Reviewer's report

Title: Association of Photopic and Mesopic Contrast Sensitivity in Older Drivers with Risk of Motor Vehicle Collision Using Naturalistic Driving Data

Version: 0 Date: 10 Oct 2019

Reviewer: Cynthia Montana

Reviewer's report:

In this study, the authors report (1) presence of a correlation between mesopic contrast sensitivity and crash rate among older drivers; and (2) absence of a correlation between photopic contrast sensitivity and crash rate. Neither conclusion is novel, as the authors admit; however, the large and prospective study design is more robust than previous studies that have been cross-sectional, retrospective, or smaller. Another unique advantage of this analysis is its use of a recently-described spatial contrast sensitivity function, which accounts for object size and is more relevant to real-world visual function than traditional contrast sensitivity measurements such as the Pelli-Robson chart. Overall, the paper makes a strong case for the utility of mesopic but not photopic contrast sensitivity in the prediction of future crash rate among older drivers.

This paper could be strengthened by additional analyses that exploit the full dataset of the SHRP2 study. As the authors describe at length in the Background section, 'naturalistic' driving studies are superior to police accident report analyses because of the wealth of data collected by sophisticated vehicle sensors. However, this study ultimately analyzed only two outcomes—crashes and at-fault crashes—which frankly could have been gleaned from more 'traditional' data sets. It would be interesting to see if contrast sensitivity correlates with other SHRP2 data points that characterize high-risk driving, such as near-crashes or roadway departures.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

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