

# On separating the magnocellular from the parvocellular: Responses to two statements by Goodhew et al.

Bernt C. Skottun<sup>1</sup> · John R. Skoyles<sup>2</sup>

Published online: 21 July 2017  
© The Psychonomic Society, Inc. 2017

**Abstract** Goodhew et al. (*Attention Perception & Psychophysics*, 79, 1147–1164, 2017) claim we (Skottun & Skoyles) hold: (1) that it is not possible to separate contributions from the magno- and parvocellular systems to psychophysical tasks, and (2) that there are no differences between magno- and parvocellular cells. Neither of these claims is correct.

**Keywords** Spatial frequency · Temporal frequency · Contrast-response · Gap detection · Suprathreshold

Goodhew and colleagues (2017) make the following two claims: (1) That we (Skottun and Skoyles) hold that contributions from the magno- and parvocellular systems cannot be differentiated in psychophysical experiments. However, the situation is the opposite: As we have repeatedly pointed out, such differentiation can be obtained by testing contrast sensitivity to high versus low spatial frequencies (Skottun, 2000, 2015; Skottun & Skoyles, 2007). (2) That we hold that there are no differences between magno- and parvocellular cells. As we have also pointed out on numerous occasions (Skottun, 2000, 2013, 2014, 2016; Skottun & Skoyles, 2007) such differences do exist. Thus, both claims by Goodhew et al. (2017) are incorrect. What we have done is to point out difficulties using *suprathreshold* stimuli (i.e., at contrast levels above threshold) to differentiate contributions from the magno- and parvocellular systems to psychophysical tasks.

Based on reviews of the literature and quantitative analyses, we have found such difficulties in connection with tasks based on contrast-response functions (Skottun, 2014), spatial frequency (Skottun, 2015), and temporal frequency (Skottun, 2013, 2016). Quantitative analyses also indicate that it is difficult to use visual persistence/temporal gap detection to assess magnocellular contributions because the stimuli used in such tasks have their largest amplitudes at the very lowest temporal frequencies (Skottun, 2004; Skottun & Skoyles, 2008).

## References

- Goodhew, S. C., Lawrence, R. K., & Edwards, M. (2017). Testing the generality of the zoom-lens model: Evidence for visual-pathway specific effects of attended-region size on perception. *Attention, Perception and Psychophysics*, 79, 1147–1164.
- Skottun, B. C. (2000). The magnocellular deficit theory of dyslexia: the evidence from contrast sensitivity. *Vision Research*, 40, 111–127.
- Skottun, B. C. (2004). On visual persistence and magnocellular sensitivity. In H. D. Tobias (Ed.), *Focus on dyslexia research* (pp. 41–56). Hauppauge: Nova Science Publishers.
- Skottun, B. C. (2013). On using very high temporal frequencies to isolate magnocellular contributions to psychophysical tasks. *Neuropsychologia*, 51, 1556–1560.
- Skottun, B. C. (2014). A few observations on linking VEP responses to the magno- and parvocellular systems by way of contrast-response functions. *International Journal of Psychophysiology*, 91, 147–154.
- Skottun, B. C. (2015). On the use of spatial frequency to isolate contributions from the magnocellular and parvocellular systems and the dorsal and ventral cortical streams. *Neuroscience and Biobehavioral Reviews*, 56, 266–275.
- Skottun, B. C. (2016). A few words on differentiating magno- and parvocellular contributions on the basis of temporal frequency. *Neuroscience and Biobehavioral Reviews*, 71, 756–760.
- Skottun, B. C., & Skoyles, J. R. (2007). Contrast sensitivity and magnocellular functioning in schizophrenia. *Vision Research*, 47, 2923–2933.
- Skottun, B. C., & Skoyles, J. R. (2008). Dyslexia and rapid visual processing: a commentary. *Journal of Clinical and Experimental Neuropsychology*, 30, 666–673.

✉ Bernt C. Skottun  
berntchrskottun@gmail.com

<sup>1</sup> Ullevaalsalleen 4C, 0852 Oslo, Norway

<sup>2</sup> Centre for Mathematics and Physics in the Life Sciences and EXperimental Biology (CoMPLEX), University College London, London WC1E 6BT, UK