Abstract

It has been proposed that objects are stored in view-based representations in the human visual system, i.e., information that we store about an object is tied to specific views of the object only. One problem about this view-based theory of visual object recognition concerns how view invariance is achieved through experience with a small number of views. The pooled activation account suggests the presence of view-specific representations, which are the most sensitive to their preferred view and also react to a range of neighboring views. Novel views activate different view-specific representations to different degrees, and the pooled activation determines recognition performance. Such an account predicts that when two views rather than one view have been studied, views between but not outside tend to activate the representations of the studied views to a larger extent, leading to interpolation but not extrapolation. It also predicts more evident interpolation when depth rotation does not occlude important parts of the objects than when occluded rotation occurs, because the view-specific representations of objects with non-occluded rotation are sensitive to a wider range of views and thus have more overlap with other representations. To test this prediction 125 university students, across four experiments, studied one or two views of a target object, and then made a same/different decision for a test image, which showed either the target or a distractor. Amoeboid and geon objects with and without self-occlusion during depth rotation were adopted. Results showed a general facilitation in recognition performance for test views that fall between the two studied views, although not in all conditions. With a large angular disparity between the two studied views, such internal facilitation was only evident if both studied views showed the same object features (i.e., there was no self-occlusion).

Having studied two very similar views resulted in subsequent recognition performance similar to the condition when only one of the views had been studied. Results supported and extended accounts of object recognition that rely on pooled activation mechanisms.