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Peeling plaids apart: Context counteracts cross-orientation contrast masking

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Contrast discrimination for an image is usually harder if another image is superimposed on top.

We asked whether such contrast masking may be enhanced or relieved depending on cues

promoting integration of both images as a single pattern, versus segmentation into two

independent components. Contrast-discrimination thresholds for a foveal test grating were

sharply elevated in the presence of a perfectly overlapping orthogonally oriented mask grating.

However, thresholds returned to the unmasked baseline when a surround grating was added with

the same orientation and phase as either the test or mask grating. Both such masking and

'unmasking' effects were much stronger for moving than for static stimuli. Our results suggest

that common-fate motion reinforces the perception of a single coherent plaid pattern, while the

surround helps to identify each component independently, thus peeling the plaid apart again.

These results challenge current models of early vision, suggesting that higher-level surface

organisation influences contrast encoding, determining whether the contrast of a grating may be

recovered independently from that of its mask.