

# Visual Design: Perception Principles

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ID 405: Human-Computer Interaction

# Visual Design: Perception Principles

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1. Gestalt psychology of perceptual organisation
2. Perception Principles by V.S. Ramachandran & William Hirstein

# Properties of physical world

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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

## 1

# Gestalt psychology

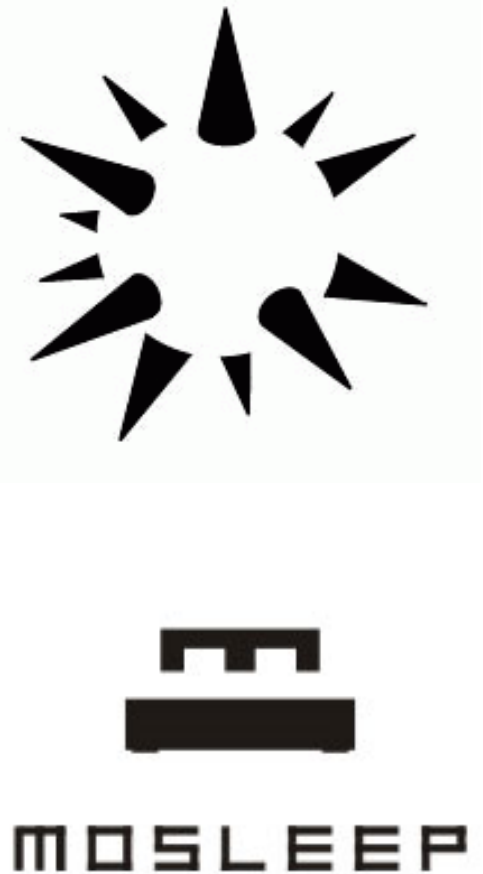
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- Based on the work of Kurt Koffka, Max Wertheimer, and Wolfgang Köhler
- Law of Prägnanz (pithiness, goodness)
- Things are organized spontaneously and assumed to be in the simplest configuration
- Perception as organised and structured wholes rather than the sum of their constituent parts
- Emergent, holistic, interdependent, and in context

# The gestalt laws of perceptual organization

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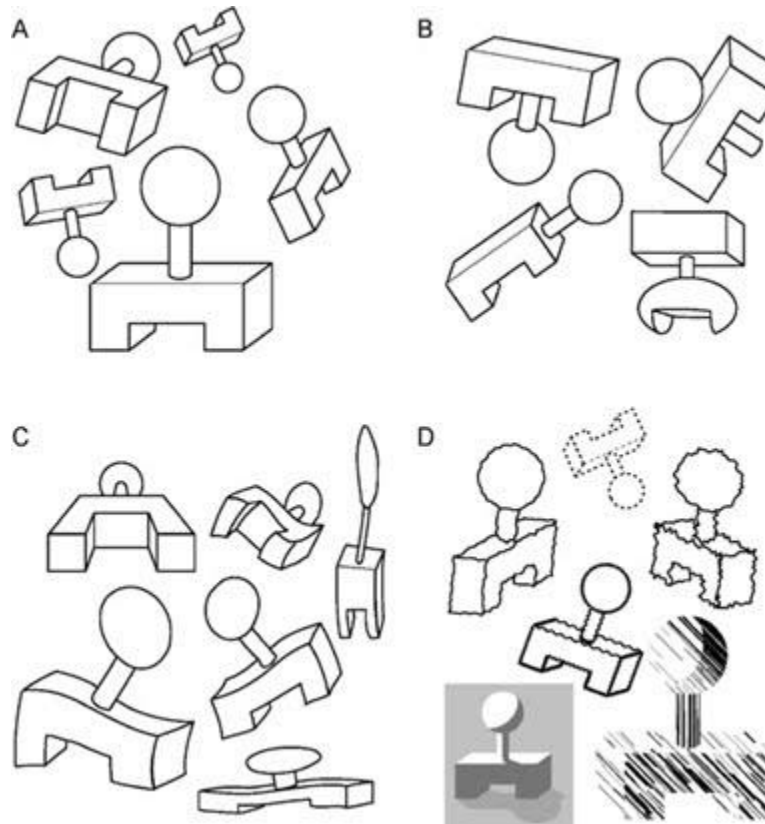
1. **Emergence**: The mind sees the whole and then the parts. It often sees more than what is specifically stated by its individual parts.



