cave	A test of visual memory for objects and spatial positions.	Centile 80 (Above average)
Mobile	An auditory memory test assessing digit span.	Centile 26 (Low-average)
NonWords	A test of phonic decoding skills.	Centile 45 (Average)

Test Name	Description	Accuracy Score
Segments	A test of syllable and phoneme deletion that identifies poor phonological processing ability.	Centile 60 (Average)
Reading	An adaptive test that involves finding the missing words in sentences.	Centile 25 (Low-average)
Spelling	An adaptive test that involves spelling single words.	Centile 25 (Low-average)
Reasoning	An adaptive test involving matrix puzzles that can be solved by a careful application of logical reasoning, using both visual and verbal strategies.	Centile 84 (Above average)

Interpretation of the test results

Reasoning Ability

On the *Reasoning* test, which was an adaptive test in which Lee attempted to solve a series of matrix puzzles that required careful application of logical reasoning and the use of both visual and verbal strategies, Lee achieved an above average score that placed him at centile 84. This was consistent with his teacher's estimate of his intellectual ability.

Memory

The *LASS* suite of tests includes two tests of memory, *Cave* and *Mobile*, which provided measures of Lee's visual short-term memory for objects/spatial positions and auditory/verbal short-term sequential memory respectively.

On the *Cave* test his score was at an above average level (centile 80). However, on the *Mobile* test his score was in the lower reaches of the average range at centile 26. These scores indicated that Lee's short-term memory skills for visual information are good and at an appropriate level for a young man of his intellectual ability. However, his auditory/verbal sequential short-term memory was a statistically significant weakness.

Phonological Skills

On the *NonWords* test, which provided a measure of Lee's phonic decoding skills, Lee attained an average score at centile 45. In addition to providing a measure of his phonological skills, this test also gave an indication of Lee's level of ability to read words that he has never seen before. On the *Segments* test, in which Lee's phonological processing ability was assessed by asking him to identify the correct result of deleting phonemes or syllables from words, he attained an average score that placed him at centile 60. Both these diagnostic test scores indicate that Lee's phonological skills are at an average level for his age and within expected limits for a pupil of his intellectual ability.

Basic Skills

On the *Sentence Reading* test, which is an adaptive test that required Lee to select the missing words in a series of sentences, he obtained a low-average score that placed him at centile 25. The *Single Word Reading* test was not administered. The *Sentence Reading* test score was consistent with his teacher's estimate of Lee's reading comprehension as being weak.

On the *Spelling* test, which is an adaptive test in which Lee had to spell a number of single words that were presented to him in context, he obtained a low-average score that placed him at centile 25. This was also consistent with Lee's teacher's estimate of his spelling skills as being weak.

Conclusions

Lee's pattern of results on the *LASS* tests is consistent with a profile of dyslexia. His reasoning and visual memory skills were found to be good, but his auditory/verbal sequential memory skills were revealed to be a statistically significant weakness. This is a typical pattern of strengths and weaknesses found in individuals with dyslexia. Lee's *Sentence Reading* and *Spelling* test scores were both at the lower end of the average range and significantly below the level that would be predicted from his non-verbal reasoning. These literacy weaknesses are consistent with the auditory/verbal memory deficit that underlies his dyslexia.

However, Lee's phonological skills (*NonWords* and *Segments*) were found to be average and within the limits that would be expected from his reasoning ability. Therefore, it is likely that Lee's dyslexic difficulties are not severe and that he should respond well to additional/specialist support.

His teacher quoted maths tests results that suggested that Lee is also experiencing some difficulties in maths. A significant number of dyslexic individuals also experience difficulties in maths (especially arithmetic). Lee's auditory/verbal short-term memory deficit is likely to underlie these difficulties in addition to his problems with literacy.

