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- Thursday, July 8, 2004
  Opponent-motion normalisation does not predict direction discrimination at low contrasts.

  Georgeson and Scott-Samuel (1999 Vision Research 39: 4393-4402) proposed an extension of the Adelson-Bergen Motion Energy Model (1985 Journal of the Optical Society of America A 2 284-299) by taking the output of that model (motion energy: motion left - motion right), and dividing it by Flicker Energy (motion left + motion right). They called this normalised measure "Motion Contrast"(MC). This research supports Georgeson & Scott-Samuel's results in demonstrating that the normalised measure (MC) correlates well with human direction discrimination performance, while Opponent Energy does not. Experiment 2 shows that normalisation can be prevented at low contrast (values ranged from 0.1% to 0.6%). At low contrast there is a relationship between direction discrimination performance and Opponent Energy. Exp 3a demonstrates that a suggested relationship between Flicker Energy and performance in Exp 2 was purely a mathematical artefact of values chosen, and that no real relationship between Flicker Energy and performance exists. Exp 3b demonstrates that at low luminance contrasts the numerator of Motion Contrast (Opponent Energy) dominates direction discrimination performance. Future experiments include investigating the spatial tuning properties of Opponent Energy and exploring the effect of varying velocity on direction discrimination.

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