Key Note

# Chapter 10: Visual and auditory localisation

## Key note 10A: Uses of information from binocular disparity

This note describes how different aspects of disparity may be used by visual processes with different aims and requirements for precision.

Although the precision of the stereoscopic system has often been emphasised (very tiny differences in depth can be detected), much coarser aspects of stereoscopic information may be used by some visual processes, and studies using brain imaging in humans have begun to reveal how horizontal disparity may be used in different regions for different purposes. For example, Preston et al. (2008) showed that regions in the dorsal stream, such as V3a, responded to the amount of disparity, as well as its sign (crossed or uncrossed), whereas the lateral occipital area in the ventral stream responded only to the sign. The authors suggested that the detailed dorsal information may be used for accurate perception of the location of objects and fine motor control, whereas the coarser ventral information, which would signal only whether one surface was in front of or behind another might support the recognition of objects at different distances. The latter would be useful in segregating the image of an object from its background.

Preston TJ, Li S, Kourtzi Z, Welchman AE (2008) Multivoxel pattern selectivity for perceptually relevant binocular disparities in the human brain. *Journal of Neuroscience* 28(44): 11315–11327.