Re: Dattilo et al.: Correlation between stereopsis and reverse stereopsis (Ophthalmology. 2017;124:411-413)

TO THE EDITOR: Like Dattilo et al.1 I also find stereoacuity to be a useful test in the neuro-ophthalmology clinic. It is a sensitive test for lesions of the chiasm and can also help to diagnose patients with functional vision loss. However, I do not completely understand the line of reasoning they used with regard to traditional stereopsis and reverse stereopsis (RS).

In their article, the authors contend that, when using the Titmus stereoacuity test, the retina is stimulated by virtual images: Figure 1 explains that, with traditional stereopsis, 1 image is projected to the fovea and another image is projected temporal to the fovea; with RS, 1 image is projected to the fovea and another image is projected nasal to the fovea. This explanation is not consistent with my understanding of the stereoacuity test. The stereoacuity images are not virtual images; they are real images presented separately to each eye. The brain is “tricked” into seeing a 3-dimensional image, essentially an optical illusion.

The stereoacuity test works similar to a 3-dimensional movie: Two separate images are presented, 1 for the right eye and 1 for the left eye. The images are projected through a polarizing filter and movie patrons wear corresponding polarized glasses. The disparity in the 2 images produces the illusion of 3 dimensions. The Titmus test uses a similar optical trick: If you look closely at the 1 dot in each of the 9 tests that seems to “stick out” of the booklet, you will see that there are actually 2 dots. The 2 dots are each under a polarizing filter, with the filters oriented at 90° to each other. A pair of polarized glasses accompanies the Titmus test. The polarizations of the 2 lenses are also oriented at 90° to each other. In this way, the right eye sees 1 dot and the left sees the other dot; the disparity in location of the 2 dots produces the illusion of 3 dimensions.

Figure 1 in the article is misleading in 2 respects. First, it implies that the images of both dots are seen by both eyes. In fact, because of the polarization of the images, 1 dot is seen by 1 eye and another dot is seen by the other eye. In addition, the figure shows that the second dot images are seen by either nasal or temporal retina. What actually occurs is that each dot is perceived by the fovea of 1 eye; there are no dots seen by nasal or temporal retina.

I am not sure if this misconception on the part of the authors negates their findings, but I do not think that they can use differences in traditional stereopsis or RS to draw any conclusions about the relationship between this disparity and visual field defects. In my personal experience, the key usefulness of the RS is that it helps to ensure that patients undergoing the test understand the test: When you flip the booklet upside down, one can ask the patient if the dot still seems to be “sticking out.” They should answer that the dot is now “sticking in.”

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