

Virtual reality headsets could put children's health at risk

Leeds University scientists found 20-minute game risked vision and balance problems for players aged eight to 12



Extended use of VR headsets may lead to vision or balance problems, particularly in children. Photograph: David McNew/Getty Images

Researchers have warned that virtual reality headsets could pose risks to users, particularly children. The scientists, [based at Leeds University](#), believe continued use of VR sets could trigger eyesight and balance problems in young people unless changes are made to devices.

The warning comes as major companies including [Facebook](#) and [Google](#) outline plans to expand heavily in the field, while hardware companies have started promoting devices that turn mobile phones into head-mounted VR viewers.

The study by the Leeds researchers – who have been working in close collaboration with British VR companies – is one of the first to be carried out into the impact of virtual reality sets on users.

“In a VR device, a virtual three-dimensional world is displayed on a 2D screen and that places strain on the human visual system,” said Mark Mon-Williams, professor of cognitive psychology at Leeds University. “In adults, that can lead to headaches and sore eyes. But with children, the long-term consequences are simply unknown.”

In their study, the Leeds team – led by Faisal Mushtaq, an expert in human performance research – looked at 20 children aged between eight and 12 as they played a 20-minute game that involved immersing themselves in a virtual reality world. The children were examined after the game.

The researchers found no child experienced serious deterioration in their eyesight. However, in two cases their stereo-acuity – the ability to detect differences in distances – was disrupted, while another child showed a “drastic worsening” of balance immediately after finishing the VR game. These effects were short-lived but were nevertheless noticeable, even though the children were immersed for only a short time in their virtual reality world.

“This study presents one of the first ever investigations into the impact of VR use on children’s vision and balance,” said Mushtaq. “Establishing the scientific evidence base on safe usage is important if we want to ensure that children benefit from all the exciting possibilities that VR has to offer.”

Failure to address the issues could lead to physiological damage in children, which in turn could limit take-up of VR devices. [Virtual reality](#) is expected to be a dominant force in domestic and industrial technology over the coming decades as engineers and scientists envisage a future in which people interact through headsets that appear to offer three-dimensional views.

Hundreds of companies are now making VR games and apps. Film-makers are exploring the potential for documentaries and animation, and Facebook and YouTube have jumped on the bandwagon with [360-degree videos](#). Computer games such as *Call of Duty* are now being enjoyed increasingly by players who immerse themselves completely into their games by wearing VR headsets rather than watching the game unfold on a television screen or computer.

The use of VR is also expanding significantly in higher education. Dental students at Leeds are trained to examine teeth that appear before them in VR headsets, for example. Similarly, medical students can study tumours and wounds that are screened this way.

“You can put on VR headsets and go on cycle races – exercise bikes fitted with devices that measure the effort you are putting into the race,” said Mon-Williams. “You can train for tennis or for golf. And further into the future, we can expect to replace computer terminals with VR headsets. The keyboard and the mouse will become things of the past and we will assemble sentences by waving our hands at words and assembling them rather like Tom Cruise’s character handles symbols on screen in the film *Minority Report*.”

But the current rapid expansion of the field should not simply be based on the creation of ever faster computers and better screens, particularly when dealing with children’s use of devices, he added: “There needs to be an understanding of how children interact with a virtual world: how they focus on objects and how they make sense of distances in that world. The crucial point is that we should tackle these problems now by designing VR devices so that they do not cause vision or balance problems.

“The great thing about virtual reality is that you are no longer restrained by Newtonian mechanics. You are creating your own world but that has the potential to set up unnatural interactions. There may be some fairly simple solutions to the problems we have uncovered. Nevertheless, an immense change lies ahead about we see things. We want to make sure that it is implemented correctly from the start and, to be fair, so does the VR industry which takes this kind of study very seriously.”