

Science and the body

Note-taking I

Read the article about special hi-tech spectacles that are being adapted to help children suffering from dyslexia. Then write short notes under each heading.

Tackling dyslexia in children

Children who are dyslexic have problems processing specific visual information, resulting in trouble reading and also difficulty with writing. Until recently, it was thought to be language-related areas of the brain which were deficient, but new research suggests that dyslexics have difficulty with the control of eye movement, or 'eye wobble'.

Scientists based at the QinetiQ Laboratory and researchers at the Dyslexia Research Trust are working together to adapt special glasses known as hi-tech specs (spectacles) to help dyslexics. These specs, originally developed to monitor the eye movements of fighter pilots, are being adapted into small versions for children as young as five.

It is hoped the technology will help children like the six-year-old boy who said to Dr Sue Fowler, a researcher at the Dyslexia Research Trust's clinic, 'Do you want to know a secret? All the words on the page move and I don't know how they do it because they don't have any legs.' Other children with dyslexia may report a disturbing sensation of 'glare' from the printed page, making them rub their eyes frequently. In some dyslexic children, reading causes a headache.

Professor John Stein, professor of neurology at Magdalen College, Oxford, has spent 20 years researching the connection between lack of eye control and reading difficulties. He says, 'We are visual people and eye movements are possibly the most important movements we make because they allow us to inspect the world around us. I believe problems with eye wobble account for up to two-thirds of dyslexia cases.'

'Dyslexia is not a disease. It is a brain difference, like left-handedness. We also believe that a cell in the brain, the magnocell, is related to eye movement. It seems that magnocells in dyslexics do not develop as well as those in good readers.'

The professor, who trained at Oxford and St Thomas's Hospital in London, will be meeting government officials to prepare for a trial of the hi-tech specs in primary schools in London and Hampshire. Professor Stein and his colleague Dr Fowler used the first prototype on a child last summer.



Professor Stein explains, 'Eye wobble is not obvious to the naked eye. The movements are small and very rapid. The hi-tech specs, which are worn for only a few minutes during tests, are the most accurate technique we have for detecting the amount of eye wobble. The child focuses on a point 45 centimetres away and then follows a moving target. The specs show whether the child's eyes are tracking steadily, or whether they wobble. We would like the specs to be mass-produced, becoming cheap enough to be used in all primary schools.'

Dr Fowler adds, 'We see 800 children a year from all over the country. They are mostly aged seven to twelve, but people of any age can be assessed. Because we are a charity and investigations are part of our research, children are seen free.'

'Children's brains are flexible enough to enable them to improve their eye control so it's important to identify young dyslexics early. After seeing them at the clinic, we give patients daily exercises to enable them to keep their eyes still and fixed on one object. In time, we believe these exercises become marked onto the brain. The result is that reading improves greatly.'

Problems a dyslexic child may complain of

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Original use of the hi-tech specs

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How the specs are used to test children for dyslexia

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Treatment after the tests

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Skills builder

Using the ideas in your notes, write a paragraph on the ways dyslexia may affect children, a technique for diagnosing dyslexia and how dyslexia can be treated. Write about 100 words (and not more than 120 words). Use your own words as far as possible.

TIP

Being aware of your reading speed

The speed at which students feel comfortable reading is a very personal matter and there is no doubt that individual speeds of reading vary a lot. Reading speed does not show how intelligent someone is, although young people often believe it does.

The fact is we all speed up and slow down as we read, depending on the difficulty of the content. We often do this without thinking, whether we are reading for pleasure or reading for information. We sometimes read groups of words quite fast, understanding the information quickly and easily, without any conscious effort. You may be surprised by how quickly you 'get through' several chapters of an exciting novel. On the other hand, we naturally slow down or reread a section of text when we want to be sure that we are getting the correct meaning from what we are reading.

Next time you read, you could try to be more aware of your reading speeds. When practising exam-style exercises, slow down a little if you begin to feel confused. Reread a sentence or group of words, checking back with the question to see if this bit of text contains relevant information. Approaching your reading in this way is a more mature attitude to study than rushing through without understanding. Don't be worried about taking more time, as the few extra seconds of double-checking are definitely worth it.

Summary 1

Read the internet article about the role of the placebo in medicine. Write a summary outlining what a placebo is, and the factors that increase the effectiveness of a placebo. Write about 100 words (and not more than 120 words). Use your own words as far as possible.

