GL Assessment®

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USER MANUAL

Rapid

Digitised Dyslexia Screening for 4 to 15 years

Sixth Edition
April 2020

Educational Consultant
Dr Joanna Horne

Published by GL Education

1st Floor, Vantage London, Great West Road, London, TW8 9AG

www.gl-assessment.co.uk

Typeset by Words & Pictures Ltd, London

6th edition, revised April 2020

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About Rapid

Rapid Dyslexia Screening is an objective computer-based system for identification of dyslexia between the ages of 4 to 15 years. It is swift and easy to administer, taking only 15 minutes – less than any comparable system currently available. Results, based on national standardised norms, are available immediately. A simple, printable report of the results, which incorporates automatic expert interpretation, gives a clear indication of the probability of dyslexia.

Rapid Dyslexia Screening gives the student three separate dyslexia sensitive subtests, each of which takes about 5 minutes. The subtests administered vary with the age of the student but have been carefully selected and validated so that screening accuracy is maximised. Two of the subtests measure the student's phonological processing and auditory working memory. For students aged 8 and over, the third subtest measures phonic decoding skills. Students under 8 years are administered a third subtest that measures their integration of visual memory skills with use of verbal labels and concepts.

Getting started

Accessing Rapid via GL Ready

Rapid runs on the GL Ready platform at www.glready.com. After being set up with a GL Ready account and a subscription for Rapid, an email will be sent from glready@gl-assessment.co.uk with information on how to access the platform.

Before logging in, set a new password via the 'Set or reset your password' link - www.glready.com/password/reset. Once this is done, log in to your GL Ready account to start setting up students and assigning Rapid.

To check the status of the school's subscription to Rapid, go to the 'Manage school' tab at the top of the GL Ready page.

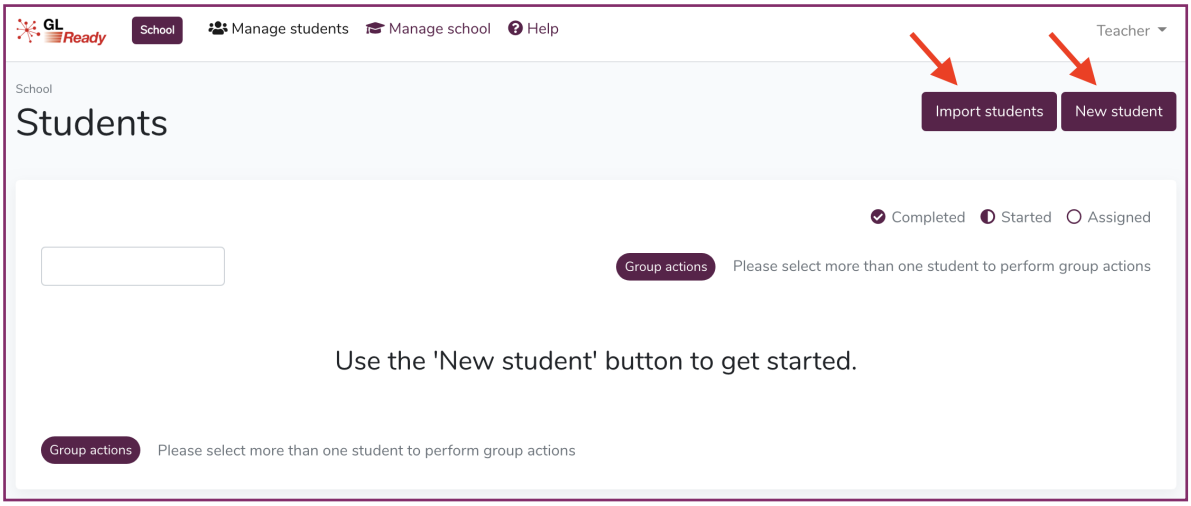
For further information about accessing and using Rapid on the GL Ready platform, please visit www.glreadysupport.com/.

Adding students to GL Ready and assigning Rapid

To administer Rapid, first add students to the GL Ready platform.

Students can be added from the 'Manage students' page (www.glready.com/students) either individually by using the 'New student' button and completing the form, or in batches via CSV import by using the 'Import students' button and following the instructions on the page.

Figure 1. Adding students

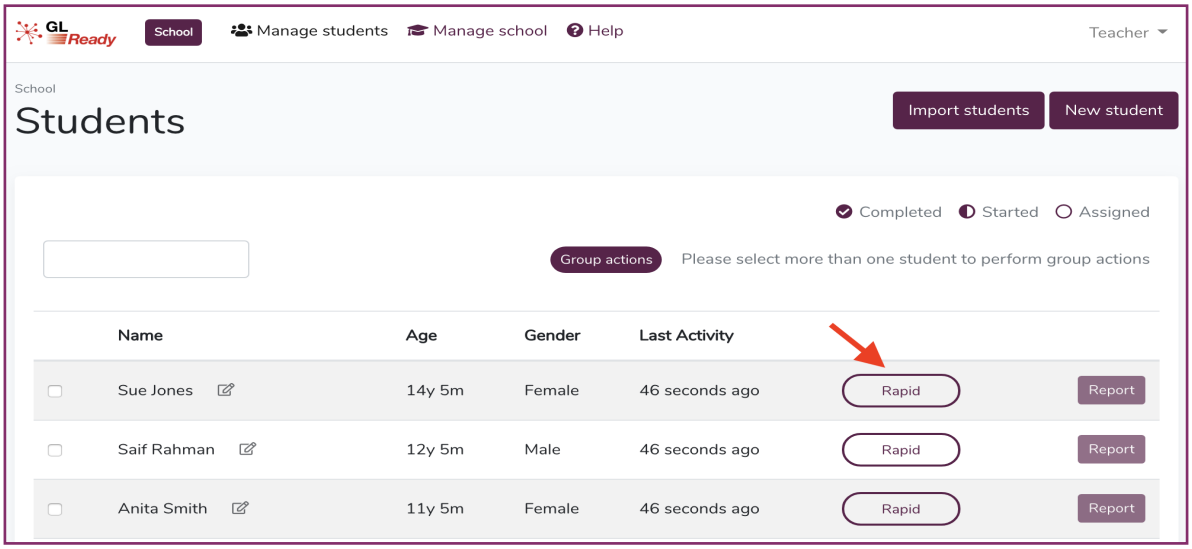


It is very important that the date of birth of each student is entered correctly as the subtests that are given to each student and the norms that are applied in their report is determined by their age.

Once students have been added to the GL Ready platform, assign Rapid to them.

To assign Rapid to an individual student, click on the 'Rapid' button next to their name.

Figure 2. Assigning Rapid to an individual student

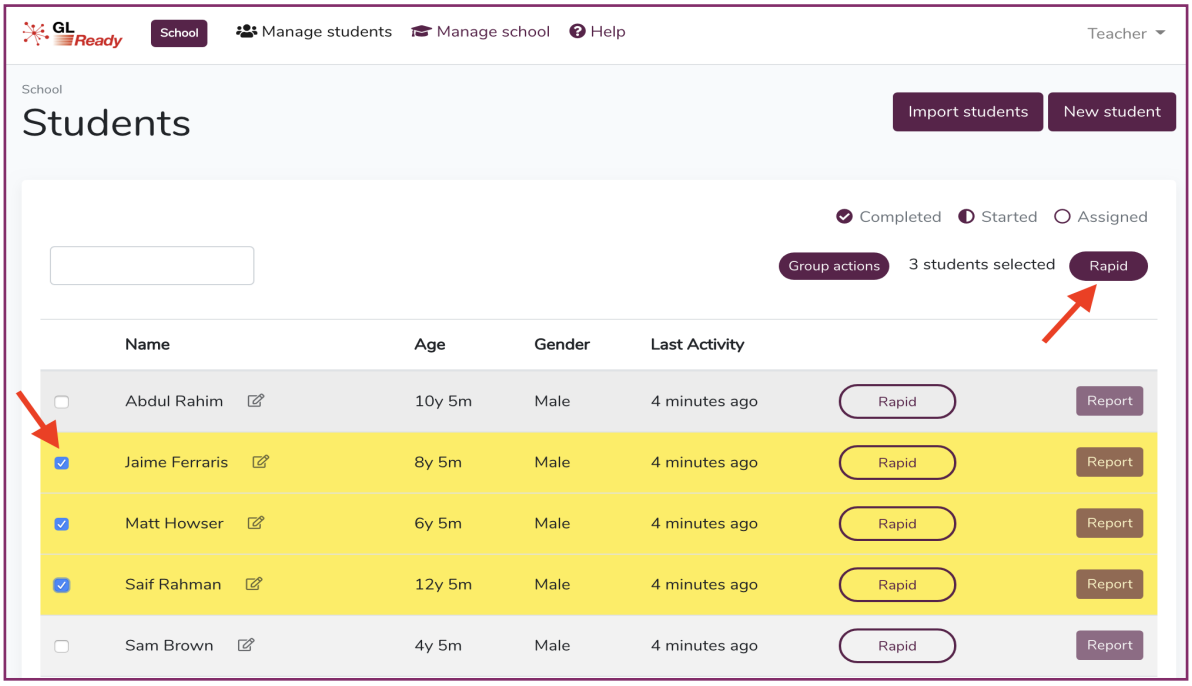


Two options are given:

- Start testing that student immediately on the machine you are using (this will take you straight to that student's session and will log you out of your teacher account) **OR**
- Confirm and return to the 'Manage students' page. This allows the student to start testing at another time or on a different machine.

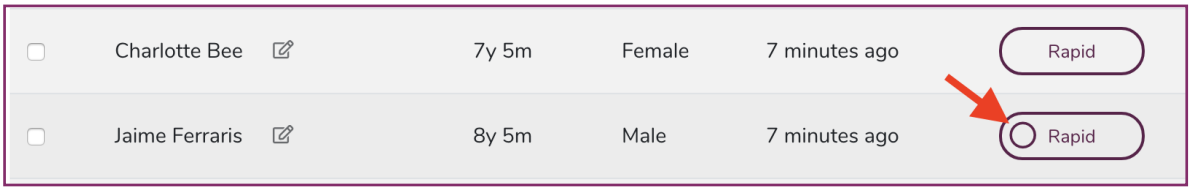
To assign Rapid to multiple students, select the students by ticking the boxes next to their names, then in the group actions above the list of students click on the 'Rapid' button.

Figure 3. Assigning Rapid to multiple students



When a student has successfully been assigned Rapid, an empty circle will appear in the Rapid button against their name.

Figure 4. Assigned student



For further information about adding students and assigning Rapid, please visit www.glreadysupport.com.

Starting a student session

To start testing on a machine, go to www.glready.com/student and enter the school password (found on the 'Manage school' page at www.glready.com/school). This gives access to a student login page that will list the names of each student that has subtests available to complete.

To start a student session, select the name of a student, enter their date of birth and press start. You will see a list of the subtests available to that student. To start a subtest, click on the 'Start' button next to a subtest name.

Figure 5.1. Student session (junior)

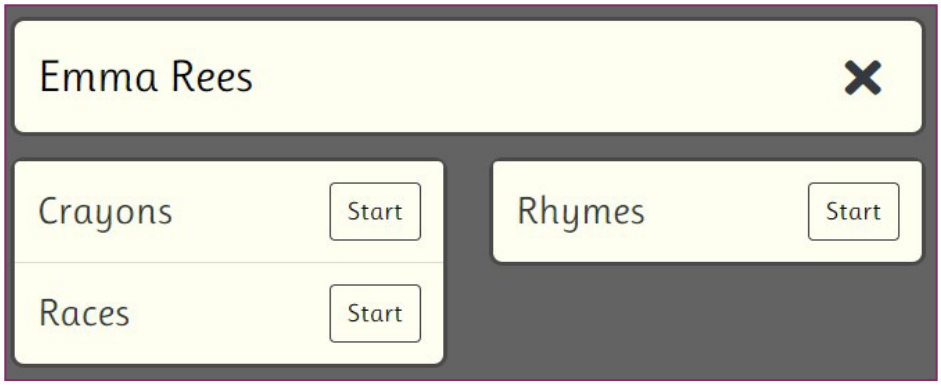
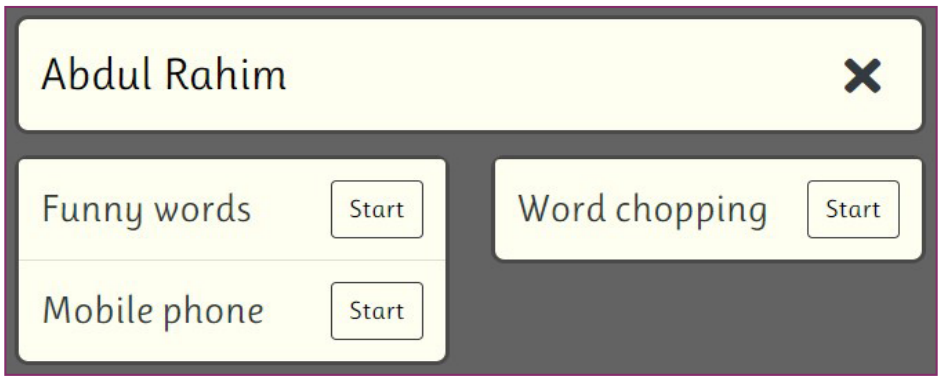


Figure 5.2. Student session (senior)



When Rapid was assigned, the program will have automatically selected the three subtests that are appropriate for the age of the student.

Monitoring the progress of your students

To easily track the progress of each student, go to 'Manage students' on the school's GL Ready account and look at the 'Rapid' buttons against each of the students' names.

	Figure 6. Student has not been assigned Rapid
	Figure 7. Student has been assigned Rapid but has not started testing
	Figure 8. Student has started testing on Rapid
	Figure 9. Student has completed all subtests in Rapid

Using this manual

Please be aware that in this manual 'teachers' is used to refer to anyone who will be administering Rapid.

Before you begin

Ensuring you are set up for testing

Before carrying out any screening with students, ensure that the machines are appropriately set up to run the subtests.

To do this, run the 'Diagnostic tool' – available from www.glready.com/student – on all the machines that will be used for testing. It is recommended that this is done while logged in to each machine as a student rather than a teacher (student sessions will tend to have more access restrictions).