# The gestalt laws of perceptual organization

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**2. Invariance:** The mind recognizes simple objects independent of rotation, translation, scale, deformations and lighting



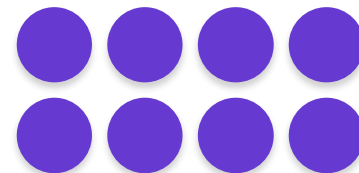
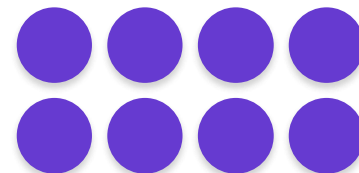
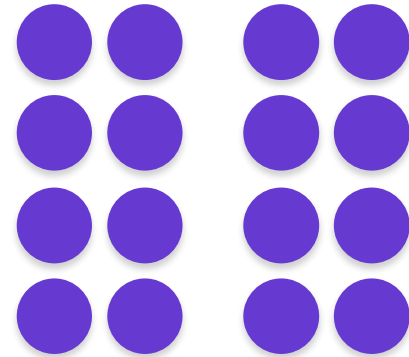
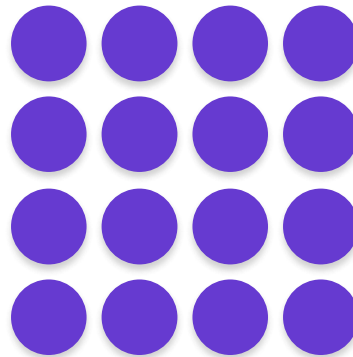
# The gestalt laws of perceptual organization

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**3. Proximity:** Elements that are closer together are perceived to be more related than elements that are farther apart



Unilever



# The gestalt laws of perceptual organization

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**3. Proximity:** Elements that are closer together are perceived to be more related than elements that are farther apart

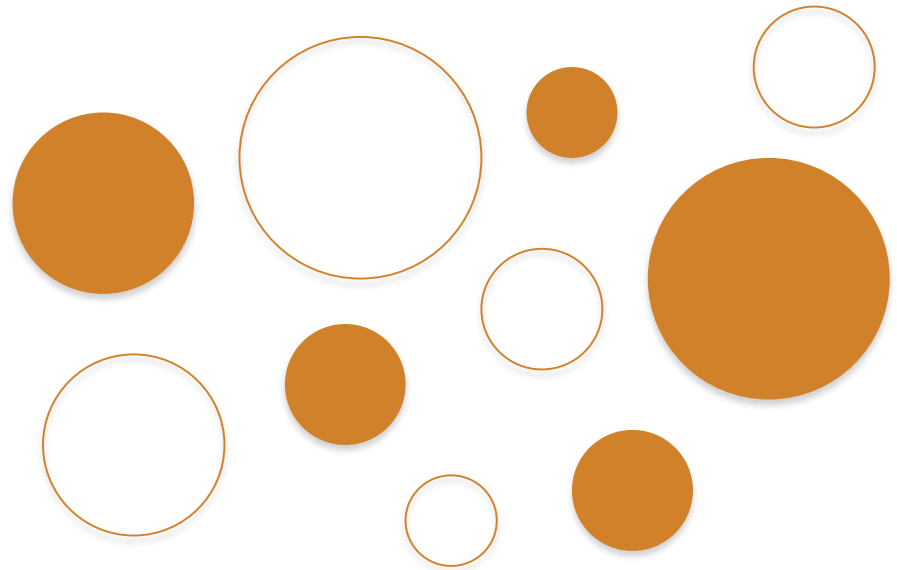
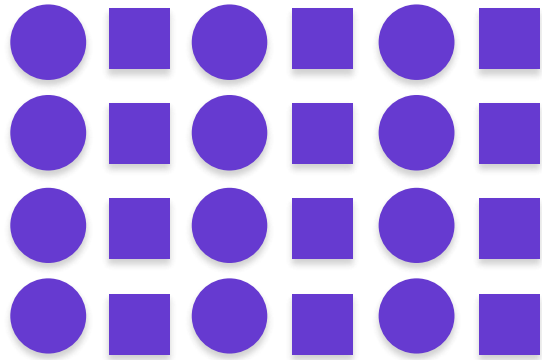




