

**Gregory, R. L. (1968). Perceptual illusions and brain models.
Proceedings of the Royal Society B, 171, 279-296.**

Some historical note

Visual perception: Main question

How does the perceptual system recover 3D world information from the retinal data, which are essentially 2D.

Hermann von Helmholtz (1821-1894)

German physiologist, psychologist

Unconscious inference

Likelihood principle

Max Wertheimer (1880-1943)

Gestalt Psychology

Part vs. Whole

J. J. Gibson (1904-1979)

Ecological approach

Direct perception

The environment has enough information, you don't need "top-down" information.

R. L. Gregory, Julian Horchberg (1923-)

Constructivism

David Hubel & Torsten Wiesel

Single cell recording, columnar organization of V1

Feature detector

David Marr

Computational approach

Computer vision, information processing.

Recent models:

Irving Biederman (Structural description),

Tomaso Poggio, Michael Tarr (view-based model)

Gregory's point: Perceptual illusions

Where do they come from?

Visual perception is essentially a constructive process.

Given available retinal data (2D bottom up data) along with those already stored in the brain (past experience), we “construct” “select a visual hypothesis / model” that is most appropriate.

→ *look-up system (p. 92)*

In most cases, the hypothesis / model is correct. But when the hypothesis / model is incorrect, then we have visual illusions.

What are stored, what information do we use?

Distilled visual cues.

Occlusion, relative size, linear perspective, atmospheric perspective

Visual illusions