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How visual attention controls the range and properties of crowding

Abstract:

Crowding occurs when easily seen visual stimuli become indecipherable due to flanking stimuli. When the stimuli are letters or Gabor patches, the flankers must be within half-eccentricity to crowd (Bouma's law) and must share features such as oriented segments. These well-known findings have been explained by feature overlap in receptive fields (RFs) in occipital cortex, but they depend on advance knowledge of the locations of targets and a fixed disposition of spatial attention. Thus cues to focus attention shrink the range of crowding (Yeshurun & Rashal), and we have shown that shifting attention from central to peripheral targets, while keeping the eyes fixed, doubles the region of crowding and abolishes the dependence on mutual orientation (Nador & Reeves). It appears that when focused, attentional feedback is scaled with eccentricity to match the typical RF size in occipital cortex, but when shifting, attention expands to cover multiple RFs. Since attention often shifts across the visual field, practical measures of crowding in patients should ideally employ conditions with both fixed and varied attention, but the essential labor of developing a suitable protocol has yet to be undertaken.

Biography

Adam Reeves completed his BA with Philip Liss at CUNY and his PhD with George Sperling at NYU. He undertook post-doctoral work with John Krauskopf at Bell Labs, Murrray Hill, and Richard Cavonius at ifARDO in Germany. He has been a professor of Psychology at Northeastern University since 1982.