

## Natural categorization through multiple feature learning in pigeons.

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Recently (Troje, Huber, Loidolt, Aust, & Fieder 1999), we found that pigeons discriminated between large sets of photorealistic frontal images of human faces on the basis of sex. This ability was predominantly based on information contained in the visual texture of those images rather than in their configural properties. The pigeons could learn the distinction even when differences of shape and average intensity were completely removed. Here, we proved more specifically the pigeons' flexibility and efficiency to utilize the class-distinguishing information contained in complex natural classes. First, we used principal component as well as discriminant function analysis in order to determine which aspects of the male and female images could support successful categorization. We then conducted various tests involving systematic transformations and reduction of the feature content to examine whether or not the pigeons' categorization behaviour comes under the control of category-level feature dimensions - that is, those stimulus aspects that most accurately divide the stimulus classes into the experimenter-defined categories of "Male" and "Female". Enhanced classification ability in the presence of impoverished test faces that varied only along one of the first three principal components provided evidence that the pigeons used these class-distinguishing stimulus aspects as a basis for generalization to new instances.