**The Art and Science of Depiction**

**Picture Organization and Gestalt**

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**Summary**

- Contrast processing  
- Different pathways  
- Computational theory of vision  
- Invariants

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**Overview**

- After image-based, we only know where edges are  
- Need to organize the image  
  - Segment by region, find structure

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**Context: Gestalt psychology**

- Early 20th century  
- Inspired by field theory in physics  
- Holistic philosophy of vision  
  - “spontaneous” organization  
  - Opposed to unconscious inference  
- Has been integrated recently into modern framework  
- Very popular in design

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**Prägnanz**

- “Goodness”  
- “Simplest” possible figure or organization  
- Has recently been related to information theory (simple in terms of amount of information required to encode it)

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**Some Gestalt principle**

- Continuation
**Continuation and Map-Making**

**Continuation and design**
- El Lissitzky, *Self Portrait: The Constructor* 1924

**Some Gestalt principle**
- Continuation
- Closure

**Plan**
- Grouping
- Figure-ground
- Completion and illusory contours

**No Grouping**
Grouping by proximity

Grouping by color

Grouping by size

Grouping by shape

Grouping by orientation

Grouping by synchronicity
**Grouping by symmetry**

- Proximity is overweighed by region

**Grouping by parallelism**

- Proximity is overweighed by connectedness

**Grouping conflict**

- Detect repetition
- Slower when between groups (0.7 vs. 1.1s)

**Grouping conflict**

- Detect repetition
- Faster when within small oval
**Grouping after lightness constancy**
- If the shadow is visible as a shadow
- Grouped by lightness

**Grouping after size constancy**
- Grouped by 3D–proximity, not by retinal image proximity

**Grouping in complex situations**
- No quantitative rule yet!

**Grouping in photos**
- Arthus-Bertrand

**Grouping and photo**
- Edward Weston
Grouping and photo

Jean-Pierre Sudre

Grouping

Frank Horvat

Grouping and photo

- Grouping reinforces contrast

Grouping by color

Georgia O’Keeffe

Grouping

- Grouping by proximity tells story

Grouping

- Abbas
  *South African Police in Training, 1978*
  - Grouping by proximity and similarity tells story
Grouping
• Grouping by similarity

Grouping & Map Making
• Grouping provides efficient analysis

Grouping & Architecture
• Grouping by similarity

Grouping & Architecture
• Grouping and symmetry
• Cesar Pelli
  Petronas Towers
  Kuala Lumpur, Malaysia
  1991-97

Grouping
• Lucien Clergue
  Camargue, 1940

Grouping and repetition
• Andy Warhol
  30 Are Better than One
  1963
**Grouping and ornament**
- Repetition, rhythm

**Closure & grouping**

**Plan**
- Grouping
- Figure-ground
- Completion and illusory contours

**Figure-ground**
- There has to be one figure and one ground
- Related to occlusion and thus to depth

**Figure-ground**
- A: ambiguous
- B: relative size
- C: symmetry & main axis
- D: contrast

**Figure-ground**
- A: symmetry
- B: convexity
- C: parallelism
**Figure-ground & familiarity**

**Closure & figure-ground**

- Information theory (Shannon)
- Figure-ground separation is simpler when high signal-noise ratio

**Figure-ground painting**

- Rubin vase
Figure-ground transition

• +grouping

Figure-ground logos

Figure Ground in design

• Sharon Gresh,
  Michael Mc Ginn

Figure ground: empty ground

Hopper

Figure ground simplification
**Figure-ground simplification**
- Egon Schiele
- Contrast enhancement

**Figure-ground simplification**

**Figure-ground and map-making**

**Figure ground – not so easy**
- Monet

**Figure ground – not so easy**
- Picasso

**Figure ground – stage of vision**
- Note that Impressionism and cubism where not classified surface-based
- In contrast, in this Raphael, figure-ground separation is easy
Figure ground – stage of vision

- Note that Impressionism and cubism were not surface-based.
- But in this Picasso, figure-ground separation is easy.

Negative space

- The ground defines the negative space.
- Usually overlooked.
- Fundamental for balance.
  - Typography.

Negative space

- George Seurat.

Negative space

- George Seurat.

Closure & Negative space

- Negative space are enclosed in the picture frame.

Negative space in Architecture

Plan

- Grouping
- Figure-ground
- Completion and illusory contours

Illusory contours

- Kanisza

Image-based (primary sketch)

- Contrast, edge detection
- Not so easy

Illusory contour

- Can be more effective

Illusory contour

- The American Short Story
Illusory contour
• William Anders
  Earthshine
  1969
• Prägnanz:
  a circle is
  “simpler”

Visual completion
• We complete the occluded part
  with the simplest shape

Visual completion
• With no context
  • With context
Relatable edges

Illusory contour & completion

Both “see” a figure from incomplete information

Visual completion

• Clarence Lee, 1977

Visual completion

• Greg Brown (mural)

Completion

• Magritte

Completion

• Degas
• Framing
Completion
- Marc Riboud
- Completion is challenged

Summary
- Grouping
- Figure-ground
- Completion
- As usual pictures can
  - Simplify
  - Challenge

Assignments
- Piranesi
  - Tutorial 1 to 4
- Reading
  - Art and Illusion, Gombrich
  - Summary 1 to 2 pages
  - 2 Discussion issues
- Feedback + 1 picture

Talks
- Start in 2 weeks
- 20-30 minutes
- Discuss your subject with me if not done

Discussion
- The Man Who Mistook his Wife for a Hat
- The Colorblind Painter
- Oliver Sacks

The Colorblind Painter
The Colorblind Painter

Figure ground simplification

• Isaac D. Fletcher

Figure-ground in design

• Shigeo Fukuda
  1986
• Poster for a one-man exhibition

Grouping

Andy Warhol