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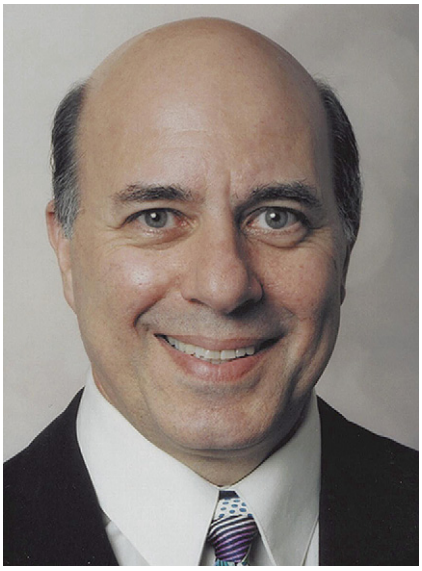
What are the visual criteria for driving?

In the U.S., driving plays a vital part of our day-to-day lives and takes on more significance than just a mode of transportation. It reinforces, among a multitude of things, our perception that we are independent and in control of our ability to "come and go as we please." It is not, however, among the inalienable rights that our Founding Fathers expressed or implied when they penned our fundamental documents; all that is subject to the "wisdom" and "clarity" of our present day lawmakers. Thus, it is extremely difficult when an otherwise competent driver is told that the privilege of driving has been revoked due to a vision problem. This revocation is typically based on a specified minimum required visual acuity level or breadth of a visual field. While these are generally the easiest and most common metrics to score clinically (and may, in fact, contribute in some fashion to one's ability to drive safely), there appear to be additional vision-related criteria which might better allow the clinician to evaluate visual risk assessment for driving. Research has shown that contrast sensitivity function and useful field of view ("a measure of visual attention skills and visual processing speed"[1]) are 2 quantifiable functional measures that can be correlated to driving performance.[2,3]

I read an article a few months ago about an 81-year-old female who was driving and "pulled out from a stop sign into oncoming traffic and was hit by a car that 'she thought came out of nowhere.'"[4] I immediately wondered what color the car (that seemingly appeared out of nowhere) was, what were the colors and complexity of the background in that environment, and the environmental conditions themselves that might have bounded that incident (i.e., clear, sunny, rainy, etc.). Additionally, one might wonder whether there were any other activities going on in that environment that might have acted as distracters (either inside or outside of the car), and whether this driver was capable of dividing her attention between those activities in such a fashion as to make an accurate judgment about whether or not to proceed. Thinking even more globally, one might wonder if, even given the ideal situation and the appropriate level of visual functioning, could her eye-hand and eye-foot reaction time allow her to follow through with what she saw; this discussion will be left for another editorial. One would hope that this 81-year-old driver had sought out and received a comprehensive eye examination. Presuming she met the visual criteria for driving in her state, it might be assumed that additional tests to determine more functional capabilities were not performed, as these are not standard or customary in either a comprehensive eye examination or state-mandated qualifications for driving.

Years ago, contrast sensitivity testing was typically performed in a laboratory setting and was considered somewhat esoteric when considering its application in mainstream eye care. Over the years, however, contrast sensitivity testing has become more user-friendly and, in fact, can be administered in any office setting. If more practitioners would perform this testing, making it more commonplace, it might drive the research needed to come up with criteria to establish guidelines correlated to visual-related driving risk assessment. (Some of this has already been done,



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showing that "drivers with a history of crash involvement were 8 times more likely to have a serious contrast sensitivity deficit in the worse eye [as defined as a Pelli-Robson score of 1.25]" and that "crash-involved drivers were 6 times more likely to have severe contrast sensitivity impairment in both eyes.")[2] This type of data could allow a clinician to more fully assess the visual risk of driving for an individual under various environmental conditions. Of course, this could apply to those with good central and peripheral vision as well.

A computer-generated method for assessing the ability to divide one's attention and to react quickly is also available, the Useful Field of View test, but is at the stage of evolution where contrast sensitivity function testing was years ago: still somewhat foreign but, in time, may find its way into mainstream eye care for those who wish to look more deeply into assessing additional functional criteria

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for visual risk assessment in driving. (For complete disclosure, my long-standing interest in this area has motivated me to begin using both of these assessments, but I have no commercial interest in either.)

Driving is a very complex task, with vision being one of many (albeit at the top of the list) skills necessary to drive. And while we might look at visual skills, reaction time, and the cognitive abilities needed for an individual to safely drive, we must still be aware that even the mechanics of an eyeglass prescription can impact driving safety. In a recent article in *Optometry and Vision Science*, it was pointed out that "the larger eye and head movements resulting from different corrections may negatively impact on the driver's attentional load and reaction times,"[5] so that even the form or style of a vision correction can impact the functional response of any driver, affecting some of what was discussed above.

Eventually, some of us will voluntarily surrender our drivers' licenses, recognizing it is the right thing to do if we feel unsafe. And, perhaps, someone will demand that some of us give up our licenses, as it will be their legal responsibility to do so, based on criteria established by the community (state) in which we live. Let's hope that the criteria are legitimate, and represent a "real world" risk assessment.

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