



## LETTERS TO THE EDITOR

### Mallett unit or fully fusionable images for prisms against asthenopia?



Parmar et al.<sup>1</sup> remarked that a “dissociative environment” could produce anomalous results of Mallett’s test. They cite work from our lab,<sup>2</sup> suggesting that our use of rotary Risley prisms could have brought about such a dissociative environment. Yes, the frame of the Risley prisms restricted the peripheral visual field, but this appeared acceptable, since the text of the Mallett unit around the target remained fully visible. We had a good reason to apply the continuously adjustable Risley prisms rather than putting on prisms step by step: Risley prisms allowed our subjects to choose the appropriate power on their own, thus avoiding suggestive influences from the examiner, and to record the procedure with a computer.

Sensibly, Mallett aimed at viewing conditions as normal as possible in order to find the smallest prism that could alleviate asthenopia. In his test, the only deviations from normal vision are monocular markers in the form of Nonius lines. To examine whether these monocular markers represent a source of artefact, we determined the vergence position of rest (the position in which the sensory-motor system is unburdened from any strain to fuse the images of the two eyes), comparing Mallett’s display with and without the Nonius lines. With the monocular markers, our subjects were asked to align the Nonius lines. Without the monocular markers, i.e., with fully fusionable pictures, our subjects adjusted the prism so that viewing appeared most relaxing. We found that the vergence position of rest differed up to 7 prism diopters between the two conditions, with an overall correlation of only  $r \approx 0.75$ . This suggests that monocular markers lead to an artefact, possibly via binocular rivalry in the area of the Nonius lines.

To determine the influence of the monocular markers, we deliberately aimed at the full vergence position of rest, not at the smallest power of the prism that aligns the Nonius lines. The latter strategy would have been appropriate for the prescription of therapeutic prisms, according to Mallett’s recommendations.

A large body of research supports the use of the Mallett unit for finding prisms that can alleviate asthenopic symptoms. Our study suggests that it may be worthwhile to investigate whether even better results can be obtained by presenting natural stimuli without monocular markers, relying on the patient’s sense of comfort. Many of Mallett’s recommendations may apply to this approach.

### References

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### Reply to: Mallett unit or fully fusionable images for prisms against asthenopia?



We thank Professors Kommerell and Bach for their interest in our article.<sup>1</sup> Mallett advocated the use of a trial frame with his test as it allows a normal head posture and visual field.<sup>2</sup>

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Mallett advocated using small step sizes (1D horizontally);<sup>2</sup> “gradually increasing the strength until the slip disappears – never the reverse procedure”;<sup>3</sup> and “between changes of prisms or spheres the patient should read two or three lines of print surrounding the target”.<sup>3</sup> These instructions depart markedly from the procedure adopted by Kommerell and Bach,<sup>4</sup> where the participant continuously adjusts a Risley prism, on several occasions starting with 10Δ, and is asked to “play a little” (with the prism power). We agree with Kommerell and Bach, their method did not aim at the smallest power of the prisms and may not be appropriate for prescribing.

We understand how a consideration of natural viewing led Kommerell and Bach to the interesting approach of self-selected prism.<sup>4</sup> The assumption behind this test seems to be that following a period of self-adjustment of a Risley prism, a subject's selection of the prism power they find most relaxing may be therapeutically helpful. We question this hypothesis for several reasons, most notably that the self-selected prism fluctuates considerably from one day to another<sup>4</sup> and subjects may select the strongest prism they can tolerate, not the weakest.

We accept that Kommerell and Bach's avoidance of Nonius markers is a step towards normal viewing conditions, but we suggest that various aspects of their experimental design, including the participant adjustment of Risley prisms, takes this approach several steps further away from normal viewing conditions. In support of this we note, the prism powers found by Kommerell and Bach<sup>4</sup> are generally more than double those typically obtained with the Mallett unit, when used as recommended.<sup>5</sup> We made the comment in our manuscript advising against using self-adjusted Risley prisms because of concerns that if clinicians use the Mallett unit in this way they could inappropriately over-prescribe prisms, both in the proportion of patients to whom prisms are prescribed and in the magnitude of prism.

Practitioners who use the Mallett unit tend to only prescribe prisms of low power to a small minority of patients with significant symptoms associated with visual tasks when other treatment approaches are unsuitable.<sup>6</sup> For example, NHS statistics for Scotland indicate ~1% of NHS funded lenses supplied by community optometrists include a prism.<sup>7</sup> We are not surprised<sup>8</sup> that these data on actual practice differ markedly from surveys of practitioners' choices given hypothetical prescribing scenarios.<sup>9</sup>

There is experimental evidence supporting the use of the Mallett unit for detecting symptomatic heterophoria<sup>10</sup> and for prescribing.<sup>11,12</sup> As Kommerell and Bach note, there is a fairly large body of research that has used the Mallett unit following the designer's instructions.<sup>6</sup> Our concern is that, since the test results are sensitive to differences in instructions<sup>13</sup> and test design,<sup>1</sup> if clinicians use the test in an unintended way this could lead to unintended consequences, including the over-prescribing of prisms.

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