# Vivid Vision and the Zone of Simultaneous Awareness

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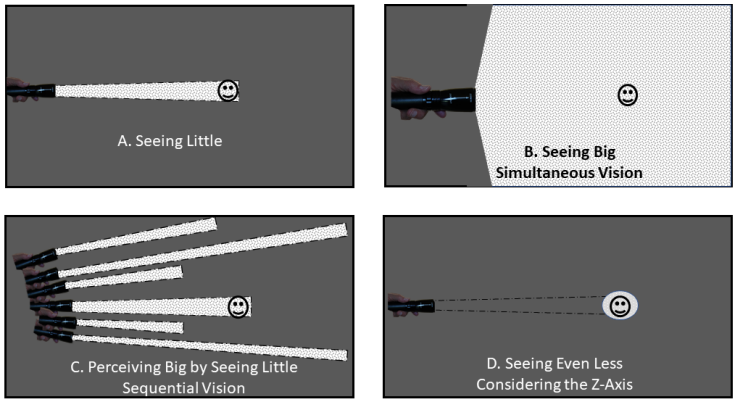
Vivid Vision is an instrument using virtual reality in the treatment of amblyopia, strabismus, and vergence disorders. This, of course, is an understatement. More accurately, Vivid Vision, is a remarkable binocular tool for the expansion of the Zone of Simultaneous Awareness in those learning to do vision.

## Zone of Simultaneous Awareness

In its essence, vision is the collision between value and space cushioned by light. When doing vision, how do we do *space*? In Skeffington's four-circle model, when we "center" we select an area of space for meaning and action. I call that area the zone of simultaneous awareness (ZOSA). If we are using tweezers to remove a splinter from the tip of a finger, your ZOSA would, for efficiency's sake, be small. Simultaneous awareness of the entire room would hardly be useful. If we are viewing the shape of the sky, the ZOSA may be large. Or not.

When many seers—whose days are spent on the close, flat world of computer screens and books—look up to see the shape of the sky, they do so sequentially, their eyes dancing to cover the sky as if they were reading words on a page. Just as our perception told us that the entire paragraph above was clear, the person with a habitually constricted ZOSA imagines he or she is seeing the shape of the sky simultaneously. The person with a habitually constricted ZOSA has no understanding of the difference in perception when the ZOSA is expanded really to take in the shape of the sky simultaneously. The person with a habitually constricted ZOSA has a "language hole" just as a strabismic patient may have no language to describe stereopsis.




**Zone of Simultaneous Attention (ZOSA)—Figure 6.1**

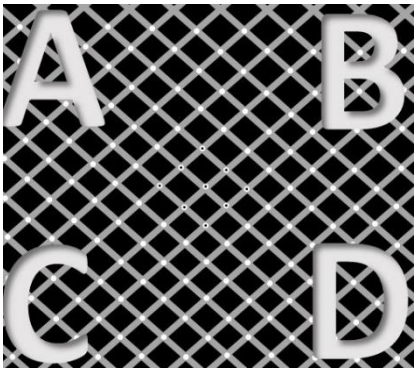
In Figure 6.1 above[1], I have given some examples of how the ZOSA may vary. In A, the viewer is seeing the Smiley but is also aware of the space between self and Smiley. In B, the ZOSA is wide, thus the viewer is simultaneously seeing the Smiley and the Smiley's position in the room. In C, the viewer probably thinks that he or she is seeing the whole room, but the perception is sequential, not simultaneous; the viewer is not aware of all the space cushioning the Smiley. In D, the viewer is aware of only the Smiley's. He or she is not aware of the distance between Smiley and self, not aware of the Smiley's position in the room. The viewer is placing all value in the Smiley, not the space cushioning the Smiley.

To understand the ZOSA, the key is the word "simultaneous," as in "simultaneous" versus "sequential." Take a moment to look over this paragraph. Are the words clear? Providing you are wearing your glasses, the answer is probably "Yes. The paragraph is clear." But, if instead you disturbed the relationship between eye, brain, body and action, and kept

[1] (All figures in this paper are taken with permission from the manuscript, in preparation, for *THE SHAPE OF THE SKY: Discovering Depth in a Flat World* by Dr. David Cook)

your eyes fixated on the first word in the paragraph, *To*, you would find you could no longer "see" most of the rest of the paragraph. The reason that the paragraph initially appeared "clear" was a result of *sequential* perception. Simultaneous perception of large areas, does not allow us to see the details in those areas, but it does allow us to see the space between larger objects— "negative space," if you will.

Another example of sequential versus simultaneous seeing is in the figure below.




There are nine black dots at the intersections of the center of the grid. There are also white dots at the other intersections of the grid. These white dots are visible only when our foveae are aligned in the vicinity of them. The dots disappear when we look away, new white dots in another area of the grid now appearing in front of our eyes. Thus, the white dots give us feedback about our eye position. If we hold our fixation on the center black dot in the very center of the grid, the white dots will disappear, providing our eyes do not wander. If we hold fixation on the black dot and open up our ZOSAs, we will be able to see the A, B, C, and D simultaneously without any of the white dots appearing. If we are seeing the letters sequentially, we will find white dots dancing about the page.

