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The brain of the beholder ? inferior temporal representations of visual objects are individually unique and predict perceived similarity

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The unique way in which each of us perceives the world must be reflected in our brain representations of meaningful objects. If brain imaging could reveal the structure of an individual's unique mental representation, it could help us understand the biological substrate of individual differences. However, studies have focused on commonalities between individuals rather than differences. Here we investigate the individually unique component of brain representations of particular objects with fMRI. We characterized the representational geometry by the dissimilarity matrix of activity patterns elicited by particular object images. The representational geometry was replicable across scanning days and unique in each individual in early visual cortex and inferior temporal cortex (IT). The IT representation predicted perceived similarity and predicted the individually unique component of the judgments when the objects were personally meaningful. Our results demonstrate that the IT representation reflects the unique way in which each of us perceives the world and that fMRI has the power to reveal individually unique representations of single particular objects.