Teaching recommendations

- Lee's teachers should make sure that, whenever possible, he overlearns facts and procedures across the curriculum to allow for his memory weaknesses. Overlearning (i.e. continuing to learn information well beyond the point at which the material would usually be regarded as having been learnt) reinforces learning and prevents much of the forgetting that would otherwise often occur. Lee will subsequently need to be given plenty of opportunities and encouragement to revise previously taught material. Research has suggested that learning is most effective for dyslexic individuals and those with relative weaknesses in short-term memory if they spend approximately two-thirds of their time learning and practising new material and the remaining one-third reviewing previously taught material.
- Lee should practice his phonics skills to develop the fluency and accuracy of his reading. The computer program *WordShark 2L* would be particularly useful for this.
- Lee should be encouraged to use a word processor for as much of his written work as possible. Research has shown that word processing is a useful teaching tool that enables individuals to improve their written work, noticing errors (e.g. in spelling or punctuation) more easily. Also the ease with which a piece of word processed work can be edited and improved should help Lee to produce better quality essays and other written work.
- It is likely to take Lee longer than other pupils to complete essays and assessed assignments. Therefore, it is recommended that excessively arduous deadlines are not placed on him which would take valuable time away from his other studying activities or cause unnecessary stress. It may be appropriate for Lee to be permitted extra time in which to submit assessed work. Allowances should be made for any relative difficulties with spelling, grammar or for any problems with essay and/or sentence construction in the marking of his assessed assignments.
- Lee should receive some additional support in mathematics. Because of his limitations in auditory/verbal short-term memory, this mathematics teaching should be as structured as possible, with plenty of additional practice whenever he is taught new mathematical procedures and regular revision of mathematical routines that have already been taught. His teacher should encourage Lee to spend approximately two-thirds of his time learning and practising new facts and procedures and one-third in reviewing and reinforcing previously learnt material.

Computer programs would be a useful way for Lee to gain some of the necessary number skills practice and revision in an enjoyable way. *NumberShark*, *Easy Peasy*, *Maths Circus* and *Math Mania* are all strongly recommended. Details of these programs can be found in a leaflet enclosed with this report.

- Lee will need to have regular practice in auditory/verbal memory skills. Information containing suggestions for games, including computer games, which develop these skills are included with this report. The games suggested in the information sheets are mostly more appropriate for young children but, with a little thought, the content could be adjusted to make them more appropriate for Lee. The *Mastering Memory* computer program would be useful for improving Lee's memory skills in an enjoyable way. Further details of this program are included in the information sheets included with this report.
- Study skills support would give Lee a number of additional strategies that would help him with his schoolwork. The books recommended as a source for this tuition are '*Study Skills: a pupil's survival guide*' by Christine Ostler (published by Ammonite Books, 1996) and '*Use Your Head*' by Tony Buzan (BBC Publications). These books contain a variety of practical strategies and exercises for improving study skills, revision techniques and preparation for examinations that Lee could be taught and encouraged to use. Because Lee's visual memory skills are good, he should be shown how to use visual approaches to learning (e.g. mind maps, also known as spider diagrams or concept webs) for the preparation of essays and for revision. In due course, when Lee has become familiar with drawing and using mind maps, and if he finds this to be a helpful technique, he could start to use the *Inspiration* computer program, which makes use of a very similar method of organising notes, essays and other work.
- Lee's dyslexic difficulties may qualify him for special provisions (e.g. additional time) in examinations, although further investigation of the level of his basic skills and his cognitive abilities may show that his under-achievements are not quite severe enough to warrant this. To establish whether special examination arrangements would be appropriate in his case, Lee would need to receive a report written by an educational psychologist or a teacher with a recognised SpLD/dyslexia qualification after some further assessment.
- Lee's profile of *LASS* results indicates that his difficulties are not severe, but that his dyslexic difficulties are causing him to under-perform in both literacy and numeracy learning. However, because he is bright and only quite mildly affected, if intensive support is given to him now, following the recommendations in this report, he should make encouraging progress and be more able to attain to his educational potential.

