

# LADS

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Lucid Adult Dyslexia Screening

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## **Administrator's Manual**

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Fourth Edition  
December 2010

The logo for Lucid features the word "Lucid" in a dark blue, serif font. Above the letter 'i' is a stylized orange and yellow arc that ends in a small orange circle, resembling a comet or a light trail.

Lucid

# LADS Administrator's Manual

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Main distributors:

**Lucid Research Ltd.**

3 Spencer Street, BEVERLEY  
East Yorkshire, HU17 9EG, UK

[www.lucid-research.com](http://www.lucid-research.com)

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# 1 Introduction

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## 1.1 What is LADS?

LADS (Lucid Adult Dyslexia Screening) is a computerised test designed to screen for dyslexia in persons of 16 years and older. LADS comprises four assessment modules, which measure:

- 1) **Word Recognition** (Lexical decoding involving speeded recognition of real word from non-words).<sup>1</sup>
- 2) **Word Construction** (Speeded lexical encoding of non-words from syllables)
- 3) **Working Memory** (Backwards digit span)
- 4) **Reasoning** (Non-verbal matrix reasoning)

The first three of these are *dyslexia sensitive* measures: it is well established in the research literature that all these tasks are difficult for most people with dyslexia. The Reasoning test has been included in order to increase the accuracy of detection of dyslexia in bright, well-compensated adults.<sup>2</sup> It also enables the Administrator to reach a rough estimate of the person's intellectual ability, which may be important when making decisions about further action after screening.

The tests in LADS are adaptive; that is, the program varies the items given according to the performance of the individual taking the test. This means that the assessment is swift and efficient. Each of the four modules in LADS takes about five minutes, so the whole screening can usually be completed in about 20 minutes. Results can be viewed on screen or printed out immediately. For further information on administering LADS, see Chapter 3.

Administration of LADS does not require professional training in education or psychology. The tests are self-administered and results very easy to interpret. The program assists interpretation by stating the probability that the person has dyslexia: 'high probability', 'moderate probability', 'borderline', and 'low probability'. However, because all the results of any LADS screening are available to Administrators they are not forced to accept the recommendations of the program; instead, they are free to use their own professional judgment when interpreting results and in making decisions about what to do next. For further information on interpreting results of LADS, see Chapter 4. Caution should be exercised when presenting results of LADS to adults, as counselling may be required in cases where an indication of dyslexia may come as a shock to a person. This important issue is discussed in more detail in Chapters 3 and 4. Persons taking LADS who are found to be 'possibly dyslexic' or 'probably dyslexic' will welcome information about how their difficulties can be supported and where they can turn to for advice. This responsibility of the Administrator should not be taken lightly. For further information on support for adults with dyslexia, see Chapter 5.

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<sup>1</sup> A nonword is a sequence of letters that is not a real word but which nevertheless conforms to the orthographic rules of the language (e.g. 'sploff', 'blust', 'goster'). Hence nonword can be decoded and pronounced as though they were real words. Since any given nonword will not have been encountered by the reader previously, the person cannot rely on visual, semantic, or contextual strategies but can only use phonological rules in order to decode it. Nonwords thus provide a pure test of a person's competence in phonological decoding or what is often referred to in education as 'phonics'.

<sup>2</sup> 'Compensated', in this context, refers to the extent to which a dyslexic person has been able develop strategies to circumvent the impact of their dyslexia on their life and work (for further discussion of this issue see Section 1.3).

## 1.2 Uses of LADS

LADS is designed to be used for:

- (a) routine group screening for dyslexia; and
- (b) individual screening for dyslexia in adults referred because of literacy difficulties or other learning problems.

LADS can be used in any adult setting whether educational or employment-related, e.g. universities or higher education colleges, further education colleges, 6<sup>th</sup> form colleges, adult literacy centres, dyslexia centres, basic skills centres, learning support units, prison and youth offender education units, careers centres, employment centres and workplaces.

Where the aim is routine group screening it is strongly recommended that the network version of LADS is used. This enables up to 40 persons to be screened simultaneously using a computer network, and gives greater efficiencies of both time and cost than using the single user version. Another advantage of using the test for group screening on entry to the institution is that it provides early warning of those individuals who are likely to be dyslexic, rather than waiting until problems emerge, which may in some cases be too late for effective action to be taken (e.g. because a student's course has almost come to an end).

Many institutions and individuals prefer to have confirmation of dyslexia provided by a report from an educational psychologist. This is an expensive service: at the time of going to press, average fees for psychological assessments in the UK are in excess of £300. Whoever bears the cost – the institution, employer, or the test-taker personally – this is a considerable expense. By carrying out a screening assessment beforehand the chances of this money being wasted (because the subsequent psychological assessment turns out to be negative) is reduced. In higher education, a psychologist's report may be necessary if a student with dyslexia wishes to apply for a Disabled Students Allowance.<sup>3</sup> In many cases, however, an adult will not need to go to the lengths of obtaining a psychologist's report, but the results of LADS will be sufficient for their requirements.

It must be emphasised that LADS is not a full diagnostic test and so does not purport to provide a definitive assessment of dyslexia. Rather, it is designed to provide a quick screen of unselected or selected adults in order to indicate which of them is most likely to have dyslexia.<sup>4</sup> Each of the three modules in LADS provides a categorisation of persons taking the test into the following three groups, which are represented by the colour of the bars on the LADS reports screen and print-out:

- Green: No indication of dyslexia.
- Amber: Weak indication of dyslexia.
- Red: Strong indication of dyslexia.

Overall, LADS provides a categorisation of persons taking the test into the following four groups:

- 1) Low probability of dyslexia
- 2) Borderline

<sup>3</sup> See the Report of the National Working Party on Dyslexia in Higher Education (C.H. Singleton, Chair, 1999) for further information on these matters.

<sup>4</sup> Note that although the term 'dyslexic' is used here for convenience, this is not regarded as politically correct in some circles because (it is argued) the person becomes identified *by* the condition rather than as a person *with* the condition. However, many adults with dyslexia are perfectly comfortable about referring to themselves as being 'dyslexic' and about others referring to them in this way. Being dyslexic is nothing to be ashamed of, they would argue, so why should we not use the term? It can also be very tedious always to use terminology such as 'an adult with dyslexia', hence term 'dyslexic' is sometimes used in this manual and we apologise if this causes any offence.

- 3) Moderate probability of dyslexia
- 4) High probability of dyslexia

The LADS reports screen and print-out also provides a brief description of the results. It should be stressed that neither these descriptions nor the categories are not definitive and are provided merely to assist interpretation of results. LADS gives full results, so Administrators are at liberty to use their professional judgement when interpreting findings and in making decisions on outcome. Guidelines on interpretation of LADS results are provided in Chapter 4. Advice about possible courses of action and forms of support for adults whose results suggest they have dyslexia are provided in Chapter 5.

### 1.3 Current scientific knowledge about dyslexia

Although we are far from a complete scientific understanding of dyslexia, and the field has its fair share of controversies and competing theories, nevertheless we know enough to be able to formulate with confidence a computerised test that will screen effectively for dyslexia in adults.

Current research evidence points very strongly to dyslexia being a constitutional disorder that is usually inherited genetically and which arises largely because of weaknesses or differences in cognitive systems that subserve processes used in the perception and production of speech, including phonological processing, lexical access and working memory (for reviews see Miles and Miles, 1999; Snowling, 2000). Phonological processing refers to the processing of information concerning the sounds of language, at the levels of phonemes, spoken words and syllables, and the integration of these with other cognitive representations, such as graphemes (letters) and written words. Lexical access is the process by which we locate stored representations of words in a mental lexicon held in long-term memory. Working memory is the process by which we can hold phonological information in a short-term memory store while we carry out some mental operation on it, such as recognising a word we have heard or read. All these processes are critical to reading, writing and spelling.

Tasks that involve decoding or encoding of individual words at a phonological or lexical level are those most notably affected in dyslexia, but any task involving speed of processing (see Wolf and O'Brien, 2001), rapid recall of rote information, or which places heavy demands on working memory is likely to be impaired. Intelligence, reasoning and problem solving skills are not directly affected, but may be indirectly affected in speeded tasks or those involving rote recall.

Although the phonological deficit is undoubtedly the predominant theory of dyslexia at the present time, there are alternative theories, which implicate deficits in visual processing (see Stein et al, 2001), and automatisisation of skills due to deficits in cerebellar processing (see Fawcett and Nicolson, 2001). It remains to be seen whether the dysfunctions referred to in these theories are best understood as subtypes of dyslexia or, alternatively, as different conditions altogether.

Dyslexia affects about 4% of the population fairly severely, while up to about another 6% may experience dyslexic difficulties of a less severe nature. In childhood, early difficulties with phonology are common in individuals with dyslexia, and at primary school problems with acquiring phonic decoding skills almost universal. The dyslexic child is normally late in learning to read and rate of reading generally remains slow in comparison with peers. Written construction and spelling are among the most difficult activities for dyslexics, and typically these remain life-long weaknesses, although the word processor has enabled many people with dyslexia to write with greater confidence. In addition to slow reading speed and difficulties with writing, limitations in speeded processing tasks and recall of information learned by rote all combine to create major problems for dyslexic people in examinations. To make assessment of learned skills fairer for people with dyslexia than they otherwise would, it has become the norm to allow additional time in written examinations, such as GCSE, 'A' level and degree exams. This issue is discussed more fully in Chapter 4.

As people with dyslexia grow up they usually develop a variety of compensatory strategies, some of which are positive tactics to help them to meet the educational or occupational demands placed upon them, while others are simply means of concealing their difficulties (see McLoughlin, Fitzgibbon and Young, 1994). But although dyslexia is a life-long condition, it is not an inevitable barrier to educational or occupational achievement. The number and proportion of students with dyslexia entering higher education is steadily increasing, and although they may have to work much harder than other students, there is evidence that their degree results are just as good (see Singleton, 1999). In almost all occupations there are now highly successful individuals with dyslexia, and in recent years dyslexia has become less socially stigmatised. Support for dyslexic adults in the workplace is more forthcoming (see Bartlett and Moody, 2000; Reid and Kirk, 2001; McLoughlin, Leather and Stringer, 2002). Nevertheless, one should not underestimate the personal difficulties of adults with dyslexia, struggling to cope in a literate world (see Miles and Varma, 1995; Riddick, Farmer and Sterling, 1997). Dyslexia is never entirely overcome, but people can and do come to terms with it and live happy and successful lives.

## 1.4 The advantages of computerised assessment

The advantages of computerised assessment in educational settings has been explored by Singleton (see Singleton, 1997b, 2001). Computers provide more precise measurement, especially when complex cognitive skills are being assessed. Tests are administered in an entirely standardised manner for all persons taking the test, which enhances reliability of measurement. Timings and presentation speeds can be controlled precisely. The subjective judgement of the Administrator does not affect the test outcome as it can in conventional tests. LADS is largely self-administered and results are available immediately; both of these factors help to reduce administrative load and avoid time delays.

Of particular importance in this context is the fact that people often prefer computerised assessment to conventional assessment. Research has shown that many adults – particularly those with reading or writing problems or who experienced difficulties at school – find conventional assessment by another person stressful and anxiety provoking, particularly when the assessor is viewed as being in the role of a teacher or some equivalent professional. By contrast, they are generally more relaxed and confident when taking computerised tests, and less worried about ‘getting something wrong’ (see Singleton, 2001).

The tests in LADS are adaptive, so that the performance of the individual taking the test is constantly monitored and the program varies the items given according to patterns of success or failure on previous items. Computerised adaptive psychological tests have been shown to be much more efficient than conventional tests because the person taking the test receives a smaller proportion of items that are too easy or too difficult, and a greater proportion of items that closely match the individual's ability level. Adaptive tests require fewer items overall in order to achieve an equivalent level of accuracy and reliability of measurement, and so the cognitive load on the person taking the test is reduced. Test fatigue is lessened, and positive test motivation maintained (for further discussion of adaptive assessment in education, see Singleton, 1997b).

Lucid has a unique track record in researching and developing computerised assessment systems for use in education. The first of these, *CoPS Cognitive Profiling System*, was an internationally pioneering scientific development, created by Singleton, Thomas and Leedale, and originally released in 1995. In producing CoPS, Lucid drew upon the results of a five-year longitudinal research study on the early identification of dyslexia carried out at the University of Hull (see Singleton, Thomas and Horne, 2000). Lucid CoPS is now used in over 5,000 primary schools in the UK and elsewhere in the world. To date, four foreign language versions of CoPS have been produced (Swedish, Italian, Norwegian and Arabic). In 1998, Lucid published *CoPS Baseline Assessment System* (Singleton, Thomas and Horne, 1998), which was accredited by the Qualifications and Curriculum Authority for on-entry assessment in primary schools in England and Wales. To date, this remains the only fully computerised baseline assessment system ever

developed, although some rival systems use computers to deliver items or process results. The development and validation of *CoPS Baseline* was reported in a paper by Singleton, Horne and Thomas (1999).

In 1999, Lucid published *LASS (Lucid Assessment System for Schools) Secondary* (Horne, Singleton and Thomas, 1999), and in 2001 followed this up with *LASS Junior* (Thomas, Singleton and Horne, 2001). These programs, which are now in use in over 2,000 primary and secondary schools in the UK, provide assessment of literacy skills, cognitive abilities and reasoning. Like the previous computerised assessment systems published by Lucid, LASS was developed in accordance with stringent psychometric and scientific principles, and with the co-operation of several hundred schools and teachers, who assisted in trials for development, validation and reliability. Lucid has also created computerised assessment systems for other organisations, including a dyslexia screening test for the University for Industry, and a comprehensive dyslexia diagnostic program for a Swedish educational agency.

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## 2 The development of LADS

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### 2.1 Scientific rationale for LADS

One might pose the question: since adults with dyslexia typically have problems with reading, writing and spelling, why not simply measure those skills in order to identify the individuals who have dyslexia? The problems with this approach are (a) the differences in literacy skills between dyslexic and non-dyslexic persons are largely quantitative rather than qualitative, and (b) the development of compensatory strategies (especially by individuals with higher intelligence) often masks such differences. If one were to take a group of dyslexic and a group of non-dyslexic adults, statistically significant differences between these groups in reading, writing and spelling would almost certainly be found. But if one took an individual adult with dyslexia, he or she may have literacy skills in the average range (although below that which might be reasonably expected from their intelligence and education), while an individual adult who does not have dyslexia may have below average literacy skills. A screening test has to be capable of identifying which individuals do, and do not, have dyslexia to a reasonable degree of accuracy, and for that task measures that are more reliable than literacy skills are required.

#### 2.1.1 The requirements of an effective screening system

The term 'screening' may be used for any procedure that facilitates rapid and easy sorting into categories where there is the expectation that some categorisation errors may occur. A certain level of error is traded for increased speed and practicality (see Singleton, 1997a). Today, the term screening is most commonly encountered in medicine where the purpose is to identify individuals at risk of some disorder or disease. In education the purpose of screening is usually to identify children or adults who have special educational needs (e.g. because of dyslexia). These individuals will require tuition or support over and above what is provided for other individuals, or may be entitled to special arrangements (reasonable adjustments, or accommodations) when being assessed or undergoing some selection process.

No screening system is 100% accurate since it is inherent within the technique of screening that a certain level of error or misclassification is inevitable. The accuracy of any screening system is indicated by the frequency of misclassifications that it makes. False positives and false negatives are the two types of screening misclassifications. A false positive is a 'false alarm', i.e. an instance in which a person has been classified as 'at risk' (in this case, possibly dyslexic) when, in fact, this is not the case. A false negative is a 'miss', i.e. an instance in which a person has been classified as 'not at risk' (in this case, not dyslexic) when, in fact, the opposite is the case (they are dyslexic). The value of any screening test depends on having low frequencies of false positives and false negatives. A high frequency of false positives generally results in the diverting of resources to dealing with cases that do not actually require attention. A high frequency of false negatives results in critical cases being overlooked, possibly with serious consequences. However, reducing misclassifications to very low levels almost always entails increasing the complexity and sophistication of the measurement, which will tend to reduce the practicality of screening and increase administrative effort and costs. In general, levels of less than 25% for each of these is advocated for effective screening (see Jansky, 1977; Potton, 1983; Singleton, 1997a).

#### 2.1.2 Key indicators of dyslexia in adults

The compensation strategies that adults with dyslexia often develop in order to cope with literacy tasks can mask their dyslexia and make it difficult to determine whether a person genuinely does have dyslexia. For this reason, the use of literacy tasks alone are unreliable in the identification of dyslexia (see Singleton, 1999, for further discussion of this). Furthermore, any task that relies strongly on acquired knowledge (e.g. vocabulary) would not be suitable as

results would be likely to be masked by educational factors. However, the cognitive difficulties that underpin dyslexia – particularly in phonological processing, lexical access and working memory – are much more fundamental and difficult to compensate. They are also less likely to be masked by educational factors. These underlying cognitive features of dyslexia have already been outlined in section 1.3. There is extensive evidence that, in adulthood, persons with dyslexia (even dyslexic university students) still exhibit limitations in tasks involving these cognitive domains (see Beaton, McDougall and Singleton, 1997; Gottardo et al, 1997; Hanley, 1997; Snowling, 2000; Snowling et al, 1997). In designing LADS it was decided to build a system that had a strong scientific research basis and therefore to centre this on in phonological processing, lexical access and working memory. Three tests were devised, called *Word Recognition*, *Word Construction* and *Working Memory*, all of which rely to a greater or lesser extent on the core cognitive abilities, as shown in Table 1.

It has already been pointed out that there are alternative conceptualisations of dyslexia, which implicate dysfunctions in the visual system and/or in the cerebellar system for automatization of skills (see section 1.3). There is insufficient space here to debate these complex issues (for a review, see Miles and Miles, 1999). However, it is undeniably the case that the vast majority of dyslexics display difficulties in phonological processing, lexical access and working memory. By contrast, at best only a much smaller proportion of dyslexics display visual processing difficulties (see Rack, 1997; Evans, 2001), and the extent of difficulties in cerebellar processing has yet to be firmly established. Hence, in developing LADS it was considered prudent to focus on the core cognitive deficits. In addition, in view of the evidence on the role of speed of processing in dyslexia (see Wolf and O'Brien, 2001), it was decided to make the tasks in LADS speeded ones to make them as sensitive as possible to dyslexic difficulties.

In Table 1, the number of crosses shows the extent to which the three dyslexia-sensitive tests in LADS — Word Recognition, Word Construction and Working Memory — are believed to draw upon the core cognitive abilities, based on a consideration of the tasks involved. The conclusions shown in Table 1 are supported by intercorrelations computed between the three tests in a sample of 134 adults, with a 50:50 split between known dyslexics and non-dyslexics. The correlation between Word Recognition and Word Construction was found to be high ( $r=0.83$ ), indicating that both these tests are assessing similar abilities; in fact, both are strongly phonological tasks. However, the correlations of these tests and the Working Memory test were much lower, although still statistically significant. This suggest that the two phonological tests also place demands on working memory, but a little more so in the case of Word Construction ( $r=0.34$ ) than in the case of Word Recognition ( $r=0.30$ ).<sup>5</sup>

*Table 1. The cognitive basis of the three tests in LADS.*

LADS Test ↓	Cognitive skills being assessed		
	Phonological processing	Lexical access	Working Memory
Word Recognition	++	+++	+
Word Construction	+++		++
Working Memory			+++

<sup>5</sup> Note that these correlations were computed on the basis of the full, original (unadaptive) versions of the tests, and are different from the data on the adaptive forms presented in Table 11.

### 2.1.3 The role of reasoning and intelligence

The decision to include a test of Reasoning in LADS was made in order to give Administrators additional information that would be helpful in interpreting results. The Reasoning test is not a dyslexia-sensitive measure, but gives a fairly good estimate of intelligence. Since very bright dyslexic adults tend to develop more proficient compensatory strategies this can make them more difficult to detect in a screening test of this nature. Conversely, individuals who are at the lower end of the ability range may struggle with some of the requirements of the dyslexia-sensitive tests in LADS, not because they have dyslexia, but because their vocabulary may be limited and because their overall speed of information processing may be relatively slow. In order to avoid excessive numbers of false negatives and false positives in such cases, the information provided by the Reasoning measure enables Administrators to take this into account when considering results and making decisions on the most appropriate course of action.

Note that this does not mean that interpretation of LADS results must necessarily conform to a discrepancy model of dyslexia.<sup>6</sup> Such models, particularly when applied to identification of dyslexia in school-age children, have been criticised in recent years (see BPS, 1999). In 1999 a working group of the British Psychological Society's Division of Educational and Child Psychology produced a report entitled: *Dyslexia, Literacy and Psychological Assessment* (BPS, 1999). The principal aim was to provide guidance for educational psychologists in the assessment of schoolchildren who are suspected of having dyslexia. A working definition that did not implicate any particular theoretical model of dyslexia was proposed:

'Dyslexia is evident when accurate and fluent word reading and/or spelling develops very incompletely or with great difficulty. This focuses on literacy learning at the 'word level' and implies that the problem is severe and persistent despite appropriate learning opportunities. It provides the basis for a staged process of assessment through teaching.' (BPS, 1999, p. 8)

It will be readily appreciated that this definition raises many critical issues (for discussion see Cook, 2001). For example: what does 'very incompletely' mean? What learning opportunities can be deemed to be 'appropriate'? How much 'additional effort' is required? Taken at face value, it would not permit a diagnosis of dyslexia to be made until additional effort and/or instruction has been put in and that was not found to have brought about significant improvements. But we know that dyslexic children's literacy skills *can* be improved by specialist skilled tuition (see Miles and Miles, 1999). Does this mean that these children are no longer dyslexic? Or were never dyslexic in the first place?

Outside of the UK school system, very few researchers endorse the BPS working group approach. Snowling, one of the foremost international authorities in the field states: 'For clinical utility, the discrepancy approach needs to be supplemented by positive dyslexic markers that will allow practitioners to identify children who show early or residual signs of dyslexia that require intervention, and do not depend solely on the extent of the child's reading problem.' (Snowling 2000, p.25.) Many educational psychologists defend the use of the discrepancy approach (e.g. Ashton, 1996).

In the field of adult dyslexia, the BPS working group approach has sometimes been adopted in Further Education, especially where support staff have not had access to psychologists who could carry out diagnostic assessments. In such cases, dyslexia has often been regarded as being synonymous with 'poor literacy skills'. On this basis, however, it is not possible to distinguish between:

- a) Adults with a specific learning difficulty (i.e. dyslexia).
- b) Adults with low general abilities.

<sup>6</sup> A discrepancy model of dyslexia is based on the assumption that dyslexia can be identified where there is a statistically significant discrepancy between intelligence and attainment in literacy (strictly speaking, between actual literacy levels and literacy levels as predicted by age and intelligence).

- c) Adults who are not in categories (a) or (b) but who have poor literacy skills as a result of inadequate educational experience (poor teaching, prolonged absence from school) or limited experience of English (e.g. immigrants).

Furthermore, the BPS working group's approach will not work when it comes to assessing adults because the psychologist cannot rely on having adequate knowledge of an adult client's educational history. Poor literacy alone is not an adequate criterion for identifying adult dyslexia. Many adults have compensated for their difficulties and consequently can score reasonably well on tests of single-word reading and spelling. In fact, it is difficult – if not impossible – to identify dyslexia reliably in bright adults without taking intelligence into account to some degree. Indeed, the fact that such individuals are typically perceived to be under performing in relation to expectations based on general ability, either in education or employment, indicates that some sort of discrepancy is critical to appreciating the nature of the problem. The use of statistically significant discrepancies when making diagnostic decisions enables psychologists to bring a measure of objectivity to what would otherwise be largely a subjective process. Hence, most authorities in the field advocate using a combination of discrepancy measure and positive dyslexia markers (e.g. in working memory or phonological processing) when identifying dyslexia, especially in adults (see Bartlett and Moody, 2000; Kirk, McLoughlin and Reid, 2001; McLoughlin, 1997; McLoughlin, Fitzgibbon and Young, 1994; McLoughlin, Leather and Stringer, 2002; Rack, 1997; Reid and Kirk, 2001; Singleton, 1999; Turner, 1997).

Hence LADS is built on a model of dyslexia identification that takes into account both key dyslexia indicators and performance that is below expectations based on estimated intelligence.

## 2.2 The adaptive algorithms in LADS

All four of the modules in LADS are adaptive, which makes screening swift and effective. However, the adaptive algorithms<sup>7</sup> that have been employed differ between the tests. The Working Memory module adapts itself to performance of the person taking the test simply by discontinuing after a both items at a given difficulty level have been failed. The Reasoning module uses probe items to identify the section of the test that is most appropriate for assessing each individual and then administers items that are easier or harder, according to individual performance, discontinuing the test when that person's ceiling has been reached.

The other two modules (Word Recognition and Word Construction) employ a technique generally known as CAST (Computerised Adaptive Sequential Testing), in which blocks of items of known difficulty are administered in an adaptive sequence (see Drasgow and Olson-Buchanan, 1999). In these two LADS modules, the CAST approaches utilises an fractionation algorithm that assign persons being assessed to a category, based on their performance on each module. The categories used are as follows:

No indications of dyslexia			Weak indications of dyslexia			Strong indications of dyslexia		
1	2	3	4	5	6	7	8	9

In other words, the higher the score on each assessment module in LADS, the higher the probability that the person has dyslexia. The adaptive fractionation algorithm operates by giving the person blocks of assessment items of similar difficulty and then applying decision rules to the outcome. These decision rules determine whether the individual either (a) clearly falls into one of the specified categories, or (b) whether more blocks of items of a different level of

<sup>7</sup> An 'algorithm' is the name given to any machine-like procedure that is carried out in a sequence of steps and which guarantees a solution to a problem. [As opposed to a 'heuristic', a method involving trial-and-error learning, which, although often quicker, may or may not result in a solution to a problem.]

difficulty should be administered before re-applying the decision rules. The difficulty level of each item has already been determined by trials involving both known dyslexic and non-dyslexic adults. This method is called algorithmic fractionation because of an analogy with chemical fractionation, in which a compound mixture is separated into its various components, usually by subjecting it to different temperatures so that different components vaporise and may be condensed out. In LADS, blocks of assessment items of different difficulty are administered, and the person's response to these items enables the program to make a separation into the designated categories.

