School's Manual

Do all your students read fluently?
Before you can understand what you read, or enjoy reading, you need to be able to read fluently.

After 8 weeks, reading speed had increased for all children - by an average of 25%
Chalgrove Primary School, Oxfordshire

I was really excited to see the changes after the children had played Engaging Eyes for 6 weeks. All 10 children's reading speed increased or accuracy improved.
Whitehall Junior School, Hillingdon

“Amella was very slow at reading, often missed out short words and constantly lost her place on the line. Since completing Engaging Eyes her reading speed and accuracy have improved and she is enjoying reading so much more.”

www.engagingEyes.co.uk
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Overview

Before you can understand what you read, or enjoy reading, you need to be able to read fluently and efficiently.

To read efficiently you need to be able to:

- Focus both eyes on the same letter (*convergence*)
- Track your eyes smoothly across the line (*eye tracking*)
- Jump your eyes down to the next line (*saccades*)

Most children with reading, writing or spelling difficulties will have these subtle vision problems.

Convergence problems aren’t fully tested by a regular optician, or in the reception eye test, so for most children their problems remain undiagnosed.

In a typical school around 90% of children on the SEN register will have convergence problems.

**Engaging Eyes** is the very first computer based vision skills program that is suitable to be played at school.

Playing Engaging Eyes, and therefore improving vision skills, removes a huge barrier to efficient reading.

Getting Started

Selecting Students to Play Engaging Eyes

**Engaging Eyes** is suitable for almost any child with reading, writing or spelling difficulties. Convergence problems are also often co-morbid with *Dyslexia, Dyspraxia, ADHD, Asperger’s, ASD and Visual Stress*.

If a student wears coloured glasses, or uses a coloured overlay, then they almost certainly have convergence problems and would benefit from playing Engaging Eyes. Equally if they complain of the text moving or seeing double then they probably have a convergence problem.
Other symptoms of convergence problems include eye strain, trouble remembering what you read and tiring easily when reading.

**Adding Students**

To add a student to Engaging Eyes, select ‘Add Student’ from the dashboard menu.

And enter their details:

Password will be assigned by Engaging Eyes, and will be the same for each student. Usernames need to be unique only within your school.
When to play Engaging Eyes

Engaging Eyes should make the student’s eyes slightly sore so it’s best to play just before break or lunch. Or else it can be done before school or at lunch.

It only takes 10 minutes and does not normally require 1:1 supervision.

Setting Screen Resolution

In order to make the student converge their eyes the correct amount, Engaging Eyes has to know how big the computer screen is. When you first log in you will be prompted to set the screen resolution. You need to do this using the same type of monitor that the students will use.

How long does the intervention take?

Playing Engaging Eyes takes 10 minutes a day.

It should be played 5 days a week.

Each student should play until they have completed all their stars. This will take at least 6 months. Although the benefits of improved convergence and eye tracking may be noticed after only a few weeks.

It is important to complete all stars to stop convergence regressing after you finish the intervention.
School Dashboard

When you login you get taken to the school dashboard, which contains: a menu, an overview of all students, details of the selected student, and target reading speeds.

The overview table shows:

- Which students are playing Engaging Eyes
- How much their convergence has improved
- How much their reading speed has improved

When you select a student you can see:

- The results from their last 4 reading speed tests
- Their target reading speed
- How far through the program they are
- Which days they’ve played
Overview Table

*Start Level, Current Level* and *Levels Gained* in the overview table refer to Target Practice A, and is a measurement of how much the students convergence has improved.

*Start WPM (Words per Minute), Latest WPM and Improved WPM By* are the results of the students reading speed tests.

**Reading Speed Graph**

The reading speed graph shows the results of the last 4 reading tests the selected student has done.

The green line on the graph shows the average reading speed for their age.

**Games Results Graph**

The bottom graph shows which days the student has played each game, and how many points they got. The tool tip shows what level they achieved.

Click on the games listed next to the graph to view the chart of how they are doing in that game.

% complete shows you how far through the intervention they are.

**Dashboard Menu**

The dashboard menu contains: Assess, Add Student, View Student, Delete Student, Print, Settings, Help and Logout.