Please note that each subtest contains audio instructions. If you intend to administer the product to multiple students in one room, every student will need access to a pair of headphones.

For further information about the technical requirements for running Rapid on your machines, please visit www.glreadysupport.com.

Carrying out screening

The three subtests can be done in any order. The three subtests do not have to be attempted at a single sitting; however, full results cannot be obtained until the student has completed all three subtests.

Screening should be carried out in reasonably quiet surroundings with minimal distractions. Good audio quality is important, so that instructions and items can be heard correctly. If in doubt, use of headphones is strongly recommended. Each subtest is preceded by a demonstration and/or practice items. If the student gets practice items wrong, the program will give more practice. Upon completion of the practice phase, the test will start.

Students typically become engrossed in the subtests and enjoy doing them. Nevertheless, younger students should be supervised during the screening to ensure they fully understand what is required of them. Older students, once they have been registered and got started, can usually be left to their own devices with little need for adult intervention. Most of the subtests in Rapid are adaptive, that is, the program will automatically adjust the difficulty of the items to suit the ability of the student. This means that some students may receive different items and different numbers of items to other students. In general, the items get harder the longer the subtest continues. Research has shown that adaptive tests are much speedier and more efficient than conventional tests, so the subtests in Rapid are as short as they possibly can be whilst still yielding accurate results.

If for any reason all three of the subtests are not completed in one sitting, it is possible to complete the remaining ones later. Completed subtests will be clearly marked with a tick.

Retesting with Rapid

Very occasionally, teachers may consider retesting a student with Rapid after they have already been tested on it before. Although there may be a valid motive for wanting to do this, generally it is not a good idea because the results of a retest could be misleading.

Possible reasons for retesting

Sometimes teachers (or parents) are unwilling to accept the result of the first screening at face value because it does not conform to expectations. When considering this issue, it is important to bear in mind that Rapid is a quick screening test comprising only three short subtests and, like all screening tests, is not infallible. Its advantages are speed combined with an accuracy level that is generally very good for detecting the most common cases of dyslexia, where the underlying problems are in phonological skills and auditory memory (see *Validation of Rapid*). But on a very few occasions Rapid may get it wrong. In particular, less common types of dyslexia, such as those where the underlying problems are in visual-perceptual or visual-motor skills, are less likely to be detected by Rapid. If the student's problems are in the latter aspects of cognition then retesting with Rapid is unlikely to shed any light on the matter and it would probably be better to consider alternative forms of assessment using a more extensive suite of tests, such as CoPS or LASS 8–11, or seeking professional help from an educational psychologist.

Another situation where retesting might be under consideration is where the student was unwell at the time of the first screening, or not appropriately motivated, or distracted, or failed to understand exactly what was required of them. As explained in *Ensuring you are set up for testing*, the proper course of action is to ensure that the conditions necessary for effective screening are met before embarking on screening in the first place.

Why is retesting not recommended as a general rule?

The chief reason why retesting is not usually a good idea is because all psychological and educational tests are subject to practice effects, which are the positive or negative psychological impacts of previous assessment(s) on a student's performance. Positive impacts, which include factors such as item familiarity and increased confidence as a result of previous experience with the tasks, tend to inflate scores on subsequent assessment occasions. Negative impacts, which include factors such as decreased motivation due to boredom with the tasks or overconfidence as a result of feedback from previous assessments, tend to deflate scores on subsequent assessment occasions. Furthermore, practice effects will not necessarily affect all students to the same extent. Some students may experience more negative effects while others may experience more positive effects. In general, the magnitude of practice effects is a function of how often students have been assessed on this or similar tests and the time interval between assessments.

Both positive and negative psychological impacts tend to decrease as the time interval between assessments increases.

It can be seen, therefore, that retesting with any psychological and educational test is highly likely to produce results that have been influenced in some way – either positively or negatively – by the original assessment, and as a consequence are less likely to be valid or reliable.

Exceptions to the general rule

However, exceptional situations may arise when the teacher feels the need to re-administer one or more of the subtests in Rapid because it was discovered after the original screening that the student was unwell, or where a fire drill interrupted the assessment, or if the student was clearly not applying proper attention or effort to the tasks. In such cases, the results are unlikely to give a true indication of abilities and it is permissible to retest the student but only after an appropriate length of time has elapsed. Professional opinions differ somewhat on this matter – some authorities recommend at least a year between tests, while others suggest that six months is acceptable. Certainly, the minimum interval that should be considered is a full term or semester. The point is that enough time should have passed to reduce the risk not only of remembering items significantly but also of being demotivated by being confronted with the same test yet again. Of course, it is important to ensure that the student is properly prepared for the retest, including explaining why the retest is necessary. The first result should be discarded and the second result should be regarded as being more likely to reflect the 'true' abilities of the student.

Retesting will overwrite the student's previous results.

For guidance on how to re-administer a subtest, go to www.glreadysupport.com.

If it is considered essential to have answers regarding a student's educational problems sooner rather than later, then instead of rescreening before an acceptable interval has elapsed it would be better to use other types of assessment using a more extensive suite of tests, such as CoPS or LASS 8–11, or to obtain a psychological assessment from a suitably qualified psychologist.

Assessing students who have limited English

Assessment of any student who has limited proficiency in spoken English is often problematic. However, Rapid is less problematic than many conventional methods of assessment due to its strongly visual format and minimal reliance on spoken instructions. Because Rapid does not include any direct measures of reading and spelling – skills which would be expected to be significantly affected by limited proficiency in spoken English – it is usually an ideal test for this type of student. In order to tackle the subtest of auditory sequential memory (***Races*** / ***Mobile phone***), however, the student will need to know the English animal names (for 4-7-year olds) or the digits 1–9 in spoken and written form (for 8-15-year olds). The practice items enable most students, even those with very little English, to understand the tasks, and where there is uncertainty a teacher or assistant who speaks the student's first language can help with explaining instructions.

As explained in *What is dyslexia* and *How were the tests in Rapid selected*, the subtests in Rapid are attempting to identify students who display deficits in various aspects of phonological processing, because the principal weight of research evidence on dyslexia supports this approach. There is also good evidence to support the use of such tests with students speaking English as an additional language, with research studies finding that:

- Students speaking a minority language typically exhibit similar phonological processing skills to students speaking a majority language, when tested in the majority language (Bruck and Genesee, 1995; Frederickson and Frith, 1998; Everatt et al., 2000; Miller Guron and Lundberg, 2003)
- Bilingual students show similar phonological processing skills in both languages (Harrison and Krol, 2007; Branum-Martin, Tao and Garnaat, 2015)
- For students speaking English as a second language, poor phonological skills are predictive of reading ability in English (Gottardo, 2002; Manis et al., 2004; Gottardo et al., 2006; Swanson et al., 2006; Harrison and Krol, 2007; Swanson et al., 2011; Chung et al., 2013)

Hence the evidence indicates that assessment of phonological ability (such as ***Rhymes/Word chopping/Segments***) and phonic skills (***Funny words/Non-words***) in English can reveal difficulties of a dyslexic nature even in students for whom English is an additional language, although obviously teachers have to exercise caution when interpreting the test results of such students.

A case study where a student for whom English is an additional language (EAL) was assessed using Rapid is given in *Case studies*. Like most students with limited English, this student responded well to the assessment and extremely valuable information was obtained. For further information on assessment of learning difficulties in literacy (including dyslexia) in EAL students and other multilingual students, see Cline (2000), Cline and Frederickson (1999), Cline and Shamsi (2000), Durkin (2000), Gunderson, D'Silva and Chen (2011), Mortimore et al. (2012), Peer and Reid (2016) and Tsagari and Spanoudis (2013).

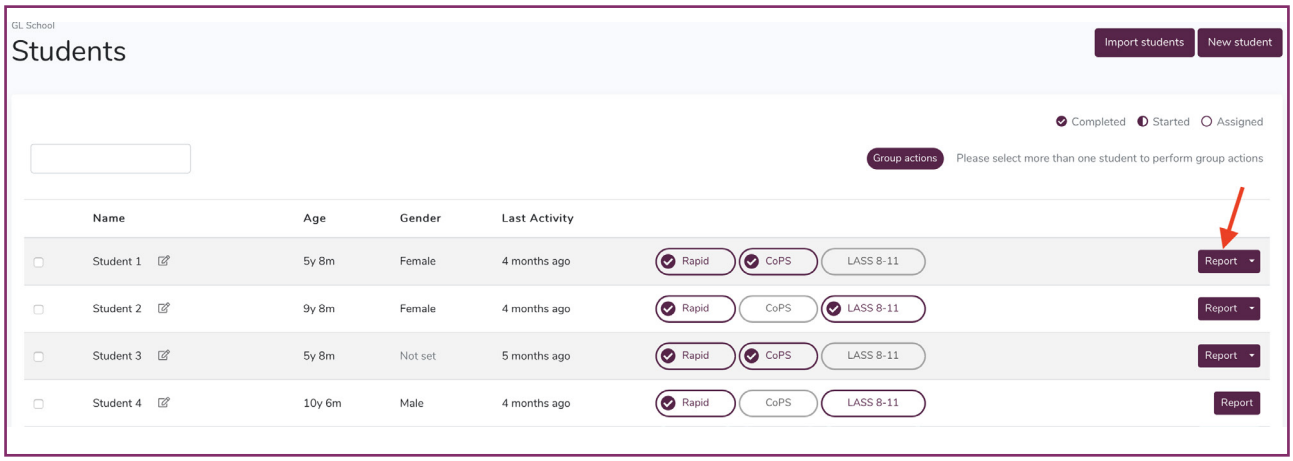
Accessing reports

Reports are only of value if a student has completed all three of the assessment tasks presented to them. There are two types of report: graphical and CSV.

Graphical reports

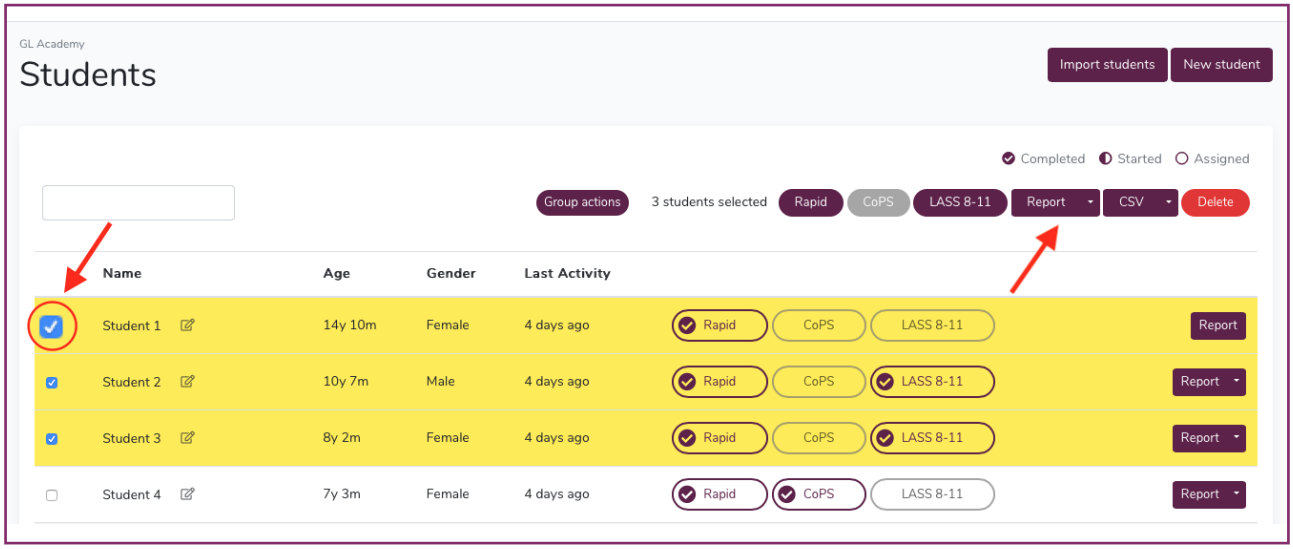
To access a student's graphical report, go to the 'Manage student' page on GL Ready and click on the 'Report' button against that student's name.

Figure 10. Accessing the graphical report of an individual student



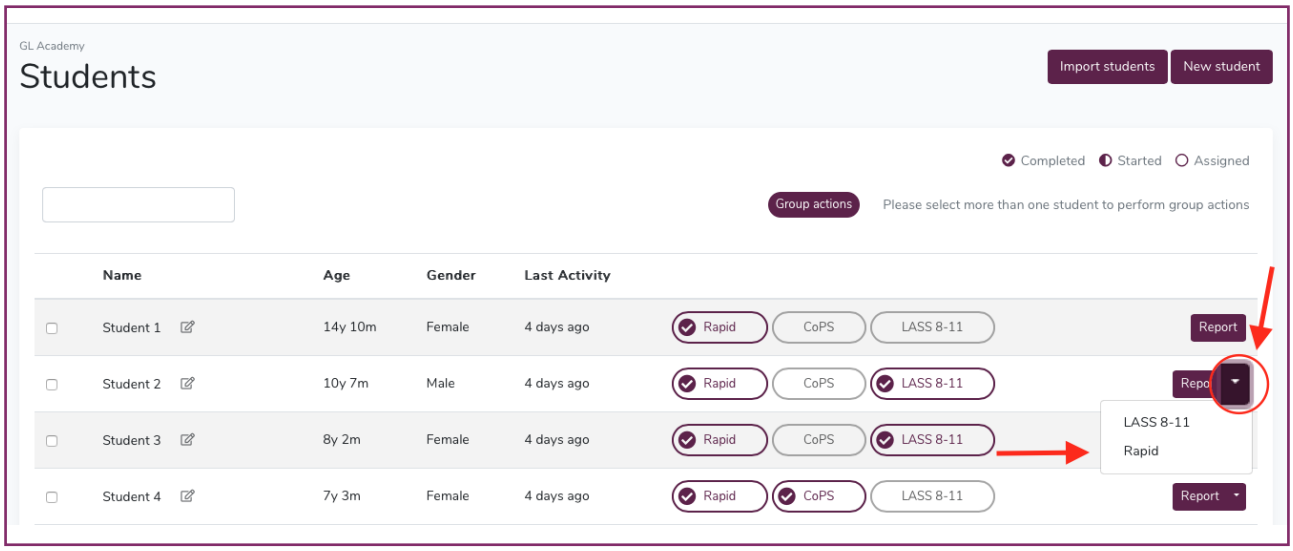
To pull up the reports of multiple students, select those students by ticking the boxes next to their names and then click on the 'Report' button in the group actions above the list of students.

