A PERCEPTUAL MEMORY FOR LOW CONTRAST VISUAL SIGNALS

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Purpose. Detection of a visual signal can be facilitated by simultaneous presentation of a similar sub-threshold signal. Here we show that this facilitation persists for more than 16 seconds. **Methods.** Contrast detection thresholds were measured (2AFC) for a foveal Gabor Signal (GS; σ=λ=0.15°, presented for 36 ms) that was preceded by a foveal GS prime (presented for 90 ms), with Stimulus Onset Asynchrony (SOA) varying from 0 to 16,290 ms. Prime contrast was varied from sub-threshold to above-threshold level. **Results.** Presenting a prime GS decreased detection threshold by 0.23 log units (40% increase in contrast sensitivity, averaged across 4 observers) with primes at just-above threshold-contrast and SOA=0.5 to 16 seconds, as compared with 0.3 log units at SOA=0. This effect was only obtained when prime and target assumed the same orientation and location, and when both were presented to the same eye. The delayed facilitation was phase independent, and could be destroyed by intervening high contrast signals. **Conclusions.** These results suggest that activated neurons in the primary visual system retain a near-threshold memory trace that persists until *re*activated. This memory trace may subserve the consolidation process of perception into visual long-term memory.

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