

Wolfgang Metzger: Laws of Seeing

Condensed version of Chapters 1 – 12 (requested by Jingling)

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Ch. 1: Figure-ground

We see the figure, but we are blind for the background (clouds)

Figure: small, closer to observer, surrounded by contour, shape, occludes background

Background: further away, partly occluded, continues behind figure, no shape, larger

We see the figure, because the contour belongs to it (unilaterality of the border)

Ambiguity: figure-ground reversal (face-vase, Maltese cross)

Hidden figures: contours and surfaces become part of a larger context

Gestalt factor of good continuation

Ch. 2: Visible and invisible forms

A stimulus can be seen in many ways, but normally we see it only in one way

We have no choice as to what gets organized

Visual system seeks out the most orderly percept and presents it to us ready made

Gestalt factors of closure, good continuation, symmetry, and common center

Arbitrary figures are invisible

Ch. 3: Of groups and borders

The law of proximity determines what is grouped

Also the laws of similarity and common fate:

Abrupt color change is a grouping factor in natural contrast (Ganzfeld),

speaks against pointillism

Ch. 4: Developmental stages in shape formation

The law of good continuation dominates vision (children).

whereas the law of closure dominates in touch

Fovea vs periphery, smallest and faintest object unstructured

Microgenesis: Tendency to closure, symmetry, simpler Gestalt

Perception not the sum of individual sensations, but result of increasing differentiation of an unstructured unity

Ch. 5: Gestalt laws serving camouflage

Ch. 10: Yet another important camouflage principle

Animals use the same factors known to us to become inconspicuous

Factor of similarity: same color and brightness as surround (contrast reduction)
Counteract good continuation: break up boundaries, introduce wrong partitioning
Factor of belongingness: mimic texture
Factor of common fate: Playing dead, motionless – move in synchrony
Camouflage depends on lighting: shadow. Countershading: Roundness of the body
Camouflage to variable surroundings: Flounder takes on the color and pattern
Gestalt laws are universal laws

Ch. 6: Brightness and spatial form

Ch. 9: Gestalt laws in the spatial effect of brightness

Glancing light brings out depth (type script, structure of Japanese paper, craters of the moon, sculpture, photographing landscape in the right light)
A glowing or self-luminous body looks flat
Mapmakers use depth from shading to enhance depth
Depth from shading as immediate as stereo-depth
Assumption: The sun shines from the upper left
Experience: A hollow face cannot be seen hollow

Ch. 7: Gestalt laws in the spatial effect of perspective drawings

Perspective drawing produces depth by distorting shapes and sizes
Remember: 4 slabs of different size and shape look the same
Acquired?: Children do not draw according to perspective
A flat object looks three-dimensional if it improves itself
A 3D object looks flat if it becomes more symmetrical and better balanced
One-eyed people can perceive depth as well as normal people because they use
Secondary depth criteria: perspective, motion parallax, occlusion, shading

Ch. 8: Form and substance of seen things-the Praeganz principle

A surface looks transparent if some section of it shares its brightness with another
A shadow reveals itself if it moves with the background
A grey gradient looks uniform according to the Gestalt principle of similarity
The Koffka rings look uniform for the same reason (inner homogeneity, coherence)
The triangle in the Benary cross is enhanced due to belongingness
An occluded bar is amodally completed due to the factor of good continuation

Ch. 11: The wandering moon

Perception of motion is relative
We see motion when an object does not move (induced motion)

Perception of motion is influenced by experience: Car vs. house, Train vs. balloon

Direction of motion at right angles to the orientation (aperture problem)

Or it follows the shape of the window (Wallach) Plaid motion

Wertheimer's stroboscopic motion: Emergent property (Gestalt)

Many Gestalt factors are also present in motion: proximity, straight continuation

Motion quartet: proximity, similarity – hysteresis

Apparent causality:

Ch. 12: Laws of seeing and laws of nature

Are the laws of seeing psychological or physiological laws?

Vision happens without explicit awareness and

without the need for judgment, attention or experience.

Animals use the same laws for protection from their predators that are also effective in human vision.

Factors of similarity, proximity and good continuation hold also for jays, chickens, parrots.

Apes exhibit brightness, shape and size constancy.

Dogs and fish see stroboscopic movement.