## 2.3 Validation of the tests in LADS

The three dyslexia-sensitive tests in LADS were validated in three separate studies.

**Study A.** This study (Singleton and Horne, 2001) involved 8 centres catering for adults with dyslexia; 2 were in universities, 3 were in colleges of further education, and 3 were in basic skills centres. A total of 140 adults participated in initial trials of the system; 71 of these were known to be dyslexic on the basis of conventional psychological assessments, and the remaining 69 were not dyslexic (as far as could be determined).

**Study B.** This study involved 48 randomly selected university students, none of whom was known to have dyslexia.

**Study C.** This study involved 38 university students (19 dyslexic and 19 non-dyslexic) who had been closely matched for intelligence.

A research paper describing these studies is in press (Singleton and Horne, in press).

### 2.3.1 Validation Study A

The participants were administered the three dyslexia-sensitive tests in LADS, with the full (not adaptive) forms of Word Recognition (120 items) and Word Construction (50 items) being used. Scores are number of items correct in all cases. Descriptive statistics of the sample are shown in Table 2.

*Table 2. LADS results from three different types of institution.<sup>8</sup>*

	N	Word Recognition		Word Construction		Working Memory	
		Mean	SD	Mean	SD	Mean	SD
University	47	99.95	12.30	38.70	9.78	5.56	2.70
FE College	47	91.38	23.90	33.27	12.33	4.28	2.54
Basic Skills	46	85.55	25.04	27.91	14.93	3.50	2.47
Total	140	90.60	23.12	32.47	13.10	4.21	2.63

As a check on the validity of the separation into 'Dyslexic' and 'Non Dyslexic' groups, all participants in Study A were administered the Adult Dyslexia Checklist (Vinegrad, 1994), which is a list of 20 yes/no questions relating to difficulties commonly experienced by adults with dyslexia, e.g. 'Do you have difficulties when writing cheques?' The dyslexic group obtained a mean (average) of 12.03 positive dyslexia indicators on the checklist (SD 3.87) while the non-dyslexic group obtained a mean of 4.47 positive dyslexia indicators (SD 3.32). Scores

<sup>8</sup> SD stands for 'standard deviation', a statistical term that represents the amount of variability of the scores obtained by the members of the group; the higher the SD, the greater the variance amongst the scores in the group. It is not necessary to understand this concept in order to follow the statistical results in this section.

of 8 or higher are usually regarded indicating a strong likelihood of dyslexia. Statistical analysis (ANOVA) revealed that all three tests in LADS distinguished significantly between the dyslexic and non-dyslexic groups (see Table 3).<sup>9</sup>

*Table 3. Comparison of dyslexic and non-dyslexic adults on the LADS tests used in Validation Study A.*

	N	Word Recognition		Word Construction		Working Memory	
		Mean	SD	Mean	SD	Mean	SD
Dyslexic	71	74.10	19.83	23.68	11.00	3.20	2.22
Not Dyslexic	69	107.49	11.01	41.12	8.47	5.16	2.68
Significance level		p < 0.001		p < 0.001		p < 0.001	

Internal consistency statistics were also computed and this enabled unreliable items to be eliminated. The overall internal reliability (alpha) scores for the final version of LADS were: Word Recognition:  $\alpha = 0.95$ ; Word Construction:  $\alpha = 0.96$ , which are very high.

The results of comparing dyslexics with non-dyslexics within the three types of institutions were broadly similar, although results for Working Memory were of a lower significance level, especially in the university group. For this reason, further research was carried out to see if a more sensitive measure for the backwards digit span test could be found. Statistical analysis showed that the most sensitive measure was a combined score created by adding the total number of items correct to the total number of digits in their correct positions. Using this combined score showed a highly significant difference was found between the dyslexic and non-dyslexic groups (see Table 4) and the statistical significance for the three types of institution were greatly improved. It was therefore decided to use this combined score in the developmental version of LADS.

*Table 4. Comparison of dyslexic and non-dyslexic adults on the combined score obtained from the LADS Working Memory test.*

	N	Mean	SD
Dyslexic	71	14.67	10.65
Not Dyslexic	69	25.97	15.00
Significance level		p < 0.001	

### 2.3.2 Creation and validation of the adaptive version of LADS

The scores obtained by the participants in Study A were used to calculate difficulty levels for every item in the test and this enabled items to be selected for the adaptive forms of the Word Recognition and Word Construction tests. The data for these tests were then run through the fractionation algorithm to calibrate the adaptive forms of the tests so that their results approximated as closely as possible to those obtained from the full forms. For the Word Recognition test, a correlation<sup>10</sup> of  $-0.95$  was obtained between the full form and the adaptive

<sup>9</sup> The level of statistical significant is shown as a probability value (p); e.g.  $p < 0.01$  means that the result obtained would be expected to occur by chance less than once in every hundred times that these data were collected. In other words, it is highly unlikely that this result is simply a chance event and therefore highly likely that the outcome represents a real difference. Similarly,  $p < 0.001$  means that the result obtained would be expected to occur by chance less than once in every thousand times. Hence the smaller the p value the greater degree of confidence one can have in the finding.

<sup>10</sup> Correlation is a statistical measure of relatedness between scores obtained on two different measures by the same individuals. The correlation coefficient (r) varies between 1.0 (absolute correlation) and 0

form, while for the Word Construction test, the correlation was  $-0.96$ . Both these correlations are exceptionally high and are statistically significant ( $p < 0.001$ ). These results indicate that a high degree of confidence can be placed in the fractionation algorithm as the mathematical basis for the adaptive forms of these tests. A similar calibration exercise was carried out on data from the Working Memory test to create outputs that were on the same scale as that of the Word Recognition and Word Construction tests (i.e. ranging from 1 to 9). To check this, data for Working Memory test from Study B were analysed and the correlation between the recalibrated scores and the original raw scores was found to be  $-0.85$ , which is also statistically significant ( $p < 0.001$ ).

The data from the adaptive forms of the three tests were then subjected to statistical analysis similar to that carried out on the original data. The results are shown in Table 5.

*Table 5. Comparison of dyslexic and non-dyslexic adults on the adaptive forms of the LADS tests (score range 1 – 9 for each test).*

	N	Word Recognition		Word Construction		Working Memory	
		Mean	SD	Mean	SD	Mean	SD
Dyslexic	71	5.6	2.27	6.04	2.43	7.03	2.23
Not Dyslexic	69	2.04	1.36	2.22	1.61	4.72	2.30
Significance level		$p < 0.001$		$p < 0.001$		$p < 0.001$	

As explained in Section 2.1, the value of any screening test depends on having low frequencies of false positives and false negatives. In general, levels of less than 25% for each of these are advocated for effective screening (see Jansky, 1977, Singleton, 1997a). The following tables show the discriminant function analysis carried out on each of the three LADS tests in their adaptive versions, in order to determine percentages of false positives and false negatives. See Table 6, Table 7 and Table 8. The results indicate that the LADS tests come well within the required limits for false negatives (see Table 10), and that with the exception of Working Memory, also come well within the required limits for false positives. The Working Memory test comes somewhat over the expected limits with a false positive rate of 30.6%. However, on investigation it was found that a substantial proportion of these cases comprised individuals who scored poorly on the test because the instructions were unclear. In the Developmental Version of LADS, the instructions for the test have been improved in order to correct this.

*Table 6. Discriminant function analysis of the LADS Word Recognition Test.*

Classification predicted by LADS ↓	Actual classification		Totals
	Not Dyslexic	Dyslexic	
Not dyslexic	59	16	75
Dyslexic	10	55	65
Totals	69	71	140

---

(zero correlation. A positive  $r$  indicates that the scores on the two measures are both in the same direction, while a negative  $r$  indicates that scores are in opposite directions. In the case of LADS, a negative  $r$  is to be expected as the output of the fractionation algorithm is in the opposite direction, i.e. low scores indicating not dyslexic, and high scores indicating dyslexia.

*Table 7. Discriminant function analysis of the LADS Word Construction Test.*

<b>Classification predicted by LADS ↓</b>	<b>Actual classification</b>		<b>Totals</b>
	<b>Not Dyslexic</b>	<b>Dyslexic</b>	
Not dyslexic	61	15	75
Dyslexic	8	56	65
<b>Totals</b>	<b>69</b>	<b>71</b>	<b>140</b>

*Table 8. Discriminant function analysis of the LADS Working Memory Test.<sup>11</sup>*

<b>Classification predicted by LADS ↓</b>	<b>Actual classification</b>		<b>Totals</b>
	<b>Not Dyslexic</b>	<b>Dyslexic</b>	
Not dyslexic	26	7	33
Dyslexic	41	60	101
<b>Totals</b>	<b>67</b>	<b>67</b>	<b>134</b>

When the individual scores for each of the three tests is amalgamated to create a composite LADS score (minimum 3, maximum 27), the incidence of false positives was 3.7%, and of false negatives was 4.5% (see Table 9 and Table 10). Overall, the percentage of cases correctly classified by the LADS composite score was almost 92%, which is extremely high for a screening instrument of this type. This demonstrates the power of a screening system in which the classification is based on a composite score derived from number of strong components, each of which has clear validity and strong predictive accuracy. In addition to using the quantitatively derived classification, Administrators can use their own judgement when examining an individual's LADS profile on a qualitative basis and in making recommendations for action (see Chapter 5 for further discussion of this).

*Table 9. Discriminant function analysis of the LADS Composite Score.*

<b>LADS Composite Score ↓</b>	<b>Actual classification</b>		<b>Totals</b>
	<b>Not Dyslexic</b>	<b>Dyslexic</b>	
Low (score 3–11)	48	6	54
Borderline (score 12–14)	14	7	21
Moderate (score 15–18)	3	20	23
High (score 19–27)	2	34	37
<b>Totals</b>	<b>67</b>	<b>67</b>	<b>134</b>

<sup>11</sup> Note that in the Working Memory test, data was only obtained from a total of 134 participants.

Table 10. Percentages of false positives and false negatives obtained in the LADS validation trials.

	False positive %	False negative %	% of cases correctly classified
Word Recognition	7.1	11.4	81.4
Word Construction	5.7	10.7	83.6
Working Memory	30.6	5.2	64.2
<b>LADS composite score</b>	<b>3.7</b>	<b>4.5</b>	<b>91.8</b>

### 2.3.3 Validation Study B

In Study B, which employed the adaptive forms of the LADS tests, three additional conventional tests were also administered: Woodcock-Johnson Word Attack Test (a test of phonological decoding skills using non-words), WRAT 3 Spelling Test, and WAIS-III Digit Span Test (digits forwards and backwards). Table 11 shows the intercorrelations between these measures and the scores obtained on the LADS tests.

Table 11. Intercorrelations between scores on the adaptive forms of the LADS tests and three conventional tests ( $n = 48$ ).

	WR	WC	WM	LC	WJ	WS	DS
LADS Word Recognition (WR)	1.0						
LADS Word Construction (WC)	0.25	1.0					
LADS Working Memory (WM)	0.04	0.28	1.0				
LADS composite score (LC)	0.62 ***	0.70 ***	0.84 ***	1.0			
Woodcock-Johnson Word Attack (WJ)	-0.16	-0.34 *	-0.35 *	-0.49 **	1.0		
WRAT 3 (WS)	-0.28	-0.37 *	-0.33 *	-0.49 **	0.46 **	1.0	
WAIS-III Digit Span (DS)	-0.23	-0.42 **	-0.48 **	-0.58 **	0.40 **	0.20	1.0

Key: \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

From these results it can be seen that although each of the three LADS tests contributes significantly to the composite LADS score, each are independent measures, since the intercorrelations between the three LADS tests are all rather low and not statistically significant. The LADS Working Memory test (digits backwards) correlates significantly with WAIS-III Digit Span Test (digits forwards and backwards):  $r = -0.58$ ,  $p < 0.001$ , thus providing further validation for the former. The results also suggest that the LADS Word Construction test draws upon skills involved in phonological coding, spelling of real words and short-term memory, since the correlations between LADS Word Construction and the three conventional tests were all statistically significant with  $r$  in the region of  $-0.3$  to  $-0.4$ . This is consistent with the argument put forward in Section 2.1 and the skills needed for the LADS tests shown in Table 1. By contrast, the LADS Word Recognition test depends much more on lexical access skills,

which were not tested separately in this study. However, in Study A, the participants were also tested using WRAT 3 Reading test, which assesses single word recognition and which therefore depends more on lexical access skills. The correlation between WRAT 3 Reading and LADS Word Recognition (full form) was found to be 0.89, which is very high and statistically significant ( $p < 0.001$ ), thus providing additional validation for the LADS Word Recognition test.

Inspection of the centile scores for the three conventional tests (see Table 12) indicates that the participants in Study A comprise a group that is above average in phonic skills (Woodcock-Johnson Word Attack) and spelling (as might be expected in university students), but not above average in working memory (and WAIS-III Digit Span). Moreover, it should be noted that the standard deviations (SDs) for both WAIS-III Digit Span and LADS Working Memory are both relatively high. This indicates that there is much greater variance in scores for short-term (working) memory. One important implication of this is that amongst non-dyslexic adults there will be quite a few who have rather weak working memory (at least, as assessed by these types of test). Such individuals are likely to show up as false positives on a dyslexia screening test, and it will be remembered that in section 2.3.2 it was pointed out that the LADS Working Memory test was found to have a somewhat higher incidence of false positives. This means that extra caution should be exercised when interpreting the results of this particular test, a point that is explored further in section 4.2.4

### 2.3.4 Gender differences

In Study A, in which the full form of the LADS tests were used, there were 58 males and 82 females. No significant gender differences were found, except in the Word Recognition test, in which the females (mean score 94.45; SD 20.34) were found to score significantly higher than the males (mean score 83.81; SD 22.70),  $p < 0.01$ .

In Study B, in which the adaptive form of the LADS tests were used, there were 19 males and 29 females. No significant gender differences were found in scores obtained from any of the three LADS tests, nor in the LADS composite score (see Table 12). As a check against this, the same students were administered three conventional tests that assessed comparable skills: Woodcock-Johnson Word Attack Test, WRAT 3 Spelling Test, and WAIS-III Digit Span Test. Although the mean scores suggested some slight differences, none of these were found to be statistically significant (t test). It may therefore be safely concluded that the tests in the Developmental Version of LADS do not bias either males or females in an unselected sample.

*Table 12. Gender differences in scores from LADS and three conventional tests.*

	Male (n=19)		Female (n = 29)	
	Mean	SD	Mean	SD
LADS Word Recognition	2.95	2.46	2.35	1.17
LADS Word Construction	2.63	1.83	3.13	2.06
LADS Working Memory	3.31	2.98	3.72	2.91
LADS composite score	8.32	4.44	9.03	4.66
Woodcock-Johnson Word Attack (centile score)	83.42	17.93	74.88	24.78
WRAT 3 Spelling (centile score)	68.77	17.62	72.60	20.95
WAIS-III Digit Span (centile score)	49.11	27.72	40.91	24.28

### 2.3.5 Validation study C

38 university students (19 dyslexic and 19 non-dyslexic) were tested with LADS.<sup>12</sup> These students had been selected so that the two groups were matched on intelligence using the Wechsler Adult Intelligence Scale (WAIS-III<sup>UK</sup>). Diagnosis, in the case of the dyslexic students, was made on the basis of extensive psychological testing that followed the assessment criteria laid down in the report of the *National Working Party on Dyslexia in Higher Education* (Singleton, 1999). The mean IQ for the dyslexic group was 112.16 (SD 11.3), and for the non-dyslexic group was 112.29 (SD 10.08). Analysis of variance indicated that there were no significant differences between the groups in intelligence. The LADS scores on the adaptive form of the test for the two groups are shown in Table 13.

*Table 13. Mean LADS scores for the dyslexic and non-dyslexic groups in Validation Study C (standard deviations in brackets).*

	Dyslexic ( n = 19)	Non-dyslexic (n = 19)
Word Recognition	4.05 (1.78)	2.37 (1.42)
Word Construction	4.00 (2.11)	2.11 (1.56)
Working Memory	3.32 (2.75)	2.89 (2.40)
LADS composite score	11.37 (4.35)	7.37 (3.58)

Analysis of variance indicated that there was a significant difference between the groups in performance on both the Word Recognition test [ $F(1,38) = 10.39$ ;  $p < 0.05$ ] and Word Construction [ $F(1,38) = 9.92$ ;  $p < 0.05$ ], but the difference between the groups in performance on the Working Memory test was not significant. However, the LADS composite score (created by addition of the scores on all three dyslexia-sensitive tests) showed a significant difference between the groups [ $F(1,38) = 9.59$ ;  $p < 0.05$ ]. These results indicate that overall, LADS can discriminate at the group level between dyslexic and non-dyslexic adults even when intelligence is controlled for. This finding also holds for the individual tests of Word Recognition and Word Construction, but not for the Working Memory test. Inspection of the standard deviations in Table 13 shows that the variance in scores was much larger in the Working Memory test compared with the other two tests. In fact, the score distributions for the two groups on the Working Memory test overlap quite a bit, indicating that many bright dyslexics have probably developed compensatory strategies that enable them to cope fairly well with working memory tasks, while some bright non-dyslexics have surprisingly poor working memory skills (at least, on this particular test).

### 2.3.6 Development of the Reasoning module

The Reasoning test in LADS has been adapted from the Reasoning module in the computerised assessment suite *LASS Secondary* (Horne, Singleton and Thomas, 1999). This has been validated and shown to be reliable and free of gender bias in a number of separate studies (for further information see Horne, 2002). In a study with 75 students (47 males and 28 females) from five different secondary schools in England and Wales, the Reasoning module was validated against the *Matrix Analogies Test – Short Form* (Naglieri, 1985). This is a conventional pencil-and-paper test of matrix reasoning. The correlation coefficient between the two measures was 0.52 ( $p < 0.001$ ). In a separate reliability study involving seven other secondary schools in England and Wales, the Reasoning module was administered to 101 students on two occasions, separated by four-week interval. The results showed no significant differences in the results on the two testing occasions (t test) and the test-retest reliability

<sup>12</sup> The authors are grateful to Fiona Simmons, who supervised and collected most of the data for Validation Study C.

coefficient was 0.51 ( $p < 0.001$ ). Finally, in another study involving 341 male and 389 female students, no significant gender differences were found on the Reasoning test [male mean 35.45 (SD 9.76); female mean 34.53 (SD 10.29)].

## 2.4 Conclusions on the validity of LADS

The process of developing LADS has involved three detailed studies of the validation of the dyslexia-sensitive tests, first in their full form, and then in their adaptive forms, including verification of the accuracy of the adaptive fractionation algorithm devised for the program, and checking for gender bias. Participants from several different institutions have been involved. In addition, the Reasoning module has been adapted from a similar test in an established and already widely used test suite, which has been independently validated. The development of LADS conforms to the requirements of the British Psychological Society's *Guidelines for the Development and Use of Computer-Based Assessments* (BPS, 2002).

Further scientific studies with LADS are planned as part of an on-going scientific programme of investigation, but it may be safely concluded that LADS meets established psychometric criteria for validity and can therefore be used with confidence as a screening test for dyslexia. The individual tests in LADS have good accuracy to discriminate between dyslexic and non-dyslexic adults and are free of gender bias. Furthermore, the combination of the three LADS scores, either as a composite score, or as a qualitative profile, or both, provides a very high degree of accuracy — much greater than reliance on the individual test results alone. However, it should not be forgotten that LADS is a screening test and, as such, is inevitably subject to some degree of classification inaccuracy. The tests in LADS assess core the cognitive skills that are typically weak in dyslexia (phonological processing, lexical access and working memory) and so would be expected to detect the majority of adults with dyslexia. However, adults with atypical forms of dyslexia (e.g. cases in which phonological processing deficits are not found or where visual processing deficits predominate) would not be detected by LADS. The careful development and validation process that LADS has been subjected to has sought to minimise of classification inaccuracy as far as has been practically possible, given the brevity of the tests in the program. In order to keep errors to a minimum, Administrators should refer to Chapter 4 when interpreting results and making decisions about adults who have been screened using LADS.



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# 3 Administering LADS

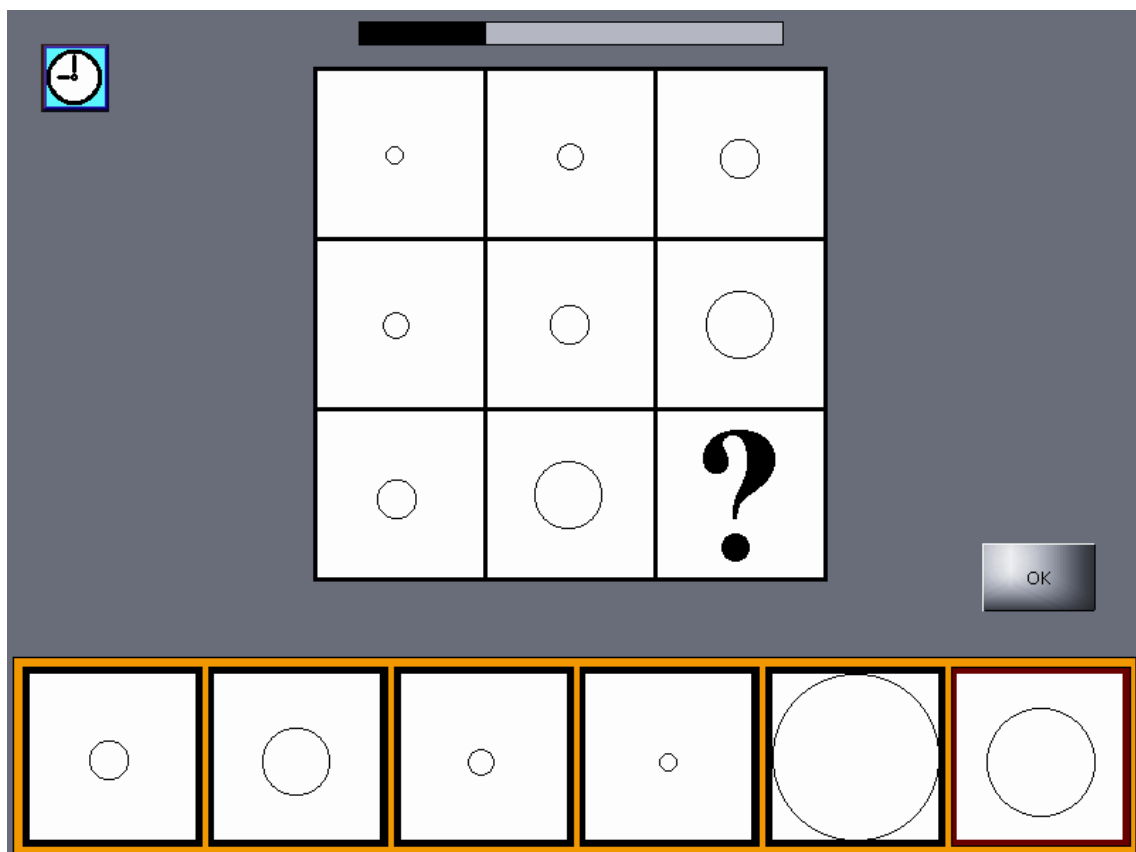
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## 3.1 The assessment modules in LADS

### 3.1.1 Reasoning

Reasoning is an adaptive test involving matrix puzzles that can be solved by a careful application of logical reasoning, using both visual and verbal strategies. Each item comprises a  $3 \times 3$  matrix with the bottom right hand square empty. The task is to choose which of six squares at the bottom of the screen complete the pattern, and then click on the 'OK' button to move to the next item (see Figure 1). Progress through the test depends on the person's performance and the test is discontinued when a certain number of items within a given level are failed.

Figure 1. Example screen from the LADS Reasoning test with Timer bar active.

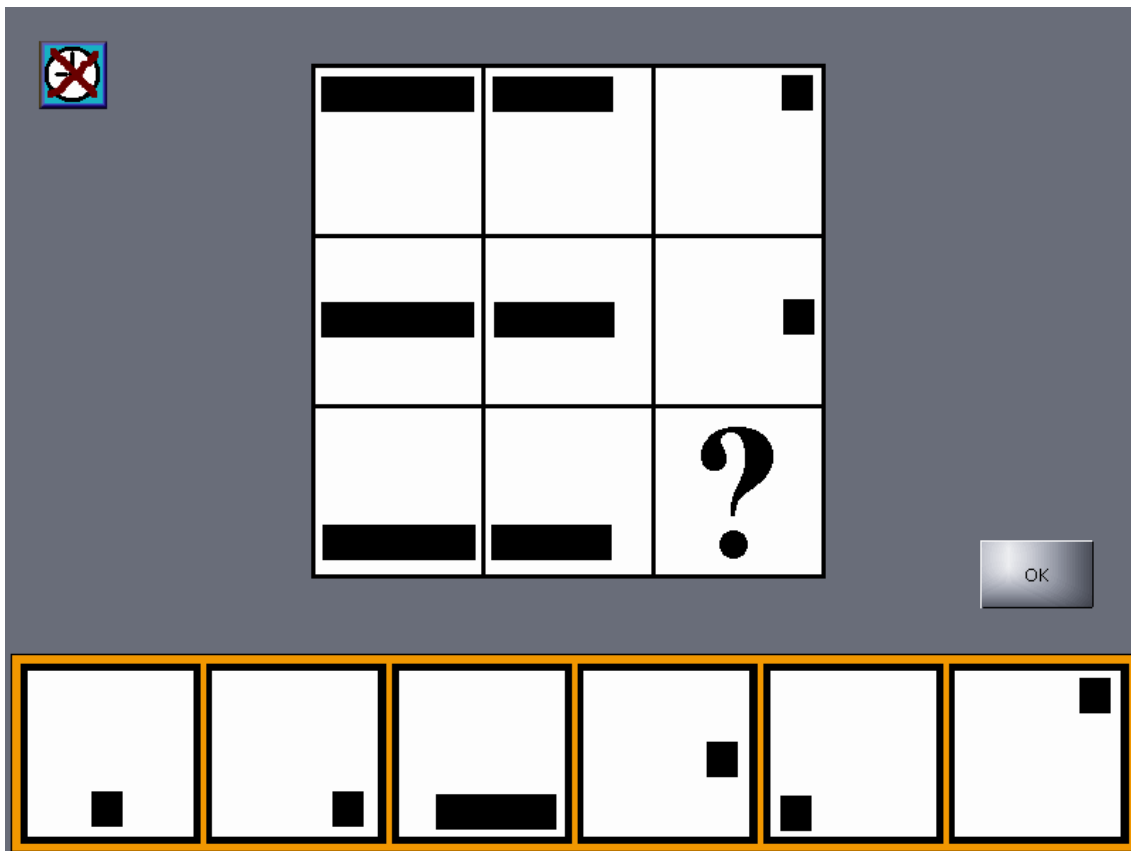


The purpose of the Reasoning module is to give the Administrator a reasonable estimate of the person's general intellectual ability or intelligence. This is a matrix test, in which both visual and verbal reasoning strategies may be employed. There is good evidence that such matrix reasoning tests correlate well with more extensive measures of intelligence and therefore provide a good overall indicator of general intellectual ability. Nevertheless, Administrators should be aware that a *small proportion* of individuals may experience difficulties with this task, even though in other respects their intelligence levels are at least average. Hence in cases of low scoring where the Administrator is puzzled by the result because it does not seem to

accord with expectations, it would be wise to check the person's intelligence using an alternative measure, such as the *British Picture Vocabulary Scale (BPVS)*<sup>13</sup>.