Another example of the ZOSA is demonstrated in Figures 6.5 A-B and 6.6a. They show the hall in my floor of our apartment building. In A, the hall is seen sequentially, detail by detail, with very little appreciation of the negative space filling the length of the hall. View

A, however, has explored all the details in Figure 6.6a. In B, the viewer is seeing the length of the hall and the space in it simultaneously.

Figure 6.6a—Seer A's ZOSAs

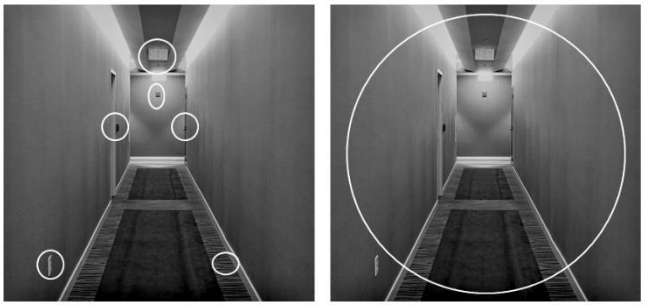

A. B.

Figure 6.5--ZOSA

**Big Stereo versus Little Stereo**

So why all the fuss about the ZOSA? There are two types of stereopsis: relative, and egocentric. If you extend your arms, one just a bit further than the other, while directing both pointer fingers at the ceiling, you will be able to see that one pointer finger is just a little closer than the other. This comparing of the distance of two targets is an example of relative stereopsis. Our stereoacuity tests are designed to measure such stereopsis. We can also call such relative stereopsis or stereoacuity, "little stereo."

Just as acuity sadly underestimates vision, so does stereoacuity sadly underestimate space. The other stereo, egocentric stereo, allows us to compare objects to ourselves. To do so, the ZOSA has to include both the object and the self. When using egocentric depth perception, which I also call "big stereo," we can be aware of the shape of the sky, a shape that begins with the touch of our eyes and end with the spires of steeps, poplar trees, and jagged mountains. To see the shape of the sky is to "be one" with the shape of the sky.

**Vivid Vision**

There are as many ways to open up the ZOSA as there are ways to do vision therapy, but Vivid Vision provides one of the best ways I know. Try this experiment. 1) Look about the

room. See what you see. 2) Play the "pepper picker" game on Vivid Vision. 3) Again, look about the room; be aware that you are no longer seeing things in the room. Your ZOSA has opened up and you are seeing a room with things in it. You are experiencing Big Stereo. Each object you look at has a simultaneous position in the room.

Once patients have "seen space," it is much easier to guide them to see space in the future. Thus, the primary strength of Vivid Vision is in expanding the ZOSA. This helps patients with various diagnoses.

**Monocular Fixation in a Binocular Field (MFBF)**

Vivid Vision is a great instrument for MFBF (only the amblyopic channel sees a central detail while both eyes see the rest of space). But at the same time the instrument enhances acuity, it opens up the ZOSA and improves Big Stereo in the real world.

**Exotropia**

With exotropia, worked without the Base-In prism adjustments so that the patient has to align eyes during the therapy, the patient also learns to use Big Stereo to align the eyes outside of the instrument.

**Esophoria**

Working with esophoric patients with restricted ZOSAs, Vivid Vision, possible with a little added Base-In demand to further trigger divergence, again, opens up the ZOSA, which is far more effective than mere Base In in these centrally compulsive patients.

**Convergence Insufficiency**

Working with convergence insufficiency, Vivid Vision provides vergence training, but, again, more importantly allows simultaneous central and peripheral vision. Cross your eyes to fixate a finger held four inches before your nose. Feel the strain of the mechanical crossing. Now instead, while being aware of the space between your finger and your eyes, move the finger to the position four inches before your eyes. For most patients, awareness of the

space cushioning the finger makes converging more comfortable. Vivid Vision aids with not only ranges, but this enhanced awareness of space.

**Intermittent Esotropia**

As with esophoria, the patient is worked with aligned eyes, learning to open up the ZOSA that will help keep the eyes aligned outside the instrument.

**Constant Esotropia with Normal Correspondence**

Vivid vision invites fusion because the environment is not real and therefore not threatening. Those patients who, in the real world, have to battle to avoid diplopia and confusion, are less concerned about fusing in a safe space. The instrument can be adjusted to match the angle of esotropia. Such patients, who have given up their defenses, may need either prism or surgery to maintain sensory fusion in the real world. With a wide open ZOSA, however, there chances of "running" from prism or surgery are reduced.

**Constant Esotropia with Anomalous Binocular Correspondence**

Since, as yet, there is no way to monitor eye position, Vivid Vision allows no way to tell if the patient is working with aligned or turned eyes. Still, if after therapy the patient has an easier time with peripheral vectograms at the centration point, Vivid Vision may still be of use to open up the ZOSA.

**Conclusion**

In vision therapy we have numerous tools that encourage patient to explore new visual environments and enhance performance in habitual environments. Vivid Vision is but one vision therapy tool, but it is an excellent tool—especially because it helps to expand the zone of simultaneous ZOSA. For this reason, the instrument is useful with all patients, not just those with strabismus or amblyopia. Vivid Vision—at least for patients without constant esotropia and ABC—is an excellent supplement to therapy, especially if a practitioner's model of vision includes awareness of space.