Rats demonstrate transposition (size, contrast)

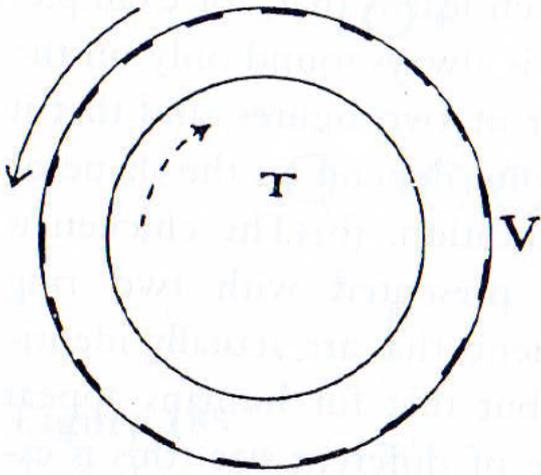
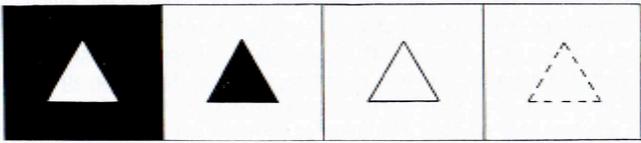
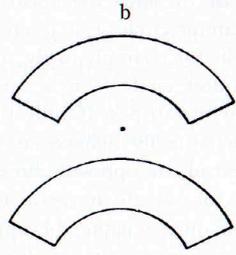
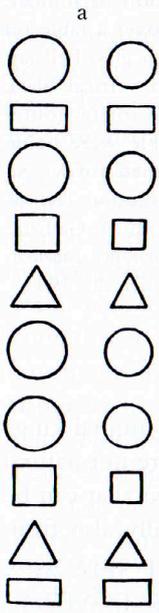
Flies demonstrate induced motion (vection).

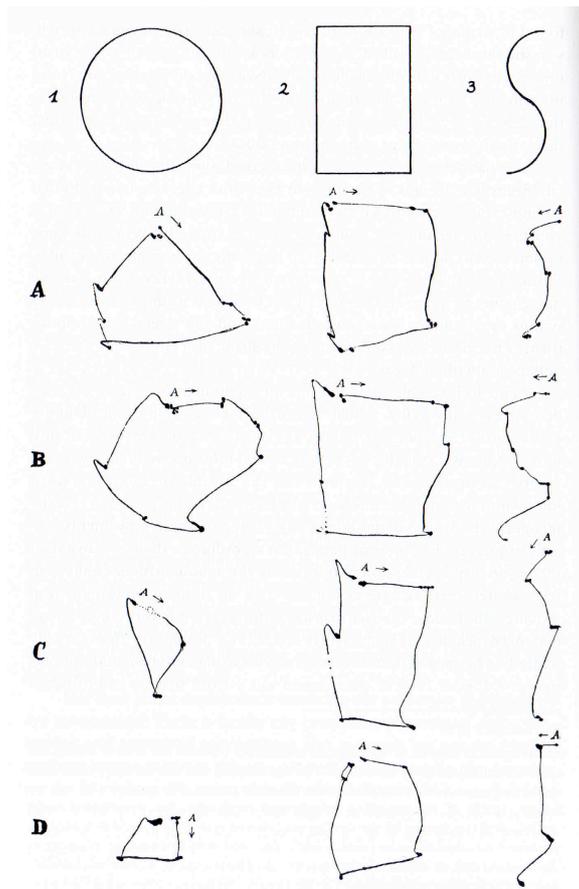
Eye movement theory is untenable.

Physiological theory is untenable. The receptor mosaic poses an unresolvable problem for continuity of space.

“We do not bow to physiology, we present challenges.”

Gestalt laws are also present in thinking – mental laws





Todorovic: Gestalt principles – from Scholarpedia

One important issue which was not discussed much in the classical literature is the *origin* of Gestalt principles. Why is it that the perceptual input is organized in accord with proximity, continuity, closure, etc? The Gestaltists tended to favor the notion that these principles are among the fundamental properties of the perceptual system, providing the basis or our ability to make sense of the sensory signals (navigation, forage, mating). An opposed view is that the Gestalt principles are heuristics derived from some general features of the external world, based on our experience with things and their properties (Rock, 1975). Objects in the world are usually located in front of some background (figure-ground articulation), have an overall texture different from the texture of the background (similarity), consist of parts which are near each other (proximity), move as whole (common fate) and have closed contours (closure) which are continuous (continuity). In sum, although these principles have been discussed for more than 80 years and are presented in most perception textbooks, there are still a number of issues about them that need to be resolved.

