

Object-centered attentional biases and object recognition contributions to scene segmentation in left- and right-hemisphere-damaged patients

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Participants viewed elongated rectangular displays in which two regions shared a central contour. In experimental stimuli, the central contour portrayed a known object on one, high-denotative, side. In control stimuli, no known objects were portrayed on either side of the central contour, but one side of each control stimulus was a scrambled version of one of the high-denotative regions, matching it on all factors known to influence scene segmentation other than object recognition. For each display, participants decided whether the left or the right region was more likely to be an object. Paradoxically, both right-hemisphere- (RH) and left-hemisphere- (LH) damaged individuals were more likely to see objects lying on the contralesional rather than the ipsilesional side of the central contour. This tendency is attributed to an object-centered attentional bias toward the central contour when objects lie on its contralesional side and away from the central contour when objects lie on its ipsilesional side. Object-centered attentional biases were stronger following RH than LH damage. Elderly control participants showed a slight bias in the same direction as RH-damaged individuals. More high-denotative regions than scrambled regions were seen as objects, even when object-centered attention was biased away from the central contour carrying the object recognition information. The latter result suggests that the object recognition processes contributing to scene segmentation are preattentive.

Attentional Biases

Spatial attention. Attentional biases toward the side of space ipsilateral to a lesion (ipsilesional space) are often evident following brain damage. When such biases are severe, spatial locations contralateral to the lesion (contralesional space) may be ignored or "neglected." Such "unilateral" neglect is more likely to arise from right-hemisphere (RH) lesions than from left-hemisphere (LH) lesions (DeRenzi,

1982; Ogden, 1987). Unilateral neglect is frequently identified by a bedside battery in which patients will evidence behaviors such as left-sided omissions on line cancellation tasks, constriction of numbers to the right side in clock drawing, and/or placement of line bisection marks to the right of center. Patients with unilateral neglect have intact visual fields; therefore, neglect appears to be a disorder of attention rather than perception.

Hemispheric specialization for spatial attention. Neglect disorders suggest that the undamaged hemispheres may be differentially specialized for allocating attention to spaces located to the left and right of the viewer's midline. Specifically, unilateral neglect might reflect a contralateral attentional orienting bias of the intact hemisphere. The fact that unilateral neglect occurs more often for RH-damaged patients than for LH-damaged patients has been taken to suggest that the attentional orienting bias of the LH is stronger (Kinsbourne, 1970), or more lateralized (Heilman & Van Den, 1980), than that of the RH. Consistent with these ideas, contralateral attentional biases can be observed in normal (i.e., non-brain-damaged) controls when the LH and RH are selectively activated, at least initially, by stimulus presentations in the right or left visual field, respectively (or in right and left hemisphere, re-

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