

How does illusory surface inclination affect the accuracy of orientation judgements?

Laura Pérez Zapata¹, Manuel Moreno¹, Hans Super^{1,2} & Antonio Aznar-Casanova¹

¹ Vision and Control Action (VISCA-Lab), Facultat de Psicologia, Universitat de Barcelona

² Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona

SUMMARY

A possible description of our surrounding is a spatial disposition of surfaces that differ in orientation, size, reflectance, texture and spatial location. When the slant of the surface is known our visual system can improve greatly the precision and accuracy of the spatial location, orientation and distances of stimuli. To correctly perceive our surrounding the visual system has to do different geometric transformations between surfaces. Here two of these transformations were studied. In the first task a segment (or the end-points of a segment) is shown on an induced inclined surface (created by a texture gradient; presentation plane) and the observer was asked to transpose it onto a frontal surface (test plane). In the complementary task a segment was shown on a frontal surface and the observer needed to transpose it onto an induced inclined surface. The results demonstrate that, for the first transformation, the accuracy has a better fit for a linear model where the error increased for more inclined surfaces, i.e. for larger differences between the presentation plane and the test plane. However, for the second transformation, the precision was better described by a non-linear model. The results suggest there are different mechanisms for tilt (2D orientation) and inclination processing (3D orientation).

Keywords: Perception of the orientation, depth perception, perception of inclination, Visual Space, Psychophysics