# The gestalt laws of perceptual organization

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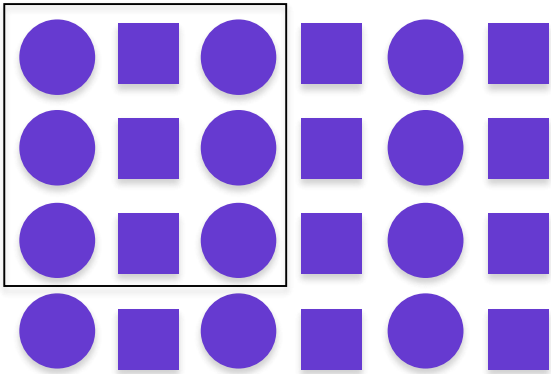
4. **Similarity**: Elements that are similar are perceived to be more related than elements that are dissimilar



# The gestalt laws of perceptual organization

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5. **Enclosure**: Elements that are enclosed by anything are perceived as belonging together



# The gestalt laws of perceptual organization

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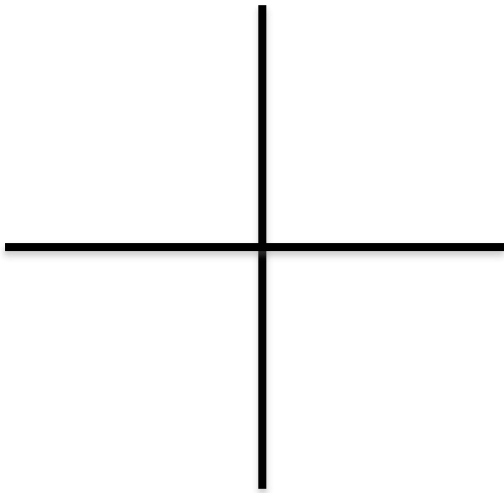
**5. Enclosure:** Elements that are enclosed by anything are perceived as belonging together



# The gestalt laws of perceptual organization

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6. **Continuity**: The mind continues visual, auditory, and kinetic patterns



REUTERS 

# The gestalt laws of perceptual organization

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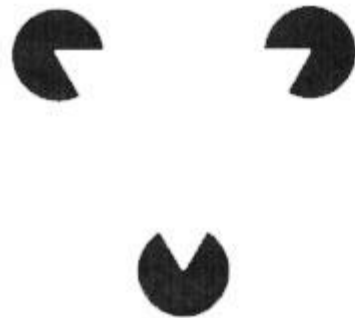
6. **Continuity:** The mind continues visual, auditory, and kinetic patterns



# The gestalt laws of perceptual organization

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**7. Closure:** The mind perceives a set of individual elements as a single, recognizable pattern



# The gestalt laws of perceptual organization

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7. **Symmetry**: The mind perceives objects as symmetrical shapes that form around their center

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# The gestalt laws of perceptual organization

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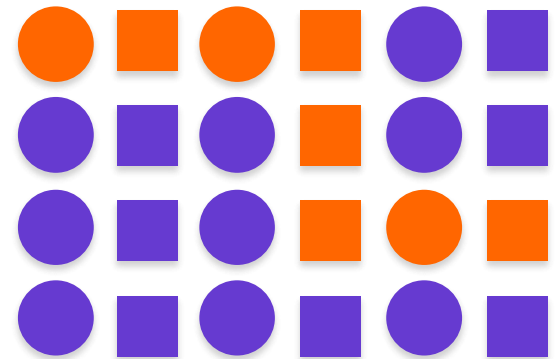
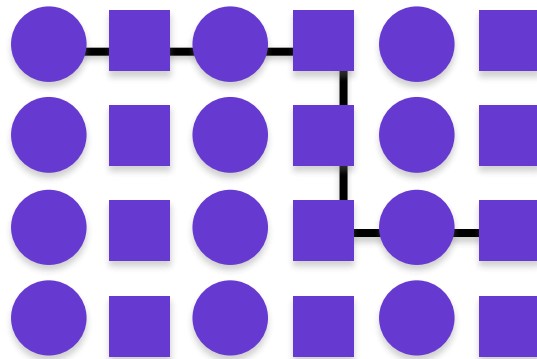
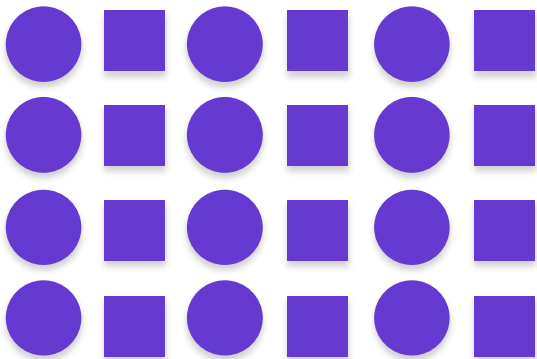
8. **Figure-ground**: Elements are perceived as either figures (objects of focus) or ground (the rest of the perceptual field)