The Reasoning module is not intended to be a speeded test (i.e. performed against the clock), but in the interests of avoiding excessively lengthy assessment sessions, a (fairly generous) time limit of 30 seconds has been allowed for each item. For most persons this should allow sufficient time for a reasonable attempt at each item. To allow greater time would not increase validity or reliability of the test, so if time runs out then this must be accepted as part of the exigencies of the task. The passage of time is shown by means of a red **Timer bar** across the top of the screen so that users can easily determine when time is running out and they must therefore come to a swift decision. However, a few individuals find this Timer bar unsettling and it may distract them from the task in hand. If this is the case, the Timer bar may be deactivated by clicking on the clock button shown in the top left-hand corner of the screen (see Figure 2).

Figure 2. Example screen from the LADS Reasoning test with Timer bar deactivated.



### 3.1.2 Word recognition

The Word Recognition module is a test of lexical decoding involving speeded recognition of real word from nonwords. Five words appear on the screen in random positions. Only one of these five is a real word; the other four are nonwords or misspellings of real words. The person taking the test has to click on the real word as quickly as they can. If no response is made within 30 seconds, the program automatically moves on to the next item, in accordance with the adaptive fractionation algorithm. However, for individuals who score within the top 10% of the population on the Reasoning test (classified 'High' Reasoning ability), the time on this test allowed is reduced to 8 seconds per item. The purpose of this is to place additional processing speed constraints on exceptionally bright individuals who will normally be able to compensate well for any dyslexic difficulties. In the validation studies it was found that this time restriction

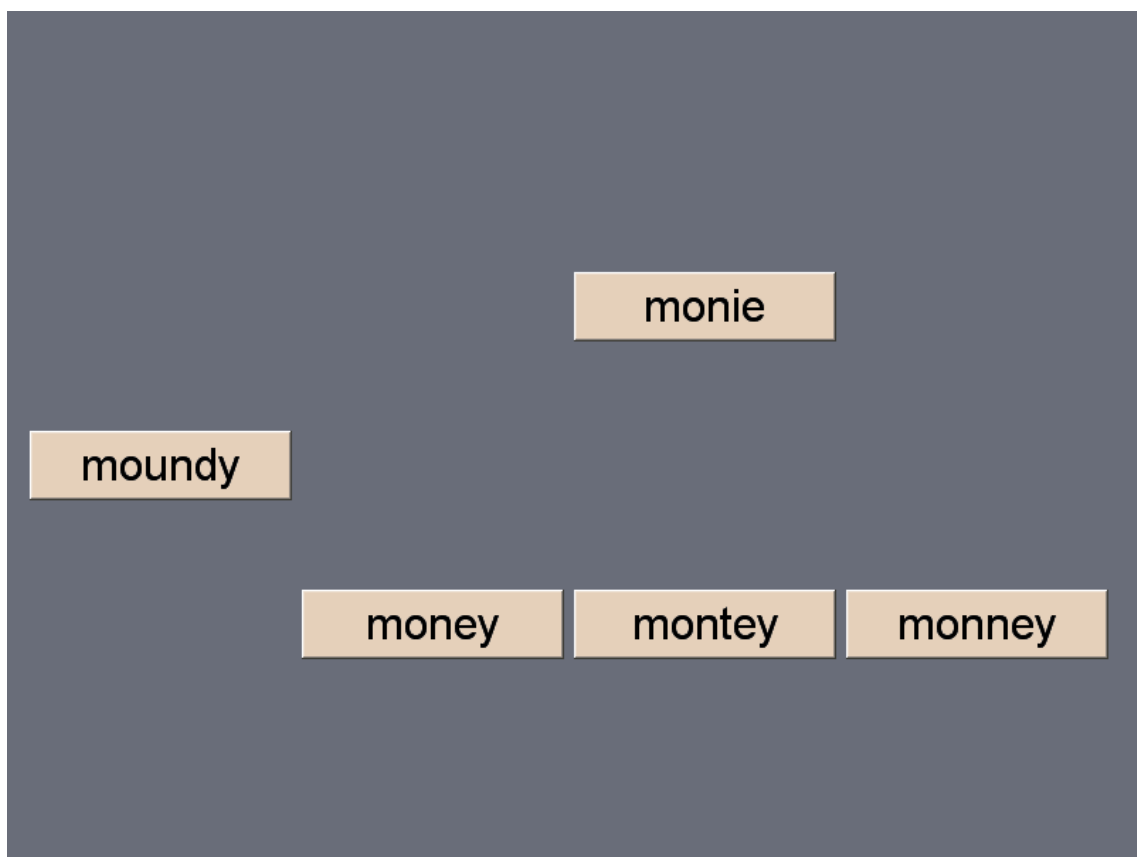
<sup>13</sup> This test is available from NFER-Nelson.

is still sufficient to allow all bright non-dyslexic individuals to cope with the items satisfactorily.

The test begins with four practice items, which are accompanied by spoken instructions. When the program has delivered sufficient test items to be able to make a reliable classification of the individual into one of the nine categories, the test is terminated. The minimum number of items administered is 12, and the maximum 48, although most people taking the test receive 24 items. Figure 3 shows an example screen from the Word Recognition module.

The cognitive processes underpinning this task are (a) rapid retrieval of real words from the mental lexicon (lexical access), and (b) swift and efficient phonological decoding to eliminate nonword distractors. Skilled readers probably carry out these processes simultaneously while quickly scanning all five words. Less skilled readers may need to process each word in succession, both phonologically and lexically. Dyslexic readers are likely to have insufficient phonological or lexical skills to cope with the task and so may have to resort to guessing for much of the time.

*Figure 3. Example screen from the LADS Word Recognition test*

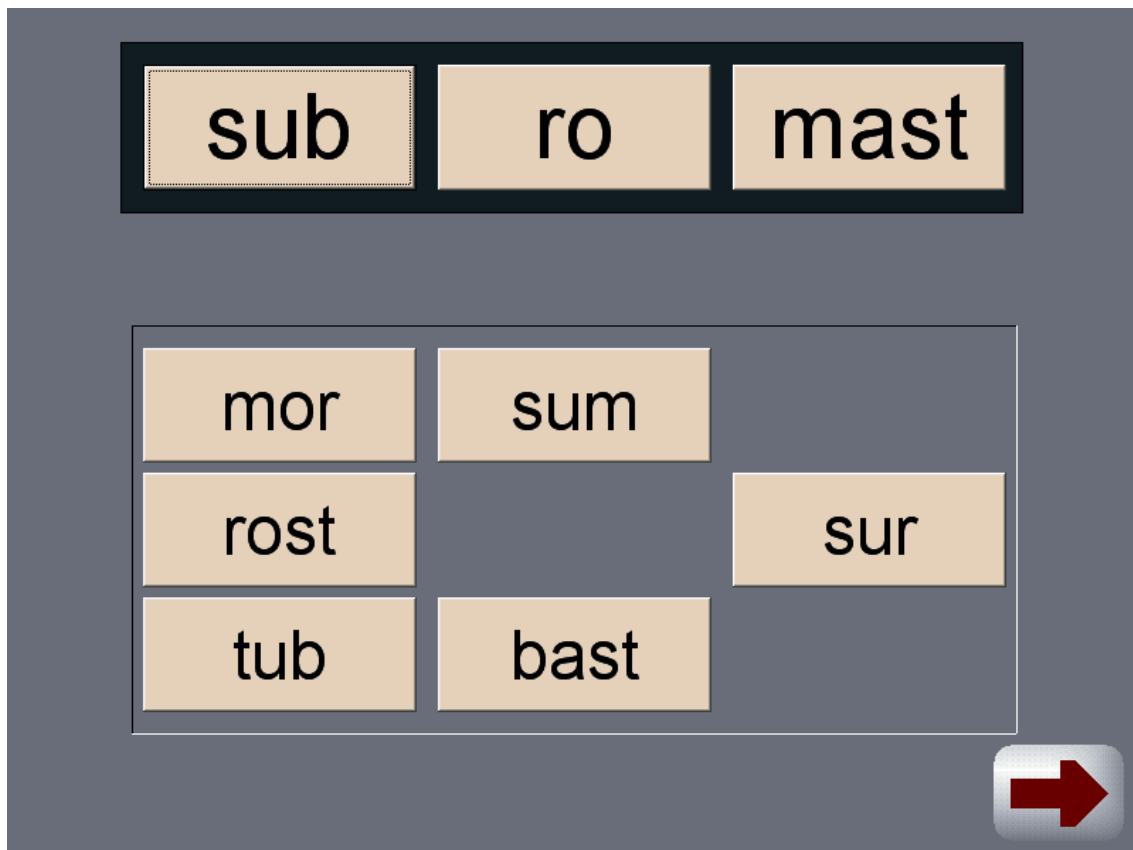


### **3.1.3 Word construction.**

The Word Construction module is a test of lexical encoding of nonwords from syllables. The computer speaks a three-syllable nonword (e.g. 'Subromast') and the person taking the test has to click on the syllables that make up this nonword in the correct order, selecting them from a nine different syllables displayed on the screen in a 3 × 3 grid. As each syllable is clicked on, it appears in a template at the top of the screen. If a mistake is made, the person can click on the template and it will undo the error, so permitting another choice can be made. When the person is satisfied with their choice of syllables, they must click on an arrow at the bottom right-hand corner of the screen, and the program proceeds to the next item, in accordance with the adaptive fractionation algorithm. The test begins with two practice items, which are accompanied by spoken instructions. The task has to be completed as swiftly as possible. If no response is made

within 30 seconds, the program automatically moves on to the next item. However, for individuals who score within the top 10% of the population on the Reasoning test (classified 'High' Reasoning ability), the time on this test allowed is reduced to 6 seconds per item. The purpose of this is to place additional processing speed constraints on exceptionally bright individuals who will normally be able to compensate well for any dyslexic difficulties. In the validation studies it was found that this time restriction is still sufficient to allow all bright non-dyslexic individuals to cope with the items satisfactorily. When the program has delivered sufficient items to be able to make a reliable classification of the individual into one of the nine categories, the test is terminated. The minimum number of items administered is 12, and the maximum 48, although most people taking the test receive 24 items. Figure 4 shows an example screen from the Word Construction module.

*Figure 4. Example screen for the LADS Word Construction Test.*



The cognitive processes underpinning this task are (at the very least): (a) good phonological awareness whereby the spoken word can be segmented into its constituent syllables, (b) a reliable auditory short-term working memory for holding the results of this segmentation in the correct sequence in the phonological loop while these are actively processed, and (c) an efficient system of phonological encoding whereby graphemic equivalents of phonemic codes can be recognised and assembled in the correct order. As with the word recognition task, few adults with dyslexia are likely to have phonological or working memory processes that are efficient enough for them to be able to carry out this task well. A particularly heavy load is placed on working memory because of the requirement for simultaneous processing of syllables in the grid (in order to be able to select the correct ones) whilst at the same time retaining the nonword heard in the phonological loop.

### 3.1.4 Working memory

The Working Memory module is a test of backwards digit span. A sequence of digits is spoken by the computer, and the person has immediately to enter these in reverse order from memory using the keyboard. The test begins with two practice items accompanied by verbal instructions.

The test then proceeds as in a conventionally delivered digit span task, commencing with items of two digits in sequence, followed by items of three digits, and so on up to nine digits in sequence. At each level two items are presented. If correct responses are made to one or both of these items then the program proceeds to the next level, in which there will be one more digit than the previous level. If both items are incorrect, then the program terminates.<sup>14</sup> The task has to be completed as swiftly as possible. The program allows a limited time for each item; this is a function of the number of digits in the item and varies from 14 seconds up to a maximum of 28 seconds. Figure 5 shows an example screen from the Working Memory module.

*Figure 5. Example screen from the LADS Working Memory Test.*



The computer scores (a) the number of items correct, and (b) the number of digits in correct position. The overall score for the test is a composite of these two measures. This method of scoring provides greater sensitivity than a conventional digit span test, in which only the first method is usually employed.

A backward digit span task places a heavy load on active rehearsal processes in short-term working memory, for which there is ample evidence of weakness in dyslexia. By contrast, a forwards digit span task arguably requires only straightforward recall from the phonological loop in short-term memory, without necessarily impinging on working memory processes. For this reason, backwards digit span is generally regarded as a more sensitive indicator of dyslexia (see Turner, 1997).

<sup>14</sup> Except at the first level, in which the person is automatically permitted to proceed to the second level. This is a precaution against premature termination of the test in the event of the person making careless errors due to not settling into the test right away.

## 3.2 Administration procedure

### 3.2.1 Test sequence

The Reasoning module must always be administered first: in fact, the program forces this. Thereafter, it is recommended (but not absolutely essential) that the three LADS tests are administered in the order in which they appear on the Tests menu: i.e. Word Recognition first, followed by Word Construction, and Working Memory last. This is because the requirements of the Word Recognition test are the easiest of the three to grasp, while those of the Working Memory test the hardest to grasp. This sequence allows persons being tested to become acclimatised to the test requirements and get used to the mental demands of the tasks in a less abrupt fashion.

LADS only takes about 20 minutes, on average, to complete and has been designed to be done in one sitting although breaks can be taken between tests if necessary. It is strongly recommended that all four tests are completed as otherwise an automatic interpretation of results cannot be given by the program. In rare cases where an individual has not been able to complete all the tests (e.g. because they have become unwell or because of extreme anxiety) it is still possible to access the report but special care should be exercised when interpreting results — see Section 4.2.6.

### 3.2.2 Testing environment

All the tests in LADS are mentally challenging and demand close concentration. Therefore, they should be administered in a quiet environment that is as free from distractions as possible. It is essential that persons taking the tests are able to hear the instructions and test words clearly. Unless the testing environment is a quiet one, this is best achieved by means of headphones. The Administrator should check that the headphones are working properly and that the sound level is suitable for the person being tested (neither too loud nor too quiet). Before a screening session, the supervisor should ensure that the computer monitor, keyboard and mouse are all working normally.

Use of headphones is imperative when more than one person is being tested at the same time in the same room (e.g. in the case of group screening using a network), and special care should be taken to ensure that individuals do not distract others. Instructions should be given beforehand that if any person being tested requires assistance, s/he should put up their hand and wait for the Administrator to come to them. They should not call out for assistance as this may distract others.

### 3.2.3 Supervision of testing

One of the advantages of LADS is that it can be self-administered, so reducing administrative load and time. The Administrator first should check that the person taking LADS has entered their name and other details correctly on the registration screen (or the Administrator should take responsibility for entering these details). The person being tested should be told that the screening comprises four separate tests and takes about 20 minutes in all. The Administrator must decide (and inform the person being tested accordingly) whether they wish the person being tested to go through all the four tests in sequence and without a break, or whether they wish them to pause and wait for further instructions before proceeding to the next test. Once the Administrator is satisfied that the person is progressing satisfactorily with the tests, most adults can be left to go through the tests themselves, with only light supervision. However, there are five circumstances in which closer supervision by the Administrator is strongly advised:

- 1) When the person being tested has never used a computer before.
- 2) When testing more than one person at the same time in the same room (e.g. in group screening using a network). This is essential to prevent persons being tested deliberately or inadvertently distracting each another.

- 3) When the person being tested is suspected of being of low ability (and so may require additional assistance to understand the requirements of the test).
- 4) When the Administrator is concerned that the person being tested may not take the assessment seriously, and so may respond at random or not respond at all, and just wait for the automatic time out to take the program though the items until termination. Such behaviour would obviously invalidate the results of the screening; by watching the person it is possible to determine whether the person is doing this.
- 5) When the person being tested seems to be excessively nervous or anxious about the assessment. Although this is extremely rare and most adults are not worried about doing computer-based tests, high levels of anxiety may interfere with cognitive functioning. The person may say things like “My mind has gone completely blank — I can’t think of anything at all” or even ‘freeze’ altogether. In such cases it is recommended that the person is reassured and allowed to calm down before starting. It may also be helpful to have the Administrator sit with them during the assessment, at least until they have got started on the tests, and to give breaks between the tests.

### **3.2.4 Accessing results**

For information on how the Administrator can access results, please consult the Software User’s Guide, which is provided as a separate file on the LADS CD. A password will be required. This is not only to prevent persons being tested from accessing other people’s results, but also to ensure that individuals being screened do not access their own results and misunderstand them.

It is recommended that the Administrator should access the results when the person who has been tested is not present. This allows the Administrator to print out the results, consider them carefully and then give proper feedback to the person, including, if necessary, advice on where to obtain further help and/or counselling. Results should not be given to the person who has been tested without careful consideration and proper feedback. These matters are explored more fully in Chapter 4.



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# 4 Interpreting results of LADS and giving feedback

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## 4.1 Who should carry out interpretation of LADS results?

LADS has been designed to give results that are very straightforward to interpret, so that Administrators who are not teachers or psychologists can deal with them perfectly well. It is not necessary to have a detailed knowledge of dyslexia in order to interpret the results of a LADS screening, but some knowledge of dyslexia is desirable, particularly when giving useful feedback to the person who has been screened. Miles and Miles (1999), and Snowling (2000) are two recommended books that review the scientific literature.

Helpful publications specifically on dyslexia in adults include:

**Bartlett and Moody** (2000) *Dyslexia in the workplace*. Whurr.

**Gilroy and Miles** (1996) *Dyslexia at college*. (Second edition) Routledge.

**McLoughlin, Fitzgibbon and Young** (1994) *Adult dyslexia: assessment, counselling and training*. Whurr.

**McLoughlin, Leather and Stringer** (2002) *The Adult Dyslexic*. Whurr.

**Reid and Kirk** (2001) *Dyslexia in adults: education and employment*. Wiley.

**Singleton** (1999) *Dyslexia in Higher Education: policy, provision and practice*. (The Report of the National Working Party on Dyslexia in Higher Education). University of Hull.

Further information can be obtained from the British Dyslexia Association and the Adult Dyslexia Organisation (see Section 6.1 for contact details).

It is recommended that the Administrator should access the results when the person who has been tested is not present. This allows the Administrator to print out the results, consider them carefully and then give proper feedback to the person, including, if necessary, advice on where to obtain further help and/or counselling. Results should not be given to the person who has been tested without careful consideration and proper feedback (see section 4.4).

Be prepared to listen to the client and answer his or her questions as helpfully as possible. Be prepared for the client to become emotional or upset about the results. Sometimes there is an emotional response because the person is under the mistaken impression that having dyslexia will restrict their educational and/or occupational opportunities. Or their reaction may be one of joyful (or tearful) relief, because at last they know that there is a name for the problems they have experienced for so many years, and that there are sources of help. Occasionally the reaction is one of anger because the client believes that their dyslexia should have been recognised long ago when they were at school, and this evokes unpleasant memories of childhood humiliation for poor schoolwork. It is often advisable to suggest that the client sees a professional counsellor to talk through their feelings about the news, although few counsellors know very much about dyslexia. If seeking someone to whom a client can safely be referred, the local dyslexia association may be able to help (contact the British Dyslexia Association for the details of your local dyslexia association). Most universities and some colleges have professional counsellors on the staff.

## 4.2 Interpreting LADS results

### 4.2.1 The Reports screen

The separate *LADS Software Guide* explains how the Administrator can access the Reports screen. The Administrator's password will be required. This is not only to prevent persons being tested from accessing other people's results, but also to ensure that a person being tested does not access their own results and misunderstand them.

The report is composed of an upper left-hand white panel showing the person's results on each of the three dyslexia-sensitive tests, the scores for which can range from 1 to 9. The categories used are as follows:

No indications of dyslexia			Weak indications of dyslexia			Strong indications of dyslexia		
1	2	3	4	5	6	7	8	9

These are depicted on the reports screen in graphical form: a red bar signals strong indication of dyslexia on that test, an amber bar signals weak indication of dyslexia on that test, and a green bar signals no indication of dyslexia on that test. In other words, the higher the score on each assessment module in LADS, the higher the probability that the person has dyslexia. If a test has not been completed, no bar will be shown against the name of that test.

To the right there is another white panel showing the person's result on the reasoning test, which gives a fair estimate of the person's general intelligence. This is also depicted in graphical form (a blue bar) with a verbal categorisation: 'low' (bottom 10% of adult population); 'below average' (next 15%); 'average' (middle 50%); 'above average' (next 15%); and 'high' (top 10%).

At the bottom of the reports screen is a third white panel containing the overall classification in terms of the probability that the person has dyslexia. ('high', 'moderate', 'borderline' or 'low') together with a brief description of the results. Note the classification and description will only be shown if the person has completed all four of the LADS tests. In cases where it has not been possible for the individual complete all four tests see Section 4.2.6 for advice on interpretation.

The Administrator may add his or her own comments to a report and these can be included in the lower half of the individual print-out for that each person.

Clicking on the **Print** button takes the user to the **LADS Print Preview** screen, through which a print-out may be obtained for each individual.

Clicking on the **Testing progress** button on the **Administration menu** will bring up a simple spreadsheet depicting which of the assessments each registered person has completed. This can also be printed out as a useful record.

### 4.2.2 Understanding the overall classification

The overall classification, in terms of the probability that the person has dyslexia ('high', 'moderate', 'borderline' or 'low'), is shown on the reports screen and printed report. This classification will only be given if the person has completed all four of the LADS tests; otherwise, it will 'Report unavailable as assessment incomplete.' The classification algorithm is based on the pattern of LADS scores, which have been calibrated against known dyslexic and non-dyslexic cases. It was demonstrated in section 2.3.2, that LADS achieves a high degree of classification accuracy, with only 8% of a sample of 134 cases being misclassified, which is extremely low for a screening instrument of this type, which takes only 20 minutes. However, Administrators are advised to check the classification against the individual's profile on the three tests. This is explained in Section 4.2.5.

LADS has been developed using extremely careful psychometric and statistical analyses to make it as accurate as possible. This scientific development process is described in detail in Chapter 2. However, it is important that those administering LADS or interpreting its results appreciate that no screening tool can be 100% accurate, and consequently occasional misclassifications can occur. It is helpful, therefore for administrators to understand the probability of the test making a misclassification.

In developing screening tests there tends to be a trade-off of *false negatives* (i.e. dyslexics who are wrongly classified as ‘not dyslexic’) against *false positives* (i.e. individuals who are not dyslexic who are wrongly classified as ‘dyslexic’). This has already been outlined in Section 2.1.1; for further discussion see Singleton (1997a). In LADS, both false negatives and false positives are well within acceptable levels. There comes a point in test development at which it is not usually possible to improve the measures in the test further in order to reduce one type of classification error without at the same time increasing the other. However, since LADS has been designed to help institutions and organisations identify adults with dyslexia so that they can be provided with appropriate support, it was sensible to try to minimise false negatives rather than false positives, so that the smallest possible number of dyslexics are overlooked.

### 4.2.3 Probability of dyslexia explained

If a person’s overall classification places them in the ‘Low probability of dyslexia’ category, there is a 95% probability that they are not dyslexic.<sup>15</sup> If a person’s overall classification places them in the ‘High probability of dyslexia’ category, there is a 95% probability that they are dyslexic. If the person’s overall classification places them in the ‘Moderate probability of dyslexia’ category, there is a 90% probability that they are dyslexic. These individuals appear to experience less extreme dyslexic symptoms, or are very well compensated, and might be regarded as having milder dyslexia.

On the other hand, if a person’s overall classification places them in the ‘Borderline’ category, then there is a 3:1 chance that they will not be dyslexic. In fact, in most cases of this type the individual will have mainly green or amber scores for the LADS tests, but an occasional red score (on the Working Memory test) may occur from time-to-time. Although this implies that it would be safer to advise the person that they do not have dyslexia, such action would mean overlooking a substantial number of dyslexic cases that might otherwise have been helped. In such cases, it is strongly advised that the Administrator checks the classification against the individual’s profile on the three tests before giving feedback to the person who was screened. This is explained in section 4.2.4.

### 4.2.4 The ‘borderline’ category

The ‘Borderline’ category is used by LADS when the person being screened has revealed in the LADS tests some difficulties that could be due to dyslexia, but the LADS profile overall was not marked enough to make a clear categorisation as ‘dyslexic’. Basically, this is a signal to the Administrator to look more carefully at (a) the results on the separate LADS tests, and (b) the person being tested. In the Validation Studies reported in Chapter 2, about 75% of borderline cases were found not to be dyslexic.

When an individual has been rated as ‘Borderline’ by LADS, the Administrator should first inspect the results of the separate tests. The most typical reason for an individual being given a ‘Borderline’ rating is because they have performed poorly on the Working Memory test but satisfactorily on the Word Recognition and Word Construction tests. This will show up as a green score for Word Recognition and Word Construction and a red score for Working Memory. Some highly compensated dyslexic adults (particularly if they have received specialist tuition or if they read a great deal) can show this profile (see Section 2.1.2 for discuss of

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<sup>15</sup> Please note that the probabilities given in this chapter are based on data obtained in Validation Study A (Section 2.3.1). The calculations were not based on the LADS composite score, but on an algorithm that took into account the pattern of red, amber and green scores, which proved to be more robust in the context of clients of very low or very high general ability.