3. Travis (14 years 0 months)

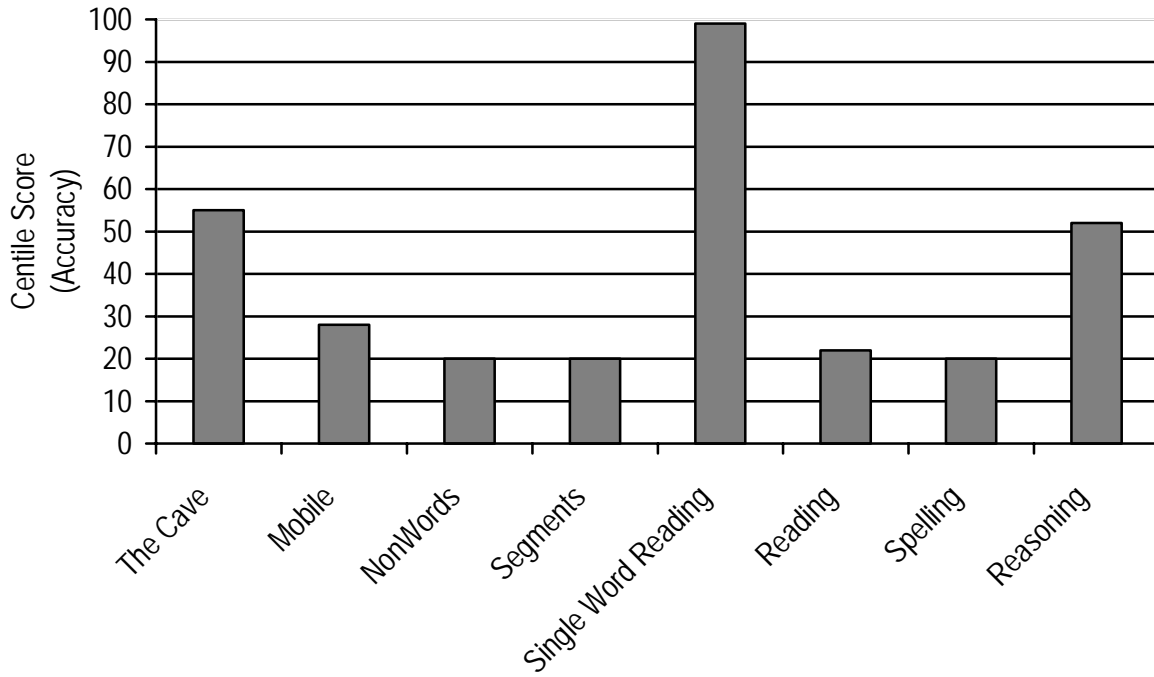
Background

Travis is a Year 9 pupil who has been receiving support at Stage 3 of the *Code of Practice on the Identification and Assessment of Special Educational Needs*. His reading aloud is estimated to be average, but his reading comprehension and spelling were both rated as weak. The result of a maths test that was administered in school in September 2001 when he was aged either 13 years 11 months or 14 years 0 months was supplied to us. On the *Vernon Maths Test*, Travis obtained a very low score that was equivalent to a mathematics age of 8 years 6 months, which was approximately 5 years 6 months behind his chronological age.

A Behaviour Rating Scale, which was part of the questionnaire that was sent by us to the school, indicated that Travis's typical levels of attention, social skills, activity and compliance are within normal limits and would not be indicative of attention deficit hyperactivity disorder AD/HD or attention deficit disorder ADD. However, it should be noted that a behaviour rating scale alone is not sufficient evidence to either diagnose or rule out the possibility of these conditions.

No information was provided about the testing conditions or Travis’s attitude, health or levels of test anxiety at the time of testing with LASS.

Figure 6 Travis' results



Summary of test results

Test Name	Description	Accuracy Score
The Cave	A test of visual memory for objects and spatial positions.	Centile 55 (Average)
Mobile	An auditory memory test assessing digit span.	Centile 28 (Low-average)
NonWords	A test of phonic decoding skills.	Centile 20 (Below average)
Segments	A test of syllable and phoneme deletion that identifies poor phonological processing ability.	Centile 20 (Below average)
Single Word Reading	A test that involves selecting a single word from five options	Centile 99 (Very high)

Test Name	Description	Accuracy Score
Reading	An adaptive test that involves finding the missing words in sentences.	Centile 22 (Below average)
Spelling	An adaptive test that involves spelling single words.	Centile 20 (Below average)
Reasoning	An adaptive test involving matrix puzzles that can be solved by a careful application of logical reasoning, using both visual and verbal strategies.	Centile 52 (Average)

Interpretation of the test results

Reasoning Ability

On the *Reasoning* test, which was an adaptive test in which Travis attempted to solve a series of matrix puzzles that required careful application of logical reasoning and the use of both visual and verbal strategies, Travis attained an average score that placed him at centile 52.

Memory

In the *Cave* test, which provided a measure of Travis’s visual short-term memory for objects and their spatial positions, he attained an average score that placed him at centile 55. However, on the *Mobile* test, which assessed Travis’s auditory/verbal short-term sequential memory, he obtained a low-average score at centile 28. These scores indicated that Travis’s short-term visual memory skills are satisfactory, although his auditory/verbal short-term sequential memory skills are a little below the level that would be predicted on the basis of his average reasoning skills.