Figure 11. Accessing graphical reports for multiple students



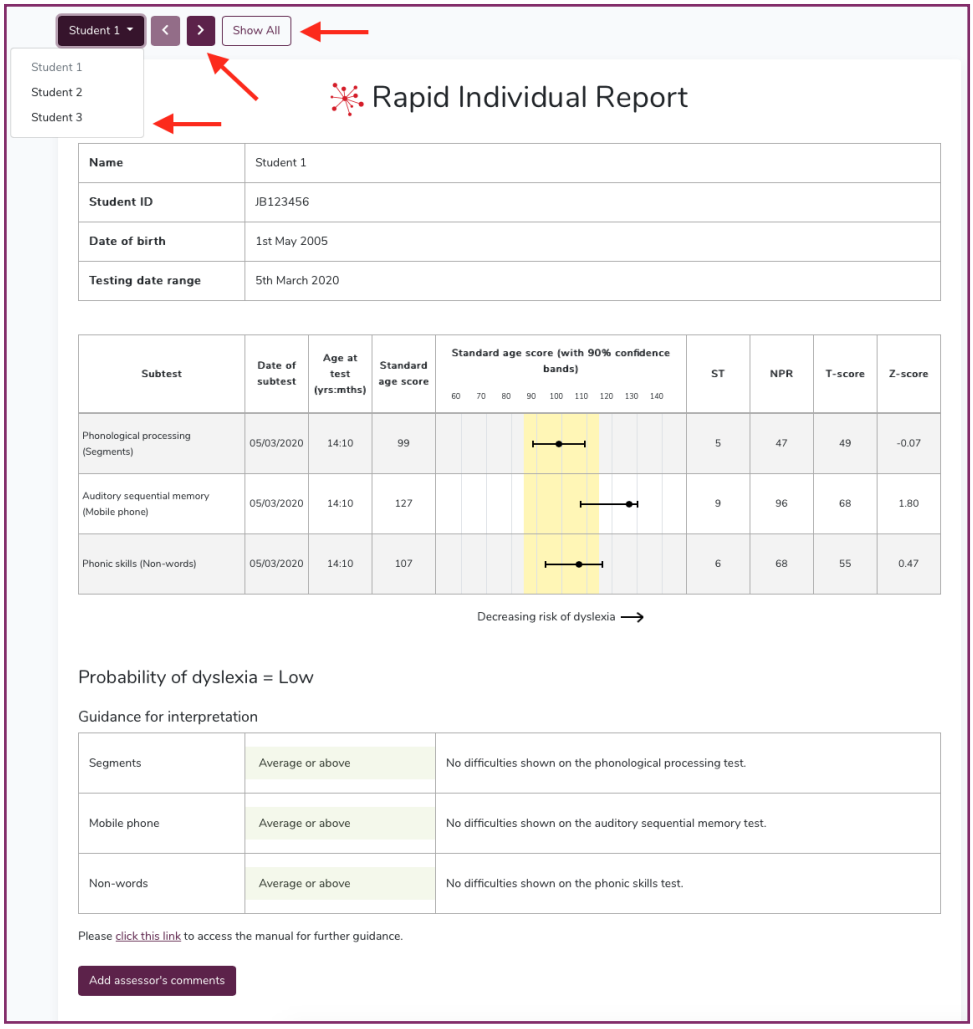
If the school is subscribed to multiple products on GL Ready and a student has more than one report available, use the dropdown arrow to select the correct report.

Figure 12. Selecting the correct graphical report for a student



To navigate between reports, use the dropdown list of names, the arrows at the top of the screen, or select 'Show All' to view all reports consecutively.

Figure 13. Navigating between graphical reports

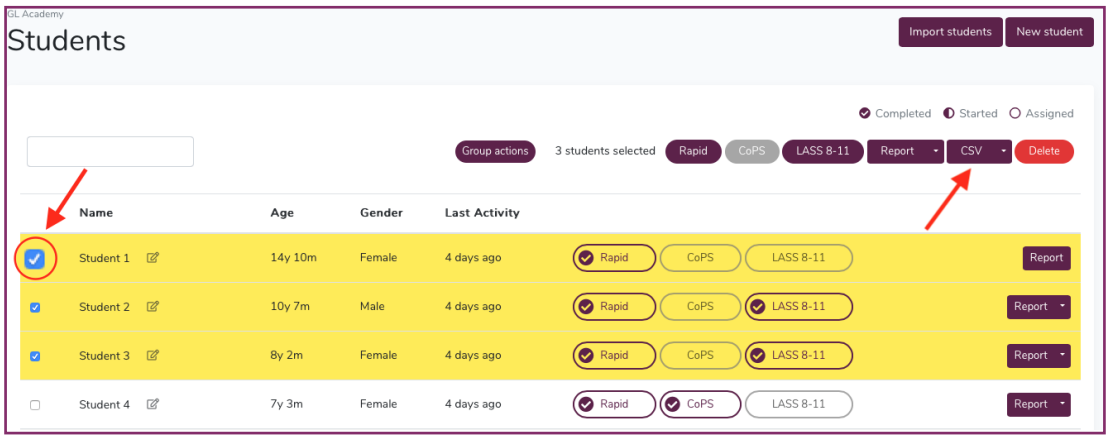


To add comments to a report, click on 'Add assessor's comments', type the comments in the box and click 'Save'. To print out a report, use your internet browser's printing options.

CSV reports

To download the CSV reports of individual or multiple students, select those students by ticking the boxes next to their names and then click on the 'CSV' button in the group actions above the list of students.

Figure 14. Accessing CSV reports for multiple students



A CSV file will automatically download and can be found in your 'Downloads' folder, or the equivalent location on your device. You need to select at least one student to activate the 'CSV' button.

Figure 15. Example CSV report

	A	B	C	D	E	F	G	H
1	Name	StudentID	DateOfBirth	TestDate	SubTestName	SAS	Interpretation_IndividualSubtest	ProbabilityOfDyslexia_OverAllSubtests
2	Student 3	CharlotteBee	01/01/2012	05/03/2020	Word chopping	129	Average or above	Low
3	Student 3	CharlotteBee	01/01/2012	05/03/2020	Mobile phone	111	Average or above	Low
4	Student 3	CharlotteBee	01/01/2012	05/03/2020	Funny words	132	Average or above	Low
5	Student 2	JS123456	08/08/2009	05/03/2020	Word chopping	85	Below Average	Moderate
6	Student 2	JS123456	08/08/2009	05/03/2020	Mobile phone	122	Average or above	Moderate
7	Student 2	JS123456	08/08/2009	05/03/2020	Funny words	116	Average or above	Moderate
8	Student 1	JB123456	01/05/2005	05/03/2020	Segments	99	Average or above	Low
9	Student 1	JB123456	01/05/2005	05/03/2020	Mobile phone	127	Average or above	Low
10	Student 1	JB123456	01/05/2005	05/03/2020	Non-words	107	Average or above	Low

For further information about accessing reports on the GL Ready platform, please visit www.glreadysupport.com.

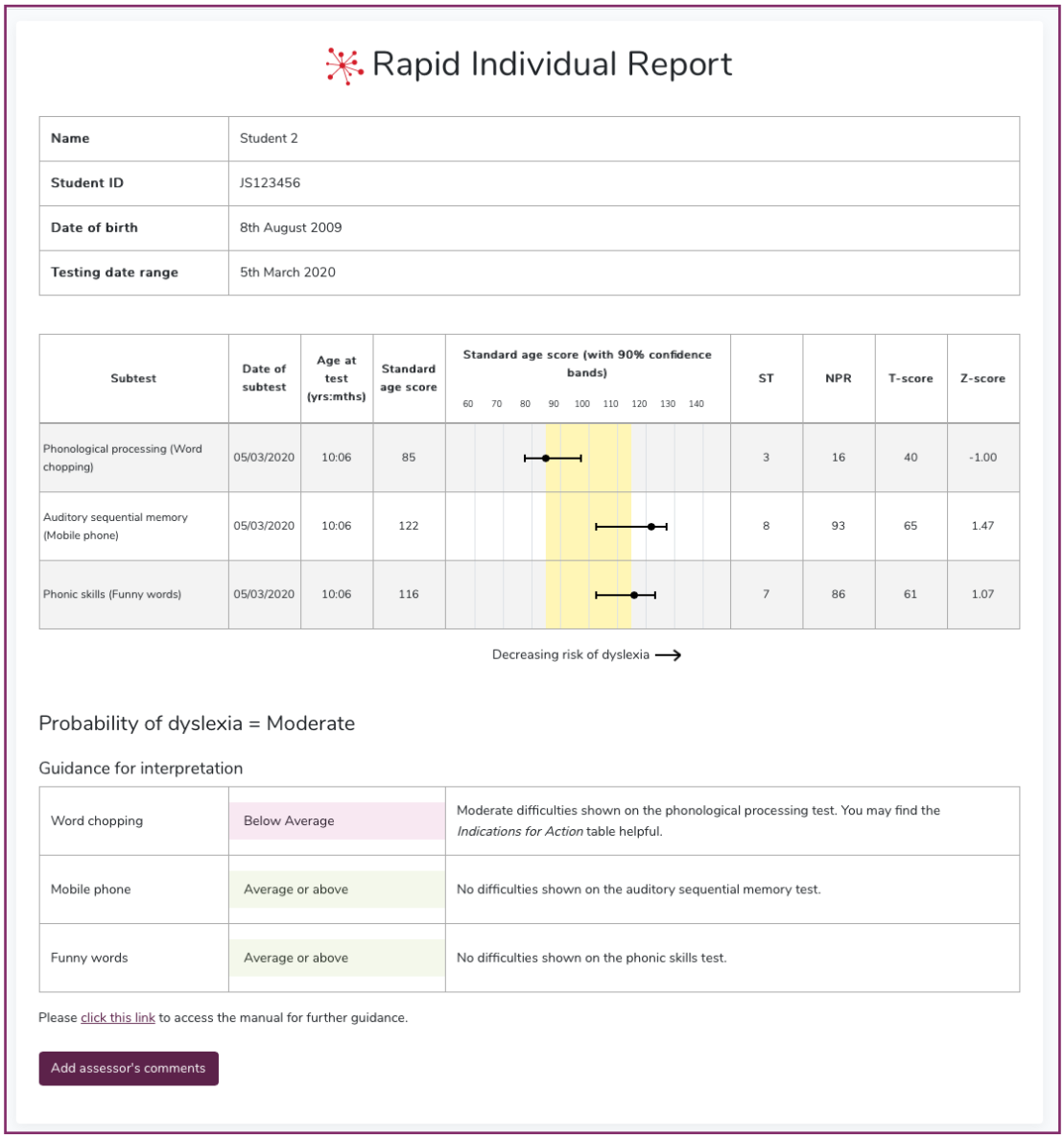
Interpreting results

The results from Rapid are presented in a way that is very easy to interpret. A table shows the Standard Age Scores (SAS) for each of the subtests. Standard Age Scores, like IQ, are usually expressed with a mean of 100 and a standard deviation of 15. These scores reflect the student's performance compared to those of the norm referenced group, which is based on the student's age, in three-month age bands from 4:0–4:2 up to 15:9–15:11.

Any test score is only an estimate of the student's ability, based on their performance on a particular day. Performance on any test can be affected by several factors. The Rapid report provides confidence bands, which give an indication of the range within which a student's score lies. The dot on each subtest row within the table represents the student's SAS and the horizontal line represents the 90% confidence band. The shaded area shows the average score range. 90% confidence bands are a very high-level estimate; if the test were taken again, we would expect the score to fall within this range 90% of the time.

The Rapid report identifies SAS scores of 88–94 as being 'Slightly below average', SAS scores of 75–87 as 'Below average' and SAS scores below 75 as being 'Very low'. As such, action is recommended where SAS scores are in any of these ranges and the Rapid report will refer the tester to the Indications for Action table on the GL Ready Support website (www.glreadysupport.com), where appropriate. The GL Ready Support website can be accessed via the 'Help' button on the GL Ready website.

Figure 16. Example graphical student report



Rapid Individual Report

Name	Student 2
Student ID	JS123456
Date of birth	8th August 2009
Testing date range	5th March 2020

Subtest	Date of subtest	Age at test (yrs:mths)	Standard age score	Standard age score (with 90% confidence bands) 60 70 80 90 100 110 120 130 140	ST	NPR	T-score	Z-score
Phonological processing (Word chopping)	05/03/2020	10:06	85		3	16	40	-1.00
Auditory sequential memory (Mobile phone)	05/03/2020	10:06	122		8	93	65	1.47
Phonic skills (Funny words)	05/03/2020	10:06	116		7	86	61	1.07

Decreasing risk of dyslexia →

Probability of dyslexia = Moderate

Guidance for interpretation

Word chopping	Below Average	Moderate difficulties shown on the phonological processing test. You may find the *Indications for Action* table helpful.
Mobile phone	Average or above	No difficulties shown on the auditory sequential memory test.
Funny words	Average or above	No difficulties shown on the phonic skills test.

Please click this link to access the manual for further guidance.

Add assessor's comments

The results of the three subtests are combined by the program to arrive at an overall probability of dyslexia, which is also shown on the reports screen. This is achieved by means of an algorithmic expert system derived from research data. The overall probability cannot be worked out until the student has completed all three subtests.

The expert system gives an overall estimate of the probability of dyslexia in one of the following categories:

- High probability of dyslexia (greater than 90% chance)
- Moderate probability of dyslexia (greater than 75% chance)
- Low probability of dyslexia (less than 10% chance).

