

LETTER TO THE EDITOR

A COMMENT ON "PERCEPTUAL CORRELATES OF MAGNOCELLULAR AND PARVOCELLULAR CHANNELS: SEEING FORM AND DEPTH IN AFTERIMAGES"

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We write concerning a recent paper by Ingling and Grigsby (1990) entitled "Perceptual correlates of magnocellular and parvocellular channels: seeing form and depth in afterimages". The thrust of the paper is that one can see excellent depth, using monocular cues, in afterimages; that any percept in an afterimage that lasts beyond a few seconds cannot be attributed to a system whose responses die out in a shorter time than a few seconds; that responses of primate geniculate magnocellular cells are transient to this degree; and that magnocellular cells cannot therefore be the sole mediators of depth perception.

The argument is ingenious, and we totally agree with the authors' observations that depth can be vivid in afterimages. (We also agree that luminance information is carried by the great majority of parvocellular cells—as the authors point out, the original evidence that it does come from this laboratory.) Our disagreement is over that notion that all magno cells give only transient responses to stimuli of long duration. There is no question that many do, but we have seen many examples of histologically verified magnocellular cells whose responses show a strong component that is highly sustained. The accompanying post-stimulus histograms show examples of responses to an on-center cell (upper) and an off-center cell (lower) to center-size white spots (Fig. 1, time in sec). We do not have enough records to allow us to estimate the incidence of such cells in the magnocellular layers, but they are not rare—for example, in the paper quoted by Ingling and Grigsby (Schiller & Malpeli, 1978) two of the four illustrations of magnocellular responses (Fig. 1, parts 1a, 1b, 2a, 2b)

show impressive maintained suppression of firing in off-center cells. The "Index of Transiency" of Schiller and Malpeli (1978, Fig. 2) does not address this question, since it is based on the ratio of transient to sustained components of the responses, whereas it is the magnitude of the sustained component alone that is relevant in this context.

In suggesting that the magnocellular system may subserve the perception of movement, depth, and other visual submodalities, our intent has been to offer a hypothesis that is important if true, and that can be addressed

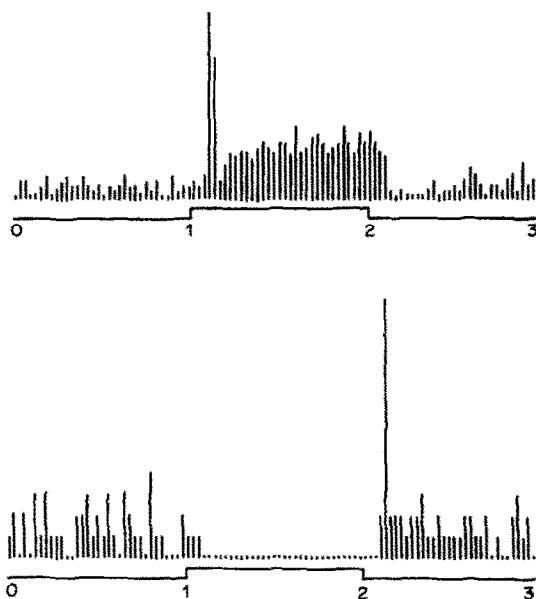


Fig. 1. Response histograms from two magnocellular-layer cells recorded from anesthetized *Macaqua fascicularis* monkeys. Each histogram represents the average of 5 responses to a 1-sec duration center-sized white spot. Upper graph, on-center cell; lower, off-center cell.

experimentally. We base the hypothesis on anatomical, physiological and psychophysical evidence that seems to support it, but realize that some impressive evidence argues against it. If the idea leads to interesting experiments (and it already has) we feel it will have been justified regardless of the outcome. We write this letter not to defend our idea through thick and thin, but to say that in our opinion the survival of

depth sensation in afterimages does not weigh heavily against it.

REFERENCES

- Ingling, C. R. Jr & Grigsby, S. S. (1990). Perceptual correlates of magnocellular and parvocellular channels: Seeing form and depth in afterimages. *Vision Research*, *30*, 823–828.
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