# The gestalt laws of perceptual organization

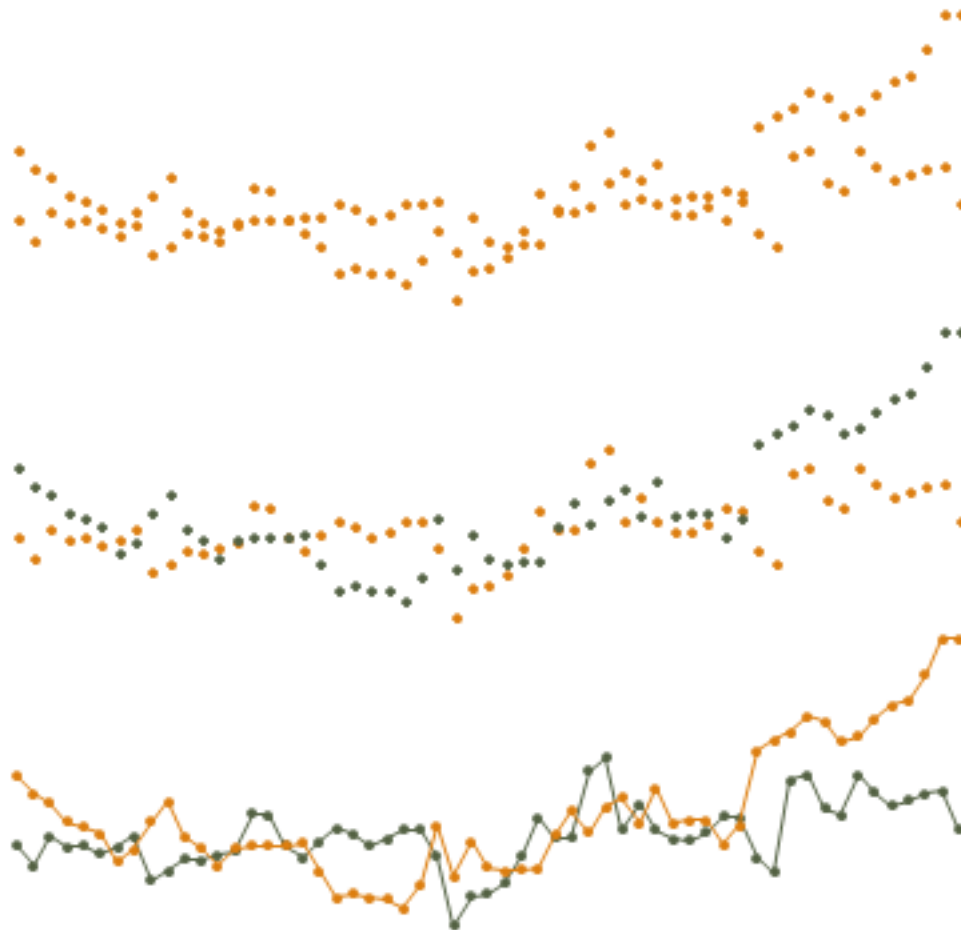
9. **Connection**: Elements that are connected (e.g. by a line) are perceived as belonging together