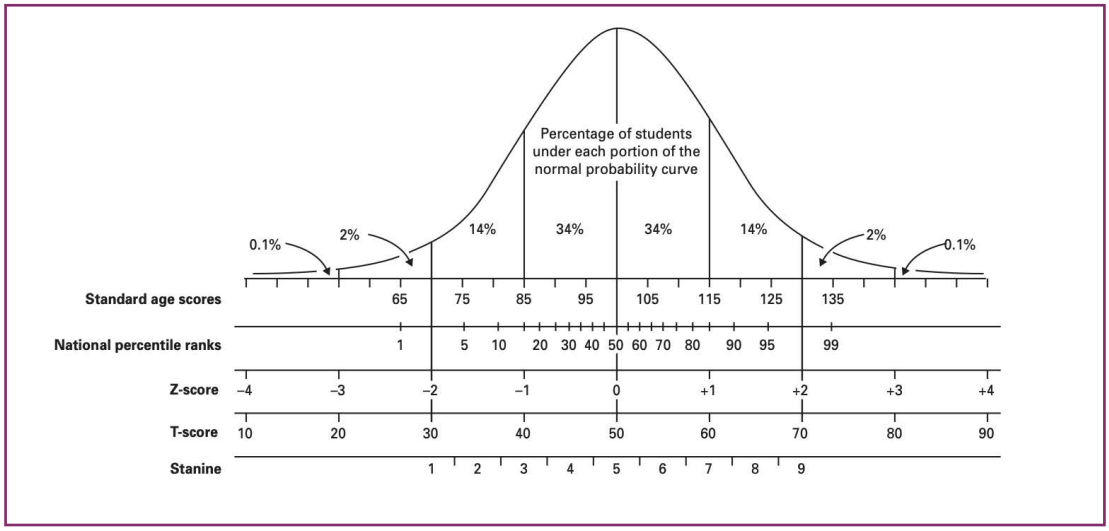
Additional scores

The Rapid reports also provide Stanine scores (ST), National Percentile Ranks (NPR), T-Scores and Z-Scores:

- The Stanine places the student's score on a scale of 1 (low) to 9 (high) and offers a broad overview of performance.
- The National Percentile Rank relates to the SAS score and shows the percentage of students obtaining a certain score or below. An NPR of 50 is average since 50% of students obtained an SAS of 50 or below. An NPR of 5 indicates that a student's score is within the lowest 5% of the nationally representative sample and an NPR of 95 means that a student's score is within the highest 5% of the national sample.
- T-scores have a mean of 50 and a Standard Deviation (SD) of 10, so a T-score of 40 is one SD below the mean and a T-score of 60 is one SD above the mean. 68% of T-scores would fall within the 40-60 range, so a T-score below 40 would be considered below average and a T-score above 60 would be considered above average.
- Finally, Z-scores show us the student's score in standard deviation units, with a mean of 0 and an SD of 1. So, a Z-score of -1.0 would indicate that the student's score is one SD below the mean and a Z-score of +1.0 would indicate that the student's score is one SD above the mean.

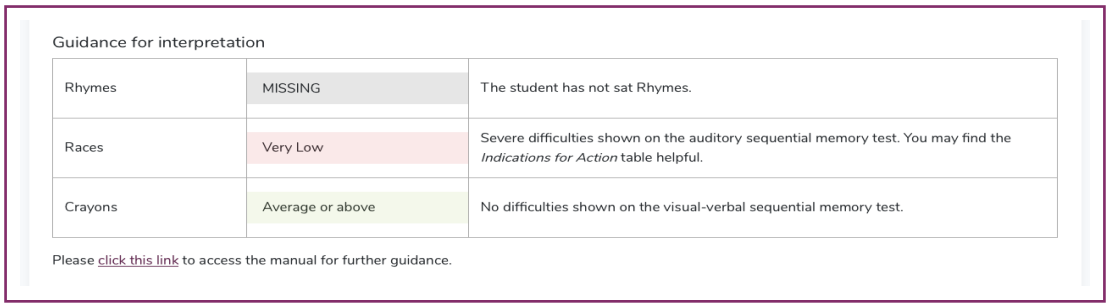
The relationships between these different scores are shown in Figure 17 below.

Figure 17. Relationship between scores



Guidance for interpretation table

Figure 18. Example of the Guidance for Interpretation section of the report


Guidance for interpretation

Rhymes	MISSING	The student has not sat Rhymes.
Races	Very Low	Severe difficulties shown on the auditory sequential memory test. You may find the *Indications for Action* table helpful.
Crayons	Average or above	No difficulties shown on the visual-verbal sequential memory test.

Please click this link to access the manual for further guidance.

The Guidance for Interpretation table on the report provides enhanced guidance for interpreting each student's results. Match the guidance to the Rapid Indications for Action Table, found on the GL Ready Support website (www.glreadysupport.com).

Interpreting the results from Rapid requires interpretation of the overall profile, and not just consideration of each individual subtest separately. Please see the Case Studies chapter for further guidance on interpreting the whole profile.

Integrating Rapid with CoPS or LASS 8–11

Rapid has been designed for use as a quick screening system that will identify most instances of dyslexia with a good degree of accuracy. For some users, that will provide all the information they need to instigate appropriate action. However, although Rapid can identify the student with dyslexia it is not a comprehensive diagnostic tool, nor does it necessarily give information about students' strengths in learning. So inevitably it will have limitations in terms of pointers for educational strategies to address students' problems in learning. The best way to overcome those limitations is by the combined use of Rapid with a follow-up diagnostic assessment given to those students who are at risk, using either CoPS (for age 4:0–7:11), LASS 8–11 (8:0–11:11) or LASS 11–15 (11:0–15:11). Students 'at risk', in this sense, are those who are found to have Rapid screening results in the 'high' or 'moderate' probability of dyslexia categories.

CoPS and LASS are designed to give a full diagnostic profile for each student, which enables the teacher to identify cognitive strengths as well as weaknesses, and therefore to formulate a more precise programme of educational support to overcome the student's problems. In addition, LASS gives an estimate of the student's intelligence and allows the teacher to determine the amount of discrepancy between expected literacy attainment and actual literacy attainment. The CoPS and LASS Manuals provide comprehensive information on interpreting profiles and teaching strategies. Results from Rapid will automatically be incorporated into CoPS or LASS 8–11. This reduces the assessment time using CoPS or LASS by about one-third, thus saving personnel time and duplication of effort.

About the subtests

How were the tests in Rapid selected?

The cognitive areas assessed by the subtests in **Rapid Dyslexia Screening** (see Table 1) assess phonological and memory skills that are known to impact on literacy.

Table 1. Areas assessed by Rapid Dyslexia Screening

Subtest	Age range	Cognitive area assessed
Rhymes / Word chopping / Segments	**4:0 – 15:11**	*Phonological processing*
Races / Mobile phone	**4:0 – 15:11**	*Auditory sequential memory*
Crayons / Funny words / Non-words	**4:0 – 7:11**	*Visual-verbal integration memory*
	8:0 – 15:11	*Phonic skills*

In order to allow for natural development in the component skills as children get older and ensure that the test gives accurate results, the content of each of these subtests varies according to the age of the child, although the underlying cognitive processes are essentially the same.

The subtests for each age group are shown in Tables 2 to 4.

Table 2. Rapid subtests for students aged 4:0–7:11

Subtest	Description
Rhymes	***Rhymes*** is a test of phonological awareness, involving detection of rhyme (for students aged 4–6) and rhyme and alliteration (for students aged 7).
Races	***Races*** is a test of auditory sequential memory using animal names. It starts with lists of three animals and progresses up to four animals (for students aged 4–6) or five animals (for students aged 7).
Crayons	***Crayons*** is a test of visual-verbal sequential memory, in which students are required to remember the order that different coloured crayons are presented in.

Table 3. Rapid subtests for students aged 8:0–10:11

Subtest	Description
Word chopping	***Word chopping*** is a test of phonological processing using syllable and phoneme deletion.
Mobile phone	***Mobile phone*** is a test of auditory sequential memory using digit span.
Funny words	***Funny words*** is a test of phonic skills involving non-word reading.

Table 4. Rapid subtests for students aged 11:0–15:11

Subtest	Description
Segments	***Segments*** is a test of phonological processing using syllable and phoneme deletion.
Mobile phone	***Mobile phone*** is a test of auditory sequential memory using digit span.
Non-words	***Non-words*** is a test of phonic skills involving non-word reading.

Teaching recommendations

What is dyslexia?

Dyslexia is a specific learning difficulty characterised principally by problems in certain aspects of language processing. Dyslexia is generally inherited and is independent of intelligence or social background. The main neurological systems affected are those that deal with processing of phonological information and auditory working memory; in other words, those involved in storage, processing and recall of information about the sounds of language (phonemes) and how these relate to the symbols of written language (graphemes). This results in difficulties in acquiring the skills of reading, writing and spelling (and sometimes numeracy), as well as problems in activities that require rote learning and recall, e.g. examinations. One of the most common and pervasive difficulties in dyslexia is in acquiring 'phonics', i.e. in learning the relationships between letters and sounds and using this knowledge to decode unfamiliar words and write words that are spelled regularly.

The theory of dyslexia that has the greatest weight of scientific evidence is the 'phonological deficit theory' (Snowling, 2000; Vellutino et al., 2004; Saksida et al., 2016). According to this theory, certain parts of the brain that are responsible for the storage, processing and recall of information about speech sounds do not function as efficiently as they should. Consequently, any activity that depends heavily on these systems (such as reading and writing) is particularly difficult. There are other theories which attribute dyslexia to malfunctioning in the visual system, or in the neurological systems concerned with balance, motor control and skilled learning generally. Although the possibility of some dyslexic individuals having neurological abnormalities other than those in the phonological processing system cannot be ruled out, the evidence to support these alternative theories is comparatively weak.

General approaches

Multisensory methods of teaching for students with dyslexia are usually advocated. These integrate visual, aural, tactile and kinaesthetic modalities to consolidate the learning experience. Lessons must be very well structured, sequential and cumulative, and all skills and concepts must be thoroughly practiced (overlearned) in order to counteract the memory problems of the dyslexic. Content generally needs to concentrate on phonic skills, as these are usually the weakest aspect in dyslexia. For a comprehensive overview of the range of approaches and materials the following book is strongly recommended: *Dyslexia: a practitioner's handbook* by Gavin Reid [Wiley, Fifth Edition, 2016].

The range of available products and materials for teaching and supporting students with dyslexia is steadily growing. Well-structured phonics-based multisensory teaching is still the fundamental requirement, especially for primary-aged dyslexics, but the currently available approaches are much more flexible and more fun than the older drill methods. These can usually be backed up with computer activities, which make learning more fun (see *Computer programs*). Various multisensory phonics teaching schemes are recommended in *Developing phonic decoding skills*.

Writing often presents the hardest challenge to dyslexic students. By its very nature, writing makes heavy demands on cognitive processes, especially memory. Use of word processing enables the dyslexic student to produce a greater amount of better-quality written work because it reduces memory load and facilitates self-correction (e.g. by using a spell checker). A talking word processor (which will speak back the text the student has entered) makes the dyslexic student much more independent when writing, because they can problem-solve their own mistakes. Examples of recommended talking word processors include ***Clicker 7***, ***DocsPlus***, ***SymWriter 2*** and ***Texthelp Read and Write***.

Many dyslexic children have problems with maths, particularly basic numeracy and calculation procedures. For excellent practical suggestions on addressing such difficulties see *Mathematics for dyslexics and dyscalculics: A teaching handbook* by Steve Chinn and Richard Ashcroft [Wiley Blackwell, 2016] and *Dyslexia, dyscalculia and mathematics: A practical guide* by Anne Henderson [Routledge, 2012].

Dyslexic students may be entitled to access arrangements in GCSE and other public examinations, e.g. additional time or use of a word processor. **EXACT** (for ages 11–24) is a computerised assessment of literacy which can be used to test for eligibility for Access Arrangements. The *Joint Council for Qualifications* (JCQ) publishes regulations and guidance relating to applying for access arrangements and reasonable adjustments each academic year. When used for the purposes of assessing eligibility for exam access arrangements, JCQ specifies that the assessment must be carried out by a suitably qualified person, who could be an HCPC registered psychologist, a specialist assessor with an Assessment Practising Certificate or an Access Arrangements Assessor who has successfully completed a post-graduate course at or equivalent to Level 7, including at least 100 hours relating to individual specialist assessment. PATOSS (*Professional Association of Teachers of Students with Specific Learning Difficulties*) produces an excellent practical guide called *Assessing the need for Access Arrangements in examinations: Fifth edition* by Lia Castiglione.

Study skills

Students with dyslexia need help to develop good study skills. Their weak memory, general disorganisation, poor literacy skills and difficulties with learning makes studying hard for them and they typically under-perform in tests and exams. Memory weaknesses can be addressed with various activities (see *Developing auditory memory* and *Developing visual memory*), but computer programs such as ***Mastering Memory*** are a good way of developing memory skills. When learning for tests or revising for exams, all students (but especially those with dyslexia) need a structured approach that optimises their recall of information. The program ***Timely Reminders*** provides an excellent basis for this and enables the dyslexic student to adopt a well-organised and more effective approach to learning and revision. Useful books to help dyslexic students develop study skills are: *Dyslexia: A teenager's guide* by Sylvia Moody [Vermilion, 2004], *Mind maps for kids: Study skills* by Tony Buzan [Harper Thorsons, 2008] and *Study skills for students with dyslexia* by Sandra Hargreaves and Jamie Crabb [Sage, 2016].

Computer programs

There are many excellent computer programs for learning and support of dyslexic students of all ages now available. The problem is to spot these amongst the hundreds advertised in the educational software catalogues. To assist busy teachers, the British Dyslexia Association New Technologies Committee website (www.bdatech.org) gives recommendations of software.

The following books are highly recommended when developing strategies for using computers to support dyslexic students at school or at home:

Dyslexia and Information and Communications Technology by Anita Keates (David Fulton, 2017).
Dyslexia: Early identification by Judith Stansfield (British Dyslexia Association, 2012).

Strategies for specific problem areas

Developing phonological processing skills

Phonological processing can be developed by a variety of methods. For example:

- **Rhyming** and **alliteration** – suitable techniques range from simple rhyming songs and games to more structured activities involving making books with rhyming or alliterative themes, playing rhyming snap or odd-one-out games with pictures and objects; using plastic letters to discover and create rhyming word families.
- **Deletion** of the first sound (e.g. *near–ear*) or of the last sound (e.g. *party–part*), or of whole syllables (e.g. saying '*alligator*' without the '*all*').
- **Elision** of the middle sound (e.g. *snail–sail*) or syllable ('*alligator*' without the '*ga*').
- **Correspondence** – e.g. tapping out the number of syllables in a word.