All in the mind?

Before the 20th century, doctors discovered that inert substances, with no active chemical ingredients, could have a dramatic effect on a patient's condition when other medicines failed to cure them. Doctors used these fake or pretend medicines in the hope that they might stimulate a patient's personal healing powers. They found that a person's belief in the power of the treatment was enough by itself to make them better. Patients might be prescribed fake medicines by doctors when other treatments had failed. Medicines of this kind became known as placebos, from the Latin 'to please'. It seems that placebos can affect the brain in some way, resulting in positive changes.

In modern times, clinical trials (research studies to investigate the best medical approaches to help patients) have demonstrated that placebos can be very effective for about 30 per cent of people. Placebos are considered especially valuable for subjective health conditions that have a psychological component, such as anxiety, pain or sleep disorders.

Maya dos Santos, a hairdresser, recently took part in a clinical trial to find out whether a placebo could help her lose weight. Maya says she had no idea that the slimming pills she was prescribed on the trial were a placebo. 'I was delighted when I was asked to participate as I wanted to lose weight to look good at my son's wedding. My previous attempts to slim had failed and nothing seemed to work. I believed in the pills and that made a difference. While I was on the trial, the doctor's advice was to take more exercise and to eat in moderation. To my amazement, I had no hunger pangs or cravings. I used to be

obsessed with fatty food and high-calorie treats. I was convinced it was the slimming pills which decreased my appetite and took away my desire to snack. Instead, I enjoyed nutritious meals.'

Soon Maya was receiving compliments about her trim shape, glowing skin and glossy hair. She says, 'It was thrilling when the doctor confirmed that I had reached my target weight. I had never felt more energetic and had a new zest for life. My only regret was that the pills had not been available before. I was stunned when he explained that the tablets were a placebo and contained nothing but a bit of flour and water.'

Maya clearly had a strong belief in the power of the pills and Professor Miller, who organised the project, says that this is important. 'We do not fully understand how a placebo works because the mind is so complex. However, the size and colour of the pills seem to matter: Large red or blue pills are perceived as more powerful than small white pills. Injections create even stronger expectations of a successful outcome. Giving strict instructions to follow also helps.'

Maya says, 'I was given big blue tablets to take 15 minutes before meals and I was careful to check the time was correct.' She adds, 'Halfway through the trial, I received an injection. I believed it boosted weight loss but I now know the nurse was injecting water.'



In addition to the pills, Maya was supported by a nurse. She says, 'Justina rang me on my mobile regularly and was so sympathetic. She praised me for my efforts.' Professor Miller says that comfort and reassurance help perhaps because they generate feel-good hormones.

The professor insists that the imagination also plays a powerful role. During the trial, Maya used her imagination to visualise the pills burning fat. Maya smiles as she explains, 'I pictured myself slim and radiantly healthy, wearing stylish clothes.'

It is unethical to prescribe a placebo without the patient's consent, unless they have agreed to be part of a clinical trial. Does Maya feel cheated? 'No!' Maya declares. 'It was not unfair. My mind is powerful – that is something I did not appreciate enough. Positive thinking helps me achieve my goals. My self-respect and self-esteem are higher now. What's more, I have just bought a gorgeous new trouser suit for the wedding!'

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TIP Ethical issues

This article raises an ethical issue – the use of placebos. It is an ethical issue because some people might think it is harmful to prescribe placebos to sick people who believe they are being given genuine medicine.

An ethical issue raises ‘moral and ethical concerns’ – involving questions of right and wrong.

However, the tone used to describe the placebo response is not sensational. Ethical issues are not necessarily discussed in an emotive way. The article distinguishes clearly between medical theories expressed by the professor and the emotional and psychological reactions of the patient. Some of the professor’s phrases sound cautious, for example: *we do not fully understand; perhaps because it may*. The idea of the article is not to give false hope that the placebo is a ‘miracle cure’. The writer’s aim is to interest readers who have no specialist knowledge and encourage them to make up their own minds.

The task focuses on finding the facts and evidence about the placebo response. This is shown by the key words for the answer: **what** a placebo is, **why** it may help and the **factors** that can make it more effective. These key words are clues that help you understand the idea of a placebo and the potential seriousness of its use.