

## 10

### Overlapping Partial Configurations in Object Memory

#### *An Alternative Solution to Classic Problems in Perception and Recognition*

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The assumption that depth and figure-ground assignment are established before object memories are accessed—the “depth-and-figure-first assumption”—provided a foundation for much visual perception and visual cognition research in the 20th century. Its foundational status arose in part because it was a critical component of the Gestalt psychologists’ critique overturning the Structuralist view. The Structuralists held that the visual field was organized primarily by the operation of past experience. In contrast, the Gestalt psychologists proposed that some initial aspects of organization—grouping and figure-ground segregation in particular—must be accomplished before past experience can affect perception. To support their view with respect to figure-ground segregation, the Gestaltists showed that a border shared by two novel regions was more likely to be seen as the bounding edge of the region that was relatively smaller in area, more convex, enclosed, and/or symmetric. The novel region to which the bounding edge was assigned was seen as the shaped *figure*. The region lying on the opposite side of the border typically appeared to be shapeless (at least near the shared border) and to continue behind the figure, forming a *background* for the figure.

The Gestalt psychologists demonstrated that factors like symmetry, con-

vexity, relative area, and enclosure affected figure assignment with novel displays—displays for which past experience putatively could not affect perception. They assumed that these factors were innate and did not depend upon past experience. The Gestalt psychologists called these factors “configural cues” because they affected the likelihood that a region would appear to be shaped (i.e., to be seen as a *configuration*). In order to avoid using the term “configural” differently in this chapter from the way it is used in many of the other chapters in this volume, I will refer to the Gestalt “configural cues” as the Gestalt “shaping cues.” As in the other chapters in this book, the terms “configural” and “configuration” will refer to information concerning parts (features)<sup>1</sup> and their spatial interrelationships.

Another reason for the foundational status of the depth-and-figure-first assumption is that it provides a solution to an object-recognition problem arising on another commonly held assumption, the “holistic-substrate assumption.” In the holistic-substrate assumption, whole, bounded regions of uniform color, luminance, texture, and so on form the substrate for object recognition. Before object memories are accessed, whole regions might be subdivided into parts (or features), but all parts (features) detected for a given region would be matched to object memories. This holistic-substrate assumption raises a problem, called the “intrinsic contour problem” by Nakayama, Shimojo, and Silverman (1989). The intrinsic contour problem will be defined by reference to figure 10.1a, which depicts multiple objects located at different distances from the viewer. For

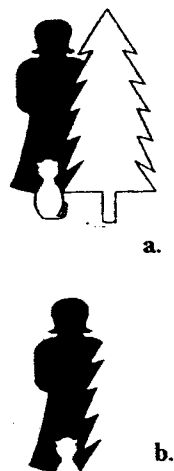


FIGURE 10.1. A schematic representation of three objects located at different distances from a viewer (a). The white regions outlined in black portray a cat and a pine tree. The black region is clearly seen to portray a woman. In (b), the black region has been extracted from the scene in (a) so that its bounding contours can be seen. It is clear that the contours on the bottom and right side are not intrinsic to a woman.