'compensation'). Also, brighter dyslexics are usually able to develop more compensatory strategies, so if the Reasoning score is above average or high, then it would be appropriate to suspect that this is the case. Note also that LADS does not use the 'Borderline' rating if the Reasoning score falls into the 'below average' or 'low' category. This because a proportion of people with below average or low reasoning ability tend to experience slight difficulties on the other LADS tests even though they do not have dyslexia. To use the 'Borderline' rating in such cases would introduce unreliability into the decision process and create unnecessary problems for Administrators. In some cases it may be possible to resolve the problem by investigating the person's educational history. Evidence of difficulties in literacy when at school would support a conclusion that the person was probably dyslexic. Similarly, if the person being screened on LADS has a child (or children) formally diagnosed as having dyslexia or specific learning difficulties, then there is a greater likelihood of the 'Borderline' rating indicating dyslexia.

Secondly, when making judgements about individuals who fall into the 'Borderline' category, accuracy can be enhanced by utilising any relevant additional information about the person. In cases where the person has been referred for screening or assessment specifically because of difficulties in literacy and/or studying, then if that person is classified as 'Borderline' by LADS it will usually be safe to assume that the person does have dyslexia, and take action accordingly. On the other hand, if the LADS results derive from a general screening of one or more unselected individuals (e.g. on-entry screening to college) unless there is additional evidence that would point to dyslexia, it would be prudent to assume that individuals classified by LADS as 'Borderline' do not have dyslexia. There are a number of ways in which helpful additional evidence may be sought, including use of adult tests of word reading and spelling (e.g. *WRAT3 Reading*, *WRAT3 Spelling*<sup>16</sup>) or by using the *Adult Dyslexia Checklist*, a copy of which is provided in Section 6.2. If the person is found to have significant difficulties in literacy and/or a large number of problems of a dyslexic nature revealed by the *Adult Dyslexia Checklist*, it will usually be safe to conclude that they probably have dyslexia. Note, however, that because responses on the check list are highly subjective and it is vulnerable to falsification it is not recommended that the check list is used as the sole means of identifying adults with dyslexia.

It can be seen that the 'Borderline' category serves the purpose of drawing the Administrator's attention more closely to that individual and their results, and in most cases it should not be inordinately difficult to make a judgement about whether or not that individual is likely to have dyslexia. If in doubt, the Administrator should seek advice from someone who has more knowledge of dyslexia and/or experience of working with dyslexic adults.

#### 4.2.5 Checking the profile of scores from individual tests

In addition to providing an overall classification in terms of the probability that the person has dyslexia, the LADS report screen and print-out also gives a description of the results. In most cases this will be more than adequate to enable the Administrator to decide on the most appropriate course of action. However, there may be circumstances in which it will be helpful (or even imperative) for the Administrator to check the profile of scores for individual LADS tests. Such circumstances are likely to include the following:

1. If the overall classification places the person in the 'Borderline' category (see Section 4.2.4).
2. If the Administrator has reason to suspect that the overall classification and/or description is incorrect.
3. If the Administrator believes that the overall classification and/or description do not tally with what they already know about the person's capabilities.
4. If the person is known to have very poor literacy skills, possibly as a result of a very disadvantaged background and disrupted schooling. Individuals conforming to this description may often be encountered in prisons or young offender institutions. See Section

<sup>16</sup> These tests are available from the Psychological Corporation .

4.5 for further information on screening and interpreting LADS results from adults in this category.

Generally speaking, two red scores on individual LADS tests (or one red plus one or two amber scores), will give a strong indication that the person has dyslexia, regardless of the third score. Likewise, one red score on either Word Recognition or Word Construction, or two to three scores at the top end of the amber range (score 6) will indicate dyslexia, but less strongly. Examples would include dyslexic individuals who have developed very good strategies for coping with sequential short-term memory tasks, and so can perform surprisingly well on the LADS Working Memory test, but who still experience difficulties with the Word Recognition and Word Construction tests.

Two green scores on individual LADS tests are generally a safe indication that the person does not have dyslexia. This is particularly the case if the highest score is Working Memory, as scores on this test show the greatest variance (of the three LADS tests) amongst non-dyslexic individuals. This means that some non-dyslexic adults perform rather poorly on the LADS Working Memory test. The most difficult cases to interpret are those with a mixture of score types (red, green and amber) or ones where low amber scores (range 4–5) predominate. In these cases a more qualitative approach to interpretation is called for. As a general rule, if the highest score is for Working Memory, and the other two scores are not higher than 4, it is probably safe to conclude that the person does not have dyslexia, but simply has weak (or unpractised) memory skills. But if the highest score is for Word Recognition or Word Construction, and the other two scores are higher than 3, then it is more likely that the person does have dyslexia. If in doubt, the Administrator should seek advice from someone who has more knowledge of dyslexia and/or experience of working with dyslexic adults. With increased experience in using LADS, it is expected that Administrators will be able to deal more confidently with rare and unusual cases.

#### 4.2.6 Cases where not all tests have been completed

It is strongly recommended that all four tests in LADS should be completed whenever possible. However, in exceptional circumstances the person may not have completed all four tests, e.g. because they became unwell or because of excessive anxiety. In such cases, the program will not be able to give an automatic categorization in terms of probability of dyslexia, although partial guidance on interpretation will be automatically provided. In order to interpret the findings of the screening the Administrator will need to refer to the results of the individual tests that have been completed (see Section 4.2.5). Sometimes it will be possible to supplement the information gained from LADS with other information available about the person, e.g. gained from interview, results of other tests or examples of the person's work. This may enable the Administrator to reach a judgement about the likelihood of dyslexia, but special care should be taken in drawing conclusions in these circumstances and it is recommended that advice be sought from an appropriate psychologist or dyslexia specialist.

### 4.3 Case studies

The following five case studies illustrate a selection of different types of results that may be obtained from LADS.

**Case study A** — This college student had scores of 2 on the Word Recognition and Word Construction tests and 6 on the Working Memory test. General ability (Reasoning test) was within the average range. The program has concluded that the probability of dyslexia is low (see Figure 1). Clearly this student had problems with the working memory test but not with any other test, and this is insufficient to give a reliable indicator of dyslexia.

**Case study B** — This university student had scores of 3 on the Word Recognition test, 7 on Word Construction test and 9 on the Working Memory test. General ability (Reasoning test) was high. The program has concluded that the probability of dyslexia is high (see Figure 7). This type of profile is often seen in bright adults (especially those at university) who read a lot

and who consequently have fairly good word recognition. But their poor working memory and lack of phonic skills is clearly revealed in the other two dyslexia-sensitive tests.

Figure 6. Case study A.

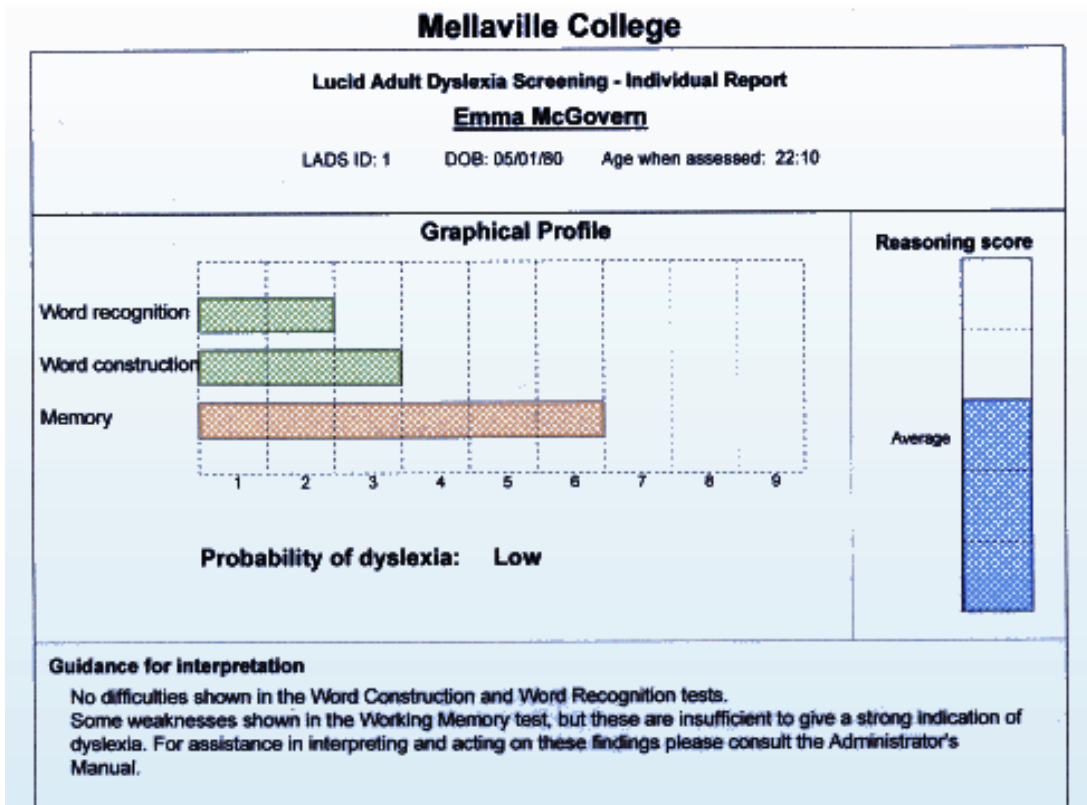


Figure 7. Case study B.

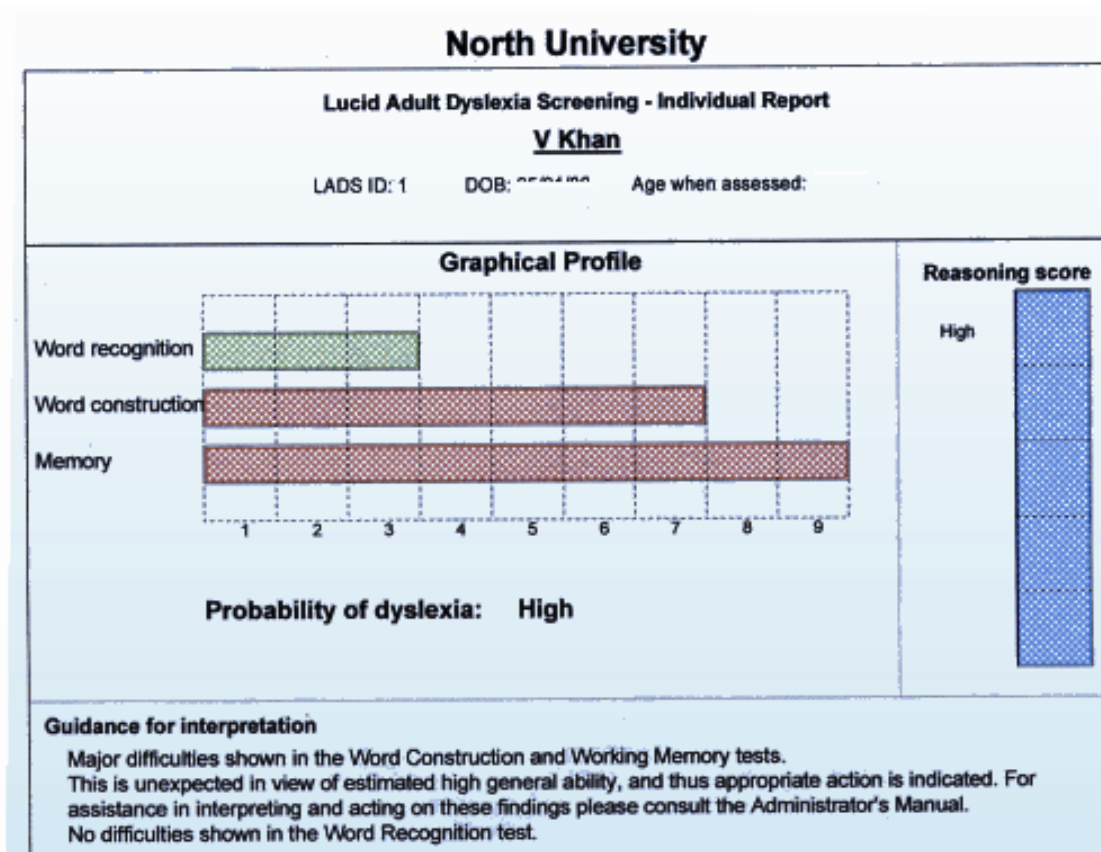
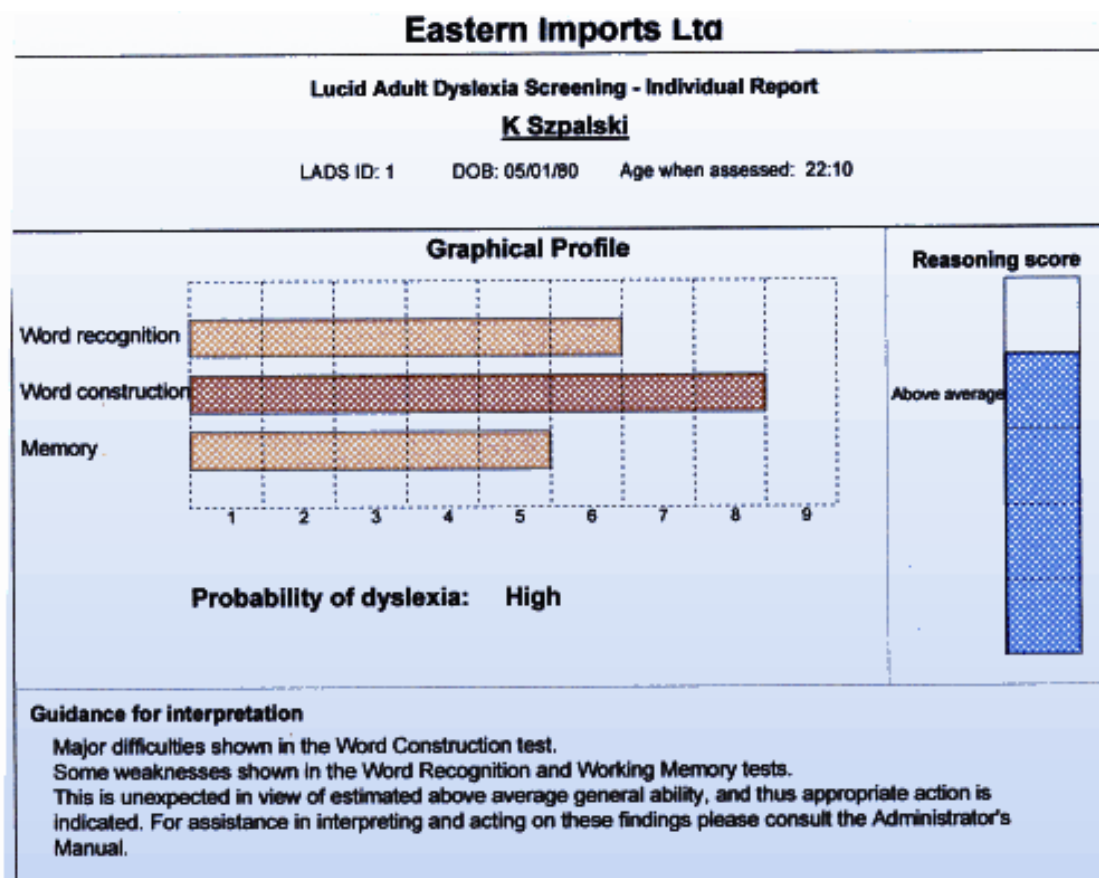


Figure 8. Case study C.



**Case study C** — This employee had scores of 6 on the Word Recognition, 8 on Word Construction tests and 5 on the Working Memory test. General ability (Reasoning test) was above average. The program has concluded that the probability of dyslexia is high (see Figure 8). He clearly shows difficulties across the range of the dyslexia-sensitive tests.

**Case study D** — This college student had scores of 4 on the Word Recognition test, 6 on Word Construction test and 3 on the Working Memory test. General ability (Reasoning test) was within the average range. The program has concluded that there is a borderline probability of dyslexia in her case (see Figure 9) and states that her weaknesses in Word Recognition and Word Construction 'could be due to dyslexia'. Although, in particular, the Word Construction score — suggesting poor phonic skills — looks quite revealing, care should be taken in automatically assuming that poor phonic skills are due to dyslexia. It may be that this student was never taught phonic skills at school (or not taught them very well), or it is possible that she has excellent visual memory and so never felt the need to acquire phonic skills because she had no problems in learning to recognise new words by the visual pattern of letters alone. Remember that three-quarters of those with a borderline categorization are not likely to be found to be dyslexic. Depending on the circumstances, the Administrator may decide to 'pay safe' and refer this student for a psychological assessment, or to ask Learning Support staff to carry out further investigations. Hopefully, she can be better supported in her college work now that her weaknesses have been more fully understood.

**Case study E** — This employee had scores of 5 on the Word Recognition, 3 on Word Construction tests and 7 on the Working Memory test. General ability (Reasoning test) was above average. The program has concluded that the probability of dyslexia is high (see Figure 10). This pattern is sometimes seen in adult dyslexics who have received a lot of specialist tuition in phonic skills, so that they experience few problems with the Word Construction test. However, such tuition often has had less impact on Word Recognition (especially in dealing

with homonyms and pseudo-homonyms) and little, if any, impact on Working Memory ability, both of which clearly reveal the underlying dyslexic problem.

Figure 9. Case study D.

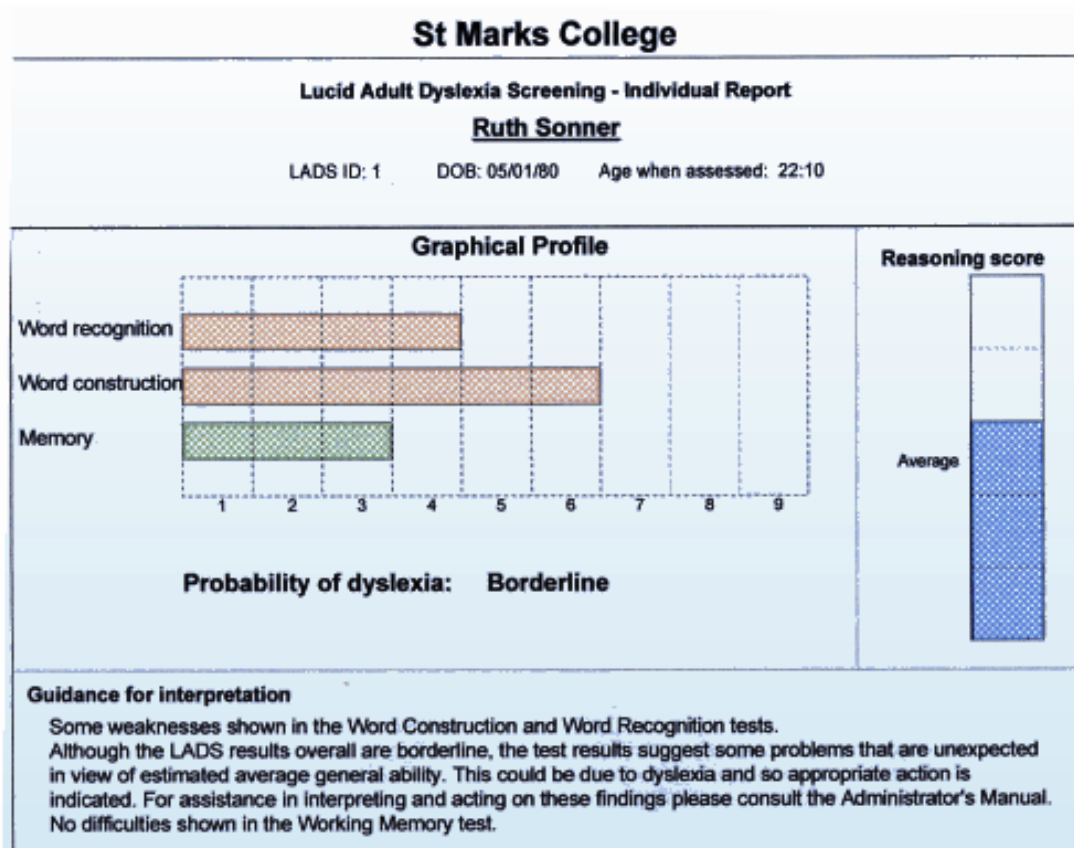
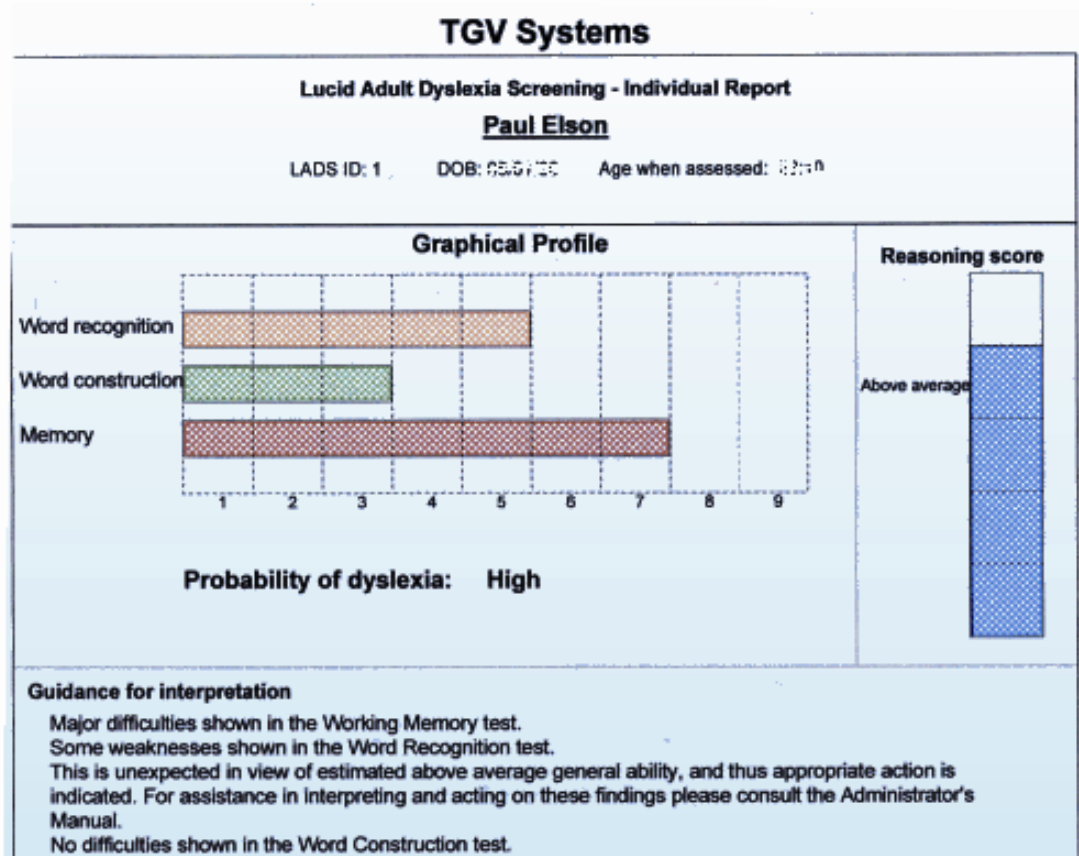


Figure 10. Case study E.



## 4.4 Giving feedback to adults screened with LADS

The decisions made and type of feedback given to persons being screened with LADS will depend to a large extent on the purposes and circumstances of the screening. In some institutions there will be established procedures to follow, as LADS will simply replace or augment existing forms of dyslexia screening. In others, new procedures will need to be instigated. Until such procedures are established, Administrators will have to use their own judgement regarding the best course of action. Please note that further advice on giving feedback to particularly vulnerable individuals is given in Section 4.5.8.

### 4.4.1 General guidelines

1. Give feedback based on the LADS classification, but point out that LADS is a screening system and does not purport to give a definitive diagnosis, e.g. *“The LADS screening indicated that you probably have dyslexia. LADS is a screening test, which is not the same as a full psychological assessment for dyslexia. Although the results are not definite proof of dyslexia, they indicate that there is a 90% probability that you have dyslexia.”*
2. If a client seeks (or requires a definitive diagnosis) they should be referred to an educational or occupational psychologist who specialises in the assessment of adults for dyslexia.
3. It should be pointed out that although LADS, overall, is over 90% accurate, some misclassifications occur. In particular, adults with unusual forms of dyslexia (e.g. characterised by underlying problems in visual processing) may not be detected by LADS.
4. It may help the person to understand their problems if they are shown the graphical chart of the individual LADS test results. If this is done, the nature of the tests should be explained to them in simple terms.

5. It should be explained that the tests in LADS do not measure reading and spelling in conventional terms. However, the LADS Word Recognition and Word Construction tests correlate highly with conventional reading and spelling measures and so the results of these will give a reasonably accurate prediction of whether or not the person is likely to have problems in reading and/or spelling. (Much will depend on the difficulty of any reading and writing tasks that the person has to carry out on a daily basis; if they do not normally have to deal with challenging reading or writing tasks they may not appreciate that they have problems in reading and writing.)
6. It should also be pointed out that the Working Memory test in LADS does not measure the totality of memory skills, only a small part of it. Although working memory may be weak, other aspects of memory may function satisfactorily.
7. Inform the client that there are many ways in which the difficulties experienced by adults with dyslexia can be helped and supported, both in education and employment (see Chapter 5 for further information on this matter).
8. Consider suggesting that the person talks to a professional counsellor if they need help in coming to terms with the discovery that they may have dyslexia.
9. Finally, it will often be found helpful to add that there are successful dyslexics in many walks of life, and that dyslexia is not necessarily a bar to achievement in education or in employment.

#### 4.4.2 Universities and colleges of higher education

In educational institutions where it is expected that a positive screening result will normally be followed up by a full psychological assessment, use of LADS will require little modification to existing procedures. This is the case in universities, where to apply for the Disabled Students Allowances (DSA) and to be granted additional time in examinations, students will normally be expected to produce evidence in the form of a psychological report that meets criteria established by the National Working Party on Dyslexia in Higher Education (see Singleton, 1999). Generally, it will be expedient to be cautious and refer for psychological assessment all except those who have been classified by the program as 'Low probability of dyslexia'. The student should be given feedback on the LADS screening based on the classification, e.g. *"The LADS screening indicated that there is a high/moderate probability that you have dyslexia (or the results were borderline), and so you are being referred for full psychological assessment."* Some explanation of what dyslexia is will be necessary unless this has already been discussed with the student. When a student who has been screened with LADS is referred for psychological assessment, a copy of the LADS print-out should be sent to the psychologist in advance of the assessment. The Administrator may add comments to the print-out by clicking on the **Add Comment** button on the report screen and typing text into the box.

