Visual Design: Perception Principles

ID 405: Human-Computer Interaction
1. Gestalt psychology of perceptual organisation

2. Perception Principles by V.S. Ramachandran & William Hirstein
Properties of physical world

Human visual system assumes:

**Definition**: Objects have well-defined edges & surfaces

**Appearance**: Light travels in straight lines and reflects off surfaces in certain ways

**Temporal Persistence**: Objects do not randomly appear/vanish

**Gravity**: Objects fall in predictable ways
Gestalt psychology

- Based on the work of Kurt Koffka, Max Wertheimer, and Wolfgang Köhler

- Law of Prägnanz (pithiness, goodness)

- Things are organized spontaneously and assumed to be in the simplest configuration

- Perception as organised and structured wholes rather than the sum of their constituent parts

- Emergent, holistic, interdependent, and in context
The gestalt laws of perceptual organization

1. Emergence: The mind sees the whole and then the parts. It often sees more than what is specifically stated by its individual parts.
2. Invariance: The mind recognizes simple objects independent of rotation, translation, scale, deformations and lighting
3. Proximity: Elements that are closer together are perceived to be more related than elements that are farther apart.

The gestalt laws of perceptual organization
3. Proximity: Elements that are closer together are perceived to be more related than elements that are farther apart.
The gestalt laws of perceptual organization

4. Similarity: Elements that are similar are perceived to be more related than elements that are dissimilar
The gestalt laws of perceptual organization

5. Enclosure: Elements that are enclosed by anything are perceived as belonging together
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6. **Continuity**: The mind continues visual, auditory, and kinetic patterns
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7. Closure: The mind perceives a set of individual elements as a single, recognizable pattern.
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7. Symmetry: The mind perceives objects as symmetrical shapes that form around their center.
The gestalt laws of perceptual organization

8. **Figure-ground**: Elements are perceived as either figures (objects of focus) or ground (the rest of the perceptual field)
9. **Connection**: Elements that are connected (e.g. by a line) are perceived as belonging together.
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9. **Connection**: Elements that are connected (e.g. by a line) are perceived as belonging together.
10. Common-fate: Elements that share a common fate (e.g., moving in the same direction) as belonging together
Edward Weston, 1886-1958
The Creation of Adam by Michelangelo, fresco Sistine chapel, 1512
1. Tell us about yourself...

- **My Name**: [First Name] **Owoh**
- **Gender**: - Select One -
- **Birthday**: - Select Month -
- **I live in**: United States
- **Postal Code**

2. Select an ID and password

- **Yahoo! ID and Email**: @ yahoo.com
- **Password**
- **Re-type Password**

3. In case you forget your ID or password...

- **Alternate Email**
- **1.Security Question**: - Select One -
- **Your Answer**
- **2.Security Question**: - Select One -
- **Your Answer**
Portrait of Adele Bloch-Bauer. 1907 by Guastav Klimt
Perception principles

Based on the work of V.S. Ramachandran & William Hirstein

1. The Artful Brain
2. The Science of Art – A Neurological Theory of Aesthetic Experience
Neurological basis of visual perception

Gestalt psychology and its evolutionary rationale and the neural mechanism
5 key principles

1. Peak shift
2. Isolation
3. Contrast
4. Viewpoint
5. Metaphor
1. Peak shift principle

- Peak shift effect in animal learning and evocativeness in visual representation

- Caricature: capturing the essential features while discarding redundant information

- Take the average of all faces, subtract the average from Federer’s face and then amplify the differences
1. Peak shift principle

Caricature
1. Peak shift principle

- Essentially a caricature of the female form

- not only captures the essence of feminine sensuality, grace, poise, dignity, and charm, but also amplifies, exaggerates

- the concept of “rasa” or “the very essence”, in order to evoke a specific mood or emotion in the viewer’s brain
1. Peak shift principle

Van Gogh’s paintings – peak shift in colour space
1. Peak shift principle

Movement, shading, highlights, illumination, texture…
1. Peak shift principle

- How is this related to the rest of visual representation?

- Seagull behaviour – a caricature in ‘beak space’
2. Isolation principle

- Also referred to as the principle of understatement

- A wealth of information leads to poverty of attention

- Isolating a single visual cue helps to focus attention

- Johansson effect

- Comedic impressions
2. Isolation principle
2. Isolation principle
2. Isolation principle

Prehistoric art
2. Isolation principle

Comics
2. Isolation principle
2. Isolation principle
2. Isolation principle

- Orthopedic
- X-Ray/Screening
- Dressing
- Dermatology
- Cardiology
- Respiratory
- Urology
- Gastrology
- Pregnancy
- Medical examination
- Operation theatre
- Emergency
3. Contrast principle

- Information resides mainly in regions of change (Claude Shannon)

- Our visual system responds mainly to edges - they are more attention grabbing, more interesting than homogeneous areas

- In representation, it is important to compare and contrast information in the same visual field to improve effectiveness of communication
4. Viewpoint principle
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4. Viewpoint principle

- Our visual system rejects unique viewpoints and prefers generic viewpoints

- In general, it abhors suspicious coincidences

- Avoid distracting visual conundrums
5. Metaphor

- A metaphor is a mental tunnel between two concepts that appear dissimilar on the surface.

- It is useful to explain the unfamiliar in terms of the familiar.

- It also allows us ignore irrelevant, potentially distracting aspects of an idea and enables us to ‘highlight’ the crucial aspects.

- Encoding the world more economically.
5. Metaphor

- Why are visual metaphors besides effectively communicating are also rewarding?

- Seeing a deep similarity and categorizing was vital for survival

- Several viewer-centred representations of a chair are linked to form a viewer-independent representation of ‘chariness’