Supporting Information

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SI Text

Movie Demonstrating the Adaptation Effect. Movie S1 presents an example of the adaptation process used in the experiments. Unlike in the experiments, the movie cycles through the stimulus sequence only six times, instead of indefinitely. To experience the indefinitely repeating sequence, as it occurs in the experiment, we have also created a Flash demonstration that can be viewed in any browser and which is available on request.

Instructions. To experience the effect, maintain fixation on the yellow cross throughout the demonstration. For the first 10 s, the flickering adaptor is presented. The flickering occurs to avoid a retinal afterimage. Keep staring at the cross to adapt your orientation-selective units. After the initial adaptation, a neutral noise pattern will appear very briefly, which will then be replaced with some top-adaptation, followed by the brief neutral post-adaptor again. This will cycle six times.

Although short-lived, the neutral postadaptor noise is the important part of the demonstration. In reality this is completely flat, uniform white-noise texture, without any dominant local orientations. If the adaptation works for you, then you should see this noise as a 3D shape. The effect is quite fleeting, but with prolonged viewing it gets somewhat stronger.

You'll also notice that after the initial adaptation sequence, two dots appear. Try to judge which of the two dots lies on a portion of the 3D surface that appears closer to you in depth. The dots are also shown during the top-up adaptation stimulus, although the judgment of depth should only be made during the period of the noise. This was the task we asked subjects to perform. The subjects indicated with a key-press whether they saw the red or green dot as closer. We tested many pairs of dots for each shape, to get an estimate of their ability to discriminate the adaptation-induced depths. In our experiments, most subjects saw the location indicated by the green dot in this demonstration as lying closer in depth.
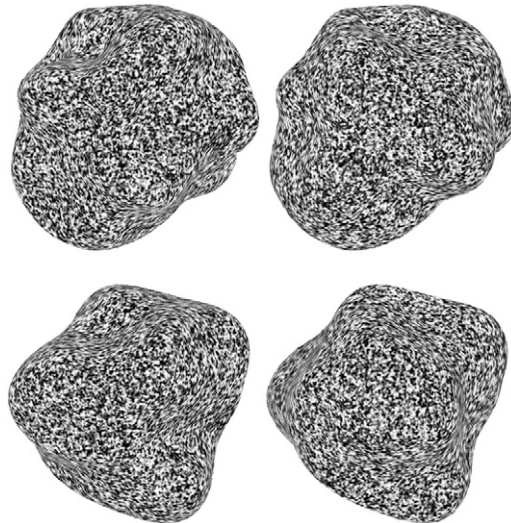

Fig. S1. Effect of occluding boundary on perceived shape. The image contains two pairs of objects (*Upper* and *Lower*) that have identical boundaries but different internal structure. Despite the fact that the boundaries are identical within each pair, we clearly perceive different 3D shapes. This finding suggests that although the boundary may play a role in perceived shape, which shape is seen is dominated by the contents of the texture for these stimuli.
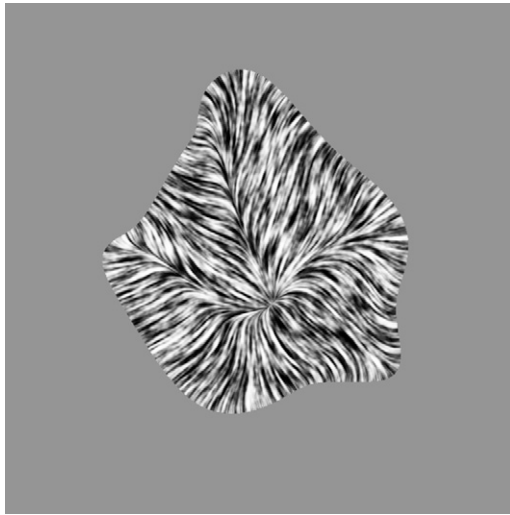
Movie S1. Movie demonstrating the adaptation effect.