While the student is waiting for a psychological assessment to be carried out, or to receive the report of that assessment, it would be appropriate to treat him or her as dyslexic for internal purposes (e.g. provision of learning support, and special arrangements in examinations), as over three-quarters of such cases are likely to be classed as dyslexic following a psychological assessment. For more information on supporting adults with dyslexia, see Chapter 5.

#### 4.4.3 Other educational institutions

In educational institutions other than universities (e.g. schools, 6<sup>th</sup> Form Colleges, and Further Education Colleges) a psychological assessment is not usually required for the student to receive support. In such institutions it would be appropriate to instigate support without further assessment in cases where the LADS results classifies the student as having a 'High' or 'Moderate' probability of dyslexia. In cases where the LADS results classifies the student as 'Borderline', the Administrator will need to check the profile of scores for individual LADS tests before a decision can be made (see section 4.2.4). The student should be given feedback on the LADS screening based on the classification, e.g. *"The LADS screening indicated that you*

*are probably dyslexic. Although LADS is not a full diagnostic test for dyslexia, the result indicates that there is a 90% probability that you actually have dyslexia, and so we are recommending that you have appropriate support to help you with your studies.*” Again, explanation of what dyslexia is will be necessary unless this has already been discussed with the student. For more information on supporting adults with dyslexia, see Chapter 5.

Where additional time in public examinations (e.g. GCSE, ‘A’ level) is required, further assessment will be necessary to supply appropriate evidence to the examination board(s). This assessment may be carried out by an educational psychologist, or by a specialist teacher who has approved qualifications in assessing and teaching dyslexic students. If in doubt, the examination board should be consulted. The British Dyslexia Association can also advise on this. A LADS report will not be adequate, by itself, to support an application for additional time in public examinations because additional evidence (e.g. of current reading skills and writing speed) will be necessary. However, the LADS result may be included as additional evidence in assessment reports (provided the student is at least 16 years of age), because the tests in LADS have been standardised and measure key cognitive indicators of dyslexia.

In cases where special examination arrangements (e.g. additional time) are being requested on grounds of dyslexia, the certificate issued by an educational psychologist (or by a specialist teacher who is entitled to issue such certificates) should contain appropriate diagnostic evidence of dyslexia. LADS is an appropriate source of such evidence, and LADS results may be cited in such cases. For guidance on preparation of assessment reports for examination candidates with dyslexia and other special educational needs, see Backhouse (2000).

#### 4.4.4 Other situations, including employment

In other circumstances in which LADS is being used, such as in the workplace or as part of careers or employment counselling, Administrators will have to use their own judgement regarding the best course of action. In employment situations, it will often be the case that some adaptations to then person’s working practices or environment will be beneficial: for further information on this, see Section 5.2.

The *British Dyslexia Association (BDA)* publishes a document entitled *‘Becoming a Dyslexia-wise Employer: A framework for action’*. This is designed to give an insight into the nature of dyslexia, how it can affect people in the workplace and how to develop an action plan for supporting employees who have dyslexia. This publication can be obtained from the BDA or downloaded from the BDA website (<http://www.bdadyslexia.org.uk>).

Where there is an obvious need for tuition in basic skills, it is recommended that the local authority should first be consulted for information on adult literacy programmes in the locality.

*Dyslexia Action* provides tuition for adult dyslexics (<http://www.dyslexiaaction.org.uk>).

There are also many national agencies that provide education programmes for adults and can give support and advice (see Section 5.4).

Chapter 5 gives detailed advice and information on supporting adults with dyslexia in various settings.

#### 4.4.5 Making a referral to a psychologist

In many cases the LADS results will be sufficient for the dyslexic adult to be able to progress to obtaining the support they require, whether in education or in employment. In some circumstances, however, a diagnosis by a suitably qualified psychologist will be necessary. For example, this is usually necessary for a dyslexic student in higher education to be eligible for Disabled Students Allowances (DSA). If there is an unresolved dispute between a dyslexic adult and their employer or their educational institution to which the issue of their dyslexia has a direct bearing, then a psychological assessment and report will be necessary if there are plans to take legal action on this matter. Legal may be available to pursue a legal case. (see useful addresses and web links in Appendix).

**Citizens Advice Bureau** — check your local phone book for details.

## **Disability Law Service**

### **Disability Rights Commission**

Many educational institutions have psychologists to whom they regularly refer students for diagnostic assessment. However, employers and other organisations may not know who to approach for this service. Care should be exercised in selecting a psychologist to carry out a diagnostic assessment. It should not be assumed, for example, that all educational psychologists will necessarily be able to carry out this task. Most educational psychologists deal largely with the pre-16 sector and have little, if any experience, of assessing adults. They may not even have access to psychological tests that are suitable for assessing adults. Although some occupational psychologists, clinical psychologists and other psychologists may be able to carry out diagnostic assessment of adults for dyslexia, most will not have either the training or the experience to do this. The first fundamental requirement is to choose a **Chartered Psychologist**, as such persons are required by the terms of the Charter only to offer professional services that they are competent to carry out and can be removed from the rolls if they do not observe those requirements. The *British Psychological Society (BPS)* maintains the rolls of Chartered Psychologists and each year publishes the *Register of Chartered Psychologists* and the *Directory of Chartered Psychologists*. The latter lists services offered by Chartered Psychologists on the rolls. For further information visit [www.bps.org.uk](http://www.bps.org.uk) and click on 'Find a psychologist'.

Having located a suitable Chartered Psychologist you should ask for confirmation that he or she is competent to carry out diagnostic assessments for dyslexia and that tests suitable for assessing adults (rather than children) will be used. Finally, you should agree the fee beforehand. At the time of going to press, professional fees for psychological assessments are in the region of £300 plus, but in some areas they may be much higher than this. Fees for reports in legal cases are usually higher because of the greater amount of work involved.

Reports of psychological assessments are usually required to meet certain professional criteria and be set out in specified ways. In higher education, the guidelines set out in the report of the *National Working Party on Dyslexia in Higher Education* (Singleton, 1999) should be followed. If preparing a psychological report for legal purposes, solicitors will advise on the specific requirements and wording.

When referring a client who has been screened on LADS to a psychologist for diagnostic assessment, a print-out of the LADS report should be sent together with any other relevant information.

## **4.5 Adults who have low levels of literacy**

### **4.5.1 Acknowledgement**

This section has been prepared with the kind assistance of Helen Boden, formerly both Project Officer for the British Dyslexia Association and Principal of The Dyslexia Institute, Sheffield. Helen previously worked in adult basic education and during her time with the British Dyslexia Association she was involved in several projects with young offenders and other vulnerable adolescents and adults who are outside mainstream education or training provision. She has been using LADS with adult clients in these various settings for over two years.

### **4.5.2 Introduction**

LADS was originally designed for, and tested out on individuals, in various post-16 educational settings, including universities, colleges and adult basic education centres. In due course its use has steadily extended to include other settings where there are adults who require screening for dyslexia. These settings include a wide variety of different employment situations and organisations concerned with careers advice and guidance, as well as various aspects of the justice system. The latter includes prisons, probation services, youth offending teams and youth offender units and institutions. Feedback from users in these various settings has been

very positive and indicates that LADS has high utility for screening individuals from a wide range of educational and social backgrounds.

However, in some of these settings individuals who have low levels of literacy are likely to be encountered. This is particularly the case with young offenders and prisoners. Working with this client base provides a host of special challenges and it is important to understand and appreciate these in order to provide individuals with positive and productive experience. For many such individuals the experience of being screened using any tool will be new and there is a strong likelihood that the difficulties that they have perhaps experienced over a long period of time have never previously been linked to dyslexia. Coupled with this is the factor that many will feel particularly emotionally vulnerable around the issue of their literacy skills. It is, therefore, important to appreciate such concerns before embarking on a screening process.

A factor that seems to provide the use of the LADS tool with a distinct advantage is that it is computer-based. Although individuals may perhaps have limited, if any, experience of operating a computer it is generally less threatening for them than those tools that require individuals to read or write, particularly those that require an individual to read aloud. This could be due to the fact that it is more socially acceptable to admit to a lack of IT skills than it is to admit to being unable to read or write.

### 4.5.3 Setting the scene

Often individuals are referred from other agencies or services to unfamiliar individuals for the screening process to be administered. A part of the process in such instances must provide the opportunity to build up a rapport and trust between the client and the administrator. Although LADS can be used to screen large numbers of individuals simultaneously, when working with this group of clients it is usually more effective to work on a one-to-one basis. The reasons for this are:

- Individuals may well require emotional support as they might find the process very stressful.
- Individuals may be unable to operate a computer effectively. The difficulty and amounts of concentration required to undertake the mechanical operations could result in an inaccurate representation of the results being produced.
- The initial instructions given within each test of the LADS may require some explanation and some support may be required in order to coach an individual through the practice examples contained within each test.
- Often individuals require positive reinforcement and encouragement throughout the process.

It should also be understood that an individual may have low levels of literacy for a variety of reasons other than dyslexia and the potential for such factors also needs to be explored. These factors could include:

*Inadequate education.* If an individual has had limited opportunity to access education then it would not be surprising that their literacy levels may be lower than expected.

*Broken or disrupted education.* If an individual has encountered frequent changes in education such as many changes of school it may also result in lower than expected literacy levels.

*Disrupted social background.* If there is a history of social disruption this may also have had an impact on an individual in terms of them being receptive to education due to emotional upheaval etc.

*People of lower ability levels.* Individuals who are of lower intelligence may well exhibit indicators that are similar to those of dyslexia, for example poor literacy/numeracy skills and difficulty with acquiring work related skills. Although this is not to say that some one of lower overall intelligence cannot also have dyslexia.

*People from diverse/different communities or ethnic minorities.* Individuals who are part of diverse/different communities or ethnic minorities may not have accessed formal education in the way that might be expected and within some communities literacy is not necessarily viewed as an important or valuable skill for all individuals to develop.

*People who have suffered a brain injury.* In some circumstances damage to the brain sustained through an injury can also present very similar to dyslexia.

*People who have a history of substance abuse.* A history of long-term substance abuse may affect an individual's cognitive (thought processing) skills, and where this is suspected such an issue should be factored into the overall analysis of the results, although such a factor would not also exclude an individual from also having dyslexia. If an individual is currently using any substance that may affect performance it is worth being cautious within the screening process as such usage may well affect the results. This also includes the use of some prescription medications.

*People with physical difficulties.* Before continuing with any screening for dyslexia it is always advisable to rule out any other physical factors such as previously undiagnosed problems with hearing or eyesight particularly as low levels of literacy or socio/economic factors may have presented a barrier for an individual in terms of accessing health care provision.

#### **4.5.4 Building a rapport**

Whilst each individual administering the LADS will have their own way of doing this it is worth noting some useful points. Often individuals are referred for screening without any real knowledge or understanding of what the process involves, or even what they are there for, and it is important that anyone going through this process is informed about what it will involve and more importantly that they are in control of the process, i.e. that if they do not wish either to undertake or continue with the process they can stop at any time.

It is also worth finding out information about previous screenings/assessments that have been undertaken and ruling in or out any of the factors that could influence the results such as those listed above. Usually the best approach is to have a discussion with the client as opposed to a more formal interview. Where the administrator wishes to make notes of such a discussion it is also important to explain to the client the purpose of such notes and where or how they will be used in the future. What is not unusual, though, as part of this process is that during such an initial discussion the client may give very limited information, often more information can be gathered at the feedback part of the process when the stress levels have been reduced.

#### **4.5.5 Starting the Screening**

After initially ensuring that the client is comfortable physically and that the environment is suitable an overview of the process should be given. This should include information about why they are there, i.e. to undertake a screening for dyslexia using a computer-based set of activities. Again, another check should be made to ensure that they are happy to continue. It should then be established whether or not the client wishes to operate the computer or whether they would prefer the administrator to undertake this task. Once these choices have been made the administrator can progress to the registration of the client on the system. Completion of this will lead to the initial screen listing the activities to be undertaken on the screen.

It should be explained to the client that the screening process requires them to complete a set of four short activities; reasoning which they can see at the top of the list but pointing out that the other three are blanked out on purpose but that these are word recognition, word construction and memory. The reason for doing this is to ensure that the client feels that they will be fully informed of all aspects of the process, particularly if they are not able to read the words on the list for themselves.

Explain that they have to do the reasoning task first but that after this one they can choose which they would like to do or they can follow the order in which they appear. Although they can take a break after any of the activities the programme should not be stopped in the middle of the activities. With each activity the computer will give them some instructions but

reassure the client that you are there to give them any assistance if required, although you cannot give them the answers and that in fact you do not know the answers. This seems to really help individuals, in that they feel that if the administrator doesn't know the answers then it doesn't feel as if you are judging them; you are, in fact, on an equal footing.

Finally double check that the client does want to continue.

#### **4.5.6 Administering the tests**

##### **Reasoning**

Clicking on the icon will start the test and the instructions will be given. Throughout the programme each task is referred to as a test that some individuals can find very daunting, again reassurance is vital to identify that these are not like tests that you can pass or fail. After the instructions have been completed it is helpful to go through them again verbally and using the picture on the screen to illustrate, explaining that what they are looking for is the missing piece of the grid. Choosing from the options at the bottom of the screen they have to pick which one they think will complete the pattern in the grid. Ask them to point at the one they would like to choose if the client is not operating the computer. Also explain that on the real task there will be a bar at the top of the screen that is the timer, reassuring them that they have plenty of time to make their choice although it will make a noise when they are running out of time. If you feel that the timer will put too much pressure on the client then turn it off, but most seem to cope with it and prefer to be able to see how much time they have. Another aspect to identify is that the tasks will become harder/more difficult and will continue to do so until the computer feels that it has found their level then it will stop and they have completed the activity.

On occasions it may be necessary to coach the individual with the first item to build up their confidence, so for this first one point out that looking across the grid they can see that the circles are getting bigger, and ask which one would they choose from the bottom. Once this has been completed they can continue to make their choices without further coaching. It is also well worth noting how they tackle each of the tasks, what strategies they use; quite often individuals will verbalise what they are thinking and this can provide a useful insight to the thinking strategies that they are using and that could be applied to other areas. Throughout the task give reassurance, providing this doesn't disturb them during the task. On completion, congratulate them on how well they have done.

##### **Word Recognition:**

This is perhaps the most challenging of the tasks for such clients for several reasons:

1. It is testing those skills that may be very weak.
2. The vocabulary used within the test is quite challenging and may be unfamiliar.
3. It is one where the client suspects that they are getting the answers wrong.
4. As some of the words displayed look very similar it is difficult, even if they think they know the word, to pick the correct option.
5. Although for an individual who is able to read at a reasonable level there is sufficient time, for those with very weak skills in this area there is not enough time for them to examine every word displayed carefully.

If the administrator knows or suspects very low levels of literacy it is worth telling the client that they might find the task more difficult, and perhaps adding that you, the administrator find it hard also, but that if they are not sure of the answer they can either simply guess, pick the one that looks most familiar or if the administrator is operating the computer say "pass", at which point an incorrect option can be chosen to move the activity on. Throughout the activity it is sometimes helpful to encourage the client by telling them that they are doing well.

During the practice elements it is advisable to coach the client through them, if required, to ensure that they pick the correct options as the response from the program if they pick an incorrect one is a little blunt and can further diminish an individual's confidence.

Again, additional information can be gathered about how an individual is tackling the activity, as often the client will attempt to sound out the word. Sometimes initially the client will ask the administrator what the word is, at which point it has to be explained that unfortunately you cannot tell them. Upon completion of the activity reassure the client that they did well and that this one is probably the most difficult of all the activities they will undertake.

### **Word Construction**

The instructions for this activity usually require further clarification although most individuals complete the task quite easily once they understand what is required. Following the instructions from the computer, coach the individual through the practice elements. Rather than use the word 'syllable' it is easier to understand if the term 'chunk' is used, so explain that they will hear a word and then they need to build the word from the chunks in the grid, but that the words they will hear are not real words just 'made up' ones. Sometimes an individual will ask you to repeat the word after it has been spoken by the computer, explain that you are not allowed to do this, unless you feel that there has been an outside noise or disturbance that has actually prevented them from hearing it.

This activity can yield some very helpful information, e.g.

- An individual may pick up the first syllable but miss the middle or end one.
- They may repeatedly confuse similar sounds.
- They may be unable to 'let go' of the previous word when the next one is given and have a very erratic profile of performance getting alternate ones correct.
- They may frequently forget the given word or chunks of that word
- It might provide an indication of their decoding skills in terms of whether or not they can deal with/identify individual letter sounds, blends, long and short vowel sounds, etc.

All such factors give an indication of both the individual's ability to process auditory information and the skills/strategies being used and also the level of such skills. Such information can then be used to inform programmes of support and/or intervention.

### **Memory**

The instructions that accompany this activity can be a little confusing to some individuals so it is worth explaining what is required in simple terms and where necessary, working through a verbal example in addition to the practice item given. Many individuals find this activity very challenging and it is best to remain as unobtrusive as possible during its administration. It is, however, a relatively quick one. Here, again, it is worth noting any strategies used, for example:

- Verbally repeating the sequence.
- Using fingers to remember numbers
- The individual placing their fingers on the keys to 'feel' the sequence
- Pretending to key the numbers into a phone keypad.

All such strategies may give an indication of both the preferred learning style and the strategies that they use to remember information.

#### **4.5.7 Interpreting the Results**

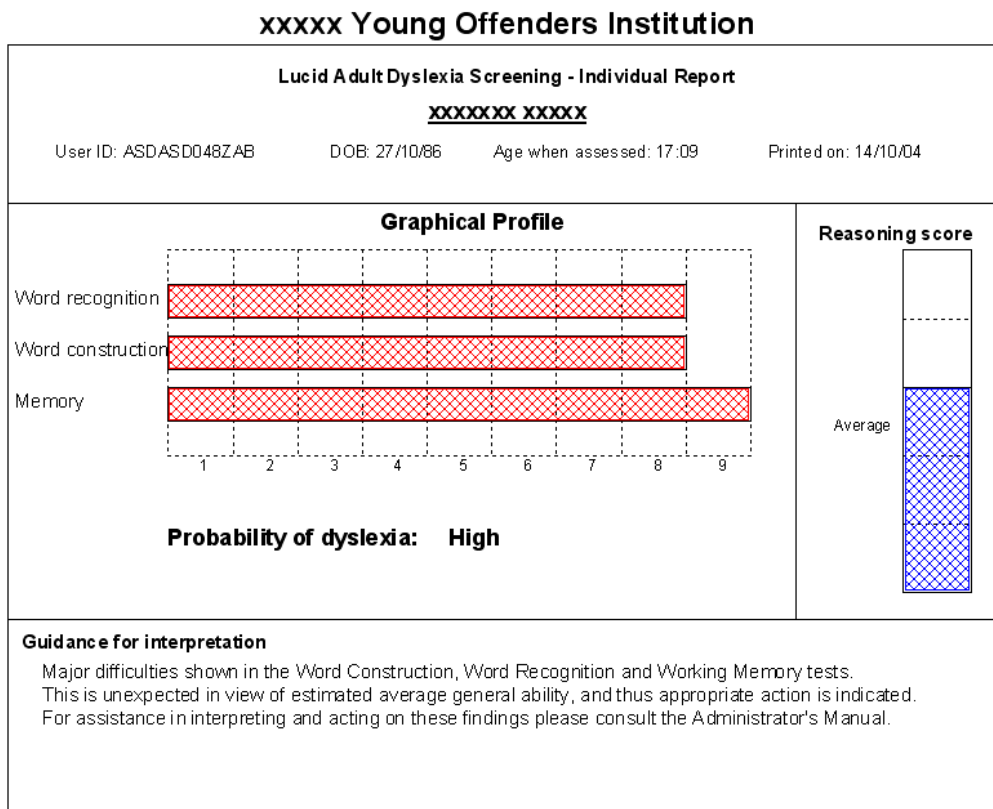
In addition to the information on interpreting the results given in Chapter 4, there are some additional factors to consider when screening individuals who have low levels of basic skills. In such cases the automatic interpretation given by LADS should be regarded as an indicator but the profile will need closer scrutiny. Administrators working with adults who have low levels of basic skills should be particularly aware that in these circumstances there a greater risk of 'false positives' i.e. individuals who show positive on screening but who do not, in fact, have dyslexia. This is especially so in groups of prisoners and young offenders, who typically have disadvantaged backgrounds and disrupted schooling, often resulting in low literacy levels. The

issue of the incidence of dyslexia in prisoners and young offenders remains controversial. Many researchers have maintained that there is evidence for a higher level of dyslexia in those convicted of criminal offences than there is in the general population. For example, in the Dyspel project carried out in London in the mid-1990s, 52% of offenders screened showed strong indicators of dyslexia (e.g. Morgan, 1997). Kirk and Reid (1999) reported similar figures in a screening study of young offenders in Scotland. The reasons for this are often assumed to lie in the greater vulnerability of young people who have undiagnosed dyslexia resulting in educational failure. Other commentators (e.g. Rice, 2000) have criticised this view, maintaining that the evidence is spurious because the incidence of false positives is rarely taken properly into account. However, regardless of whether the incidence of dyslexia in such groups is greater than elsewhere, the arguments in favour of screening adults with poor literacy skills and who may therefore have dyslexia remains the same. For a general review of the issues surrounding this, see Reid and Kirk, 2001, pp119-131.

Clearly the results from the non-verbal Reasoning test are unlikely to be affected by social and educational background factors; this one reason why this is such a useful test. Often it will reveal that an individual who may have been assumed not to be particularly bright (because of poor oral vocabulary) is much more capable than was previously imaged. It would, however, be very common for this type of client to obtain a high score (red bar) on the Word Recognition test, indicating a major area of difficulty. This is because although the words used in this test are fairly common, lack of reading experience is likely to mean they have difficulty in making decisions about what might be real words as opposed to non-words, especially under conditions of time pressure.

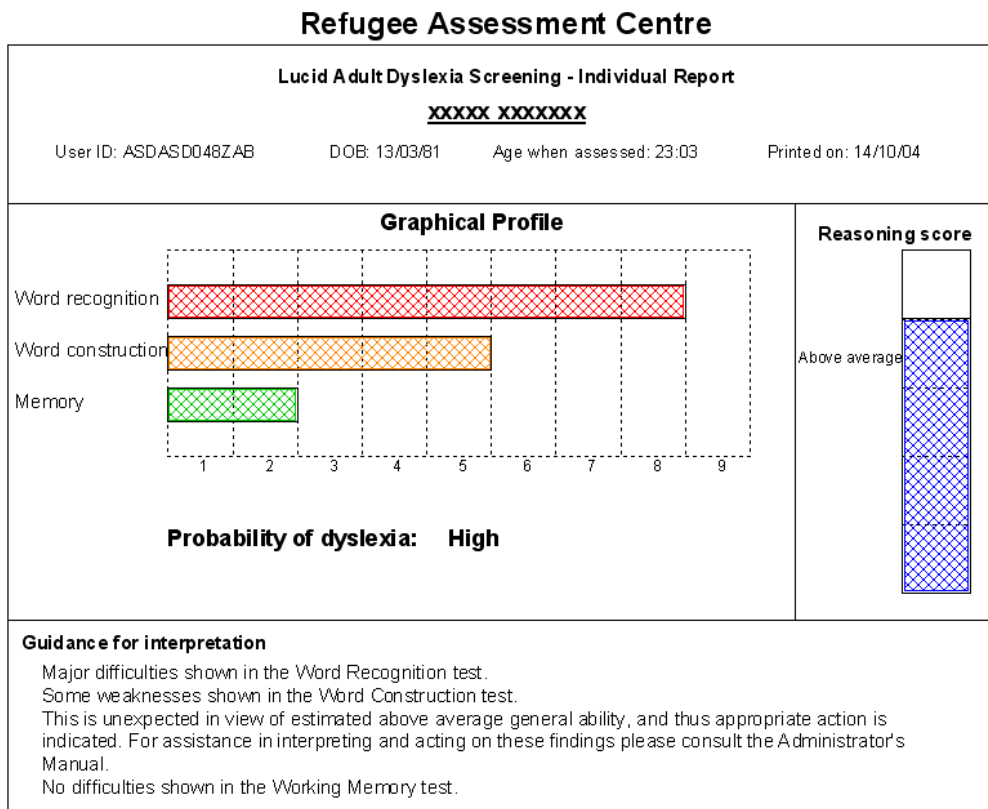
The areas that yield very useful information in terms of dyslexia identification are the Word Construction and Memory tests. If these are giving positive indications (red bars/high scores) then the overall probability of dyslexia is likely to be high. This is illustrated in the following case studies.

Figure 11. Case study F.