Recommended computer-based activities for practising phonological skills include ***Tizzy's Toybox***, ***Talking Animated Alphabet***, ***Letterland*** and ***Sounds and Rhymes***.

In general, younger students respond well to phonological training activities and skills swiftly improve. However, some dyslexic students may have more persistent difficulties that will require particularly careful literacy teaching. In such cases, a well-structured multisensory approach incorporating plenty of practice in phonic skills (over-learning) is recommended (see *Developing phonic decoding skills*). Without phonological training, many students with such weaknesses are liable to develop an over-reliance on visual (whole word) and contextual strategies in reading (especially if they are bright). They can easily slip through the net, only to re-appear as a student who is failing in reading and spelling later in their schooling.

Developing auditory memory

Memory limitations are more difficult to improve by direct training, especially with younger students, than are weaknesses in phonological processing. Older students can respond well to *metacognitive* approaches to memory improvement, i.e. techniques designed to promote understanding of their own memory limitations and to develop appropriate compensatory strategies (Buzan, 2006; Reid, 2016). However, that does not mean that memory training is not worthwhile with young students. Indeed, it may well be the case that with improved training techniques, remediation of memory weaknesses could turn out to be a much more promising approach in the future. The emphasis should be on variety and on stretching the student steadily with each training session. The tasks should not be too easy for the student (which would be boring) nor much too difficult (which would be discouraging), but they should give just the right amount of *challenge* to motivate the student to maximum effort. Use of prizes, star charts for improvement, etc., should all be used if these will help motivation. Activities can usually be carried out at home as well as in school. Competition can be motivating for some students, but it can also be discouraging for the student with severe difficulties, because they will easily perceive and be embarrassed by the discrepancy between their performance and that of others.

Auditory sequential memory training activities include:

- **I went to the supermarket** – teacher says sentences of increasing length and complexity and the student has to repeat these back verbatim (e.g. '*I went to the supermarket and bought three tins of beans, one loaf of bread, a carton of milk, a packet of sweets, two bars of chocolate....*' etc.)
- **Find the changed (or missing) word** – teacher says sequences of words to the student (e.g. *dog, cat, fish, monkey, spider*) and then repeats it changing one (or missing one out altogether), either slightly or more obviously (e.g. *dog, cat, fox, monkey, spider*) and the student has to identify the change.
- **What's their job?** – teacher says to the student a list of name-occupation associations (e.g. *'Mr Pearce the painter, Mrs Jolly the teacher, Mr Fish the hairdresser, Miss Brown the electrician*') and then asks for recall of one (e.g. '*Who was the teacher?*' or '*What is Miss Brown's job?*').
- **Word repetition** – teacher says sequences of unrelated words to the student (e.g. *hat, mouse, box, cup, ladder, tree, biscuit, car, fork, carpet*) and the student has to repeat them in the correct order. The length of the list can be gradually extended. If the words are semantically related it is more difficult, and if they are phonologically related (e.g. *fish, film, fog, fun, phone, finger*) it is more difficult still.
- **Phoneme repetition** – as word repetition, but with phonemes ('*oo, v, s, er, d*'). Note that phonologically similar lists will be much more difficult (e.g. '*p, b, k, d, t*')
- **Letter name repetition** – as word repetition, but with letter names.
- **Digit repetition** – as word repetition, but with digits. About one per second is the maximum difficulty for short sequences. Slightly faster or slower rates are both, generally, easier to remember, but dyslexics tend to find a slower sequence harder (because their rehearsal processes in working memory are deficient).

A good computer program for developing auditory sequential memory is ***Mastering Memory***.

Developing phonic decoding skills

For the reasons explained above, the student who displays major difficulties in *auditory* memory is likely to have problems in acquiring effective phonic skills. The recommendation here would be for a highly-structured *multisensory phonic approach* to literacy learning. This should not only provide ample practice to compensate for memory weakness but should also make use of the student's strong visual skills in order to reinforce learning and help to maintain confidence.

Examples of well-structured multisensory phonics schemes suitable for students with dyslexic difficulties include ***Alpha to Omega, Toe by Toe, The Bangor Dyslexia Teaching System, The Phonics Handbook, Sound Linkage, Spelling Made Easy, The Hickey Multisensory Language Course, Star Track Reading and Spelling, Sounds-Write*** and ***Sound Discovery***.

Good computer software for practising phonic skills includes: ***Wordshark 5, Talking Animated Alphabet, Nessy*** and ***Lexia***.

Developing visual memory

It is widely acknowledged that the *predominant* problems found in dyslexic students are phonological rather than visual. Indeed, dyslexic individuals often have excellent visual skills. Nevertheless, teachers and educational psychologists are not infrequently confronted by cases of young students who appear to have inordinate difficulties in remembering various types of information presented visually. With students under eight years, this will tend to show up on **Rapid** in the results of the visual-verbal sequential memory subtest (***Crayons***).

Structured phonics work, with ample practice (over-learning), will compensate for visual memory weaknesses. A multisensory approach is strongly recommended, building on any auditory and kinaesthetic strengths (see *Developing phonic decoding skills*).

The following are suggested training activities for students with poor visual memory or poor visual-verbal sequential memory:

- **Find the missing part** – create pictures of everyday things with parts of the pictures missing (e.g. doll with one arm, table with only three legs) and ask the student to identify what is missing. To do this the student has to recall visual images of the relevant objects.
- **What's wrong here** – use pictures of everyday things with parts of the pictures wrong (e.g. house with the door halfway up the wall; person with feet pointing backwards instead of forwards) and ask the student to identify what is wrong. To do this the student has to recall visual images of the relevant objects.
- **Kim's game** – place an array of familiar objects on a tray (or picture of an array of objects). The student scans this for two minutes (or whatever period of time is appropriate) and then has to remember as many as possible.
- **Symbols** – show the student a sequence of symbols, letters or shapes of increasing length, and then jumble them up and the student has to rearrange them in the correct order.

- **Who lives here?** – make a set of pictures of people (these may be cut from magazines) and a set of houses of different colours, or different appearance in some way. The people are matched with the houses, and then jumbled up. The student has to rearrange them in the correct relationship. If the people are given names then the task relies more on visual-verbal integration.
- **Pelmanism** – put pairs of cards upside down and jumble them up. Pelmanism is a game of remembering matching pairs of cards from a set, when cards are individually turned over and then turned back. The student has to remember where the other one of the pair is, and if both are located these are removed from the set, and so on.
- **Card games** – e.g. Snap, Happy Families.

A good computer program for developing visual memory skills is ***Mastering Memory***.

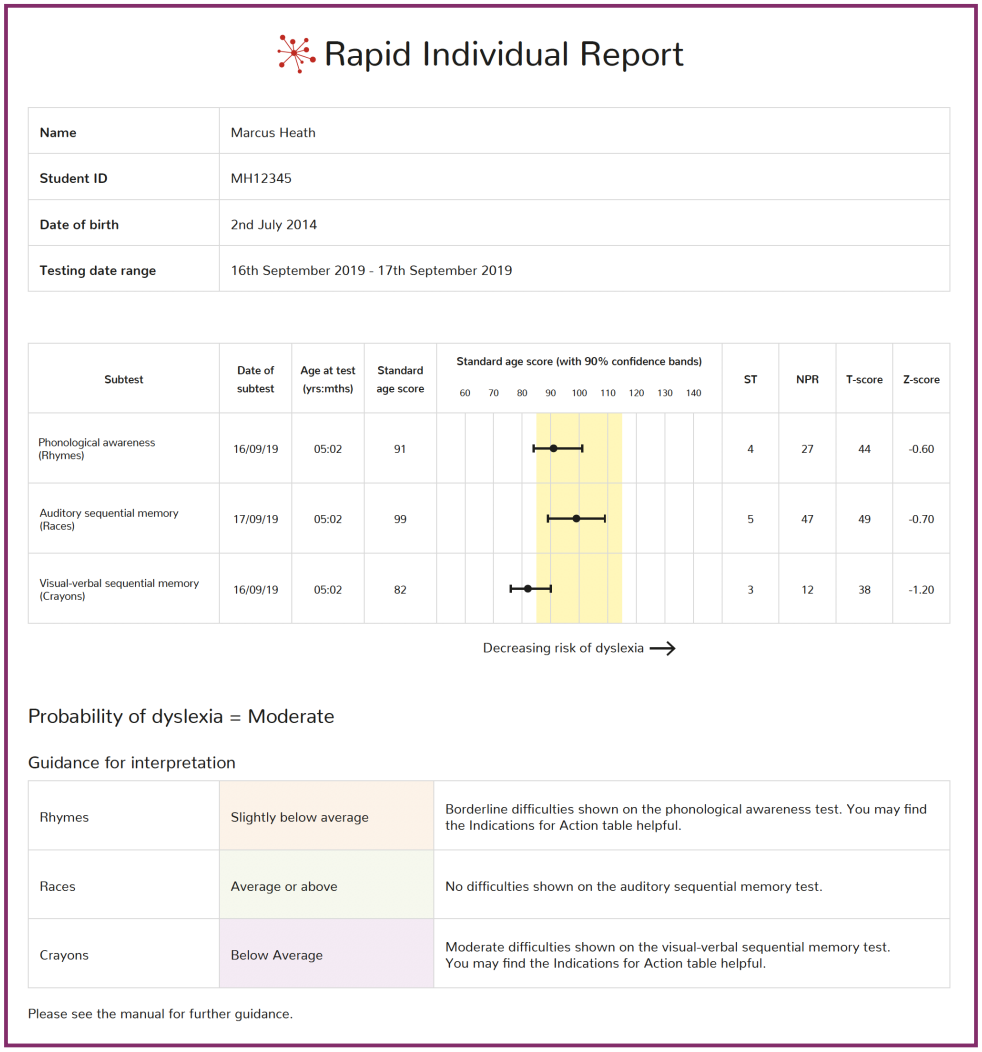
Case studies

The following six case studies illustrate how the results of Rapid can be interpreted, over and above the interpretation automatically provided by the program. It should be emphasised that in all these cases, diagnosis can only be tentative because the information derived from a 15 minute screening program is inevitably limited. Nevertheless, in most cases the information from each of the three subtests in Rapid can help the teacher to understand the nature of the fundamental underlying problems and move forward to effective action without unnecessary delay. In cases where more detailed understanding is sought, the student can be tested on CoPS or LASS 8–11 (as appropriate to the student's age). For CoPS and LASS 8–11, results from Rapid will automatically be incorporated into the results, thus avoiding unnecessary duplication of effort and testing (see *Integrating Rapid with CoPS or LASS* for further information about this).

Marcus [5 years 2 months]

Marcus has been in school for a little over six months. His parents were worried about him because there is dyslexia in the family and because he showed no interest in books or writing, despite ample opportunities both at home and at pre-school. At school he was struggling with the fundamentals of reading and could not yet reliably recognise all the letters of the alphabet and was confused about even simple words. Tested on Rapid, his results are shown in Figure 19.

Figure 19. Rapid results for Marcus



Rapid Individual Report

Name	Marcus Heath
Student ID	MH12345
Date of birth	2nd July 2014
Testing date range	16th September 2019 - 17th September 2019

Subtest	Date of subtest	Age at test (yrs:mths)	Standard age score	Standard age score (with 90% confidence bands) 60 70 80 90 100 110 120 130 140	ST	NPR	T-score	Z-score
Phonological awareness (Rhymes)	16/09/19	05:02	91		4	27	44	-0.60
Auditory sequential memory (Races)	17/09/19	05:02	99		5	47	49	-0.70
Visual-verbal sequential memory (Crayons)	16/09/19	05:02	82		3	12	38	-1.20

Decreasing risk of dyslexia →

Probability of dyslexia = Moderate

Guidance for interpretation

Rhymes	Slightly below average	Borderline difficulties shown on the phonological awareness test. You may find the Indications for Action table helpful.
Races	Average or above	No difficulties shown on the auditory sequential memory test.
Crayons	Below Average	Moderate difficulties shown on the visual-verbal sequential memory test. You may find the Indications for Action table helpful.

Please see the manual for further guidance.

Rapid has rated the probability of dyslexia as 'moderate' for Marcus. Obviously, the family history of dyslexia would strengthen that conclusion. Closer inspection of his results indicates that he does not have any extreme deficiencies, but both his phonological awareness and visual-verbal sequential memory are weak. In particular, the latter result suggests why he was experiencing problems in basic word and letter recognition. However, his average score for auditory sequential memory is good news and implies that if the early literacy difficulties can be overcome the longer-term prospects for Marcus are much better and he is unlikely to struggle with learning to the extent that most dyslexics do throughout their schooling. Overall, Marcus's results point to the following recommendations:

- Significantly increased input of phonological activities to improve his phonological processing skills. All activities involving word games, creating and learning rhymes, alliteration, and segmentation of words would be highly beneficial.
- Plenty of practice in memory activities, especially those requiring use of verbal labels to represent visual information (e.g. **Kim's game**).

- A carefully structured multisensory approach to teaching phonics, with ample opportunity to practise each phonic rule as it is introduced, e.g. using a scheme such as ***Jolly Phonics*** or ***Letterland***.
- Several computer programs are available that will provide help for Marcus, including: ***Talking Animated Alphabet*** (visual and aural letter recognition); ***Letterland*** (basic phonics); and ***Lexia Core5 Reading*** (phonological awareness, phonics, fluency, vocabulary and comprehension).

If a more detailed understanding of Marcus's difficulties is required, it is recommended that he should be tested on CoPS, which should uncover any other significant cognitive weaknesses and thus enable a clearer diagnosis to be made.

Gemma [6 years 9 months]

Gemma made satisfactory early progress in reading but now seems to have hit a barrier and is falling steadily behind the other students in her class. She enjoys stories but prefers being read to rather than to read them herself. When she does read she makes a lot of mistakes and guesses at words she does not recognise rather than sounding them out phonically. As a consequence, she often misunderstands what she is reading. Gemma's Rapid results are shown in Figure 20.

