Introduction

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INTRODUCTION

The purpose of this special issue is to bring together recent experimental findings and newly acquired theoretical insights that shed light on an old problem in psychology: the relation between visual perception and knowledge.

Broadly, two theoretical points of view can be distinguished, one holding that perception and cognition are qualitatively different, the other stating that perception is completely governed by perceptual inference which is to be viewed as a special kind of reasoning.

This special issue features six papers that highlight the main theme using different methodology, topics and philosophy.

The introductory paper by Rock states that knowledge ordinarily does not affect stimulus bound perception. On the other hand knowledge enables recognition and interpretation to occur, and in doing so can affect perception as well.

In contrast to the main theme Kanizsa argues that seeing is an instrument for knowing and rather tries to distinguish between seeing and thinking. A number of new and fascinating visual demonstrations serve to illustrate his point.

Next, Kawamoto and Anderson present a model for the phenomenon of multistable perception. Their neural network model describes the processes of reversal, adaptation, hysteresis and, indirectly, mechanisms for disambiguation. In their model perception may be conceived as an independent module that is not affected by cognition and does not make top-down inferences.

How a single object can be perceived in different ways is also discussed by Palmer, who elaborates his symmetry theory of contextual effects. The symmetry theory is shown to hold for various objects and many arrangements, but it is also made clear that local and global axes of symmetry are important as well. Palmer's model implies that perception forms a closed system, at least within perceptual levels.

That context may be effective in a very short time of processing is demonstrated in an experiment by Leeuwenberg, Mens and Calis. They

show that a contextual pattern preceding another one can affect its interpretation in as little as 30 milliseconds. Their model rejects a rigid bottom-up approach, being based on the minimum principle that allows for alternate courses of processing, in which top-down processing cooperates.

One basic problem in the recognition of visual objects is that they can present themselves in many different sizes and under various rotations. Shepard and Farrell propose that this is possible through perceptual mechanisms embodying knowledge on transformations in Euclidean space. Their geometrical model can describe data from discrimination and mental rotation tasks in an interesting and novel way. These transformations, that subjects can apply, are not relegated explicitly, or exclusively, to the perceptual level or the cognitive domain.

Taken together, the majority of these papers cover the field of simple object perception. They represent an encouraging step in the direction of future research that will also need to concentrate on the applicability of the ideas put forward here in processes of reading, visual search, attention and recognition of complex objects.

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