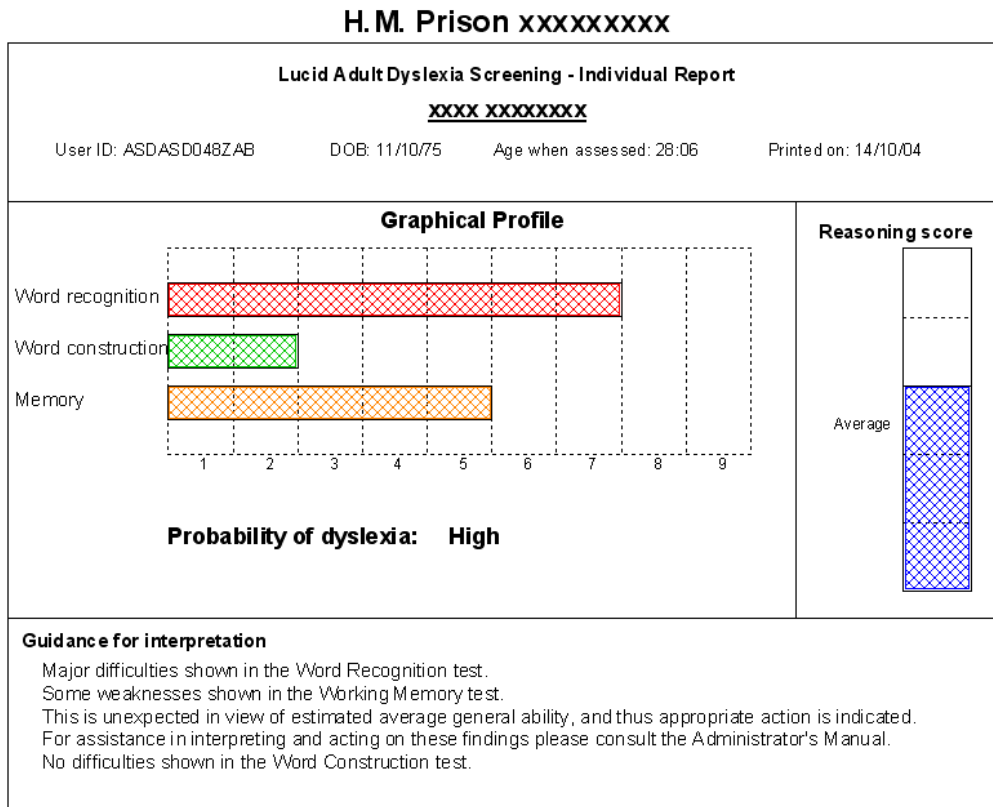
**Case Study F** — This young man, aged 17, who was in a youth offender institution, had a very disadvantaged background and experienced many disruptions to his education from age 11 onwards. His tested reading skills were equivalent to those of an average 12 year-old and his spelling skills in the bottom 1% of his age group. He had poor oral vocabulary knowledge but his non-verbal reasoning was in the average range. He had good practical skills and loved tinkering around with cars (in fact, his period in this secure institution was as a direct result of several incidents of taking cars without the owners' consent). He had plans to become a motor mechanic but needed to improve his literacy skills in order to undertake the necessary training. The LADS profile (see Figure 11) shows red scores in all three of the dyslexia-sensitive tests: 8 for Word Recognition, 8 for Word Construction and 9 for Memory. While the score for Word Recognition is understandable in terms of his general low level of literacy, his disadvantaged background, and his general lack of experience with reading, the other two results give a pretty clear indication of dyslexia. The Word Construction test requires not only good auditory memory but also good phonological analysis and sequencing skills, but it not so dependent on reading vocabulary. The skills to do this task are normally acquired in the primary school and if adults experience great difficulty with this it usually indicates that they have dyslexia. The Memory test in LADS not strongly related to reading or spelling skills (and is also independent of non-verbal reasoning ability and oral vocabulary skills). Where adults score high (red bar) on this it is usually an indication of dyslexia, especially when there is corroborative evidence of phonological difficulties (as there is in this case from the results of the Word Construction test). Hence this young man showed strong evidence of dyslexia, and this was subsequently supported by findings of further psychological tests, including phonological tasks (Spoonerisms, etc.) on which he was very poor. He is currently having special tuition for his literacy difficulties that carefully addresses his problems dealing with phonological information, and although he is still struggling he is making progress and has not abandoned his hopes to pursue a career in motor mechanics.

Figure 12. Case Study G



**Case Study G** — Where the profile contains a high score for word recognition and a moderate score for word construction but a low score for memory it is worth exploring with the client whether or not their difficulties are the result of a lack of opportunity to develop literacy skills due to such factors as mentioned previously which might well indicate a true lack of basic literacy skills as opposed to a dyslexic difficulty. Taking a similar approach to developing skills as that which would be taken with a dyslexic client may still be appropriate and bring significant benefits. To illustrate this we consider the case of a young woman aged 23 in a basic skills class. She was a refugee who came to Britain in 1999, during the war in Bosnia. She has been working as a kitchen helper and subsequently waitress in a hotel, during which time her spoken English has improved considerably. Recently she decided she needed to be able to read and write in English to improve her employment prospect and so has been attending adult literacy education classes. As a routine measure, LADS was administered and the results are shown in Figure 12. From this it can be seen that her non-verbal reasoning was in the above-average range and her Word Recognition score is high/red (8), indicating that she has little ability to recognise real English words. But her Word Construction score is moderate/amber (5), indicating that she has some skills in recognising the sounds of syllables and linking them up with her very limited knowledge of English orthography. Finally, her Memory score is low/green (2), indicating that there are no problems with her working memory. The automatic interpretation algorithm has classified this young woman as having a ‘high’ probability of dyslexia, but before assuming that she has dyslexia it is worth reflecting on the results. Her poor performance on the Word Recognition is to be expected in view of her background. If we therefore put that result to one side we can see that there is not a great deal of evidence to support the view that she has dyslexia. Her teachers can therefore be reasonably confident that with conscientious application to an adult literacy course, she should be able to develop a satisfactory standard of literacy English.

Figure 13. Case Study H.



**Case Study H** — This man, aged 28, was screened using LADS on commencement of a prison sentence. He had a disadvantaged background, disrupted schooling and a history of convictions for various offences before being convicted of burglary. His reading and spelling skills had already been assessed by education staff at a previous secure establishment while he was on remand awaiting trial, and these had been found to be below average. His LADS result is shown in Figure 22. His non-verbal reasoning was in the average range and, as might be expected from his background, his Word Recognition score is high/red (7). But his Word Construction score is low/green (2), indicating no problems with phonological encoding. His Memory score is moderate/amber (5), suggesting some problems with working memory. The automatic interpretation algorithm has classified this man as having a ‘high’ probability of dyslexia, but again, it is important to consider the reasons behind these results. In fact, if the Word Recognition score is taken out of the equation, we are left with one moderate/amber score, which would then place him in the ‘borderline’ category. Since the majority of individuals in the ‘borderline’ category do not have dyslexia, the safest course of action would be to assume that he does not have dyslexia (unless there are indications to the contrary, such as a family history of dyslexia or evidence of early speech and language problems).

#### 4.5.8 Providing Feedback<sup>17</sup>

Although each administrator will have their own style in providing feedback following a LADS screening, when working with this particularly vulnerable client group the feedback part of the process is vital and should be undertaken not only with a high degree of sensitivity and professionalism, but also provide the individual with a clear explanation of both their strengths and difficulties and how this relates to dyslexia. It is, therefore, important the person providing the feedback has a reasonable understanding of dyslexia in order that they can provide appropriate and useful information.

All human beings have a profound need for praise and reassurance and without this we feel insecure and unhappy. For vulnerable individuals there are may not be many opportunities to secure praise and reassurance, yet there will often be discouragements. Therefore we need to know not only when we have been successful but also why we have been successful so that we can try and repeat this success. In the case of dyslexia identification we also need to provide an individual with information on how they can capitalise on the positive to support those areas where there might be specific difficulties.

Feedback is more likely to help an individual if it:

- is given promptly
- gives specific information
- contains positive words,
- gives detailed comment on how success has been achieved or not achieved,
- can be linked to further positive courses of action.

For feedback to work effectively it has to be a two-way process. It is sometimes difficult to find the necessary balance between being honest about performance and being gentle on another person's feelings. This can be a particular difficulty where an individual has achieved a low score on the non-verbal reasoning activity. On such occasions it is probably best not to draw attention to this. Where an individual has scored average or above, providing this information can provide an individual with an enormous confidence boost, as many within this vulnerable client group genuinely believe that their difficulties stem from a lack of intellect as opposed to a specific difficulty. It is also vital that the feedback provides them with the opportunity to move forward in a direction of their choosing if they wish to.

The way that feedback is delivered is almost as important as the content. Using superior, condescending or disinterested tones and inappropriate body language will ensure that

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<sup>17</sup> Please first refer to the general guidelines on giving feedback, which may be found in Section 4.4.1.

the person to whom you are giving feedback does not receive it well, no matter how constructive you think it is.

The knowledge of the other person and their background that will have been gathered at a previous stage of the screening process is important within the feedback context so that you can illustrate the information about their strengths and difficulties with specific examples that have relevance to them. For some individuals this information will be new and can potentially affect the way that they see themselves. It can also bring to the surface a great deal of emotion.

It is also vital that any such feedback session is conducted in private and sufficient time is allowed for this process. It is also up to the individual to decide what information will become public knowledge.

It is easy to assume that you have been crystal clear in the information that you have given and yet the other person may not have understood what you have said or has misinterpreted the meaning of what you have said. Thus it is often useful to ask open questions to ensure this has not happened, e.g. 'would you like to summarise what we have discussed?' Avoid asking closed questions, e.g. 'Have you understood?' or 'Is that all right?' which make it harder for the person to say 'No, I haven't understood' because they may feel that any failure to understand is their fault.

Also, use of emotive words that can be misinterpreted should be avoided. An example of this was where an individual was told that they were 'slow at reading' they interpreted it that they were 'slow' in terms of general thought processes and intellectual ability. This had a profoundly negative impact on their self-esteem that took a great deal of effort to undo.

The skill of giving effective feedback following a screening session requires both a high level of thought and consideration, effective use of communication skills and a variety of strategies. It also requires that there is an opportunity for an individual to get further information and support at a later date if they wish to, so information about support agencies should also be provided. Identification of dyslexia should not usually be viewed as the end of a process but instead the beginning of a new and, hopefully, more positive one. The individual should be leaving with a greater level of awareness and understanding.

**Key points in giving feedback:**

- The importance of this process should not be underestimated.
- The effect of the screening/identification process on an individual should not be underestimated.
- Without effective feedback the process of identification is pointless.
- Feedback is a two-way process that should be positive.
- Screening should help an individual to move forward if they wish to, and in a direction that they have chosen.
- Feedback should contain information that is useful and relevant to that individual and others who may be in the position of providing support.
- The ownership of the decision about where the information is used and by whom is that of the individual who has been screened.
- Screening should be carried out in a professional and sensitive manner by someone with knowledge and understanding of dyslexia.



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# 5 Supporting adults with dyslexia

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## 5.1 Introduction

This chapter is designed to provide guidance for Administrators in following up a screening with LADS. The issues and recommendations in this chapter are things that an Administrator, teacher or counsellor will want to share with a dyslexic adult in order to help them find solutions to their difficulties. But the chapter has not been written in a style that is suitable to be read by dyslexic adults themselves, so it is preferable to impart the information through discussion rather than by giving this chapter to the dyslexic person to read.

Most adults with dyslexia who are screened using LADS will fall into one (or sometimes both) of two categories: employment and education. Hence this chapter has been organised around the issues that typically arise in these two areas, and the two sections that follow this (i.e. 5.2.0) consider what legal rights the dyslexic adult has (based on the provisions of the Disability Discrimination Act) and how disputes may be resolved. However, since the day-to-day needs of the dyslexic adult are often very similar whether they be a student at college or university or an employee, the final two sections (i.e. 5.6 and 5.7), which deal with specific support strategies, do not distinguish between employment and education but are applicable to both.

Many of the suggestions in this chapter relate to computer technology that can be used to support adults with dyslexia. A broad range of strategies and products is covered. Because technologies are changing constantly we no longer provide a list of suppliers, though a web search will show many of these organisations and other organisations listed in this manual may be able to help. In addition, the recommendations in this chapter, although up-to-date at the time of printing, may not be so appropriate in years to come. Readers may therefore need to check with suppliers whether newer systems have been developed that would be more suitable than the ones mentioned here.

Although fairly comprehensive, this chapter does not purport to cover *all* the issues concerning adults with dyslexia. If further information is required, a number of books have been recommended in Section 4.1.

## 5.2 Employment issues

### 5.2.1 The Disability Discrimination Act (Employment)

The Disability Discrimination Act 1995 (DDA) prohibits discrimination against disabled people in employment. Employers must not discriminate against a disabled person in the

- recruitment and retention of employees
- promotion and transfers
- training and development
- the dismissal process.

For the purposes of the Act a person is regarded as having a disability if he or she has a physical or mental impairment which has a substantial and long-term adverse effect on their ability to carry out normal day-to-day activities. Although dyslexia does not always affect a person's ability to carry out normal day-to-day activities because they often develop

compensatory strategies, if dyslexic people cannot do this for any reason the effects can be disabling and would therefore come within the terms of the Act.

Employers must make 'reasonable adjustment' to their premises or employment arrangements, if these substantially disadvantage a disabled employee, or prospective employee, compared to a non-disabled person. An employer must not refuse to employ someone simply because they have a disability. They also have a duty to think about different ways of working. However, the DDA does not apply to the police, armed services personnel, prison officers, fire fighters or people who work on board ships, aircraft or hovercraft. It also does not apply to organisations that have fewer than 15 employees. 'Reasonable adjustments' in cases of employees or prospective employees with dyslexia might include:

- supplying additional training
- reallocating part of a job to another employee
- acquiring additional equipment
- modifying instructions or reference manuals
- modifying procedures for testing or assessment
- providing a reader
- allowing absences from work for special tuition in literacy

For further information about the DDA, visit the website [www.disability.gov.uk](http://www.disability.gov.uk)

## 5.2.2 Supporting dyslexic adults in the workplace

The **British Dyslexia Association** (BDA) maintains that if employers become 'dyslexia-wise' then in addition to supporting dyslexic employees they will reap benefits for business as a whole. The BDA recommends that workplace support for dyslexia should be based on the following five fundamental principles:

1. **Understand what dyslexia is** — Dyslexia is widespread across all workforces. Issues with reading are just one of the many challenges that face dyslexic people at work.
2. **Ensuring access to information** — Use a variety of communication tools to disseminate information to the workforce.
3. **Identify the issues in the workplace** — Assess situations that may place dyslexic employees at a disadvantage, impede their performance or limit their potential. Carry out an audit to ensure there is a balance between written and non-written communication. Consider how to improve alternative ways of communicating in the organisation; for example, meetings not memos.
4. **Develop specialist knowledge and support** — Offer access to dyslexia screening, assessment and ongoing support for those who request it. Make sure that everyone knows this provision is available.
5. **Create a culture of confidence** — Provide mechanisms so that dyslexics can be open about their dyslexia. Work with Unions and other employee organisations to enable them to enhance their performance.

Further information about these five principles can be found in the BDA publication entitled *'Becoming a Dyslexia-wise Employer: A framework for action'*, which can be obtained from the BDA or downloaded from the BDA website.

## 5.2.3 Resolving disputes

If an employee believes he or she has been discriminated against, the issue should first be raised with an appropriate person in their organisation (e.g. their line manager, personnel manager or trades union official), who may be able to resolve the issue or explain the organisation's internal

complaints and appeals procedure. Remember that LADS is only a screening system and does not purport to provide a diagnosis of dyslexia, so if an employee is minded to take a dispute further (e.g. to Court) then further professional evidence of their dyslexia will be necessary, e.g. from a suitably qualified psychologist.

Further advice and help may be sought from the following organisations:

**ACAS** (Advisory, Conciliation and Arbitration Services) is a government agency that will provide free initial advice on an employment query, and try to negotiate a settlement. A copy of any complaint lodged with a tribunal will be sent automatically to an ACAS conciliation officer. If conciliation is successful, the parties will reach an agreement, which will normally be recorded in writing. Ask for the regional centre. Tel: 020 7396 5100. Web: [www.acas.org.uk](http://www.acas.org.uk)

**Citizens Advice Bureau** can help individuals negotiate with their employer and may in some cases be able to represent them at a hearing. Check the local phone book for details.

**Disability Law Service** provides free legal advice to disabled people and representation where appropriate. Tel: 020 7791 9800. Fax: 020 7791 9802. Email: [advice@dls.org.uk](mailto:advice@dls.org.uk)

**Equality and Human Rights Commission.** This is an independent body working towards the elimination of discrimination against - and equalising opportunities for disabled people. Helplines:  
England. Tel: 0845 604 6610 Wales Tel: 0845 604 8810 Scotland Tel: 0845 604 5510  
E-mail: [info@equalityhumanrights.com](mailto:info@equalityhumanrights.com) Website:  
<http://www.equalityhumanrights.com/> Provides government information booklets on the Disability Discrimination Act. [See also Section 5.3.2].

**Employers Forum on Disability.** Tel: 020 7403 3020. Fax: 020 7403 0404. Email: [disabilitydirections@efd.org.uk](mailto:disabilitydirections@efd.org.uk) Web: <http://www.efd.org.uk/>

**Employment Rights Association.** Tel: 020 7387 2522. Fax: 020 7387 2250. Email: [enquiries@lowpayunit.org.uk](mailto:enquiries@lowpayunit.org.uk) Web: [www.lowpayunit.org.uk](http://www.lowpayunit.org.uk)

**The Employment Tribunal** has a National Helpline number: Tel: 08457 959 775. Fax: 01284 766 334 . Web: <http://www.employmenttribunals.gov.uk/>

**Local Law Centres** may provide free advice and representation. Contact the head office to locate the nearest: **Law Centres Federation.** Tel: 020 7387 8570. Fax: 020 7387 8368. Email: [info@lawcentres.org.uk](mailto:info@lawcentres.org.uk) Web: [www.lawcentres.org.uk](http://www.lawcentres.org.uk)

**RADAR** is able to give advice on the Disability Discrimination Act: Tel: 020 7250 3222. Fax: 020 7250 0212. Email: [radar@radar.org.uk](mailto:radar@radar.org.uk) Web: [www.radar.org.uk](http://www.radar.org.uk)

## 5.3 Educational issues

### 5.3.1 The Disability Discrimination Act (Education)

The provisions of the Disability Discrimination Act (DDA) have been extended to include education, making it unlawful for education and training providers and other related services to discriminate against disabled people. This amending legislation was brought in as the Special Educational Needs and Disability Act (SENDA) 2001, but became Part 4 of DDA legislation and implemented in September 2002. The post-16 sections of the Act apply to the following bodies in England, Wales and Scotland<sup>18</sup>

- higher and further education institutions, including 6<sup>th</sup> form colleges

<sup>18</sup> Institutions in Northern Ireland are not covered within this part of the Act at the moment, but reviews are currently taking place to include these as well.

- local education authorities and education authorities providing adult and community education
- youth services (except voluntary groups such as Scouts, etc.)
- other 'designated' institutions (including specialist further education residential colleges).

For the purposes of the Act a person is regarded as having a disability if he or she has a physical or mental impairment which has a substantial and long-term adverse effect on their ability to carry out normal day-to-day activities. Although dyslexia does not always affect a student's ability to carry out normal day-to-day activities in their educational setting because they often develop compensatory strategies, if dyslexic students cannot do this for any reason the effects can be disabling and would therefore come within the terms of the Act.

Under the requirements of the Act, educational institutions and other responsible bodies must not treat a disabled person 'less favourably' than a non-disabled person for reasons related to his/her disability without 'justification'. For example, it is likely to be unlawful for a university to turn down a dyslexic student who applies to do a degree in English, saying that they do not take dyslexic students on English degrees. This may be considered 'less favourable treatment'. However, an institution may be able to justify less favourable treatment in certain situations, e.g. where it is necessary to maintain academic or other course-specific standards.

Responsible bodies are also required by the Act to make 'reasonable adjustments' to ensure that a disabled student is not placed at a 'substantial disadvantage'. Making 'adjustments' means that if a disabled person is at a 'substantial disadvantage', the education provider is required to take reasonable steps to alleviate that disadvantage. This might include:

- changing admissions, administrative and examination procedures
- changing course content, including work placements
- changing physical features and premises
- changing teaching arrangements
- providing additional teaching
- providing communication and support services
- offering information in alternative formats
- training staff.

For example, if a dyslexic student who has writing difficulties and needs to tape-record lectures is not permitted to do so, this is likely to be unlawful because it constitutes a failure to make 'reasonable adjustments'.

Many educational institutions have **Disability Statements**, which state what the institution offers for disabled students. However, if particular support is not mentioned within the statement, this does not mean it cannot be provided. Institutions are expected to make reasonable adjustments to all facilities available for disabled students. Disability statements are available on the institution's website or direct from the institution.

Some adult students will continue to receive support from existing sources such as the Disabled Students Allowances (DSA) in higher education. In such cases, the institution may not be expected to cover the same disability support that is met by another source. However, if not all the needs of a disabled person are met by other sources then the institution would be expected to provide reasonable additional support.

Further education students should first approach the college about extra disability support. The college should consider your needs and, where reasonable, make adjustments to meet them. If the college is unable to meet those needs (e.g. because of an 'unreasonable cost') the student can also try to gain funding for disability support from charitable trusts.

### 5.3.2 Resolving disputes

If a student believes he or she has been discriminated against because of their dyslexia, the issue should first be raised with an appropriate person in their institution (e.g. disability coordinator, student union's welfare officer). They may be able to resolve the issue or explain the institution's internal complaints / appeals procedure. Remember that LADS is only a screening system and does not purport to provide a diagnosis of dyslexia, so if a student is minded to take a dispute further (e.g. to Court) then further professional evidence of their dyslexia will be necessary, e.g. from a suitably qualified psychologist.

The **Equality and Human Rights Commission (EHRC)**, which was established in 2000, can offer legal advice and arrange conciliation between the institution and the student. The case can also be taken directly to the County Court (in England and Wales) or a Sheriff Court (in Scotland). The outcomes of this may include compensation for injury to feelings, an injunction (in England and Wales) or an interdict (in Scotland) to prevent further discriminatory practices by the institution. The aims of the Disability Rights Commission are to:

- work towards eliminating discrimination against disabled people.
- promote equal opportunities for disabled people in the provision of services.
- provide information and advice to anyone with rights or obligations under the Act (including disabled people, employers and service providers).
- supply assistance and support to disabled litigants.
- prepare new/revised codes of practice and encourage good practice.
- keep the working of the Disability Discrimination Act (1995) under review.
- carry out formal investigations into discrimination and ensure compliance with the law.
- arrange for a conciliation service between service providers and disabled people to help resolve disputes in regard to access to goods and services (Part 3) and education (Part 4).

The EHRC can also take offenders to Court. The Court may award remedies, including compensation for financial loss or injury to feelings, an injunction to forbid a repetition of the discriminatory act, and a declaration as to the rights and responsibilities of the parties involved. For further information about the EHRC, visit the website [www.equalityhumanrights.com](http://www.equalityhumanrights.com)

Other useful sources of information and advice include the following:

**Citizens' Advice Bureau** — see local telephone directory for address.

**Community Legal Service**

**Department for Education and Skills (DfES)**

**Disability Law Service**

**Disability Rights Commission**

**Equality Commission for Northern Ireland**

**Skill: National Bureau for Students with Disabilities**

## 5.4 Developing basic skills

When an adult has been identified as dyslexic (or probably dyslexic), the immediate temptation is to concentrate on their difficulties in reading, writing and spelling (and, possibly, maths) and try to improve those deficiencies in basic skills by providing specialist tuition. However, this is not always such a helpful strategy, for a number of reasons:

1. **Suitability.** In essence, this approach relies on taking dyslexic adults 'back to the classroom' to try to teach them what they failed to learn when they were originally in school. Although the teaching method this time round might be different, revisiting the experiences of their schooldays (which were probably not very pleasant) is likely to be counterproductive and possibly emotionally unsettling, because it underlines their inadequacies as learners.
2. **Time.** Specialist tuition is not a 'quick fix'. It is usually a very time-consuming process that requires several months – if not years – of hard work on at least a weekly basis. Few dyslexic adults, especially those in employment, full-time education or training, or who have families to look after, can find the time to devote to this.
3. **Availability.** Teaching adults with dyslexia is a very specialist job, and few teachers have been trained for it. The chances of a dyslexic adult being able to find a suitably qualified tutor in the locality, who can provide tuition at mutually convenient times, are slim. While most local authorities run special classes for adult with poor literacy skills, these are rarely designed to meet the learning needs of dyslexics, and generally offer intensive individual specialist tuition.<sup>19</sup>
4. **Cost.** Remedial teaching requires specialist skills and is very labour intensive, so it is usually expensive. Tuition from a private dyslexia tutor, at two sessions a week for two years (which would not be unreasonable) can cost in excess of £5,000. Although most of us would value literacy far higher than that, in practice few adults can afford such costs. Since adults with poor literacy skills are likely to be in relatively low-paid employment – if in employment at all – the expense can present real difficulties. Although adult literacy classes run by local authorities are inexpensive – or even free to those not in employment – they may not always be suitable.

**As a general principle, therefore, it may be concluded that what most adults with dyslexia require is not to be sent back to school to try to learn what they failed to learn. Rather, what they require is support to *enable* them to cope with the demands of a literate world, at work, in the family, in education, and in leisure time. For further suggestions on this, see Sections 0 and 5.6.**

Obviously there will be exceptions to the general principle given above. If an adult with dyslexia has exceptionally poor basic skills, and this deficiency alone is preventing the person from:

- a) obtaining employment, or
- b) gaining promotion within employment
- c) being accepted on to a course of training or education

then specialist tuition may be required. Before embarking on this course of action, however, the person needs to understand exactly what is involved, and that a great deal of hard work will be expected of them. Their motivation and determination will be a major factor in determining success. **Dyslexia Action** (<http://www.dyslexiaaction.org.uk>) can offer advice in such cases and provide suitable tuition in literacy skills. Although such specialist tuition is expensive it may be possible to obtain financial assistance through local disability employment services. For further information contact your local **Jobcentre** (see telephone directory or ask directory enquiries) or visit the website [www.jobcentreplus.gov.uk](http://www.jobcentreplus.gov.uk) and select '*Customers Home — Help for Disabled People*'. Helpful guidance on ways in which basic skills can be improved for dyslexic adults (whether in employment or unemployed) may also be obtained from the following agencies:

**Skills for Life**, the national strategy for improving adult literacy and numeracy skills:  
<http://rwp.excellencegateway.org.uk/readwriteplus/>

**National Institute of Adult Continuing Education:** [www.niace.org.uk/](http://www.niace.org.uk/)

<sup>19</sup> To some extent this is likely to have been due to staff in adult literacy classes lacking the means to identify adults with dyslexia. Since LADS provides a solution to this problem, it may facilitate the development of teaching and support facilities for adult dyslexics in such classes.

Learn Direct: [www.learndirect.co.uk](http://www.learndirect.co.uk)

Learning and Skills Council: [www.lsc.gov.uk](http://www.lsc.gov.uk)

## 5.5 Managing dyslexic difficulties

### 5.5.1 Acknowledgement

This section has been prepared in consultation with Dr Sylvia Moody, a chartered psychologist who specialises in assessing adults who have dyslexic and/or dyspraxic difficulties. It lists difficulties commonly experienced by adults with dyslexia, and suggests strategies for managing these. For further detail on the issues raised here, see Bartlett and Moody (2000).