# The gestalt laws of perceptual organization

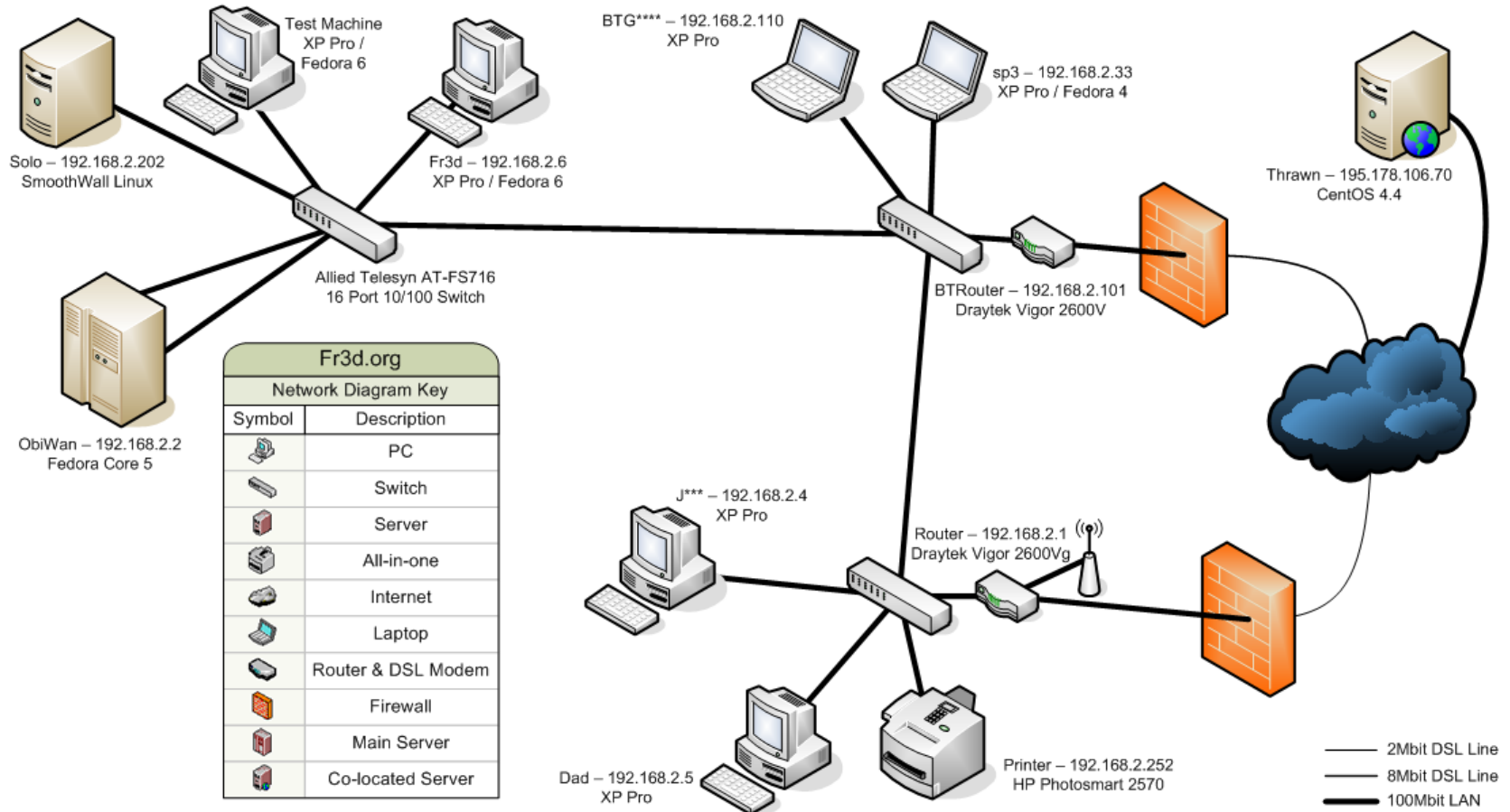
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**9. Connection:** Elements that are connected (e.g. by a line) are perceived as belonging together



# The gestalt laws of perceptual organization

**9. Connection:** Elements that are connected (e.g. by a line) are perceived as belonging together



# The gestalt laws of perceptual organization

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10. **Common-fate**: Elements that share a common fate (e.g., moving in the same direction) as belonging together





Edward Weston, 1886-1958



# 27 DRESSES

FOX 2000 PICTURES AND SPYGLASS ENTERTAINMENT PRESENT  
A BIRNBAUM/BARBER PRODUCTION

KATHERINE HEIGL "27 DRESSES"

JAMES MARSDEN MALIN AKERMAN JUDY GREER  
AND EDWARD BURNS MUSIC BY RANDY EDELMAN

HAIR STYLIST BUCK DAMON COSTUME DESIGNER CATHERINE MARIE THOMAS

CO-PRODUCER ERIN STAVY EDITOR PRISCILLA NEED FRIENDLY, A.C.E.

