

Op de Beeck, Wagemans and Vogels (2001) discovered that IT neurons represent low-dimensional configurations of parameterized abstract shapes. We have reported an event-related (ER) fMRI adaptation experiment (SFN 2004 abstract Program No. 664.8) which showed that the amount of recovery of adaptation in anterior LOC was monotonically related to the transformational distance between the two object contours in each trial.

In the present ER-fMRI adaptation experiment we explicitly control for the number of unique stimulus repetitions to study additionally whether responses to prototypical shapes are lower than to less prototypical shapes, as suggested by recent single-cell recordings (Kayaert, Op De Beeck, Biederman and Vogels, 2004). For each of 8 categories, we started from the 4 extremes in a measured two-dimensional similarity space and created the 2 diagonal morph lines (0%-33%-66%-100%) resulting in 8 unique stimuli for each of the 8 categories. By pairing stimuli with themselves or with others from the same morph line, we constructed 4 adaptation trial types (2 stimuli in each trial) such that each unique stimulus was presented an equal number of times: 1) same extreme, 2) same morph, 3) 33% distance, and 4) 66% distance. These four trialtypes each included 4 unique stimulus pairs for each category. Furthermore, by pairing each stimulus with a contour from another category we created a fifth trialtype (different category) with 8 unique pairs.

Our results, together with those of recent single-cell, imaging and computational studies on object recognition and categorization, further substantiate the view that the highest level of the ventral visual pathway represents objects using shape-space approximation (Edelman, 1998).