



AB068. Texture density aftereffect can be bidirectional

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Background: It has been suggested that adaptation to texture density only ever reduces, i.e., never increases, perceived density, implying that density adaptation is ‘uni-directional’ and that texture density is coded as a scalar attribute (Durgin & Huk, 1997). However, we have recently shown that simultaneous density contrast, which describes the effect of a surround texture on the perceived density of a centre region, is ‘bi-directional’—that is, not only do denser surrounds reduce perceived density of the center but sparser surrounds enhance it (Sun, Baker, & Kingdom, 2016). Therefore, we decided to re-examine the directionality of density adaptation.

Methods: We measured the density aftereffect in random dot patterns using a 2AFC matching procedure that established a point-of-subjective-equality (PSE) between an adapted test patch and an unadapted match patch. The adaptors and test were presented at the same position, either at top left or bottom right of the fixation. The match was presented at bottom left or top right correspondingly. These positions were fixed within a block and switched between blocks. Then, using sequential presentation, we measured the density aftereffect for a wide range of adaptor and test densities.

Results: In the first experiment, we observed a unidirectional density aftereffect when test and match were presented simultaneously as in previous studies. However, when they were presented sequentially, bidirectionality was obtained. This bidirectional aftereffect remained when the presentation order of test and match was reversed (second experiment). In the third experiment, we used sequential presentation to measure the density aftereffect for a wide range of adaptor densities (0–73 dots/deg²) and test densities (1.6, 6.4, and 25.6 dots/deg²). We found bidirectionality for all combinations of adaptor and test densities, consistent with our previous SDC results.

Conclusions: In three experiments, we found that density adaptation is bidirectional when the test and match stimuli are presented sequentially. The unidirectional density adaptation reported in previous studies might have been due to effects arising from simultaneous presentation of test and match stimuli. Our evidence again supports the idea that there are density-selective channels in the visual system in line with our previous finding in SDC.

Keywords: Adaptation; aftereffect; texture; texture density

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