APPENDIX

Physical print size is often given in units of Sloan M or N point. Sloan M represents the physical x-height of character that subtends 5 min arc at the distance indicated by the M value [48,49]. Although distance is mentioned, this is a measure of physical rather than angular size [50]. N point represents the body size of a letter (from the top of the ascenders to the bottom of the descenders) in points, where 1 point is 1/72 of an inch [4]. 1M print is usually considered as equivalent to a font size of N8. However, in evaluating the data presented, it was noted that 1M print on the MNRead chart appeared more comparable to Microsoft Word Postscript samples of N10 print rather than N8.

Measurements were made with an engineer's rule of the x-height of lower case letters of a range of sizes on the MNRead chart and of Microsoft Word Postscript samples of Times New Roman print. These were compared to the given N point notations, and to the exact M sizes used in production of the MNRead chart, using linear regression. Note that the MNRead chart is constructed based on exact logMAR sizes, and the M values given on the chart are nominal values correct to 1 decimal place (J. Stephen Mansfield, personal communication).

The linear relationship between MNRead chart M size and measured x-heights was:

x-height = 6.17 M   (R^2=1.0)

The linear relationship between Times New Roman point size (Microsoft Word) and measured x-heights was:

x-height = 0.582 Point size (R^2=1.0)

Combining the two equations to determine the relationship between M size and Times New Roman point size gives:

$6.17\ M = 0.582$ Point size

And thus:

$M = 0.094$ point size, or Point size $= 10.6\ M$

Therefore, 1M print on the MNRead chart appears to better reflect N10 print in Microsoft Postscript Times New Roman font, rather than the traditionally held N8.

It has previously been noted [50] that "it is difficult to anticipate how software will render characters of a given nominal point size on any particular computer display", and we would suggest that this also applies to printed material. Note that the discrepancies reported here have been found for two texts with nominally the same font (Times New Roman). Differences will be even greater when comparing different font designs, such as Arial and Times New Roman [3]. It is recommended [50] to calibrate point size with x-height by physical measurement of the x-height, as has been done here. We conclude that care should be taken when converting between, and particularly when assuming equivalence between, different physical print size measures.