PRODUCTION DESIGNER SHEPHERD FRANKEL DIRECTOR OF PHOTOGRAPHY PETER JAMES, ACS/ASC

EXECUTIVE PRODUCERS BOBBY NEWMYER DECKI CROSS TRUWILL MICHAEL MATER

PRODUCED BY ROGER BIRNBAUM GARY BARBER JONATHAN GLICKMAN

WRITTEN BY ALINE BRODY MCKENNA DIRECTED BY ANNE FLETCHER



LIMA

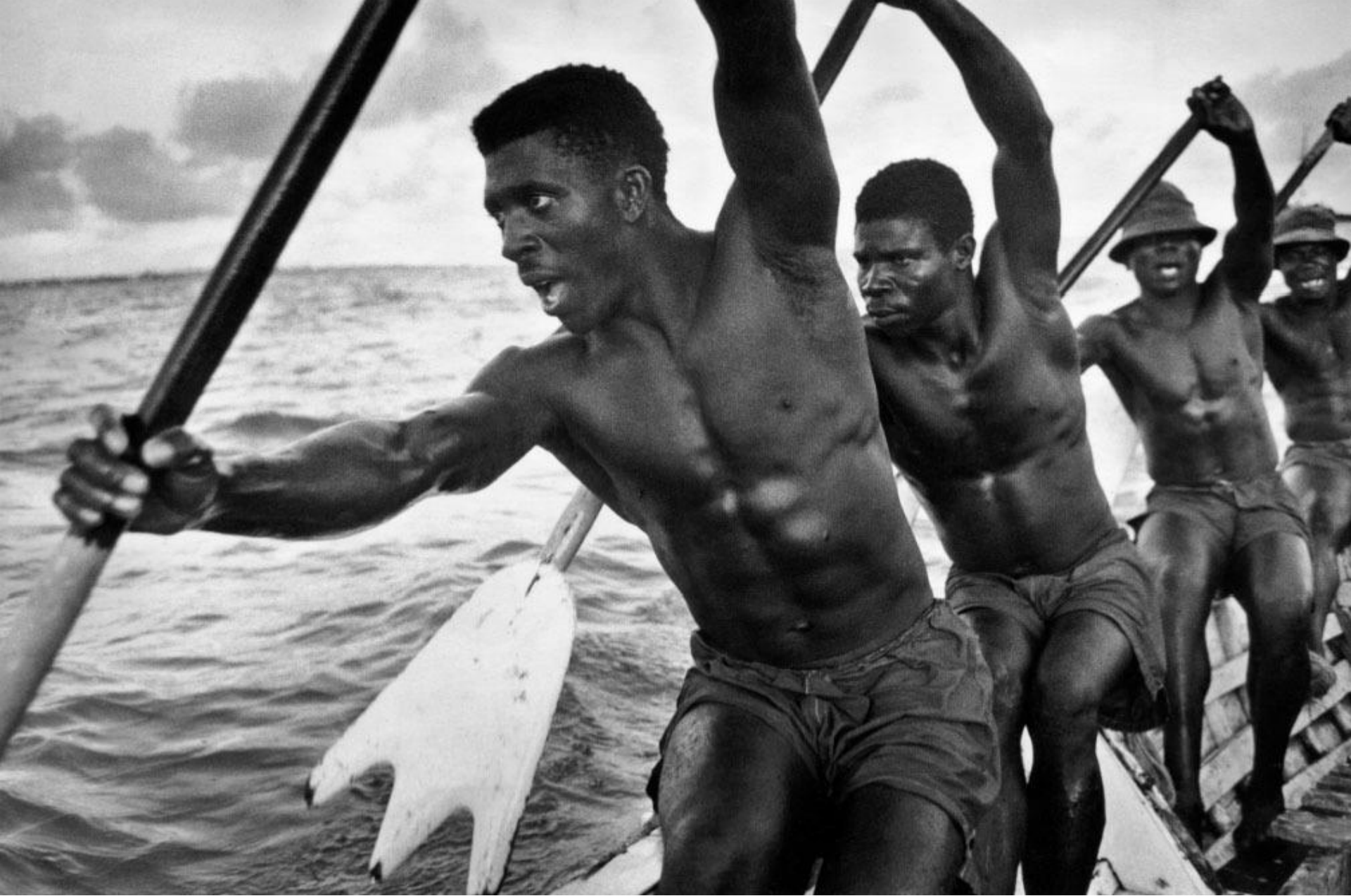


MOROCOCHA



The Creation of Adam by Michelangelo, fresco Sistine chapel, 1512





Marc Riboud, 1923-

### 1. Tell us about yourself...

My Name

Gender

Birthday

I live in

Postal Code

### 2. Select an ID and password

Yahoo! ID and Email  @

Password  Password Strength

Re-type Password

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

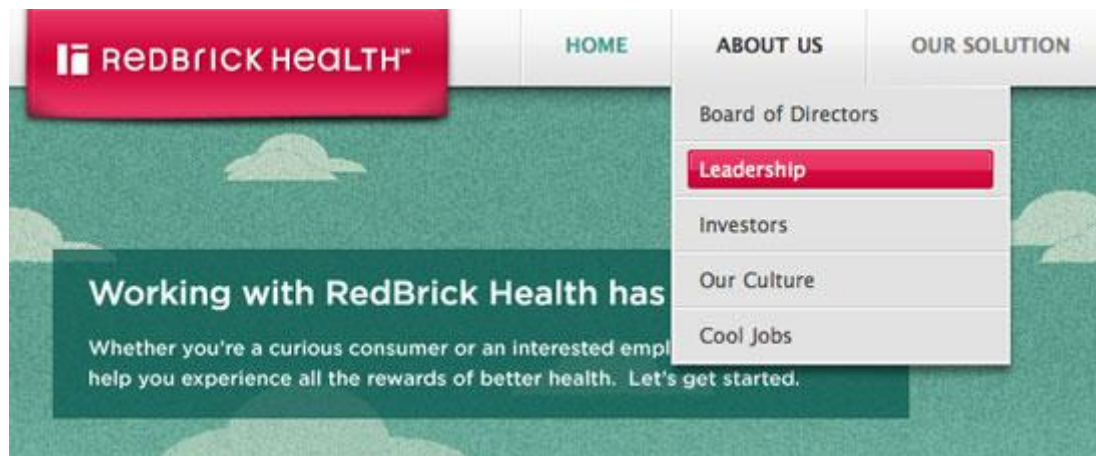
Alternate Email

1.Security Question

Your Answer

2.Security Question

Your Answer





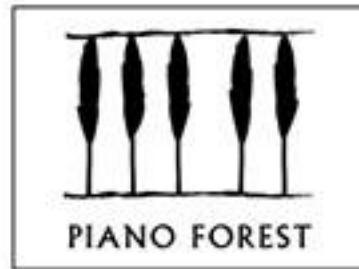
*Portrait of Adele  
Bloch-Bauer. 1907*  
by Gustav Klimt





Marc Riboud, 1923-









