

Testing VA: Do symmetrical charts make a difference?

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ABSTRACT

Data on 117 subjects over seven years of age were obtained to determine whether there is a difference in the results obtained from visual acuity charts that use only letters with lateral symmetry and those that use a combination of letters with and without this symmetry. Subjects with acuities of 6/9 or better were used to overcome the problems associated with difference in letters on the 6/60 to 6/18 lines, such as the number of letters, their spacing on a line, and the spacing between lines.

The results showed a highly significant statistical difference ($p=0.0001$) between the two charts, with the charts that use only letters with lateral symmetry giving a better result of on average, 0.49 letters. This means that on approximately every second test, an eye tested on a chart with lateral symmetry would read one more letter than one tested on a chart with letters with and without symmetry. It is unlikely that clinical decisions would be based on this small difference. These findings should only be generalised to subjects with good visual acuity.

INTRODUCTION

In most eye examinations, an assessment of visual acuity is made with a standard visual acuity chart based on Snellen's principles. Several factors can influence results from a visual acuity test, such as the illumination of the chart itself, room illumination and the overall design of the chart.^{1,2,3,4} Another factor could also be the choice of letters that are used on the chart. Although the logMAR chart has been designed to overcome most of the identified problems of the standard Snellen's chart, many clinics still use the traditional charts in their standard testing procedures.

Vision charts usually display different letters of the alphabet. Some use symmetrical letters such as A, O, H, V, T, a feature of the Sheridan Gardiner charts, whilst others (for this project referred to as Snellens charts) use a variety of letters, some with lateral symmetry others without, such as L, C, N. As recognition of a letter often involves detecting certain cues, symmetrical letters may be easier to detect as such features are present on both sides of the letter, so that the cues of line, or space, are doubled for that particular letter.

On many vision testing boxes, charts of each type may be used, so that a Sheridan Gardiner chart is used

for testing one eye, and Snellens chart is used for testing the other eye. A difference in test results may be interpreted as a true difference in visual acuity, whereas it may simply represent a difference in the ability to recognise letters with (or without) symmetry.

This study was designed to determine whether there is a difference in the legibility of letters on these charts give that could be explained by the above factors. If this is so, then a change in visual acuity between assessments may be attributed to improvement or reduction in acuity, rather than an artifact caused by the type of chart used.

METHOD

Twenty five third year orthoptic students gathered data on subjects over seven years of age who were not familiar with the standard charts.

As there are different numbers of letters on each line of the charts, different spacing between the lines and between the letters on different lines, a study such as this is best carried out at a level of acuity that minimises these effects. Therefore, subjects were included only if they could read all the 6/9 letters on the first chart tested, as the number of letters on each line (from 6/9 to 6/5) is fairly consistent. The charts used were identical in all features apart from the type of letters used.

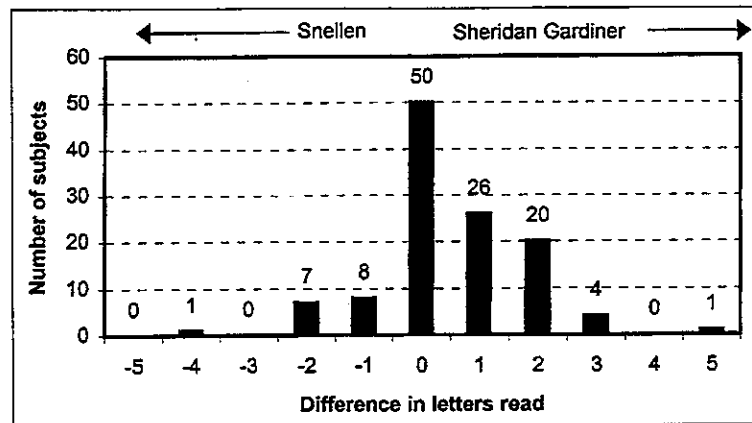
For each subject, visual acuity was measured with the same eye on each type of chart. The order of testing was varied. The difference in the number of letters read was recorded as positive if there were more letters read on the Sheridan Gardiner chart and negative if there were fewer read on this type of chart. If there was no difference, the score was zero. The results from all students were pooled and analysed. As differences of over 5 letters are unlikely, given the above criteria, the few scores at this level were probably due to error on the part of the students and were not included in the analysis.

RESULTS

Data from 117 subjects were obtained and are shown in Figure 1. A Wilcoxon signed rank test was performed to determine whether the difference in letters read varied significantly from zero. A mean difference of (positive) 0.49 was found which indicates that the Sheridan Gardiner letters were easier to detect. The p value was 0.0001 (ie, highly statistically significant).

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Figure 1



Results from 117 subjects aged 7 years and over tested on the Snellens and the Sheridan Gardiner visual acuity charts. Positive values show the additional number of letters read on the Sheridan Gardiner chart, negative values show the additional number of letters read on the Snellens chart. Zero values indicate no difference in the results from each chart.

DISCUSSION AND CONCLUSIONS

Although there is a statistical highly significant difference between the results obtained on each chart, the actual difference was equivalent to only 'half a letter'. This means that on one out of two tests there may be a difference found of one letter that was due to the type of letters on the chart. It is unlikely that clinical decisions would be based on this small difference. This illustrates the difference between 'statistical' and 'clinical' significance.

Nevertheless, as some subjects in this study showed differences of several letters with each chart, it would be advisable to ensure that the same type of chart is used to compare each eye, and to measure the progress of treatment.

These results can only be generalised to testing subjects with good visual acuity. As the 6/60 - 6/18 letters on standard charts vary considerably in the number of letters on a line, and the spacing between letters and the lines, the effect of the cues of symmetrical letters discussed above may be more significant.

Acknowledgements

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