### 5.5.2 Short-term memory

Short-term memory (STM) is a temporary store for information. The information in this store will later either be forgotten or, if important, transferred to our long-term memory store. For example, we use STM to remember a telephone number for a few seconds, or to keep the shape of an object in mind as we try to draw it. To use your STM, carefully read through the following numbers ONCE ONLY; then look away and see if you can recall them in the correct order: 5 9 2 8 3 7 4 6. One important component of STM is working memory. In the example given above, STM was a passive recipient of information – its task was to remember the information only, not to do anything with it. The working memory component, however, is active: it takes the information held in the main STM store and uses it in some way. For example, we use working memory when we do mental arithmetic. To use your working memory, carefully read the following sentence through ONCE ONLY and then try to work out the sum in your head. Add 5 and 3 and 8 and 4 and then divide by 2.

Poor short-term memory, especially in the visual and auditory modalities, is often associated with dyslexia. Below are some of the difficulties it causes:

#### *General difficulties*

- remembering telephone numbers
- copying down numbers correctly
- remembering messages, instructions and directions
- keeping track of ideas when speaking, listening or writing
- remembering people's names
- remembering where things have been put

#### *Studying difficulties*

- taking notes in lectures
- formulating responses to questions in seminars

#### *Workplace difficulties*

- taking notes in meetings
- following discussions
- following oral instructions
- taking telephone messages

#### *Managing the difficulties*

- break numbers and words into chunks
- read sentences slowly and methodically

- try to identify the central theme of each paragraph you read
- request repeats or written back-up for instructions
- ask for instructions to be given in visual form, e.g. flow charts
- use set formats for telephone messages
- use visual symbols or pictures as cues and reminders
- tape record instructions / lectures / meetings
- take regular rest breaks
- do relaxation exercises

### **5.5.3 Sequencing and structure**

The logical sequencing and structuring of information, ideas and activities is a necessary part of human life. Though we may prefer to see the world holistically, yet still we cannot escape structure in our daily lives. Language in particular is highly structured. It is not surprising, therefore, that dyslexic people have a number of difficulties with language, especially written language. However, they are often also inefficient in many other tasks that involve sequencing and structure. Some commonly-reported difficulties are listed below.

#### ***General difficulties***

- writing and copying words and numbers
- following instructions / carrying out instructions in the correct sequence
- working under pressure
- keeping workspace tidy
- organising daily life

#### ***Studying difficulties***

- structuring essays
- taking succinct notes
- organising work and revision schedules
- presenting an argument logically in a seminar
- dealing with library catalogues / finding books

#### ***Workplace difficulties***

- filing documents / retrieving files
- following work protocols
- writing letters and memos
- structuring reports
- presenting ideas clearly in oral interactions / presentations
- carrying out tasks in an efficient, logical way
- dealing with a varied workload
- getting the times and places of meetings wrong
- missing appointments
- failing to prioritise / missing deadlines

- never having the right papers

### ***Managing the difficulties***

- read words and sentences bit by bit
- skim text to get an overview before reading for detail
- use alphabet cards
- colour code columns and rows of figures
- colour code instructions / protocols
- colour code files and filing trays, e.g., use red for urgent work
- clearly label files and filing trays
- keep workspace tidy
- plan daily, weekly and monthly action lists
- leave some time each day to deal with emergencies / unexpected tasks
- at the beginning of each day review the action plan for that day
- at the end of each day check what has / hasn't been done
- pre-plan essays and reports
- pre-plan oral interactions / presentations
- pre-plan tasks, and split them into sections / stages
- work one step at a time

### **5.5.4 Perception and movement**

Dyslexia denotes difficulty with reading and writing, and it is often supposed that this difficulty must stem from poor phonology (ability to recognise, produce and sequence letter sounds). However, dyslexia may also be associated with perceptual and motor (movement) difficulties. Such difficulties are often grouped together under the term 'dyspraxia'. Dyspraxic difficulties can often be identified in a psychological assessment (e.g. using the WAIS-III<sup>UK</sup> test). However, if physical clumsiness is a marked feature, it is advisable to seek an assessment also from a physiotherapist or occupational therapist who specialises in adult dyspraxia. If perceptual difficulties are marked, then a referral to a perception therapist would be useful.<sup>20</sup>

### ***General difficulties***

- poor balance and posture
- clumsy gait and movement
- difficulty with bat and ball games
- tendency to fall, trip, bump into things and people
- poor handwriting and typing
- lack of manual dexterity (needed in tasks such as cooking)
- over-sensitivity to light and noise
- discriminating between left and right

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<sup>20</sup> Dr Moody would like to acknowledge that many of the bullet points in this section are based on ideas in the book *Living with Dyspraxia: A guide for adults with developmental dyspraxia*, edited by Mary Colley, which is available from the Dyspraxia Foundation.

- judging distance
- finding one's way about
- doing numerical and spatial tasks
- planning and organising thought, and expressing thoughts
- organising daily life
- social interaction

### ***Studying difficulties***

- presentation of written work
- keeping place when reading
- keeping overall structure of essay in mind

### ***Workplace difficulties***

- using machines such as photocopiers, faxes
- entering data on a computer / calculator
- copying down figures correctly and in the proper columns
- remembering where things have been put
- taking messages
- using a date stamp
- keeping papers in order
- carrying trays, e.g. of coffee mugs

### ***Managing the difficulties***

- use a ruler to keep place on page
- photocopy text onto coloured paper
- colour-mark layout of tables of numbers
- systematically scan each part of graphs, charts, tables of numbers
- keep operating instructions for fax machine, etc. by the machine
- use an ergonomic keyboard
- use keyboard shortcuts / slow down the mouse
- plan a daily, weekly and monthly work schedule
- carefully pre-plan before going to a new place
- use upside-down maps
- make a note of routes, e.g. to photocopying room
- request a quiet workspace
- get a tray with high sides and a long central handle (from disability organisations)
- use specially adapted utensils for cooking / tools for DIY

### 5.5.5 Emotions

Dyslexic people are increasingly encouraged to view their dyslexia in a positive light. However, many dyslexics feel a number of distressing emotions about their difficulties and their situation. Most commonly reported are the following:

#### *Confusion and bewilderment*

Many adult dyslexics are unaware that they have a recognizable pattern of difficulties which can be significantly alleviated through the learning of appropriate skills and strategies. Typically, therefore, an adult dyslexic feels thoroughly confused. He/she seems to be quite bright and quick-thinking in some ways, but apparently quite slow and 'stupid' in others.

#### *Embarrassment, shame and guilt*

Feelings of embarrassment about dyslexia can deepen into shame, and, whereas embarrassment is often specific to a particular situation, shame seems to seep through the whole personality. Often dyslexic people come to feel that they have a guilty secret. Ella, a successful potter, describes it thus:

*“I had a secret inside me. I kept 'it' in a box; and would only open the lid very cautiously. You may well laugh when you know the contents of the box: it was dyslexia. That word, that almost indescribable thing, lived in the box and pervaded almost every part of my life, but no one could see it. It was a living nightmare.”*

#### *Lack of confidence, low self-esteem*

The emotions described above – bewilderment, shame, guilt – deal a crippling blow to confidence and self-esteem. Lack of confidence manifests itself both in relation to specific tasks that a dyslexic person finds difficult, and in a more general way. At work there is a feeling of not being competent to hold down one's job. There may also be nervousness about applying for promotion, or for another job. In interviews, particularly, lack of confidence can be very damaging.

The daily questionings of one's own abilities and capacities will slowly but surely erode one's self-esteem. Among all the problems, the difficulties, the inefficiencies, the traumas, where is the person who is of worth? Is there such a person in there somewhere? Lack of confidence may result in aggressive or defensive behaviour. Then the dyslexic person becomes trapped in a pattern of interaction, or rather reaction, which imprisons him/her in a lonely and distressing world.

#### *Frustration and anger*

A sense of being imprisoned, trapped, impotent is often reported by dyslexic adults. George, a long-distance lorry driver, describes it thus: “I felt I couldn't move in any direction. In my job I was always moving, going in all directions, but in myself I couldn't go anywhere. I was grounded. That's why I liked the driving – I would drive and drive and drive to try and get away from the frustration, but however far you drive, you can't get away from yourself.”

In human beings, frustration soon turns to anger. But whom should the anger be directed against? Who is to blame? All too often dyslexic adults end up blaming themselves.

#### *Anxiety, fear and panic*

Whatever difficulties one may have in life, anxiety usually makes them worse, and this is certainly true of dyslexic difficulties: adult dyslexics become locked in a vicious circle of anxiety and inefficiency. Anxiety and stress can also precipitate physical symptoms: panic attacks, nausea, migraine, susceptibility to illness. Being physically below par naturally further reduces efficiency and so the downward spiral continues.

#### *Despondency, depression and despair*

If the difficulties continue to go unrecognised, if there is continual failure in attempts to study and hold down jobs, then the dyslexic person may lose hope and sink into depression.

### ***Relief, determination and hope***

It perhaps seems as if this paper has been full of doom and gloom. Yet all the emotions that have been described here are commonly reported by dyslexic adults. However, once dyslexic difficulties have been recognized, and strategies for dealing with them put in place, life can often take a turn for the better. All the energy that previously went into worrying about the problems, and covering them up, can now be channeled into developing effective ways of dealing with them, both practically and emotionally. What usually emerges most strongly is a sense of hope and a feeling of determination to turn one's life around.

As James, who was recently diagnosed as dyslexic, said: "I felt as if the prison doors had been opened. I looked out and saw paths leading in all directions. I didn't know which of the paths was mine. All I did know was that I would have a path in future and that the years of confinement were over."

## **5.6 Technology support**

### **5.6.1 Acknowledgement**

This section and the remainder of the material in this manual on technology has been prepared by E. A. Draffan, formerly Assistive Technology Consultant at TechDis, University of Sussex. E.A. has been a member of the Computer Committee of the *British Dyslexia Association* for several years and has lectured on technology support for adults with dyslexia at national and international conferences. She now works as a consultant on technology and disability.

### **5.6.2 Why technology support?**

In this manual we have chosen to focus strongly on technology support for adults with dyslexia, for several reasons.

1. It is widely accessible.
2. It does not require the assistance of a specialist dyslexia teacher, although training is beneficial and sometimes essential.
3. It generally costs less than specialist tuition and is more cost-effective.
4. Developing the necessary technological skills is faster and takes up less time than following a remedial programme. Great strides can be made in a relatively short period.
5. It is very flexible, and can support dyslexic adults in education, at work, and in their leisure pursuits.
6. The technological skills acquired are transferable and can enhance employment and promotion prospects.

### **5.6.3 Practical issues**

The strategies included in this chapter are intended to encourage adults with dyslexia to take up the challenge of using technology that could enhance both their work and their personal life. Although most of the technology described here is computer-based, it is not entirely so. Sometimes, great benefits can be achieved by use of simpler technology (so called 'low-tech' solutions). However, technology can never provide the answer to all the problems. Other, non-technological, strategies may need to be acquired.

There are several elements that often cause people to shun technology as a solution to their dyslexic difficulties. One of the main reasons for not trying technology is lack of experience and support. Without support and training many feel that they may fail, or that it may even make the experience of reading and writing more difficult. A few determined individuals may be able to succeed on their own, but usually adequate support is essential for success.

Another common reason for not trying technology relates to the costs involved. No one wants to make an expensive mistake. Government funding may be available to assist with payments, support and advice. For further information employers and employees can seek help from their local **Jobcentre Plus** or use the website: <http://www.jobcentreplus.gov.uk>

Students who are taking full or part-time undergraduate or postgraduate courses can apply for the Disabled Students Allowances (DSA) through their Local Education Authority, which can provide information on this. The DSA can be used to purchase suitable technology to support their studies. Further information can also be obtained from the Department for Education and Skills, which publishes a free leaflet called *Bridging the Gap* (Tel: 0800 731 9133).

Technology that may be extremely helpful for one dyslexic person may prove ineffectual for another. Wherever possible, try things out before making a purchase, or visit a centre that may have a large selection of items on show. All items of technology will require a period of learning in order to develop the necessary skills. It is beneficial if the person concerned is prepared to 'have a go' and learn from trial and error. It is essential not to become downhearted when things go wrong and to be realistic about what the technology can achieve. In all such matters, it helps to have someone who can be called upon for advice and support.

The environment in which the technology is being used should also be a consideration. For instance, more desk space will be required if a scanner is to be used as well as a printer (although it is possible to buy machines that fulfill both these functions in one). Tape-, disk- and digital-recorders, as well as speech recognition software usually require a quiet environment. A microphone can pick up external noises (especially in busy surroundings) and this may disrupt the activity. This will probably mean that the user needs a headset.

Computers require maintenance and are not necessarily cheap to run. It is vital that a purchaser thinks about guarantees and warranties as well as insurance and technical support to cope with the upgrades, repair and renewal of systems, especially if they have to be adapted to suit a user.

However, with well-chosen, software and a computer system that is specifically designed to suit the user, successful work practices can be achieved. Ideas can be recorded without any manual handwriting skills. Text and graphics are relatively easy to edit and the finished work can be shared with others. Learning to use a word processor is often an essential skill in the employment market; it also has the potential to make reading, spelling and writing a much speedier process improving both confidence and self-esteem.

#### **5.6.4 Ergonomic and health issues**

Ergonomic issues are particularly important when considering the use of a computer, for both health and comfort. Comfort and ease of use can encourage better concentration over longer periods and enable the person to get the maximum out of their equipment.

##### **5.6.4.1 Seating**

It is essential that before anyone uses a computer they consider how they are going to work at the machine. A computer and its many peripherals form a useful toolkit but they can cause damage to health if used for too long and without due care. It is important to be able to concentrate in comfort so a good *height adjustable back supporting chair* must be set to the correct height in line with the table with the eyes focusing towards the upper centre of the monitor without the need to crane the neck or shift the body. The forearms should be at a comfortable angle (usually at right angles) to the upper arms when using the keyboard and the latter should be an appropriate size for the user. A mouse that is used too far away from the keyboard affecting the central body position can also cause repetitive strain injuries.

### 5.6.4.2 Supportive desktop items

*Copy holders* assist with eye tracking when copying text as they can be positioned between the monitor and keyboard for a non-touch typist or at the side of the monitor for those who are able to concentrate on the screen rather than looking down at the keys to type. There are versions that clamp on the side of a table and can carry heavier papers or the very lightweight versions that are on a stand and have a ruler that can be placed beneath a line of text.

*Wrist rests and mouse rests* can help prevent strain and encourage ergonomic positioning when pausing in between keyboarding and using the mouse. These come in both foam-filled and gel filled versions. It should be noted that many computer users do not like using such devices and that, as with most items mentioned here, ideally the individual should try the equipment before making a purchase. It may be more helpful to change the types of mouse used and/or keyboard to achieve comfort and ease of typing.

Reflections on the computer screen do not help and are often caused by poor positioning of the monitor or overhead lighting; however, a *task light* can help to focus light on the papers being used beside the computer. Some people find the glare and flicker from the monitor causes problems, although higher refresh rates have helped. Thin Film Transistor (TFT) screens (flat screen monitors or laptop screens) with their quick reacting liquid crystal displays are another option. *Glare guards* fitted to a monitor surround can cut shimmer and dull the output.

### 5.6.4.3 Input Devices

There are many *ergonomic keyboards* on offer but these tend to have a central dividing area with a gap between the keys, intended to encourage correct finger positioning with slightly splayed hand and wrist positions. This may help the trained typist but is not so easy for the 'hunt and peck' typist who is looking at the keys and tends to cross over to the left or right side or uses one hand more than the other. There are times when it is easier for a small-fingered person to use a *mini keyboard*, which does not require quite so much movement around the keys. *Coloured keycap overlays* can also encourage good finger positioning with appropriate colours for each finger. It is surprising how much is expected of the little finger!

If the user is left-handed then they should consider a mouse that is designed with the right-hand button for actions. This is possible in most system software but the shape of the mouse should also be generic or curved to the right. The *Logitech wheel mouse*, which allows for easy scrolling up and down pages, and *wireless optical mice* are easy to position on either side of a keyboard and can be used on virtually any surface. For users who find it difficult to control wrist movement, items such as the *Kensington Orbit Trackball* can be of great benefit. The sensitivity of mouse trackballs should be altered to suit the individual.

## 5.7 Supporting reading

Dyslexic adults are often able to perform better on conventional reading or spelling tests rather than the tests set by LADS but problems still arise. Reading mechanically word-by-word, can still be a task that is not undertaken lightly and accuracy may only come after many attempts.

### 5.7.1 Text-to-speech systems

#### 5.7.1.1 Vocabulary

Due to a lack of practice, a dyslexic adult's vocabulary may be weak and handheld electronic or computer based dictionaries and encyclopaedia can help. They have search and browsing facilities that do not always require the whole word to be finished and some come with speech feedback for instance the *Franklin Language Master* or the *Concise Oxford Dictionary CD ROM* on which the main word is read by a recorded digitised voice, and the meanings can be heard via a synthesised voice.

Small scanning pens have also been designed specifically to read a word and provide a spoken meaning for example the *Quicktionary Readingpen II*. They need to be held at the right angle and drawn steadily across the word, but have improved their recognition rates in recent years. *iANSYST* is a company that has provided a particularly helpful set of web pages with descriptions of these products <http://www.dyslexic.com/>

### 5.7.1.2 Reading text

Text-to-speech software is usually designed to read the text within windows on the screen, by use of a computer-based voice, and can help those who tend to skip lines or whose eye jumps a small section of text so that the meaning is lost. This type of software can also be used when syntax problems result in a misunderstanding of the whole, despite being able to cope with particular phrases or clauses. Poor comprehension also occurs when someone is reading so slowly that they cannot remember what was at the beginning of a section and find themselves re-reading parts over and over again without improving their understanding. If someone is reading at around 150 words per minute the text to speech program can often provide intelligible speech at a higher rate (after the reader has become used to the voice) and even encourage faster reading speeds (the average adult reading speed tends to be around 240 words per minute).

These programs do not have to be expensive if the reading element is all that is required. The benefit of using a reader such as the one provided by *TextHelp(Read and Write) or Sensory Software (SpeakOut)* is that the menu bar floats above most Windows programs (or can be hidden in the case of SpeakOut) and the text does not have to be cut and pasted into a separate program. This is usually the case with freeware or shareware versions such as *ReadPlease 2003*. The latest versions of the Windows and Apple Mac systems come with their own machine readable text-to-speech software, but these programs do not work with certain applications. It should be noted that all these programs require a sound card and speakers.

### 5.7.1.3 Scanning text

If independent reading is very slow it may be beneficial to use a scanner for the complex sections of text along with a program such as *Kurzweil 3000, Wynn, Read and Write Gold or Wordsmith*. These optical character recognition (OCR) programs are designed to take in multiple pages and save them as single files for reading later. They can also save the graphics while allowing for background and font changes. Many other features are available besides text-to-speech in these applications, including magnification, highlighting key points and note-taking. A cheaper option is to use the scanner with its own OCR software, which tends to be a light version of a more expensive program such as *Abby FineReader or ScanSoft's OmniPage Pro*, and then a text-to-speech program such as *ReadPlease 2003* or *TextHELP Screen reader*. In fact OmniPage Pro has its own text reader

There are times when it is easy to miss the humour or irony in written text because it does not have the back up of verbal intonation patterns and body language. This means that long pieces of writing can appear boring. Misunderstanding the function of certain punctuation marks can further exacerbate the problem. Text-to-speech software is not very good at helping with this type of difficulty although many of the programs pick up on the more obvious things like question marks and full stops. Despite the changes that can be made to the choice of voices, range of pitch, speed and pausing, synthetic voices are still rather uncomfortable to listen to over time.

### 5.7.1.4 Electronic books

Electronic books (or 'E-books') can be read on-line in a web browser on a computer without any specialist software other than a text-to-speech program, if required. There is the advantage of being able to change the background colours and visual appearance of the text. E-books can be downloaded from many websites and stored on pocket organisers or tablets. *Microsoft Reader* software will work with Windows Mobile *Pocket PC* devices along with *ClearType*,

which enhances the fonts and clarity of the text, Text can be highlighted and the font size can be enlarged to assist reading and the Pocket PC offers basic text to speech feedback. The screen size is small so the amount of text that can be read at any one time is limited but this may help those who find large amounts of text daunting.

### 5.7.2 Pre-recorded readings

Prerecorded readings are available on tapes, disks, CDs and the internet Well-known fiction books have often been read by famous actors and recorded onto *standard analogue cassette tapes* that can be used in small *hand-held tape machines*, standard cassette track recorders or in hi-fi equipment. This means that the text on the page can be followed whilst a pleasant voice reads it aloud. *Listening Books* have special tape-playing machines and a large lending library. Membership costs around £50 per year but includes the loan of a machine and all the postage for the tapes and catalogues. Local libraries often have a reasonable stock of both tapes and videos of classics.

Audio-text synchronisation (as found in digital talking books) with the use of real voices whilst the text is highlighted, so that the phrasing can be followed as the story unfolds, would seem to be an ideal solution for some readers. However, there are still many discussions taking place with publishers as it means that all books would be available electronically causing concerns about copyright.

The latest *minidisk* players and *MP3* machines will record speech in digitised form, which is highly compressed so that much can be made of very little memory or disk space. Recordings have to be made via a good quality *external microphone* or downloaded from the Internet. More and more recordings are being made onto Compact Disks (CDs) and Digital Versatile Disks (DVDs). The *Daisy Consortium* has been working with the *Royal National Institute for the Blind* to ensure an international standard for digital talking books. The software provided for this purpose has been designed by *Labyrinth Data AB* in Sweden, who are linked with *Dolphin UK*.

There is also the *LPStudio* or *IsSpound* technology for recording the chosen text while incorporating navigational aids such as indexing, bookmarking, searching and skimming facilities. Downloadable editions of *LpPlayer*, *Playback 2000* or *Microsoft Reader* can be used as reading programs for audio books on the computer. Portable players are available for the CDs such as the *Victor Reader* and *Plextalk* originally designed for the blind. The controls are backed up with audible commands but it is not possible to see text on these machines.

### 5.7.3 Aids for visual discomfort

People who suffer from visual discomfort when reading (also known as 'visual stress', 'Irlen syndrome' or 'Meares-Irlen syndrome') experience unpleasant visual symptoms when reading. These symptoms include illusions of colour and movement in the text, loss of clarity and difficulty focusing on the text, headaches and eyestrain. This condition, which affects 15-20% of the population, is independent of dyslexia but because people with dyslexia typically have to focus more intently on each individual word in order to decode it, they become more susceptible to the effects of visual stress. Visual stress is believed to be related to migraine, but can generally be alleviated by use of coloured lenses or use of coloured plastic overlays when reading, which reduce glare from the page (see Evans, 2001; Singleton & Henderson, 2006; Wilkins, 2003). For further information on visual stress and details of suppliers of overlays and tinted lenses visit [www.visual-stress.com](http://www.visual-stress.com) and [www.essex.ac.uk/psychology/overlays](http://www.essex.ac.uk/psychology/overlays). Adults with visual stress can also be supported with several different technologies. Magnification of print size and elimination of the visual impact of surrounding text both help to reduce visual discomfort effects. The *Visual Tracking Magnifier* is a small dome magnifier with a tracking window that encourages the reader to keep the eyes steady across a line. This helps to avoid line jumping and reduces the distractions caused by surrounding text. The *Optim-Eyes lamp* has 60 different hues, so that light-emitting displays of various colours can be beamed onto the paper and changed to suit the environment and the users' eyes at whatever time of day. These items should only be tried after an initial assessment by an expert in the field.

## 5.8 Gathering information

Over the last few years the strategies that are being used for research and gathering information have widened considerably to include information provided on CD-ROMs and the internet. The **World Wide Web**, which is hosted on the global network of computers making up the internet, is a vast collection of interconnected documents, which are often linked to other documents by completely different authors. A browser program like Netscape or Microsoft Internet Explorer displays these documents, which contain text with pointers to other text (this is known as *hypertext*). Hypermedia is a superset of hypertext, i.e. medium with pointers to other media. This means that browsers do not display just text files, but also images, sound and animations. The text can be read by text-to-speech software and the pictures and videos provide additional sources of information. As a result a dyslexic person can often enjoy the research process much more than they would have when using conventional sources of information (encyclopaedias, etc.). It also means there is an enormous amount of information within which to find specific points of interest and there can be a tendency to become swamped or distracted by the sheer volume.

In the past the strategies used to cope with large amounts of information were based on narrowing the topic before starting the process of research, using contents and index pages to home in on a specific item of interest; locating relevant paragraphs and sentences and, finally perhaps, copying out useful quotes and snippets of information onto note cards and pads. The computer can now be used to brainstorm the topic and locate hyperlinks to related materials and sources. For those who are working with students, it is vital to ask questions about what has been cut and pasted from the materials before they become imbedded in the writer's own work without citation (reference to the original writer). Often the writer's own ideas can be masked by the sheer volume of material collected.

### 5.8.1 Using search engines

A search engine is a program that enables you to explore either a database or the internet for a specific file or web page, e.g. Google (<http://www.google.co.uk/>). When searching for a topic it is a good idea to begin with key word searches and exact phrases in order to narrow the field and prevent being overwhelmed by information. Better results are obtained from search engines if a few related words are entered, rather than a single word. Avoid using generic words as these tend result in feedback from with many thousands of websites and will be lengthy and very tedious to search through. For more advanced searching use operators such as 'and', 'or' and 'not' (these are called 'Boolean operators'). When using some search engines it can also help to put quotation marks around key phrases "to be or not to be". When you locate some information you think you will need, bookmark the website so that you can find it again if you need to, and instead of printing out pages of information copy relevant sections electronically to a notepad application or into a word processed document which is then saved onto disk. This will be easier to access and use later.

When searching it is often the hyperlinks within documents that lead to more useful information and new ideas but once the information has been found always check the validity of the document. When was the web page last updated? How old is the information – is it out-of-date? Check the writer's credentials – can he or she be found elsewhere on the internet and in what context? Who is hosting the website – is it a political or commercial organisation or lone crank that might be giving a biased view? It pays to be vigilant when using the web because information on some website can be out-date, inaccurate and/or misleading. There are more guidelines and links to useful websites on the subject of evaluation on the 2Learn website at <http://www.2learn.ca/>

## 5.9 Supporting writing

### 5.9.1 Getting notes down on paper

Once a good collection of information or material is available it may help to brainstorm ideas with a graphical planning program, e.g. *Inspiration*. In this application ideas are held within shapes or alongside pictures and the lines link the shapes although these can also have notes on them. The material can be switched between linear text mode and graphical mode. This type of brainstorming is usually called mind mapping or concept mapping using concept webs or spider diagrams. There are also programs used for paper-based mind mapping, e.g. *MindManager* and *MindGenius*. Here the ideas are held on the branches that emanate from a main idea and each branch reduces in size but can have pictures or different colours.