Phonological Skills

On the tests of phonological abilities, *NonWords* and *Segments*, which provided measures of his phonic decoding skills and ability to delete phonemes or syllables from words respectively, he obtained below average scores; in both cases his scores placed him at centile 20. Both test scores were markedly below the level that would be predicted from Travis’s average reasoning skills and, therefore, indicate that Travis has a deficit in both these aspects of his phonological skills.

Basic Skills

On the *Sentence Reading* test, which is an adaptive test that required Travis to select the missing words in a series of sentences, he obtained a below average score at centile 22. This was clearly below the level that would be expected of a pupil of Travis’s average reasoning ability. On the *Single Word Reading* test, in which he had to select a single word from five options, Travis achieved a very high score that placed him at centile 99. However, the latter test is not normally distributed (i.e. most individuals will achieve a maximum or near-maximum score in this test – a ceiling effect). Although the *Single Word Reading* test usually discriminates quite effectively between the scores of those individuals who are experiencing significant problems with reading, this is not invariably the case and, therefore, in Travis’s case this score should be disregarded. However, Travis’s reading of single words may be somewhat better than his text reading as his teacher reported that his reading aloud was average.

On the *Spelling* test, which is an adaptive test in which Travis had to spell a number of single words that were presented to him in context, he obtained a below average score that placed him at centile 20.

This score was also markedly below the level that would be predicted from Travis's average reasoning ability.

Conclusions

Travis's pattern of results on the *LASS* tests is consistent with a profile of dyslexia. His reasoning and visual memory skills were found to be average, but his phonological abilities (both phonic decoding and phoneme/syllable deletion skills) and auditory/verbal sequential short-term memory were revealed to be markedly below the levels expected on the basis of his average reasoning ability.

Travis's *Sentence Reading* and *Spelling* test scores were also found to be clearly below this expected level. These weaknesses in his reading and spelling are consistent with the memory and phonological weaknesses that typically lie at the root of dyslexia.

Maths test results were quoted that indicate that Travis experiences particular difficulties in this area. Approximately 60% of dyslexic individuals find mathematics (particularly calculation skills) very difficult and it is probable that Travis's auditory/verbal short-term memory weaknesses also underlie his problems with mathematics.

Teaching recommendations

In view of the above findings the following recommendations are made:

- Travis's teachers should make sure that, whenever possible, he overlearns facts and procedures across the curriculum to enable him to compensate for his memory weaknesses. Overlearning (i.e. continuing to learn information well beyond the point at which the material would usually be regarded as having been learnt) reinforces learning and prevents much of the forgetting that would otherwise often occur. Travis will subsequently need to be given plenty of opportunities and encouragement to revise previously taught material. Research has suggested that learning is most effective for dyslexic individuals and those with limitations in short-term memory if they spend approximately two-thirds of their time learning and practising new material and the remaining third reviewing previously taught material.
- Travis would find it useful to work through a phonics teaching scheme with regular practice and revision. Taking a multi-sensory approach to this teaching would enable him to learn this using a combination of verbal, visual and kinaesthetic memory, which could support each other and enable him to learn more effectively. Care should be taken that Travis gets sufficient practice and revision, moving on to the next step only when the present step has been thoroughly mastered. Ideally this learning should be given little and often in a one-to-one situation. Recommended phonic schemes include: *Toe By Toe* and *Step By Step*.
- Computer activities would give Travis opportunities for enjoyable practice of his phonics work, for example *WordShark 3*.
- Travis should be encouraged to use a word processor for as much of his written work as possible. Research has shown that word processing is a useful teaching tool that enables individuals to improve their written work, noticing errors (e.g. in spelling or punctuation) more easily. Also the ease with which a piece of word processed work can be edited and improved should help Travis to produce better quality essays and other written work. The program *textHELP! Read and Write 5.0* which works alongside other word processing packages and allows pupils to listen to their work being read back to them is particularly recommended. This program makes it easier for the individual to concentrate on the most important part of the task, i.e. getting ideas on paper, and makes it easier to detect errors.
- It is likely to take Travis longer than other pupils to complete essays and assessed assignments. Therefore, it is recommended that excessively arduous deadlines are not placed on him which would take valuable time away from his other studying activities or cause unnecessary stress. It

may be appropriate for Travis to be permitted extra time in which to submit assessed work. Allowances should be made for any difficulties with spelling, grammar or problems with essay and/or sentence construction in the marking of his assessed assignments.

