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CORRESPONDENCE

Using an excel spreadsheet to convert Snellen visual acuity to LogMAR visual acuity—further explanation

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TO THE EDITOR:

In clinical practice, the use of both conventional Snellen and ETDRS LogMAR visual acuity charts are common. The ETDRS chart is more commonly used in big studies since its design is standardised to reduce confounding factors. In some clinics, the ETDRS chart is used but documentation of the visual acuity is written in traditional Snellen equivalent due to its familiarity and better communication with non-ophthalmic practitioners who may understand Snellen scores better than LogMAR. When evaluating larger studies, LogMAR vision data are much easier to evaluate and perform statistical tests than Snellen visual acuity. In order to help clinicians and researchers facilitate the conversion process as efficient as possible, we have presented a simple, practical formula that can be easily used in a widely available software (excel spreadsheet) [1]. The main advantage of the formula is in being able to quickly facilitate the conversion for a large series of Snellen data to LogMAR. For letter charts with five letters in each line, the formula presented in our original study would provide a perfect conversion and hence be suitable for studies that use these.

Charles and Frost [2] have employed a linear interpolation method to show potential errors with regards to our formula. Whilst we accept the limitation, the linear interpolation method is still based on the assumption that the credit for each letter is dependent on the number of letters in each line. This may not be entirely accurate either. We appreciate that there are different numbers of letters per line in the standard Snellen chart, therefore the formula is not as accurate compared to visual acuities measured in the ETDRS chart. To help those who are using the standard Snellen chart in their practice and wish to convert it to LogMAR, we have produced 81 possible combinations of Snellen visual acuity and their true LogMAR values, in both minus and plus fashion (Supplementary Table 1). This was devised by calculating the minimum angle of resolution (MAR) for each line by knowledge of the size of each letter in each line and the test being carried out at 6 m. Each letter of each line was recognised by attributing a fractional change in the MAR. For "plus" results, this is based on how many additional letters they were able to read in the line below compared to the total number of letters on that line. Compared to using the LogMAR linear interpolation method, out of the 81 combinations, only 17 values differ by $+/-0.05$ or more. The differences range from -0.08 to 0.10. Furthermore, from our calculations by determining the MAR and linear interpolation, we found that there were some variations in our results to that by Charles and Frost [2] (Supplementary Table 2). We agree with other values.

We accept that our formula is not perfect for those using the standard Snellen chart but we believe it still can be used by such clinicians taking into account of the errors as stated above. Although we have aimed to provide an easy formula for big studies, we recognise the importance and the need for an easy formula that converts visual acuities from the standard Snellen chart to LogMAR. Unfortunately, we did not see a comparable formula in the comments by Charles and Frost [2] which could be used rapidly to convert a large series of data to LogMAR. We can hence conclude that for charts with five letters, our formula provides an accurate conversion whilst for standard Snellen charts, our formula provides a reasonably accurate conversion within 0.05 for the majority of conversions.

Christina Lim [1]✉, Ian De Silva [1] and Stephenie Tiew [1]
[1]*Department of Ophthalmology, University Hospitals of Leicester NHS Trust, Infirmary Square, Leicester LE1 5WW, UK.*
✉*email: christina.sk.lim13@gmail.com*

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COMPETING INTERESTS

The authors declare no competing interests.

ADDITIONAL INFORMATION

Supplementary information The online version contains supplementary material available at https://doi.org/10.1038/s41433-021-01764-y.

Correspondence and requests for materials should be addressed to Christina Lim.

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