Author's response to reviews

Title: Assessment of visual disability using visual evoked potentials

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Author's response to reviews: see over
Thank you for the comments on our paper, “Assessment of visual disability using visual evoked potentials”. We are grateful to your helpful suggestions. We have adopted them in this revised manuscript.

**Reviewer’s report:**

1) One of the main conclusions of the study is that there were no reliable differences between the measured acuity in patients with optic neuritis and the acuity predicted by the linear regression model generated using data from normal and amblyopic observers. While this is true in the strictest sense it is worth noting that the p value the authors report for the t-test comparing these values is 0.07 with a significant difference being 0.05. It would be useful for the authors to state in the limitations of the study that this statistical result is marginal and that the non-significant difference might be due to a lack of statistical power and/or high levels of variability in their data. In addition, the average difference between the actual and predicted acuities was 0.18 logMAR which is approaching the clinically significant level of 2 lines of letters on a logMAR chart. This is also a point that would be worth mentioning in the limitations of the study.

: We agree with you. We added it.

_Fourth, the statistical result of optic neuritis in the difference between actually measured visual acuity and function value is marginal (p=0.07). This non-significant difference was 0.18 logMAR, which is approaching the clinically significant level of 2 lines of letters on a logMAR chart, might be due to a lack of statistical power and/or high levels of variability in their data._

2) The authors state that the linear regression results for the normal+amblyopia and the optic neuritis datasets are not significantly different from one another. How was statistical significance determined for this comparison?

: We compare two linear regressions by GrapadPrism. This system compare slopes and intercepts of two or more regression lines

The P value for comparing slopes was greater than 0.05. We added P>0.1356 in the manuscript.

: _We compared function of normal /unilateral amblyopia (y = −0.072x +1.22) vs optic neuritis(y = 0.108x +1.55). The slopes were not significantly different (p>0.1356). The pooled slope equals −0.0789258 (GraphPad Prism)._  

Followings are from GrapadPrism
Are the slopes equal?
F = 2.29694.  DFn=1 DFd=53
P=0.1356
If the overall slopes were identical, there is a 14% chance of randomly choosing data points with slopes this different. You can conclude that the differences between the slopes are not significant.
Since the slopes are not significantly different, it is possible to calculate one slope for all the data.
The pooled slope equals -0.0789258

Are the elevations or intercepts equal?
F = 1.20261.  DFn=1 DFd=54
P=0.2777
If the overall elevations were identical, there is a 28% chance of randomly choosing data points with elevations this different. You can conclude that the differences between the elevations are not significant.
Since the Y intercepts are not significantly different, it is possible to calculate one Y intercept for all the data. The pooled intercept equals 1.3420
Comparing slopes

Prism compares slopes first. It calculates a P value (two-tailed) testing the null hypothesis that the slopes are all identical (the lines are parallel). The P value answers this question:

- If the slopes really were identical, what is the chance that randomly selected data points would have slopes as different (or more different) than you observed.

If the P value is less than 0.05

- If the P value is low, Prism concludes that the lines are significantly different. In that case, there is no point in comparing the intercepts. The intersection point of two lines is:

\[ X = \frac{\text{Intercept}_1 - \text{Intercept}_2}{\text{Slope}_2 - \text{Slope}_1} \]
\[ Y = \text{Intercept}_1 + \text{Slope}_1 \cdot X = \text{Intercept}_2 + \text{Slope}_2 \cdot X \]

If the P value for comparing slopes is greater than 0.05

- If the P value is high, Prism concludes that the slopes are not significantly different and calculates a single slope (pooled) for all the lines. Essentially, it shares the Slope parameter between the two data sets.

Comparing intercepts

- If the slopes are significantly different, there is no point comparing intercepts. If the slopes are indistinguishable, the lines could be parallel with distinct intercepts. Or the lines could be identical with the same slopes and intercepts.

- Prism calculates a second P value testing the null hypothesis that the lines are identical. If this P value is low, conclude that the lines are not identical (they are distinct but parallel). If this second P value is high, there is no compelling evidence that the lines are different.

3) Many sections of the manuscript are still rather difficult to follow. The abstract in particular is hard to understand. I suggest avoiding terms such as “evaluate for registry” as these are difficult to understand. A term such as “diagnose the presence or absence of visual disability” may be better. The title is also hard to understand. One possibility might be “Assessment of visual disability using visual evoked potentials”. The subheadings in the results sections may be better as “predicting visual acuity in patients with optic neuritis” and “predicting visual acuity in patients with visual pathway lesions”.

We agree with you. We change term, title and subheadings.

We change title as Assessment of visual disability using visual evoked potentials. Subheadings as
Predicting visual acuity in patients with optic neuritis, and Predicting visual acuity in patients with visual pathway lesions

We also change “evaluate for registry” into “diagnose the presence or absence of visual disability”.

4) Information relating to the case study patients should be provided in the “patients” sub-section of the “methods” section.

: We consider it. However, we mentioned the cutoff value in this case study so that this section would be provided well in the result section (Predicting visual acuity in patients with visual pathway lesions). The explanation of cut off value is on the result section.

5) The term “interrelationship” is a little unusual. I suggest replacing this with “relationship”.

: We agree with you. We change them.

6) The manuscript that would benefit from close proof reading for grammatical errors.

: This first revised manuscript was edited by Edanz. We asked them to look through this manuscript for grammatical errors.