**Assess Convergence**

Assess takes you through to the main game screen (student dashboard) so that you can assess a student’s convergence. This is another way to decide which students need to play Engaging Eyes.
Ask the student to play Target Practice A. If their convergence is good they will be able to complete level 10. In this case they do not need to play Engaging Eyes. You may want to press the arrow keys for them while they tell you what to do, so they don’t look down at the keyboard and lose their place.

Otherwise they do have convergence problems and would benefit from playing Engaging Eyes.

*See Appendix A for a full list of symptoms of convergence insufficiency*

**Settings**

Engaging Eyes needs to know how large the students monitor is, so that the levels in Target Practice can be set correctly.

Hold a credit card up to the screen and move the slider so that it lines up exactly with the width of the credit card – i.e. the slider is set at 8.5cm.

If a student plays Engaging Eyes from multiple computers (e.g. at school and at home) then screen resolution needs to be set each time.

**What resolution is the monitor your students will use?**

*Move the slider to the length of a standard credit card (8.5cm), so that Engaging Eyes can adjust to your screen size.***

**Playing Engaging Eyes**

The games have sound effects, so you may wish students to wear headphones.

**Student’s Dashboard**

When the student logs in ‘*Play Today*’ shows which games they should play.

It should take around 10 minutes to complete the daily session.
Whack an Alien

Click on as many aliens as you can in 3 minutes. Keep your head still and just move your eyes.

Whack an Alien exercises *saccades* – rapid eye movements. It is a human reflex to look at moving objects, so the student will be exercising their saccades whether or not they are able to ‘whack’ the alien in the allowed time.

There are 3 levels. Each level is slightly faster than the previous one. However it doesn’t matter whether the student is able to whack the alien or not – they will still be exercising their eyes.
**Target Practice**

Game A encourages you to converge your eyes (focusing both eyes on the same point which is near to them), game B to diverge your eyes (focusing both eyes on the same point which is far away), and game C to switch between the two.

To play Target Practice wear red cyan 3d glasses and sit approximately 16” away from the screen. If you need more pairs of glasses you can either buy them from Amazon or contact Engaging Eyes.

The glasses have one red and one cyan lens. The targets are drawn as red and cyan circles overlapping each other. If you’re able to converge your eyes you will see the circles merged into one 3d image.

When wearing the 3d glasses the targets should appear to be positioned at different depths. They should look like they are floating off the screen or disappearing into the distance.

You can wear the 3d glasses over normal glasses. However if the student wears coloured glasses they’ll need to take them off before putting on the red cyan 3D glasses.
How to Play

Try to blow up all the targets by spinning the shooter with the left or right arrow key till it’s facing the target. Next use the up or down arrow to bring the shooter to the same depth as the target. Then press the space bar to fire.

If the shooter is at the correct depth then the target will be blown up. Otherwise the bullet will travel in front of or behind the target and miss.

The goal is to blow up all the targets at that level, then you will move on to the next level which will be slightly harder.

The only way to determine what depth the shooter should be at is by converging or diverging your eyes. Otherwise they’ll just look like overlapping red and cyan circles. Each level the distance between the red and cyan circles increases, forcing you to converge or diverge your eyes more.

After level 1 it’s virtually impossible to hit all the targets by guessing, so there is no way for the student to complete the level if they can’t converge their eyes adequately.

Target Practice always starts at level 1, as it is very hard to converge your eyes to a higher level without gradually going through the levels.
Therefore the student needs to stay focussed and keep looking at the screen throughout the game. If they look away it’s very hard to complete the level when they look back.

To get you to your hardest level quickly the game presents 4 targets instead of 8 until you are near your highest level.

Level 16 is the top level. You need to gain all twenty-seven stars for level 16 in order to make sure your convergence is really strong and won’t slip back once you stop playing Engaging Eyes. This will ensure the improvements are permanent.

If you miss too many targets you go down a level. When you have played for at least 5 minutes and you miss too many targets then the game is over.

**Tips**

If a child is struggling, or is very young, someone can press the arrow keys for them so they can concentrate on staring at the screen. Because they mustn’t look down at the keyboard while playing.

If a student has very poor convergence they will struggle with level 1 and won’t be able to see that the targets are 3D. If so they need to relax and just stare at the screen until their eyes converge and they can see them in 3d. Alternatively try moving the shooter in and out (up and down arrows) slowly and they should keep trying to bring their eyes together so that they go slightly cross-eyed.

