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: 24 Aug 2019

Reviewer: Youjia Fang

Reviewer's report:

This paper investigated the relationship between photopic and mesopic contrast sensitivity and driving risk among older drivers using SHRP 2 naturalistic driving study data. The data, methods, results, and conclusion are scientifically sound. The writing is is in professional manner. There are some comments that can be helpful.

(1) There are some previous papers that also studied the older driver vision condition and driving risk, especially also using SHRP 2 data. Please include (at least some of) them in your literature review part.

(2) Please be very clear which SHRP 2 variables did you use from SHRP 2 data. You can provide a list/table of variables, e.g. miles/hours, age, contrast sensitivity measures .... And which variables (e.g. CSF) are derived from those raw SHRP 2 variables, and how to derive.

(3) In methods part, please provide details of Poisson regression models (equations, setups, variables), and how "age-adjusted" was performed? I guess you need to consolidate some age groups, e.g. 95-99 group, as there are very few people in that group.

(4) Results part. Table 1. race, ethnicity, and gender are not that important, as they are not in your model. Instead, you should look at the distribution of important variables (e.g. # crashes, # miles, the raw and derived contrast sensitivities variables, etc.), and the distribution across different age groups (to see if the pattern vary by age group).

(5) Table 2. You'd better give more summary statistics, such as min, max, 5, 25, 50 (median), 95, 95 percentile, max. Here you can also provide the distribution of the raw SHRP 2 contrast sensitivity variables which you used to derived your variables. In a word, show details of the RELEVANT variables.

(6) Table 3. all crash and at-fault crash are OK, but at-fault crashes are typically proportional to all crashes, so essentially you may not find a big difference. You can develop models to test on more vision related driving conditions, such as at nighttime/daytime, good weather/bad weather, etc. SHRP 2 event table have lots of such driving environmental variables. Use your domain knowledge to explore vision-relation bad driving conditions. In such as, you need to compare bad condition to a good condition. Moreover, you can study the risk of crash with severity level 1-4 (your current "all crash"), AS WELL AS crashes with severity level 1-3 (exclude level-4 low-risk tire strike curb).
You may find significant and meaningful findings when focusing on different driving environment scenarios and/or crash types. ("all crash" is just too broad, but you can still present though).

(7) When you present summary statistics, you can use figures/plots to help present the distributions (or scatter plots for 2-D relations).

(8) In short, please present more details on relevant variables, and explore more vision-related driving scenarios and different crash severity types.

**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.

No

**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 am able to assess the statistics

**Quality of written English**
Please indicate the quality of language in the manuscript:

Acceptable

**Declaration of competing interests**
Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?
2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?

If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests.

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.

I agree to the open peer review policy of the journal