Rapid has rated Gemma as having a 'high' probability of dyslexia. She has significant weaknesses in both phonological awareness and auditory sequential memory. However, her visual-verbal sequential memory is a little better. It is most likely that in her literacy development she has been relying largely on her visual memory. But this has left her unable to decode new or unfamiliar words by sounding them out; in other words, she is struggling with phonics. It should be pointed out that just because children have difficulties learning phonics does not necessarily mean that they are dyslexic. Many students find phonics hard to learn and a great deal depends on the skill of the teacher in teaching these skills. For some students the teaching may be at too fast a pace, with insufficient opportunities to practise and consolidate new learning. In Gemma's case, however, the poor memory and underlying phonological difficulties point fairly strongly to dyslexia.

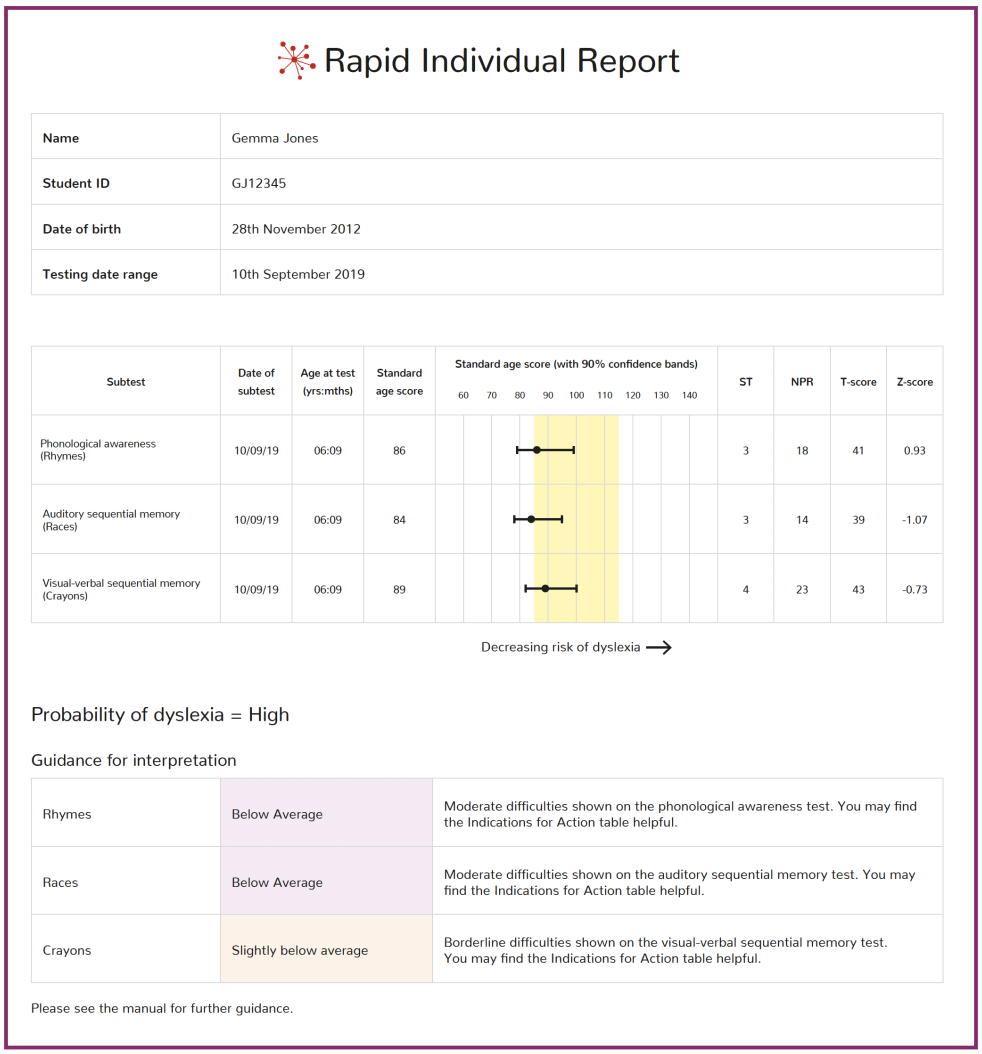
Intervention should begin right away, before Gemma loses interest and motivation. The following recommendations about teaching would be made:

- Getting the teaching of phonics right is going to be essential. A well-structured multisensory approach will be necessary to achieve maximum progress. A list of suitable teaching schemes is given in *Developing phonic decoding skills*. Integration of phonological processing practice activities with phonic decoding would be beneficial, using a teaching scheme such as ***Sound Linkage***. Checking Gemma's progress in phonics should be carried out regularly.
- Activities to develop Gemma's memory skills should be built into her school work and her home life as much as possible.
- It is likely that Gemma will find writing the hardest aspect of literacy, because writing places particularly heavy demands on short-term memory. Use of a talking word processor, such as ***Clicker 7*** or ***SymWriter 2***, takes the pressure off short-term memory and should enable her to produce a better standard of written work.

- Many of the computer programs mentioned in the previous section for Marcus would also be helpful for Gemma. In addition, the following computer programs would also be useful for her: ***Word Builder*** (phonic skills); ***Starspell 3*** (spelling); and ***Wordshark 5*** (reading and spelling).

If a more detailed understanding of Gemma's difficulties is required, it is recommended that she should be tested on CoPS. Among other things, this would provide assessment of her visual memory and auditory discrimination, and thus enable a clearer diagnosis to be made.

Figure 20. Rapid results for Gemma



Rapid Individual Report

Name	Gemma Jones
Student ID	GJ12345
Date of birth	28th November 2012
Testing date range	10th September 2019

Subtest	Date of subtest	Age at test (yrs:mths)	Standard age score	Standard age score (with 90% confidence bands) 60 70 80 90 100 110 120 130 140	ST	NPR	T-score	Z-score
Phonological awareness (Rhymes)	10/09/19	06:09	86		3	18	41	0.93
Auditory sequential memory (Races)	10/09/19	06:09	84		3	14	39	-1.07
Visual-verbal sequential memory (Crayons)	10/09/19	06:09	89		4	23	43	-0.73

Decreasing risk of dyslexia →

Probability of dyslexia = High

Guidance for interpretation

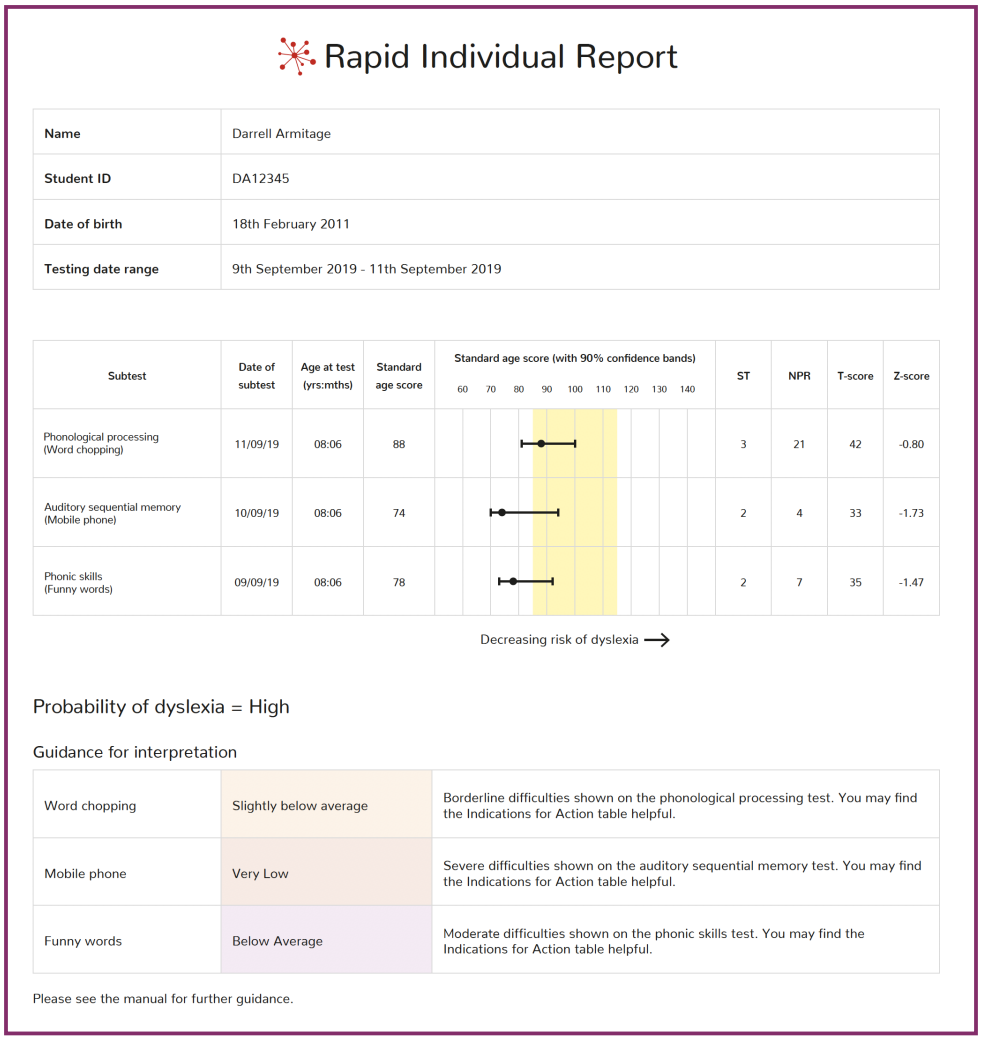
Rhymes	Below Average	Moderate difficulties shown on the phonological awareness test. You may find the Indications for Action table helpful.
Races	Below Average	Moderate difficulties shown on the auditory sequential memory test. You may find the Indications for Action table helpful.
Crayons	Slightly below average	Borderline difficulties shown on the visual-verbal sequential memory test. You may find the Indications for Action table helpful.

Please see the manual for further guidance.

Darrell [8 years 6 months]

Darrell is rated by his teachers as bright but he has also been described as lazy, forgetful and disorganised. In class discussion he typically shines, but when it comes to getting his work down on paper he is a cause of constant frustration for his teachers. His spelling is particularly poor. Although his reading skills are below average he is usually able to make reasonable sense of what he reads using intelligent guesswork. Darrell's results on Rapid are shown in Figure 21.

Figure 21. Rapid results for Darrell



Rapid Individual Report

Name	Darrell Armitage
Student ID	DA12345
Date of birth	18th February 2011
Testing date range	9th September 2019 - 11th September 2019

Subtest	Date of subtest	Age at test (yrs:mths)	Standard age score	Standard age score (with 90% confidence bands) 60 70 80 90 100 110 120 130 140	ST	NPR	T-score	Z-score
Phonological processing (Word chopping)	11/09/19	08:06	88		3	21	42	-0.80
Auditory sequential memory (Mobile phone)	10/09/19	08:06	74		2	4	33	-1.73
Phonic skills (Funny words)	09/09/19	08:06	78		2	7	35	-1.47

Decreasing risk of dyslexia →

Probability of dyslexia = High

Guidance for interpretation

Word chopping	Slightly below average	Borderline difficulties shown on the phonological processing test. You may find the Indications for Action table helpful.
Mobile phone	Very Low	Severe difficulties shown on the auditory sequential memory test. You may find the Indications for Action table helpful.
Funny words	Below Average	Moderate difficulties shown on the phonic skills test. You may find the Indications for Action table helpful.

Please see the manual for further guidance.

Rapid rated Darrell as having a 'high' probability of dyslexia. Inspection of the individual test results shows that he has very little by way of phonic decoding skills and his auditory sequential memory is very poor. These are classic signs of dyslexia, particularly at this age. His phonological processing ability is a little better. The recommendations in Darrell's case would include the following:

- An intensive multisensory phonics teaching scheme needs to be commenced without delay. A list of suitable teaching schemes is given in *Developing phonic decoding skills*.
- Darrell will need regular (preferably daily) practice in applying his new phonic skills in both word recognition and spelling. This could be achieved most effectively by use of the computer program ***Wordshark 5***.

- Learning the spelling of essential words would be facilitated by use of the program ***Superspell 2***, which provides enjoyable practice.
- Memory training should be carried out, e.g. using the computer program ***Mastering Memory***.
- Use of programs for reporting work that incorporate speech feedback (e.g. ***Clicker 7*** or ***SymWriter 2***) would help Darrell to overcome many of his writing difficulties.

If a more detailed understanding of Darrell's difficulties is required, it is recommended that he should be tested on LASS 8–11. This would enable a check of his intelligence to be carried out as well as measuring his levels of reading and spelling, which could then be monitored regularly to ascertain progress in response to intervention.

Jake [10 years 1 month]

Jake is a typical boy who prefers most things to reading and writing. He is good at sports and spends most of his time outdoors playing football, cycling and skateboarding. When he is indoors he is inseparable from his computer games console. In school he is popular but does the minimum to get by in his work. Recent poor school reports have caused his parents to query whether he might have dyslexia and so he was tested on Rapid and the results are shown in Figure 22.

Figure 22. Rapid results for Jake

Rapid Individual Report

Name	Jake Spears
Student ID	JS12345
Date of birth	8th August 2009
Testing date range	13th September 2019

Subtest	Date of subtest	Age at test (yrs:mths)	Standard age score	Standard age score (with 90% confidence bands) 60 70 80 90 100 110 120 130 140	ST	NPR	T-score	Z-score
Phonological processing (Word chopping)	13/09/19	10:01	116		7	86	61	1.07
Auditory sequential memory (Mobile phone)	13/09/19	10:01	93		4	32	45	-0.47
Phonic skills (Funny words)	13/09/19	10:01	108		6	70	55	0.53

Decreasing risk of dyslexia →

Probability of dyslexia = Low

Guidance for interpretation

Word chopping	Average or above	No difficulties shown on the phonological processing test.
Mobile phone	Slightly below average	Borderline difficulties shown on the auditory sequential memory test. You may find the Indications for Action table helpful.
Funny words	Average or above	No difficulties shown on the phonic skills test.

Please see the manual for further guidance.