But it may take several sessions or even several weeks for them to learn how to converge their eyes.

**Speed Fix**

Speed Fix helps reduce fixations (the number of points you look at when reading) and increase saccades (the distance you jump to the next fixation). This is necessary for smooth and efficient eye tracking.

First of all keep your head still while watching the animals.

Then 4 letters flash up briefly (game A) or 3 sets of 4 letters (game B), and you are asked if an 'a' was one of them.

After 10 flashes, some more animals appear, then another lot of 10 letter flashes.
Each level the letters flash progressively quicker.

**Eye Tracking**

Press the space bar every time you see a ‘b’ (Game A) or if the highlighted word starts or ends with an ‘e’ (Game B).

Keep your head still and just move your eyes to follow the highlighted letter or word.

The eye tracking games force the student to concentrate carefully on the highlighted letter, which moves across the screen so that you are practicing eye tracking needed for reading.

There are three levels. Each level is slightly faster than the previous one. You need to get a certain amount of points to collect a star. When you have all the stars for one level, you are moved up to the next level.

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**Press the spacebar every time you see a letter 'b'.**

**Press the spacebar to start.**

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**Reading Speed Tests**

The first time a student logs on they have to complete a reading speed test.

First they select the appropriate story level:
Then they are presented with a short passage to read. They have a minute to read as much as they can. This needs to be supervised by an adult who can count how many mistakes they make in one minute.

After the reading test the student is taken to their dashboard so they can do their daily session. This reading test is then repeated every 6 weeks so that you can measure improvements.
Appendix A - Convergence Insufficiency Symptom Survey

Answering yes to 4 or more of the following symptoms is suggestive of convergence insufficiency:

1. Do your eyes feel tired when reading or doing close work?
2. Do your eyes feel uncomfortable when reading or doing close work?
3. Do you have headaches when reading or doing close work?
4. Do you feel sleepy when reading or doing close work?
5. Do you lose concentration when reading or doing close work?
6. Do you have trouble remembering what you have read?
7. Do you have double vision when reading or doing close work?
8. Do you see the words move, jump, swim or appear to float on the page when reading or doing close work?
9. Do you feel like you read slowly?
10. Do your eyes ever hurt when reading or doing close work?
11. Do your eyes ever feel sore when reading or doing close work?
12. Do you feel a "pulling" feeling around your eyes when reading or doing close work?
13. Do you notice the words blurring or coming in and out of focus when reading or doing close work?
14. Do you lose your place while reading or doing close work?
15. Do you have to re-read the same line of words when reading?
Appendix B – Research Studies

Ophthalmic findings in dyslexic schoolchildren

*British Journal of Ophthalmology 1994; 78:339-343*

M-L Latvala, TT Korhonen, M Penttinen, P Laippala

[http://bmj-bjo.highwire.org/content/78/5/339.full.pdf](http://bmj-bjo.highwire.org/content/78/5/339.full.pdf)

Abstract

The ophthalmic findings of 55 dyslexic 12 to 13 year-old Finnish schoolchildren and 50 age, sex, and social class-matched control children were evaluated... The two groups did not differ significantly from each other in visual acuity, cycloplegic refraction, the amount of phorias and tropias, stereo acuity, fusion, or accommodation. **Convergence near point >= 8 cm was, however, statistically more frequent in the dyslexic group**... This finding suggests a low accommodative convergence / accommodation ratio in these children...

Diagnosis of dyslexia by means of a new indicator of eye dominance.

*British Journal of Ophthalmology 1982; 66, 332-336*

J F Stein and S Fowler

[http://bjo.bmj.com/content/66/5/332.full.pdf](http://bjo.bmj.com/content/66/5/332.full.pdf)

Abstract

**Many dyslexic children are unable accurately to control the movements of their eyes even when they are not trying to read.**

This immaturity helps to explain their visual confusions. It may result from failure to develop dependable associations between retinal and ocular motor signals these are essential to fix the true, as opposed to retinotopic, locations of objects in the outside world. We have used a new test to study retinal/ocular motor correspondence in dyslexic children and age/IQ matched normal readers. Over half the dyslexics showed unstable ocular motor dominance.
Dyslexia is however, often associated with abnormal movements of the eyes. Although many people suggest that these are merely a consequence rather than a cause of reading difficulties, perhaps arising from children’s inability to make sense of what they see, it is now clear that many dyslexics have unusual eye movements even when they are not trying to read.