- Travis should receive some additional support in mathematics. Because of his limitations in auditory/verbal short-term memory, this mathematics teaching should be as structured as possible, with plenty of additional practice whenever he is taught new mathematical procedures and regular revision of mathematical routines that have already been taught. His teacher should encourage Travis to spend approximately two-thirds of his time learning and practising new facts and procedures and one-third in reviewing and reinforcing previously learnt material. Computer programs would be a useful way for Travis to gain some of the necessary number skills practice and revision in an enjoyable way. *NumberShark*, *Easy Peasy*, *Maths Circus* and *Math Mania* are all strongly recommended. Details of these programs can be found in a leaflet enclosed with this report.
- Travis will need to have regular practice in auditory/verbal memory skills and phonological skills. Information containing suggestions for games, including computer games, which develop these abilities are included with this report. The games suggested in the information sheets are mostly more appropriate for young children but, with a little thought, the content could be adjusted to make them more appropriate for Travis. The *Mastering Memory* computer program would be useful for improving Travis's memory skills in an enjoyable way. Further details of this program are included in the information sheets included with this report.
- Study skills support would give Travis a number of additional strategies that would help him with his schoolwork. The books recommended as a source for this tuition are '*Study Skills: a pupil's survival guide*' by Christine Ostler (published by Ammonite Books, 1996), '*Advanced Study Skills*' by Christine Ostler and Frances Ward (published by SEN Publishers) and '*Use Your Head*' by Tony Buzan (BBC Publications). These books contain a variety of practical strategies and exercises for improving study skills, revision techniques and preparation for examinations that Travis could be taught and encouraged to use. Because Travis's visual memory skills are relatively good, he would benefit from being shown how to use visual approaches to learning (e.g. mind maps, also known as spider diagrams or concept webs) for the preparation of essays and for revision. In due course, when Travis has become familiar with drawing and using mind maps, and if he finds this to be a helpful technique, he could start to use the *Inspiration* computer program, which makes use of a very similar method of organising notes, essays and other work.
- Travis's dyslexic difficulties may qualify him for special provisions (e.g. additional time) in examinations, although further investigation of the level of his basic skills and his cognitive abilities may show that his under-achievements are not quite severe enough to warrant this. To establish whether special examination arrangements would be appropriate in his case, Travis would need to receive a report written by an educational psychologist or a teacher with a recognised SpLD/dyslexia qualification after some further assessment.
- Travis needs continuing special help in order to help him to achieve to his full potential. Every effort should, therefore, be made by all those concerned with his education to instigate an appropriate programme of educational provision for him, following the recommendations in this report.

Recommended resources

General recommended reading

All the publications in this section are available from **SEN Marketing**, 618 Leeds Road, Outwood, Wakefield WF1 2LT. Tel/Fax: 01924 871697. Email: sen.marketing@ukonline.co.uk

Dyslexia: a hundred years on by Tim Miles and Elaine Miles. Second edition, Open University Press, 1999. *[A well-written, up-to-date and pretty comprehensive review of the field, but with the emphasis on research knowledge rather than teaching approaches.]*

Dyslexia: a practitioner's handbook by Gavin Reid. Wiley, 1998. *[An accessible, up-to-date overview of knowledge, plus a very practical compendium of resources for teachers.]*

Dyslexia by Margaret J. Snowling (Second edition). Blackwell, 2000. *[A very clear up-to-date survey of research evidence on dyslexia, with a particular focus on the phonological deficit hypothesis of dyslexia.]*

Dyslexia: Theory and Good Practice' (Ed. Angela Fawcett). Whurr, 2001. *[A compendium of some of the main papers and keynote addresses from the 5th International Conference of the British Dyslexia Association, by prominent international researchers. Includes particularly useful reviews on intervention studies, infancy, genetics and phonology.]*

Dyslexia: biology, cognition and intervention (Eds. Charles Hulme and Maggie Snowling). Whurr, 1997. *[A fairly comprehensive survey of current research taken from papers delivered at the 4th International Conference of the British Dyslexia Association, with chapters written by many international experts.]*

Dyslexia, Literacy and Psychological Assessment (Report of a Working Party of the Division on Educational and Child Psychology of the British Psychological Society, Chaired by Rea Reason.) British Psychological Society, 1999. *[A useful and fairly concise survey of current knowledge, with specific reference to how educational psychologists should be assessing dyslexia. Some of the findings and conclusions of the Working Party are questionable.]*