Rapid rated the probability of Jake having dyslexia as 'low'. His phonological processing ability and phonic decoding skills are both above average for his age. His auditory sequential memory is a little below average, but by itself this does not give great cause for concern. On the basis of these results, there is no cognitive reason why Jake should underperform in literacy and school work generally. In other words, there is no evidence for dyslexia. Most likely he simply lacks interest in such pursuits and consequently lacks the practice and experience that is essential to develop fluent and efficient reading and writing skills. Jake needs to understand that unless he spends more time reading and writing and puts more effort into his school work generally, he will find the work at secondary school very difficult and slide down to the bottom of the class.

A more detailed understanding of Jake's case could be obtained by testing him on LASS 8–11, which would also enable regular monitoring of his progress in reading and spelling. If Jake needs assistance in learning material for tests and examinations, the program ***Timely Reminders*** would be very useful.

Nita [12 years 7 months]

Nita, who has Anglo-Indian parentage, has lived in the UK for about four years. Prior to that she was educated in India and when she first came to the UK her written and spoken English was not strong. Since then she has made good progress and her oral ability in English is now rated above average, but she is still well below average in reading and spelling and her written work fails to come up to expected standards. She is a quiet, well-behaved girl who lacks confidence and does not draw attention to herself. General screening of the whole school year with Rapid yielded the following results for Nita (see Figure 23).

Figure 23. Rapid results for Nita

Rapid Individual Report

Name	Nita Austin
Student ID	NA12345
Date of birth	12th February 2007
Testing date range	18th September 2019

Subtest	Date of subtest	Age at test (yrs:mths)	Standard age score	Standard age score (with 90% confidence bands) 60 70 80 90 100 110 120 130 140	ST	NPR	T-score	Z-score
Phonological processing (Segments)	18/09/19	12:07	89		4	23	43	-0.73
Auditory Sequesntial Memory (Mobile phone)	18/09/19	12:07	90		4	25	43	-0.67
Phonic skills (Non-words)	18/09/19	12:07	93		4	32	45	-0.47

Decreasing risk of dyslexia →

Probability of dyslexia = Moderate

Guidance for interpretation

Segments	Slightly below average	Borderline difficulties shown on the phonological processing test. You may find the Indications for Action table helpful.
Mobile phone	Slightly below average	Borderline difficulties shown on the auditory sequential memory test. You may find the Indications for Action table helpful.
Non-words	Slightly below average	Borderline difficulties shown on the phonic skills test. You may find the Indications for Action table helpful.

Please see the manual for further guidance.

Rapid rated the probability of Nita having dyslexia as 'moderate'. Her scores for all three subtests were in the 'borderline' category. Her previous inexperience in English, which obviously complicates the interpretation, might account for her rather weak phonic skills, but is a less satisfactory explanation for her weak phonological processing ability and not a tenable reason for the weak auditory sequential memory result. Her results may have also been affected by poor confidence. Nevertheless, there is a bona fide reason for further investigation of Nita's case. She could be tested in more detail using LASS 11–15, which should enable a clearer diagnosis to be made, or she could be referred to an educational psychologist for full assessment.

There are several resources that would be beneficial for Nita, including the following:

- Regular practice using the program ***Wordshark 5*** would help to sharpen and consolidate her word recognition and spelling skills.
- Her memory skills could be enhanced by using the program ***Mastering Memory***, and the program ***Timely Reminders*** would help her to revise material for tests and examinations.
- Since her spoken English is good, use of word processing with additional speech feedback facilities, such as ***Co:Writer*** or ***Texthelp Read and Write***, would be particularly useful.

Jamie [14 years 4 months]

Jamie has always been a difficult student. At primary school he was not rated as being particularly bright, but his learning was also hampered by poor attention together with hyperactive tendencies. At secondary school he had settled down considerably and his concentration was noticeably improved (albeit with occasional dramatic lapses and aggressive confrontations with teachers and other students). Recent results of a cognitive abilities test given to the whole school year suggested that Jamie's intelligence had been seriously underestimated. This caused his teachers to re-evaluate his continuing underperformance in literacy work and query the possibility of dyslexia. Rapid was administered, and the results are shown in Figure 24.

Figure 24. Rapid results for Jamie

Rapid Individual Report

Name	Jamie Brown
Student ID	JB12345
Date of birth	1st May 2005
Testing date range	16th September 2019

Subtest	Date of subtest	Age at test (yrs:mths)	Standard age score	Standard age score (with 90% confidence bands) 60 70 80 90 100 110 120 130 140	ST	NPR	T-score	Z-score
Phonological processing (Segments)	16/09/19	14:04	77		2	6	35	-1.53
Auditory Sequential Memory (Mobile phone)	16/09/19	14:04	85		3	16	40	-1.00
Phonic skills (Non-words)	16/09/19	14:04	91		4	27	44	-0.60

Decreasing risk of dyslexia →

Probability of dyslexia = High

Guidance for interpretation

Segments	Below Average	Moderate difficulties shown on the phonological processing test. You may find the Indications for Action table helpful.
Mobile phone	Below Average	Moderate difficulties shown on the auditory sequential memory test. You may find the Indications for Action table helpful.
Non-words	Slightly below average	Borderline difficulties shown on the phonic skills test. You may find the Indications for Action table helpful.

Please see the manual for further guidance.

Rapid rated Jamie as having a 'high' probability of dyslexia. The test results show that his phonological processing ability is very poor, and his auditory sequential memory is almost as weak. Jamie's phonic decoding skills are somewhat better, although still lower than would be expected for a student of above-average intelligence. It is likely that he has been able to compensate for his dyslexic difficulties by using his intelligence, and this is reflected in his phonic

skills result. Overall, however, when his above-average intellectual ability is taken into account, there is a very marked discrepancy between expected and actual levels of these skills and so the conclusions regarding dyslexia in Jamie's case are pretty clear. In Jamie's present educational situation the most important things for him are (a) access to the curriculum (this will require differentiated worksheets) and (b) development of effective techniques for recording his work. Without these two things he will be unable to achieve his potential in forthcoming examinations such as GCSEs.

There are several resources that would be beneficial for Jamie including the following:

- Regular practice using ***Wordshark 5*** or, alternatively, the ***Lexia PowerUp Literacy*** computer program would help to develop Jamie's reading skills.
- Like Nita, his memory skills could be enhanced by using the program ***Mastering Memory***, and the program ***Timely Reminders*** would help him to revise material for tests and examinations.
- Use of word processing with additional speech feedback facilities would help Jamie to produce better written work as he could problem-solve his own mistakes; ***Co:Writer*** or ***Texthelp Read and Write*** are especially recommended.

Statistical information

Standardisation

Rapid underwent a full national re-standardisation in January – July 2019. The standardisation was conducted in 48 Primary schools and 16 Secondary schools (England n = 50; Northern Ireland n = 11; Scotland n = 1; Wales = 1; Republic of Ireland n = 1). Of those schools where an Ofsted assessment has been published, 24% were rated as Outstanding, 68% were rated as Good and 8% were rated as Requiring Improvement (which compares well to national figures for the 2018/19 academic year: 20% Outstanding; 66% Good; 11% Requires improvement). The number of students on the roll for the Primary sample schools ranged from 30 to 683, with an average of 268. Whilst the number of students on the roll for the Secondary sample schools ranged from 280 to 1777, with an average of 846.

School characteristics (where these were available on Gov.uk or the equivalent websites for Scotland, Northern Ireland, Wales and the Republic of Ireland) for the sample schools were compared to the national average (for English state-funded Primary and Secondary schools) – see Table 5. It can be seen that the schools overall included a slightly higher proportion of girls than the national average and a slightly lower proportion of pupils with an ECHP than the national average. Within the secondary schools, the proportion of pupils requiring SEN support was slightly above the national average, whilst there is a lower proportion of pupils whose first language is not English and pupils eligible for FSM than the national averages.

Table 5. Characteristics of schools within the standardisation sample

School characteristic	Primary sample Mean	Primary National average	Secondary sample Mean	Secondary National average
Girls on roll	51.5%	48.7%	54.4%	49.2%
Pupils with an SEN Education, Health and Care Plan	2.1%	3.1%	2.7%	4.4%
SEN Support	12.6%	12.2%	12.0%	10.4%
Pupils whose first language is not English	18.6%	21.3%	10.5%	16.5%
Pupils eligible for free school meals at any time during the past 6 years	24.4%	24.3%	22.2%	28.6%

Within the selected schools, students were included in the standardisation on an entire class basis, to avoid any selection bias. The number of students completing each subtest, within each age group of the standardisation sample, are shown in Table 6.

Table 6. Students per age group for each subtest

Subtest	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Total
Crayons	92	187	302	509									1090
Races	142	267	443	611									1463
Rhymes	126	262	432	599									1419
Mobile phone					900	780	695	803	775	577	561	316	5407
Funny words / Non-words					891	775	681	851	838	604	583	327	5550
Word chopping / Segments					776	719	684	777	752	560	509	277	5054

Demographic information concerning the students within the standardisation sample are given in Table 7 (note that information was not provided for all students). Population parameters are also provided, but these are based only on English state-funded Primary and Secondary schools, whereas the sample also includes students from Northern Ireland, Wales, Scotland and the Republic of Ireland, so the comparisons are limited.

For the Primary sample, it can be seen that the sample included a slightly higher proportion of female students than the national average for English state-funded Primary schools. With regards to ethnicity, the sample has a higher proportion of Asian students than is found in the population and lower proportions of White, Black, Mixed and Other students, although ethnicity information was not provided for 11.0% of the sample. The number of students within the sample who are eligible for Free School Meals is slightly higher than in the population. However, it should be noted that the national average for Northern Ireland (where 9 of the schools were based) is 29.4%, which may account for the higher proportion of students eligible for FSM within the sample. With regard to language, the percentage of students within the sample speaking English as an Additional Language is close to the population average. The proportion of students within the sample with a diagnosed SEN is slightly higher than within the population, whereas those with an Education, Health and Care plan reflects the national average. Again, it should be noted that the national average for SEN in Northern Ireland is 21.0%, which may account for the slightly higher proportion of students with SEN within the sample.

For the Secondary sample, it can be seen that the sample included a lower proportion of female students than the national average for English state-funded Secondary schools, although this information was not provided for 11.6% of the sample. With regards to ethnicity, the sample has a higher proportion of White and Other ethnicity students than are found in the population and

lower proportions of Asian and Black students, although ethnicity information was not provided for 6.0% of the sample. The number of students within the sample who are eligible for Free School Meals is higher than in the population. However, it should be noted that the national average for Northern Ireland (where 2 of the schools were based) is 31.4%, which may account for the higher proportion of students eligible for FSM within the sample. The percentage of students within the sample speaking English as an Additional Language is below the population average, although this information was not provided for 23.6% of the sample. The proportion of students within the sample with a diagnosed SEN is slightly higher than within the population, whereas those with an Education, Health and Care plan is considerably higher than the national average. Again, it should be noted that the national average for SEN statements (equivalent to EHCP) in Northern Ireland is higher (4%), which may account for the higher proportion of students with ECHPs within the sample.

Table 7. Demographic details of sample

Variable	Classification	Primary sample	Primary population parameters*	Secondary sample	Secondary population parameters**
Gender	Male	46.6%	51.3%	44.7%	50.8%
	Female	50.8%	48.7%	43.6%	49.2%
	Not available	2.6%		11.6%	
Ethnicity	White	59.1%	73.6%	79.5%	73.2%
	Asian	20.4%	11.7%	5.1%	11.7%
	Black	2.9%	5.5%	1.5%	6.0%
	Mixed	5.5%	6.3%	4.7%	5.5%
	Other	1.1%	2.0%	3.1%	1.9%
	Not available	11.0%	1.0%	6.0%	1.7%
Free School Meals (FSM)	Eligible for FSM	17.2%	15.8%	20.3%	14.1%
	Not eligible for FSM	75.3%		62.8%	
	Not available	7.5%		16.9%	
English as an Additional Language (EAL)	EAL	22.5%	21.2%	3.3%	16.9%
	Not EAL	56.3%		73.2%	
	Not available	21.1%		23.6%	
Special Educational Need / Disability (SEND)	Diagnosed SEND	15.1%	14.2%	16.6%	12.4%
	Suspected SEND	3.1%		10.2%	
	No SEND	79.6%		49.9%	
	Not available	2.2%		23.3%	
Education, Health and Care Plan (EHCP)	Has EHCP	1.3%	1.6%	9.3%	1.7%
	No EHCP	91.7%		75.1%	
	Not available	7.0%		15.6%	

* Based on DfE school census data for English state-funded Primary schools, January 2019

** Based on DfE school census data for English state-funded Secondary schools, January 2019

Of the 4–7-year-olds within the standardisation sample, 91% undertook the tests using desktop computers, whilst 9% used tablets. Analysis showed that on all three subtests, there was evidence of a platform effect, with students using desktops outperforming those using tablets. However, it is possible that these differences are due to school effects, with the schools that used tablets showing higher proportions of students being eligible for free school meals, and more students with SEND support/ECHPs than the schools using desktops. Of the 8–10-year-olds within the standardisation sample, 84% undertook the tests using desktop computers, whilst 16% used tablets. Analysis shows no evidence of a platform effect. Of the 11–15-year-olds within the standardisation sample, 95% undertook the tests using desktop computers, whilst 5% used tablets. Analysis showed that on all three subtests, there was evidence of a platform effect, with students using tablets outperforming those using desktops. However, it is likely that these differences are due to school effects, with the two schools that used tablets both being independent schools, whilst the group of 14 schools testing on desktops included just one independent school.

The sample data has been weighted according to age, gender and SEND proportion against population parameters. Using a non-parametric age-standardisation model, the raw scores for each age group were transformed into Standardised Age Scores (SAS) with a mean of 100 and a standard deviation of 15. This builds on previous work conducted by Schagen (1990). SAS scores for the subtests range from 65 to 135, although on subtests where there is a ceiling effect, the SAS is capped at the upper end. However, the caps do not distort the scoring at the lower end of abilities, which are those most commonly interested in.

Table 8 shows the correlations between all Rapid subtests. The correlations range from .350 to .607, with the majority being within the moderate range (.4 to .6). All correlations are significant at the p<.001 level.