They are more likely than normal readers to show esophoria, convergence insufficiency, breakdown to saccadic jerks (cogwheeling) during attempts at smooth pursuit, excessive numbers of regressions, and inability to maintain stable fixation when viewing sequentially illuminated light-emitting diodes.

These eye movement disorders may help to explain a child’s difficulties with learning to read. Reading demands highly accurate ocular motor control, together with precise monitoring of eye position, since this is essential to determine true visual direction. When we look at a letter we can estimate its true position in space only if we know the exact angle of our gaze...

Monitoring of eye position is of course necessary long before reading begins, but to read successfully a new degree of precision is demanded. Dyslexics tend to lose their place on a page, and for them letters often seem to move around and reverse themselves. It is possible therefore that they fail to develop sufficient information about the direction of their gaze, to tell them precisely where their eyes are pointing when they are trying to read.

Visual skills of poor readers in high school

Optometry - Journal of the American Optometric Association; Oct 2007; 542-549

David Grisham, Maureen Powers, Phillip Riles

Abstract

... Visual skills and visual acuity were measured in 461 students (average age 15.4 years) in 4 California high schools within the same school district. Participating students had been identified by their schools as poor readers. Standard optometric tests and published criteria for “adequate” or “weak” visual skills were used.

Results

In this sample, 80% of the students were found to be inadequate or weak in 1 or more of the following visual skills: binocular fusion ranges at near, accommodative facility, and convergence near point. More students were deficient in binocular fusion range than in either accommodative function or near point of convergence. In contrast, only 17% had deficient visual acuity—20/40 or worse in 1 eye—the standard model of deficiency for school vision screenings.

Conclusion

The results support and extend previous studies showing that large numbers of poor readers in high school may be at high risk for visual skills dysfunction.

Saccadic tracking skills of poor readers in high school

Optometry - Journal of the American Optometric Association; May 2008; 228-234

Maureen Powers, David Grisham, Phillip Riles


Abstract

Background

Oculomotor control has been implicated as a factor when reading is poor, but few studies exist for adolescents.

Methods

The saccadic eye movement efficiency of 684 ninth grade students, identified as poor readers in 5 California high schools, was quantified using the Developmental Eye Movement test. Frequency distributions were produced from scores on vertical and horizontal components, and gender and test-retest factors were considered during analysis.
Results

Vertical times were within 1 standard deviation of normal for eighth grade. However, horizontal (saccadic) times were typical of grade 3, and the average number of errors on the horizontal test was typical of grade 2. Boys and girls performed similarly. Results of retests showed slightly improved horizontal times and fewer errors, but the grade level equivalents remained dramatically low. Overall, fewer than 10% of students scored above the 50th percentile for eighth grade.

Conclusion

The results indicate that poor readers in high school may be at high risk for poor saccadic tracking skill.
Appendix C - Average Reading Speeds

Average reading speeds do not appear to have been measured in the UK, but in the US it has been studied quite a lot. These are the US national averages for optimal silent and oral reading rates by grade level that Hasbrouck & Tindal published in "Oral Reading Fluency: 90 Years of Measurement":

Silent Reading Rates

1st grade: 80 wpm
2nd grade: 115 wpm
3rd grade: 138 wpm
4th grade: 158 wpm
5th grade: 173 wpm
6th grade: 185 wpm
7th grade: 195 wpm
8th grade: 204 wpm
9th grade: 214 wpm
10th grade: 224 wpm
11th grade: 237 wpm
12th grade: 250 wpm
College or University: 280 wpm

Oral Reading Rates

1st grade: 53 wpm
2nd grade: 89 wpm
3rd grade: 107 wpm
4th grade: 123 wpm
5th grade: 139 wpm
6th grade: 150 wpm
7th grade: 150 wpm
8th grade: 151 wpm

Notice that oral reading rates beyond the 8th grade level are not listed. This is due to the fact that when we read aloud, we generally do not read faster than what we can read at an 8th grade reading level.