## 2

# Perception principles

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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

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Gestalt psychology and its evolutionary rationale and the neural mechanism



# 5 key principles

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

# 1. Peak shift principle

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- 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

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## Caricature



# 1. Peak shift principle

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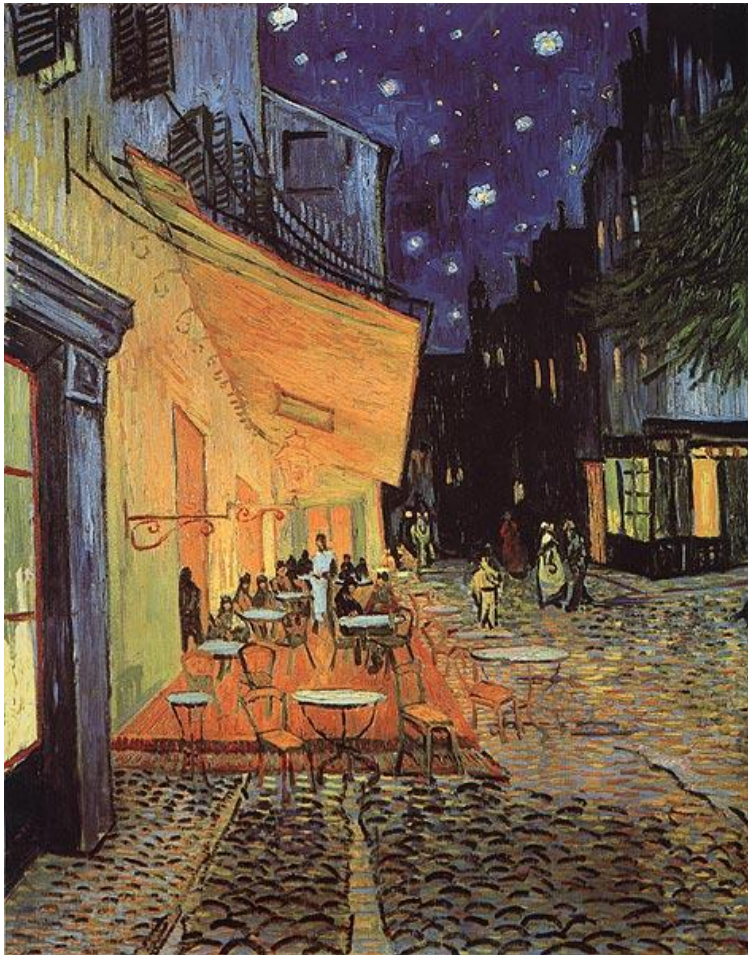
- Essentially a caricature of the female form
- not only captures the essence of feminine sensuality, grace, poise, dignity and charm, but also amplifies, exaggerates
- the concept of “*rasa*” or “the very essence”, in order to evoke a specific mood or emotion in the viewer’s brain