Table 8. Intercorrelations between subtests

	Cr	Ra	Rh	MP8	FW	WC	MP11	NW	Se
Crayons 4-7 (Cr)	1								
Races 4-7 (Ra)	.440* (983)	1							
Rhymes 4-7 (Rh)	.350* (965)	.363* (1315)	1						
Mobile phone 8-10 (MP8)				1					
Funny Words 8-10 (FW)				.461* (2156)	1				
Word Chopping 8-10 (WC)				.540* (2000)	.542* (1987)	1			
Mobile Phone 11-15 (MP11)							1		
Non-Words 11-15 (NW)							.434* (2976)	1	
Segments 11-15 (Se)							.501* (2680)	.607* (2852)	1

*all correlations are significant at p<.001; (N is shown in brackets)

In order to check for any gender bias, comparisons were made between males and females (where gender had been identified) on each subtest (see Table 9). Small effects were found on ***Crayons*** and ***Mobile phone***, with both subtests slightly favouring girls. There were no other gender effects.

Table 9. Gender differences

Subtest	Gender	N	Mean	SD	SE of Mean	Cohen's d*
Crayons (4-7)	Female	597	101.66	14.549	0.595	0.20
	Male	454	98.63	15.204	0.714	
Races (4-7)	Female	764	101.55	14.798	0.535	0.12
	Male	648	99.80	14.871	0.584	
Rhymes (4-7)	Female	744	101.23	13.013	0.477	0.19
	Male	625	98.75	13.097	0.524	
Mobile phone (8-10)	Female	1228	102.47	14.742	0.421	0.24
	Male	1122	98.89	15.196	0.454	
Funny words (8-10)	Female	1193	100.36	14.846	0.430	0.07
	Male	1128	99.31	15.450	0.460	
Word chopping (8-10)	Female	1101	100.95	14.764	0.445	0.18
	Male	1055	98.16	15.596	0.480	
Mobile phone (11-15)	Female	1346	102.91	14.895	0.406	0.21
	Male	1355	99.77	14.549	0.395	
Non-words (11-15)	Female	1465	101.46	15.015	0.392	0.10
	Male	1484	99.84	14.885	0.386	
Segments (11-15)	Female	1290	102.19	14.445	0.402	0.19
	Male	1280	99.33	15.384	0.430	

*Cohen's d is a measure of effect size of the difference between two means

Checks were also made for ethnic group bias. Due to the small numbers in some ethnic minority groups, comparisons were made between White students and Other ethnic groups combined (where ethnicity had been identified) on each subtest (see Table 10). Small effects were found on ***Races*** and ***Rhymes***, slightly favouring White students; and on ***Mobile phone*** (11–15), ***Non-words*** and ***Segments***, favouring other ethnicities. There were no other ethnicity effects.

Table 10. Ethnic group differences

Subtest	Ethnicity	N	Mean	SD	SE of Mean	Cohen's d*
Crayons (4-7)	White	607	100.43	14.778	0.600	0.03
	Other	341	100.05	15.600	0.845	
Races (4-7)	White	802	102.37	14.840	0.524	0.21
	Other	473	99.21	14.618	0.672	
Rhymes (4-7)	White	775	101.25	12.801	0.460	0.24
	Other	457	98.07	13.412	0.627	
Mobile phone (8-10)	White	1538	101.13	14.632	0.373	0.04
	Other	626	100.56	15.839	0.633	
Funny words (Non-words) (8-10)	White	1494	100.13	15.215	0.394	0.03
	Other	632	99.65	15.152	0.603	
Word chopping (Segments) (8-10)	White	1381	100.46	15.010	0.404	0.15
	Other	589	98.13	15.520	0.639	
Mobile phone (11-15)	White	2489	100.90	14.789	0.296	0.23
	Other	407	104.28	14.865	0.737	
Non-words (11-15)	White	2660	100.16	14.907	0.289	0.25
	Other	484	103.86	14.342	0.652	
Segments (11-15)	White	2352	100.31	14.828	0.306	0.21
	Other	411	103.40	14.923	0.736	

*Cohen's d is a measure of effect size of the difference between two means

Validation of Rapid

Validity is the extent to which a test measures what it claims to be measuring and appropriate inferences can be made from the test score. There are a variety of methods used in estimating the validity of a test. Construct validity relates to how well the test measures the intended construct and one way of assessing this involves comparison of mean scores of groups for which score differences would be expected. For Rapid, this analysis looks at the differences between dyslexic and non-dyslexic students for each subtest (see Table 11). This analysis indicates effects on all subtests, with non-dyslexics outperforming dyslexic students. Note that this analysis does not include students within the 4–7-year-old age range as only a very small proportion of dyslexic students are diagnosed prior to the age of 8.

Table 11. Construct validity

Subtest	Group	N	Mean	SD	SE of Mean	Cohen's d*
Mobile phone	Dyslexic	71	95.48	12.867	1.527	0.39
	Non-dyslexic	2088	100.95	14.992	0.328	
Funny words (Non-words)	Dyslexic	73	93.59	11.499	1.346	0.48
	Non-dyslexic	2067	100.05	15.195	0.334	
Word chopping (Segments)	Dyslexic	63	92.35	12.364	1.558	0.55
	Non-dyslexic	1846	99.94	15.146	0.353	
Mobile phone (11-15)	Dyslexic	13	100.23	9.833	2.727	0.27
	Non-dyslexic	1576	103.60	14.580	0.367	
Non-words (11-15)	Dyslexic	16	93.13	13.185	3.296	0.77
	Non-dyslexic	1738	103.80	14.606	0.350	
Segments (11-15)	Dyslexic	15	97.60	12.304	3.177	0.47
	Non-dyslexic	1664	103.97	14.524	0.356	

* Cohen's d is a measure of effect size of the difference between two means

Reliability

'Reliability' generally refers to the extent to which a test can be expected to give the same results when administered on a different occasion (test-retest reliability) or to which the components of a test give consistent results (internal consistency).

Internal consistency is a measure of whether each item in a test measures the same concept. There are several methods of calculating this, although the most commonly used is Cronbach's alpha, which is based on the ratio of the sum of the individual item variances to the overall subtest score variance. However, Cronbach's alpha presumes a complete set of responses to the items, since all items need to contribute to the factor score equally, which is not case with all the Rapid subtests. An alternative formula is the standardised Cronbach's alpha (shown below), which is based on the average non-redundant item correlation.

$$\alpha\ standardised = \frac{\text{(Number of items x mean of non-redundant correlations)}}{\text{(1+((Number of items-1) x mean of non-redundant correlations))}}$$

Table 12 shows the standardised Cronbach's alpha estimates. An internal consistency of $\alpha > .7$ is generally considered to be adequate, whilst $\alpha > .8$ is deemed as good. It can be seen from Table 12, that the majority of the subtests show a good level of internal consistency, with a few at an adequate level. ***Mobile phone*** (8–10) is showing a lower level of internal consistency due to the

strict discontinuation rule on this particular subtest (whereby the test stops when the student fails both items at a level – similar to other digit span tests). However, a normal Cronbach's alpha calculation (based on the remaining more difficult items being failed after discontinuation) estimates the internal consistency on this subtest as .831.

Table 12. Internal consistency

Subtest	Standardised α
Crayons (4-6)	.822
Crayons (7)	.736
Races (4-6)	.786
Races (7)	.730
Rhymes (4-6)	.856
Rhymes (7)	.823
Mobile phone (8-10)	.629
Funny words (8-10)	.805
Word chopping (8-10)	.813
Mobile phone (11-15)	.693
Non-words (11-15)	.728
Segments (11-15)	.803

Test-retest reliability estimates the degree to which a test provides stable measurements over time. A small subset of the Rapid standardisation sample (n = 200) repeated the Rapid subtests 4–6 weeks after the first administration. Correlations (using Pearson's r) between scores on the two sittings are given in Table 13. A correlation of .60 is considered to be an adequate level of test-retest reliability, with .70 considered as good. As can be seen in Table 13, ***Rhymes*** shows a good level of test-retest reliability. The remaining subtests are mostly within or around the acceptable level, although ***Races*** and ***Mobile phone*** are a little below. Earlier research on LASS found lower correlations on the memory subtests than on the literacy subtests, which appeared to be due to greater susceptibility of these tasks to practice effects arising from enhanced motivation and application of strategic thinking at the retest.

Table 13. Test-retest reliability

Subtest	Pearson's r
Crayons	.63
Races	.53
Rhymes	.76
Mobile phone	.57
Funny words (Non-words)	.59
Word chopping (Segments)	.62

References

B

Branum-Martin, L., Tao, S. and Garnaat, S. (2015) Bilingual phonological awareness: Re-examining the evidence for relations within and across languages. *Journal of Educational Psychology, 107*(1), 111-125.

Bruck, M. and Genesee, F. (1995) Phonological awareness in young second language learners. *Journal of Child Language, 22*, 307-324.

Buzan, A. (2006) *Use your memory: Understand your mind to improve your memory and mental power*. London: BBC Books.

C

Chung, K. K. H., McBride-Chang, C., Cheung, H. and Wong, S. W. L. (2013) General auditory processing, speech perception and phonological awareness skills in Chinese-English biliteracy. *Journal of Research in Reading, 36*(2), 202-222.

Cline, T. (2000) Multilingualism and dyslexia: Challenges for research and practice. *Dyslexia: An international journal of research and practice, 6*(1), 3-12.

Cline, T. and Frederickson, N. (1999) Identification and assessment of dyslexia in bi/multilingual children. *International Journal of Bilingual Education and Bilingualism, 2*(2), 81-93.

Cline, T. and Shamsi, T. (2000) *Language Needs or Special Needs? The Assessment of Learning Difficulties in Literacy Among Children Learning English as an Additional Language: A Literature Review*. Norwich: DfEE.

D

Durkin, C. (2000) Dyslexia and bilingual children – Does recent research assist identification? *Dyslexia: An international journal of research and practice, 6*(4), 248-267.

E

Everatt, J., Smythe, I., Adams, E. and Ocampo, D. (2000) Dyslexia screening measures and bilingualism. *Dyslexia: An International Journal of Research and Practice, 6*(1), 42-56.

F

Frederickson, N. and Frith, U. (1998) Identifying dyslexia in bilingual children: A phonological approach with inner London Sylheti speakers. *Dyslexia: An International Journal of Research and Practice, 4*(3), 119-131.

G

Gottardo, A. (2002) The relationship between language and reading skills in bilingual Spanish-English speakers. *Topics in Language Disorders, 22*, 46-70.

Gottardo, A., Chiappe, P., Yan, B., Siegel, L. and Gu, Y. (2006) Relationships between first and second language phonological processing skills and reading in Chinese-English speakers living in English-speaking contexts. *Educational Psychology, 26*(3), 367-393.

Gunderson, L., D'Silva, R. and Chen, L. (2011) Second language reading disability: International themes. In McGill-Franzen, A. and, Allington, R.L (Eds) *Handbook of Research on Reading Disabilities*. Oxford and New York: Routledge, pp.13-24.

H

Harrison, G.L. and Krol, L. (2007) Relationship between L1 and L2 word-level reading and phonological processing in adults learning English as a second language. *Journal of Research in Reading, 30*(4), 379-393.

Horne, J. K. (2002) *Development and evaluation of computer-based techniques for assessing children in educational settings*. Unpublished Ph.D. Thesis, Department of Psychology, University of Hull, UK.

M

Manis, F. R., Lindsey, K. A. and Bailey, C. E. (2004) Development of reading in grades K2 in Spanish-speaking English-language learners. *Learning Disabilities Research and Practice, 19*, 214-224.

Miller Guron, L and Lundberg, I. (2003) Identifying dyslexia in multilingual students: can phonological awareness be assessed in the majority language? *Journal of Research in Reading, 26*, 69-82.

Mortimore, T., Hansen, L., Hutchings, M., Northcote, A., Fernando, J., Horobin, L., Saunders, K. and Everatt, J. (2012) *Dyslexia and multilingualism: Identifying and supporting bilingual learners who might be at risk of developing SpLD / dyslexia*. British Dyslexia Association and the Lottery Fund. Research Reports for External Bodies. Bracknell, UK: The British Dyslexia Association.

P

Peer, L. and Reid, G. (Eds) (2016) *Multilingualism, literacy and dyslexia: Breaking down barriers for educators (Second edition)*. London: Routledge.

R

Reid, G. (2016) *Dyslexia: a practitioner's handbook* (5th Edition). Chichester, UK: Wiley.

S

Saksida, A., Iannuzzi, S., Bogliotti, C., Chaix, Y., Démonet, J.-F., Bricout, L., ... Ramus, F. (2016) Phonological skills, visual attention span, and visual stress in developmental dyslexia. *Developmental Psychology, 52*(10), 1503-1516.

Schagen,I.P. (1990) A method for the age standardization of test scores. *Applied Psychological Measurement, 14*(4), 387-393.

Singleton, C. H. (1997a) Screening early literacy. In J. R. Beech and C. H. Singleton (Eds.) *The Psychological Assessment of Reading*. London: Routledge, pp.67-101.

Singleton, C. H., Thomas K. V. and Horne, J. K. (2000) Computer-based cognitive assessment and the development of reading. *Journal of Research in Reading, 23*(2), 158-180.

Snowling, M. (2000) *Dyslexia* (Second Edition). Oxford: Blackwell.

Swanson, H. L., Saez, L. and Gerber, M. (2006) Growth in literacy and cognition in bilingual children at risk or not at risk for Reading disabilities. *Journal of Educational Psychology, 98*, 247-264.

Swanson, H. L., Orosco, M. J., Lussier, C. M., Gerber, M. M. and Guzman-Orth, D. A. (2011) The influence of working memory and phonological processing on English language learner children's bilingual reading and language acquisition. *Journal of Educational Psychology, 103*(4), 838-856.

T

Tsagari, D. and Spanoudis, G. (Eds) (2013) *Assessing L2 students with learning and other disabilities*. Newcastle upon Tyne: Cambridge Scholars Publishing.

V

Vellutino, F. R., Fletcher, J. M., Snowling, M. J. and Scanlon, D. M. (2004) Specific reading disability (dyslexia): What have we learned in the past four decades? *The Journal of Child Psychology and Psychiatry, 45*(1), 2-40.