British Journal of Ophthalmology, 1983, **67**, 134

Correspondence

Acuity and contrast sensitivity

SIR, The *British Journal of Ophthalmology* has been a leader in publishing articles on spatial contrast sensitivity. The journal's recognition of contrast sensitivity as an important advance in visual diagnosis was further emphasised by editorials in 1978[1] and 1981.[2] But a recent article[3] in the *BJO* contains a fundamental confusion about interpretation of contrast sensitivity data that we fear may become widespread because of the journal's prominence.

In their paper[3] on macular vasculature and visual function in homozygous sickle cell disease Marsh and colleagues wrote that 'Visual acuity was assessed by Snellen's type test and by measuring contrast sensitivity' (p. 155). This identification of contrast sensitivity as a measure of acuity impedes understanding of the proper use of the test and of its power.

Michaels's excellent treatise[4] has a particularly good treatment of this issue. Michaels notes that both Snellen type tests and spatial contrast sensitivity tests measure thresholds. But Snellen type tests measure an *extensity* threshold, the minimum size target that can be resolved or recognised, while contrast sensitivity tests measure *intensity* thresholds, the minimum luminance difference that can be seen.

Contrast sensitivity tests, particularly as embodied in Arden's plates,[5] measure intensity thresholds for very large targets, whose component bars cover distances very many times greater than the extensity threshold for normal vision (6/6). Except under special circumstances the extensity threshold (visual acuity) and the intensity threshold (contrast sensitivity) are uncorrelated.[6] That is, knowledge of a patient's visual acuity may give little or no ability to predict that patient's contrast sensitivity. This empirical fact simply reminds us that the 2 tests do not measure the same underlying ability and that comprehensive assessments of visual loss should include both measures.

We are also concerned about the wisdom of compressing contrast sensitivity measurements taken at several spatial frequencies into a single, 'representative' score. Here the fault evidently lies with the instructions for using the Arden plates. There is considerable evidence that pathology may cause 'notch' losses over a restricted range of spatial frequencies.[7] In nonclinical populations measurements of thresholds for similar spatial frequencies are highly correlated ($r > +0{\cdot}90$); thresholds for spatial frequencies differing by a factor of 4 are statistically independent ($r \approx 0{\cdot}0$). These facts suggest that using a single summary score to express sensitivity to different patterns diminishes the test's power as a diagnostic instrument.

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References

1 Editorial. Spatial contrast sensitivity. *Br J Ophthalmol* 1978; **62:** 197.
2 Editorial. Spatial contrast sensitivity revisited. *Br J Ophthalmol* 1981; **65:** 513–4.
3 Marsh RJ, Ford SM, Rabb MF, Hayes RJ, Serjeant GR. Macular vasculature, visual acuity, and irreversibly sickled cells in homozygous sickle cell disease. *Br J Ophthalmol* 1982; **66:** 155–60.
4 Michaels DD. *Visual optics and refraction: a clinical approach*. St Louis: Mosby, 1980.
5 Arden GB, Jacobson J. A simple grating test for contrast sensitivity: preliminary results indicate value for screening in glaucoma. *Invest Ophthalmol Visual Sci* 1978; **17:** 23.
6 Sekuler R, Owsley C, Hutman LP. Assessing spatial vision of older people. *Am J Optom Physiol Opt* in press.
7 Bodis-Wollner I, Camisa J. Contrast sensitivity measured in clinical diagnosis. In: Lessel S, van Dalen JTW, eds. *Neuro-ophthalmology*. Amsterdam: Excerpta Medica, 1980.

SIR, I must agree with Professor Sekuler and Dr Mulvanny that there was an error in nomenclature of the contrast sensitivity, which is of course a measure of visual function and not of visual acuity. We are going to search through our retinal material and carry out statistical tests to see if there are any correlations between the foveal vascular zones and the individual grating scores.

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Book reviews

Histological Typing of Tumours of the Eye and its Adnexa. Eds. L. E. ZIMMERMAN and L. H. SOBIN. Pp. 82. Sw.fr.60. With 150 colour transparencies Sw.fr.210. WHO: Geneva. 1980.

If pathologists and ophthalmic surgeons from different centres are to compare their findings it is important that the diagnostic criteria they use are clear and readily intelligible and, even better, that there should be a degree of conformity. To this end the World Health Organisation has sponsored a series of panels to provide an internationally acceptable classification of all tumours, the present volume concerned with the eye being one of the last to emerge.

The classification is supplemented by brief but helpful notes where the basis for recognition of the entities may not be immediately obvious. A section encompassing half the book consists of representative colour photographs of many of the tumours listed, and, although the colour reproduction is less than perfect in some instances, the opportunity to see what the panel is describing is most valuable. (Happily, the colour of the separately available matching transparencies is much more faithful.) In line with the general philosophy of an integrated classification every attempt has been made to let the designations reflect those used to describe tumours of other tissues. Thus the section on eyelid tumours follows the categories listed in the skin volume, and that on lacrimal gland tumours is aligned with the volume dealing with salivary tissue.

Not all pathologists will agree with every apsect of the classification, especially as the histogenesis of some tumours is a matter for conjecture, but there is little to which strong