Early sensory processing of a feature is modulated by the feature’s contribution to high-level object perception

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1 Background
High-level object percepts modulate early visual processing[1][2]. But how?
Conflicting findings on whether global percepts sharpen or dampen sensory processing of low-level local features[3][4].

Our reconciling hypothesis: The effect of top-down modulation is dictated by whether the local feature contributes to the global percept.

2 Online psychophysics experiment
Measured sensitivity to local orientations within a dynamic point-light walker.
2 conditions to manipulate local features’ contribution to the global percept
2 baseline conditions
N = 101
(A shorter version of this task with N = 212 showed similar results overall)

3 Differential top-down modulation
(1) Better sensitivity to contributing features than to non-contributing features.
(2) This can’t be explained by differences in local alignment.

4 Underlying mechanism
(1) Sensitivity to contributing features was sharpened.
(2) Sensitivity to non-contributing features was not dampened (compared to baseline sensitivity).

5 Individual differences
Extent of top-down processing is related to sensory precision in local orientation processing.

6 In summary
Top-down modulation is moderated by dynamic interactions between high- and low-level visual processing.
Psychophysical evidence for predictive processing models.

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