The Psychological Assessment of Reading (Eds. John Beech and Chris Singleton) Routledge, 1997. *[A compendium of different approaches to assessing reading from both the teacher's and the psychologist's point of view, authored by national experts. Contains an appendix with reviews of many of the tests used in the field.]*

Specific Learning Difficulties (Dyslexia): challenges and responses by Peter Pumfrey and Rea Reason. Routledge, 1991. *[At one time this was the authority on evidence regarding research and practice on dyslexia; it is perhaps a little dated now, but still a valuable resource, especially when writing essays or assignments.]*

Some research publications on dyslexia assessment

Beech, J. R. and Singleton, C. H. (1997) The psychological assessment of reading: theoretical issues and professional solutions. In J. R. Beech and C.H. Singleton (Eds.) *The Psychological Assessment of Reading*. London: Routledge, pp 1-26.

British Psychological Society (1999) *Guidelines for the development and use of computer-based assessments*.

British Psychological Society (1999) *Dyslexia, Literacy and Psychological Assessment*. (Report by a Working Party of the Division of Educational and Child Psychology).

Fawcett, A. J., Singleton, C. H. and Peer, L. (1998) Advances in early years screening for dyslexia in the UK. *Annals of Dyslexia*, 48, 57-88.

Simmons, F. R. and Singleton, C.H. (2000) Reading comprehension abilities of dyslexic students in higher education. *Dyslexia: An International Journal of Research and Practice*, 6, 178-192.

- Singleton, C. H. (1997) Screening for early literacy. In J. R. Beech and C.H. Singleton (Eds.) *The Psychological Assessment of Reading*. London: Routledge, pp. 67-101.
- Singleton, C. H. (1997) Computerised assessment of reading. In J. R. Beech and C.H. Singleton (Eds.) *The Psychological Assessment of Reading*. London: Routledge, 1997, pp. 257-278.
- Singleton, C. H. (2001) Computer-based assessment in education. *Educational and Child Psychology*, 18(3), 58-74.
- Singleton, C. H. (2002) Dyslexia: Cognitive factors and implications for literacy. In G. Reid and J. Wearmouth (Eds.) *Dyslexia and Literacy: Research and Practice*. London: Wiley.
- Singleton, C. H. (In press) Using computer-based assessment to identify learning problems. In L. Florian and J. Hegarty (Eds.) *ICT and Special Educational Needs*. Milton Keynes: The Open University Press.
- Singleton, C.H., Horne, J.K. and Thomas, K.V. (1999) Computerised baseline assessment of literacy. *Journal of Research in Reading*, 22, 65-78.
- Singleton, C.H., Thomas, K.V. and Horne, J.K. (2000) Computerised cognitive profiling and the development of reading. *Journal of Research in Reading*, 23, 158-180.

On examination arrangements for candidates with SEN

Backhouse, G. (2002) **Providing for candidates with special educational needs during GCE (A level) VCE, GCSE and GNVQ**. Patoss Publications. Price £5.00.

Available post free direct from PATOSS, P.O. 10, Evesham, Worcs., WR11 1ZW. (See also the PATOSS website www.patoss-dyslexia.org)

Or from SEN Marketing, 618 Leeds Road, Outwood, Wakefield WF1 2LT. Tel/Fax: 01924 871697. Email: sen.marketing@ukonline.co.uk

The BDA (British Dyslexia Association) also produces information leaflets on exam arrangements for dyslexic students.

British Dyslexia Association, 98 London Road, Reading RG2 5AU. Tel: 0118 966 8271. Fax: 0118 966 2677. Email: info@dyslexiahelp-bda.demon.co.uk

Computer programs

Computer programs for use in schools and at home are available from **REM**, Great Western House, Langport, Somerset TA10 9YU. Tel: 01458 253636 Fax: 01458 253646.

A free copy of the REM catalogue is available on request. Email: info@r-e-m.co.uk

Many programs can also be tried out by accessing their website: www.r-e-m.co.uk

Many computer programs for dyslexics to use in schools and at home are also available from **iANSYST**, which also offers sales and advice on computer hardware and software for students and other dyslexics:

iANSYST, The White House, 72 Fen Road, Cambridge, CB4 1UN. Tel: 01223 420101. Fax: 01223 426644.

Email: sales@dyslexic.com See also their website for further information: www.dyslexic.com

For more information about Lucid or the developments or research please visit the Lucid web site www.lucid-research.com. The Lucid staff can be contacted by email info@lucid-research.com, telephone +44 (0)1482 862121 or fax +44 (0)1482 882911.

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