*Starthink* (formerly known as *Thinksheet*) works on the principle of sorting ideas onto cards and being able to shuffle them into a suitable order much as one can do with post-it notes on a board. This program has its own dictionary and database of words and all the programs have spelling checkers and the ability to export the graphical maps or linear versions of the ideas into a word processing package. Some people may find it just as easy to use the card-like slide views in *PowerPoint*, a presentational program within Microsoft Office, as these come with some very useful templates and the slides can be shuffled around in the same way as the post-it notes. Most office suites, whether on a PC, a Macintosh or UNIX machines, have presentational tools that can be used in this way.

Outliners are also available in many word processing programs such as Word, where each main point is made by hitting the return button, followed by using the tab button, so forming a hierarchy of ideas. This is a more linear way of working but may suit those who like to feel organised from the beginning and do not appreciate the muddle that can sometimes ensue from excessive mind mapping. Forming sentences and making further notes with references may be easier in a program like *DraftBuilder*, in which the whole process is more controlled, with hierarchical mindmapping and templates for different writing styles, plus a talking Franklin spellchecker.

### 5.9.2 Speech recognition

Making short notes and keeping track of ideas can be undertaken with ease by dictation because the sentence structures do not have to be so formal or the writing as concise as would normally be required in academic assignments. It is possible to gather notes by reading into a personal digital dictating machine such as an *Olympus* or minidisk recorder, which then allows the user to take the file and have it transcribed into a speech recognition system such as *Dragon Naturally Speaking* and *IBM ViaVoice*.<sup>21</sup> These systems work on PCs and Via Voice will also work on an Apple Mac. These types of software also allow the user to dictate into most text-based programs or into their own text windows. It is essential that training is undertaken and time is spent really ensuring that the initial attempts at using the programs are well supported. Over-correction can cause problems and constant hesitating whilst training can make the whole process a very frustrating business. When implementing speech recognition software always allow for a few weeks of practise to gain proficiency. The reason most people fail to use this software on an ongoing basis is due to unrealistic expectations. Recent versions of the software are much improved and recognition rates, when used with clear speech, good microphones and high-powered machines with plenty of Random Access Memory (RAM) are usually very successful. Text-to-speech software works well in combination with speech-to-text software where sections of dictated text are read back to help with corrections.

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<sup>21</sup> Some people use the term 'voice recognition' as interchangeable with 'speech recognition'. The latter has been used here, as voice recognition tends to encompass products that recognise speech patterns as a means of identification in a security setting, rather than converting the speech patterns into a text command by typing what is said or opening a document, etc.

*Iansyst* has a web page that compares the various speech recognition software packages <http://www.dyslexic.com/>. The Ace Centre in Oxford have also provided up dates for a very useful book on *Voice Recognition Technology in Education – Factors for Success* by Donegan (2000) [<http://ace-centre.hostinguk.com/>]. However, if a user finds it hard to frame his thoughts coherently in conversation and is not able to use amanuensis (a scribe) when under pressure such as in exam conditions, then it may be worth practising dictation with a tape recorder before expending large amounts of time using speech recognition software. The user needs to be able to frame complete sentences without pausing to make the most of the continuous speech recognition packages. This can be quite tiring when writing 2,500-word essay so it is often best to be prepared to use the keyboard in conjunction with the software.

### 5.9.3 Other strategies for writing support

Most office software packages have resources to help with the design of templates and there are usually ways of automating text as in AutoText in Microsoft Word. This function can provide a user with a personal database of words that are often misspelled or phrases that are most commonly used with access by a single keystroke. There are also abbreviation programs that allow a few letters to represent a series of words as in AutoCorrect or a section in *Read and Write* or *Abbreviate!* Care should be taken not to use well-known shortcuts of commonly used initials as it is infuriating when the abbreviate file produces complete words and these go unnoticed.

#### 5.9.3.1 Prediction

Word prediction and phrase prediction programs can help those with slow typing speeds as they produce possible choices as the user types, however it means that the screen must be watched and it can be hard to choose the correct word from a long list. These can be used with text-to-speech, which is very helpful, and *Read and Write* or *Type and Talk for Mac*, *Prototype and Aurora* have a floating window with a choice of words that can be increased or decreased in number to suit the user. In addition, the window in *Soothsayer* can be made to follow the cursor. *CoWriter* works within its own window but there is easy access to the word processing package. This is also the case in *WordBar* and most other on-screen programs that include databases of predetermined or user defined phrases and words.

#### 5.9.3.2 Proofing and spell checking

As an adult, failure to spell accurately may affect the whole writing process and stultify the creative instincts that most people have when wishing to exchange ideas on paper. It is important to realise that spelling is a very small part of the whole process of written communication and spell checkers do not necessarily help all users.

Having assembled the text and formatted the document, proof reading and checking spelling may not always be the easiest of tasks, although most programs will have provided the writer with a clue as to how many errors were being made along the way. In fact, many will provide bleeps and squiggly lines which halt the typist mid-flow and this can be very disconcerting.

Generic spelling checkers incorporated in word processing packages have improved from the days when they only picked up Qwerty keyboard type mistakes to recognising some grammatical errors such as missed capital letters, duplicated words and even the odd homophone.

There are several different types of spellcheckers from the *Franklin handheld dictionary/thesauri* and *Read and Write* that have already been mentioned to software that comes free for certain Windows programs such as a spell checker for Outlook Express (<http://www.geocities.com/vampirefo/>). Handheld spellcheckers vary in size and are available with a variety of dictionaries including Collins. Some have thesaurus, dictionary and homophone facilities. The more expensive versions have speech and larger screens with bigger keys. The hand held spell checker tends to operate on phonic errors rather than typing errors,

which are the most frequent errors picked up by a computer spell checker. The *Franklin Bookman* series have extra cards that can be added at any time to expand the repertoire of the basic model and these include translation dictionary models.

### 5.9.3.3 Homophones

Homophones are words that sound the same but are spelled differently and have different meanings, e.g. would, wood; pain, pane; mayor, mare. Many dyslexic people have enormous problems in distinguishing these, so it is advisable to have a homophone checker in addition to ordinary spell checking. Most prediction programs provide homophone checking with speech. However, *SoundsWrite* is a neat little database program that is simple to use with a very easy facility to add new words. It pops up whenever a word in the database appears and reminds the user of the meaning but does not have text-to-speech. *Keystone* is a spellchecker, text to speech program that includes a homophone checker designed specifically to work alongside Dragon Naturally Speaking. It echoes the words as dictation takes place and offers the user reading support whilst training the speech recognition software and when working in Microsoft Word.

### 5.9.3.4 Improving handwritten work

If there is no option but to handwrite a piece of text and legibility is an issue, designers have produced pens with a wide variety of different grips. These range from wide soft touch versions, such as those available in stationery stores with rubber surrounds near the pen tip, to pens that cause the writer to develop a different grip technique such as the *EzGrip Ergonomic Pen*. Individual *pencil grips* also come in varying shapes and sizes and can often help writing style as can the position of the paper, which can be changed by using a *writing slope*.

Blocking out sections of the page or screen can also help writing and reading skills. On paper this can be achieved with rulers and frames, on the computer using columns and various page layouts can help. If the reason for having to resort to handwriting is because the computer at home is a desktop, there are portable keyboards, which are cheaper than laptops and can be used for note taking, after which the text is downloaded to the computer via a cable or infrared link, e.g. *Calculuscribe* and *AlphaSmart*. The *Laser PC6* also has a text-to-speech facility.

## 5.10 Memory and organisation

Trying to remember discussions, organise work and cope with messages can be difficult for many adults with dyslexia. Portable recorders whether digital, disk or tape based can help but one has to remember to go back to the data that has been put into them. The same applies to using electronic personal organisers or Personal Digital Assistants (PDAs). The appointments have to be made and alarms set. However, these machines can provide accurate addresses and telephone numbers once the data is correctly in place and they can often be synchronised with a computer database and/or diary. They have memo pads or notebooks that can be searched by keywords and these can act like post-it notes. Some have complete mini versions of Microsoft Office in the form of Windows CE.

There is a choice between the palm versions that have a screen and a pen and use handwriting recognition systems or onscreen keyboards (e.g. *Handspring Visor* or *Sony Clie*), Additional portable keyboards can be added to most palm organisers. Some versions have coloured screens and others are backlit. Both these functions can help to clarify text, most have the facility to enlarge the font and change the style.

The amount and type of batteries used, plus the amount of memory available are issues that need to be checked. Coloured screens and more powerful operating systems offering many extra features (that may not be used) can cause a drain on power and processing speed. Most will also connect to the internet and many will soon be linked or integrated with mobile phones such as the *Nokia 9210*.

On a computer the desktop screen can be arranged so that notes are posted up using Microsoft Outlook and calendars can be used as desktop wallpaper such as *Visual Day Planner*, one of many shareware diary programs. Important documents can be put into the Start-up menu of Windows so that they appear when the computer is turned on and databases can be designed as reference guides, bibliographies, etc. These tools maybe used to form lists that can be checked off and for planning ahead with tutors or employers. These ideas may help one to keep to deadlines and improve organisation and time management skills. However, in many offices and homes there are monitors adorned with sticky post-it notes, suggesting that high-tech is not always the preferred option!

Colour coding strategies work well for many people who habitually forget to bring the relevant paperwork to a class or meeting. A common strategy for students would be designating a colour for a subject being studied, e.g. Blue for Biology, Mauve for Maths, and placing all work for that subject in the correctly coloured folder and placing stickers on textbooks. If the timetable shows Biology then all the blue items are taken to class. In business, folders can be coded to show priority, or to connect data relating to a given project. Coloured post-it notes and highlighters can be used on wall charts and calendars.

Searching on the internet will provide the surfer with many websites that show students how to memorise subjects more easily and employees how to work more efficiently. Most of the quizzes and games are based on old-fashioned auditory or visual memory games such as pelmanism. The program *Mastering Memory* also provides the user with a chance to practise memory skills using both visual and auditory modes.

*Wordswork* not only has advice about spelling and other reading and writing skills but it also includes a section about learning styles that affect the way things are remembered and aims to make the most of a person's strengths rather than playing to their weaknesses. It is important to be aware that there are auditory, visual and tactile methods for remembering items and smell can also prove a very efficient reminder. The *Nessy BrainBooster* program also offers study skills advice.

# 6 Appendices

## 6.1 Organisations and general resources

*N.B. The following list is in alphabetical order, not in order of importance. Every effort has been made to ensure that information is correct at the time of going to press, but nevertheless cannot be guaranteed.*

**Ability Net** which has some helpful information pages and technology tips.

[www.abilitynet.co.uk](http://www.abilitynet.co.uk)

**ACAS (Advisory, Conciliation and Arbitration Service).** Provides free initial advice on employment queries in England, Scotland or Wales. 22<sup>nd</sup> and 23<sup>rd</sup> Floors, Euston Tower, 286 Euston Road, London NW1 3JJ. National Helpline: 08457 47 47 47.

**ACE – Advisory Centre for Education.** [www.ace-ed.org.uk](http://www.ace-ed.org.uk)

**Action on Access:** The Action on Access mission is to promote inclusivity and diversity, and the broadest possible access to higher education. <http://www.actiononaccess.org/>

**Adult Dyslexia Organisation,** Ground Floor, Secker House, Minet Road, Loughborough Estate, London, SW9 7TP Helpline: 020 7924 9559, Tel Admin. 020 7207 3911. <http://www.adult-dyslexia.org/>

**After 16.** A site for teenagers and young people in the UK who have an impairment or disability and are wondering what opportunities and services there should be when they leave school.

<http://www.direct.gov.uk/en/EducationAndLearning/14To19/OptionsAt16/index.htm>

**British Dyslexia Association,** 98 London Rd, READING RG1 5AU. Tel: Helpline 0118 966 8271 Tel: Administration 0118 966 2677 Fax: 0118 935 1927.

<http://www.bdadyslexia.org.uk/>

**British Psychological Society,** St Andrews House, 48 Princess Road East, Leicester LE1 7DR. Tel: 0116 254 9568. Fax: 0116 247 0887. [www.bps.org.uk](http://www.bps.org.uk)

**Closing the Gap in the USA:** for all technology ideas related to disability

[www.closingthegap.com/](http://www.closingthegap.com/)

**Community Legal Service.** Tel: 0845 608 1122 Website: [www.justask.org.uk](http://www.justask.org.uk) Covers education, benefits, etc. Has directory of advice providers.

**DFES (Department for Education and Skills).** Sanctuary Buildings, Great Smith Street, Westminster, London SW1P 3BT. Tel: 0800 731 9133 Textphone: 0800 210 280. E-mail: [info@dfes.gov.uk](mailto:info@dfes.gov.uk) Website: [www.dfes.gov.uk](http://www.dfes.gov.uk)

**Digest of Health-related Research Funding and Training Opportunities.**

[www.rdinfo.org.uk/](http://www.rdinfo.org.uk/)

**Disability** information about the requirements for the Disability Discrimination Act

<http://www.direct.gov.uk/en/DisabledPeople/index.htm>

**Disability Law Service.** 39-45 Cavell Street, London E1 2VP. Tel: 020 7791 9800 Textphone: 020 7791 9801. Fax: 020 7791 9802. E-mail: [advice@dls.org.uk](mailto:advice@dls.org.uk) Free legal advice for disabled people and their families/carers throughout Britain.

**Disforum.** Offers an exchange of ideas on issues concerning disability. This can be accessed using e-mail or through the digests that can be found on the web.

[www.jiscmail.ac.uk/lists/dis-forum.html](http://www.jiscmail.ac.uk/lists/dis-forum.html)

- DIAL UK.** A national organisation for a network of approximately 120 local disability information and advice services run by and for disabled people. [www.dialuk.info/](http://www.dialuk.info/)
- Dyslexia Adults Link** [www.dyslexia-adults.com](http://www.dyslexia-adults.com)
- Dyslexia Action** <http://www.dyslexiaaction.org.uk/>
- Dyspraxia Foundation** 01462 454986 [www.dyspraxiafoundation.org.uk](http://www.dyspraxiafoundation.org.uk)
- Employability.** On-line Careers Service for Disabled People <http://www.employ-ability.org.uk/>
- Equality and Human Rights Commission.** This is an independent body working towards the elimination of discrimination against - and equalising opportunities for disabled people. Helplines:  
England. Tel: 0845 604 6610 Wales Tel: 0845 604 8810 Scotland Tel: 0845 604 5510  
E-mail: [info@equalityhumanrights.com](mailto:info@equalityhumanrights.com) Website:  
<http://www.equalityhumanrights.com/>
- Equality Commission for Northern Ireland.** Equality House, 7-9 Shaftesbury Square, Belfast BT2 7DP. Tel: 028 90 500600 Fax: 028 90 248687. E-mail:  
[information@equalityni.org](mailto:information@equalityni.org) Website: [www.equalityni.org](http://www.equalityni.org)
- Helen Arkell Dyslexia Centre,** Frensham, Farnham, Surrey GU10 3BW.  
Tel. 01252 792400. [www.arkellcentre.org.uk](http://www.arkellcentre.org.uk).
- Higher Education Funding Council for England.** [www.hefce.ac.uk](http://www.hefce.ac.uk)
- Humberside Partnership Assessment Toolkit.** The Humberside Partnership Assessment Toolkit is designed to support the work of PA's and others involved with Connexions.  
<http://www.connexions-humber.co.uk/>
- iANSYST** has web pages with information about computers and dyslexia. [www.dyslexic.com](http://www.dyslexic.com)
- LD OnLine in the USA:** the interactive guide to learning disabilities for parents, teachers, and children. [www.ldonline.org/](http://www.ldonline.org/)
- LearnDirect** can offer careers advice and various courses in your area. [www.learnirect.co.uk](http://www.learnirect.co.uk)
- Learning and Skills Council (LSC)** is responsible for funding and planning education and training for over 16-year-olds in England. [www.lsc.gov.uk](http://www.lsc.gov.uk)
- Learning and Skills Development Agency,**  
Regent Arcade House, 19-25 Argyll Street, London W1F 7LS.  
Responsible for the development of policy and practice in post-16 education and training. <http://www.lsnlearning.org.uk/>
- National Institute of Adult Continuing Education (NIACE):** <http://www.niace.org.uk/>
- NFER-Nelson** (for *BPVS Test*), [www.gl-assessment.co.uk/](http://www.gl-assessment.co.uk/)
- PATOSS** (Professional Association of Teachers of Students with Specific Learning Difficulties). P.O. Box 10, Evesham, Worcs., WR11 6ZW. Tel/Fax: 01386 712650.  
[www.patoss-dyslexia.org](http://www.patoss-dyslexia.org)
- Prospects.** The official UK graduate careers site, with thousands of graduate jobs, postgraduate courses and career guidance [www.prospects.ac.uk](http://www.prospects.ac.uk)
- Psychological Corporation** (for *WRAT3 tests*), <http://www.psychcorp.co.uk/>
- RADAR** is able to give advice on the Disability Discrimination Act: Tel: 020 7250 3222. Fax: 020 7250 0212. Email: [radar@radar.org.uk](mailto:radar@radar.org.uk) Web: [www.radar.org.uk](http://www.radar.org.uk)
- Richard Wanderman's** pages on dyslexia and the use of Apple Computers (based in the USA).  
[www.ldresources.com](http://www.ldresources.com)
- Scottish Dyslexia Trust.** [www.dyslexiascotland.org.uk](http://www.dyslexiascotland.org.uk)

**Scottish Funding Council (SFC).** <http://www.sfc.ac.uk/>

**Shaw Trust** (helps disabled people into work). [www.shaw-trust.org.uk/](http://www.shaw-trust.org.uk/)

**SKILL (The National Bureau for Students With Disabilities)** provide a guide to higher education for people with disabilities. Email: [skill@skill.org.uk](mailto:skill@skill.org.uk)  
Web: [www.skill.org.uk](http://www.skill.org.uk) Information Service Tel: 0800 328 5050 (freephone).

**Skills for Life**, the national strategy for improving adult literacy and numeracy skills:  
<http://www.excellencegateway.org.uk/>

**Student Finance England** Student Finance England is a partnership between the Department for Business Innovation & Skills (BIS) and the Student Loans Company Ltd (SLC) to provide financial support to students entering higher education in the UK on behalf of the UK government. It replaces Student Finance Direct and the new service aims to be simple, easy to understand and flexible in meeting the needs of students, sponsors and advisors. <http://practitioners.studentfinanceengland.co.uk/>

**TechDis:** information and advice resource for those in Further and Higher Education, on the use of Information and Communications Technologies (ICT) and how it relates to disabilities and/or learning difficulties. [www.techdis.ac.uk/](http://www.techdis.ac.uk/)

**TUC (Trade Union Congress).** Publications Department, Congress House, Great Russell Street, London WC1B 3LS. Tel: 020 7467 1294 Fax: 020 7636 0632. Website: [www.tuc.org.uk](http://www.tuc.org.uk)

**UCAS.** Universities & Colleges Admissions Service for the UK. [www.ucas.ac.uk](http://www.ucas.ac.uk)

**UKCOSA: The Council for International Education.** [www.ukcosa.org.uk](http://www.ukcosa.org.uk)

## 6.2 Publications on the Disability Discrimination Act

*Challenging Disability Discrimination.* Disability Right Commission.

*Code of Practice – Duties of trade organisations to their disabled members and applicants.* Available from the Stationery Office or downloaded from [www.equalityhumanrights.com](http://www.equalityhumanrights.com)

*Code of Practice for the elimination of discrimination in the field of employment against disabled persons or persons who have had a disability.* Available from the Stationery Office (£9.95) or downloaded from [www.equalityhumanrights.com](http://www.equalityhumanrights.com) (Information and legislation).

*Code of Practice for Providers of Post-16 Education and Related Services.* Available from the Disability Right Commission or downloaded from: [www.equalityhumanrights.com](http://www.equalityhumanrights.com)

*Disability Conciliation Service: a brief guide to the service.* Disability Right Commission.

*Disability Discrimination Act 1995.* Copies of the Act are available from the Stationery Office (£9.55). Available free from the web link [http://www.opsi.gov.uk/acts/acts1995/Ukpga\\_19950050\\_en\\_1.htm](http://www.opsi.gov.uk/acts/acts1995/Ukpga_19950050_en_1.htm) .

*Disability Discrimination Act booklets.* A number of individual booklets covering topics such as: employment, service provision and education. Disability Right Commission.

*Disability Discrimination Post-16 Education: The 5 Step Test.* The 5 step test takes you through the steps involved in determining whether discrimination has occurred or not. Available from Skill.

*Disability Discrimination: A Practical Guide* (2<sup>nd</sup> edition) by Jean Brading and John Curtis. Published by Kogan Page, 2000.

*Disability Discrimination – Law and Practice* (4<sup>th</sup> edition) by Bryan Doyle. Jordan Publishing Limited, 2000.

*Guide to the DDA* (5th Edition, 2002, Skill). A detailed but straightforward account of the law, aimed at institutions of further and higher education. The guide also features case studies, suggestions about good practice and a listing of further information sources.

*Guide for Disabled Students and Learners.* Disability Right Commission.

*Good Practice Guides.* A series of 11 good practice guides on the DDA Part 4, aimed at different groups of higher education staff, including Marketing and Admissions, Examinations and Assessments, Careers Services and Estates staff. Available from the Disability Right Commission downloaded from [www.equalityhumanrights.com](http://www.equalityhumanrights.com)

*Special Educational Needs and Disability Act 2001.* Available from the Stationery Office (£7.50). Available free on from this web link [http://www.opsi.gov.uk/acts/acts2001/ukpga\\_20010010\\_en\\_1](http://www.opsi.gov.uk/acts/acts2001/ukpga_20010010_en_1) .

### 6.3 Adult Dyslexia Checklist

The Adult Dyslexia Checklist (reproduced on the next page) is a list of 20 questions relating to the typical 'symptoms' of dyslexia. It is widely used (especially in colleges and universities) to assist in the process of identifying adults who have dyslexia. It is not copyright and so may be copied and used freely. Copies are widely available (including in books, magazines and on the internet) so an adult being screened or assessed for dyslexia may well have seen it before. For this reason (and because responses are highly subjective) it is vulnerable to falsification and misleading responses. Therefore it is not recommended that the check list is used as the sole means of identifying adults with dyslexia. However, it can be useful as part of an overall screening process and for exploring an individual's particular difficulties. For further information on the Adult Dyslexia Checklist see Vinegrad (1994).

There is no set method for scoring the Adult Dyslexia Checklist. However, the authors have found the following rules of thumb to be useful.

Checklist Score	Likelihood of dyslexia
Less than 7	Low (below 25% risk)
7–14	Moderate (25–50% risk)
15+	High (75% risk or greater)

Horne and Singleton (1997) reported on a study of 72 university clients with dyslexia. Clients falling into three categories of severity were found to be significantly different on the Adult Dyslexia Checklist and also on measures of reading, spelling and memorisation. However, although the Adult Dyslexia Checklist can be a useful general indicator, the authors have encountered cases in which it was strikingly inaccurate. These included one adult who scored only 2 on the Adult Dyslexia Checklist who was subsequently found to be dyslexic, and another adult scoring 19 on the Adult Dyslexia Checklist who was not found to be dyslexic (although he had general learning difficulties).

In the context of interpreting LADS results (and especially individuals falling into the 'Borderline' category), the Adult Dyslexia Checklist can be useful, provided caution is exercised when drawing conclusions. Administrators should be confident that the client is answering the check list questions truthfully and (where possible) that the answers are consistent with what is known about the client.

## ADULT DYSLEXIA CHECKLIST

**Instructions: Please tick YES or NO to each of the following questions. Don't miss any questions out. If you are in doubt, tick which ever feels like the truer answer.**

	YES	NO
1. Do you find difficulty in telling left from right?	<input type="checkbox"/>	<input type="checkbox"/>
2. Is map reading or finding your way to a strange place confusing?	<input type="checkbox"/>	<input type="checkbox"/>
3. Do you dislike reading aloud?	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you take longer than you should to read a page of a book?	<input type="checkbox"/>	<input type="checkbox"/>
5. Do you find it difficult to remember the sense of what you have read?	<input type="checkbox"/>	<input type="checkbox"/>
6. Do you dislike reading long books?	<input type="checkbox"/>	<input type="checkbox"/>
7. Is your spelling poor?	<input type="checkbox"/>	<input type="checkbox"/>
8. Is your writing difficult to read?	<input type="checkbox"/>	<input type="checkbox"/>
9. Do you get confused if you have to speak in public?	<input type="checkbox"/>	<input type="checkbox"/>
10. Do you find it difficult to take messages on the telephone and pass them on correctly?	<input type="checkbox"/>	<input type="checkbox"/>
11. When you have to say a long word, do you sometimes find it difficult to get all the sounds in the right order?	<input type="checkbox"/>	<input type="checkbox"/>
12. Do you find it difficult to do sums in your head without using your fingers or paper?	<input type="checkbox"/>	<input type="checkbox"/>
13. When using the telephone, do you tend to get the numbers mixed up when you dial?	<input type="checkbox"/>	<input type="checkbox"/>
14. Do you find it difficult to say the months of the year forwards in a fluent manner?	<input type="checkbox"/>	<input type="checkbox"/>
15. Do you find it difficult to say the months of the year backwards?	<input type="checkbox"/>	<input type="checkbox"/>
16. Do you mix up dates and times and miss appointments?	<input type="checkbox"/>	<input type="checkbox"/>
17. When writing cheques, do you frequently find yourself making mistakes?	<input type="checkbox"/>	<input type="checkbox"/>
18. Do you find forms difficult and confusing?	<input type="checkbox"/>	<input type="checkbox"/>
19. Do you mix up bus numbers like 95 and 59?	<input type="checkbox"/>	<input type="checkbox"/>
20. Did you find it hard to learn your multiplication tables at school?	<input type="checkbox"/>	<input type="checkbox"/>

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