# 1. Peak shift principle

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Van Gogh's paintings – peak shift in colour space



# 1. Peak shift principle

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Movement, shading, highlights, illumination, texture...





# 1. Peak shift principle

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- How is this related to the rest of visual representation?
- Seagull behaviour – a caricature in ‘beak space’



## 2. Isolation principle

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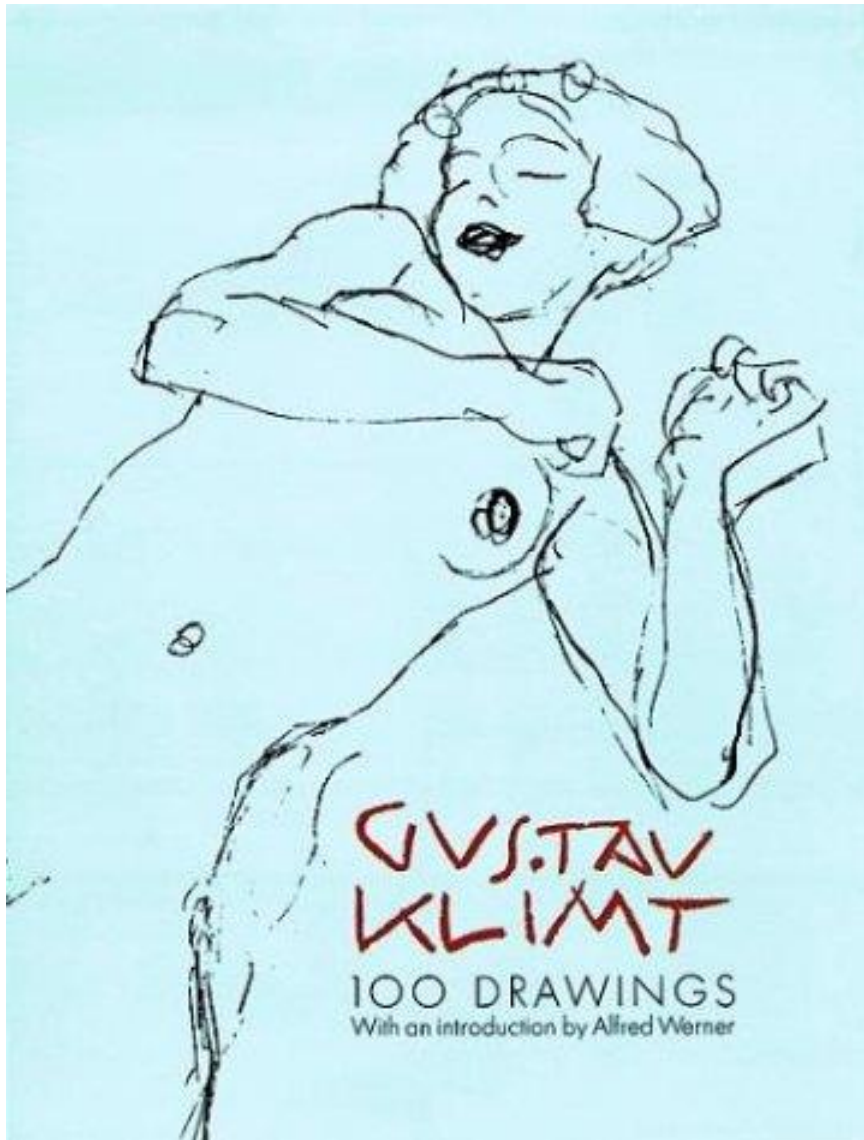
- Also referred to as the principle of understatement
- A wealth of information leads to poverty of attention
- Isolating a single visual cue helps to focus attention
- Johansson effect
- Comedic impressions

## 2. Isolation principle

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## 2. Isolation principle



## 2. Isolation principle

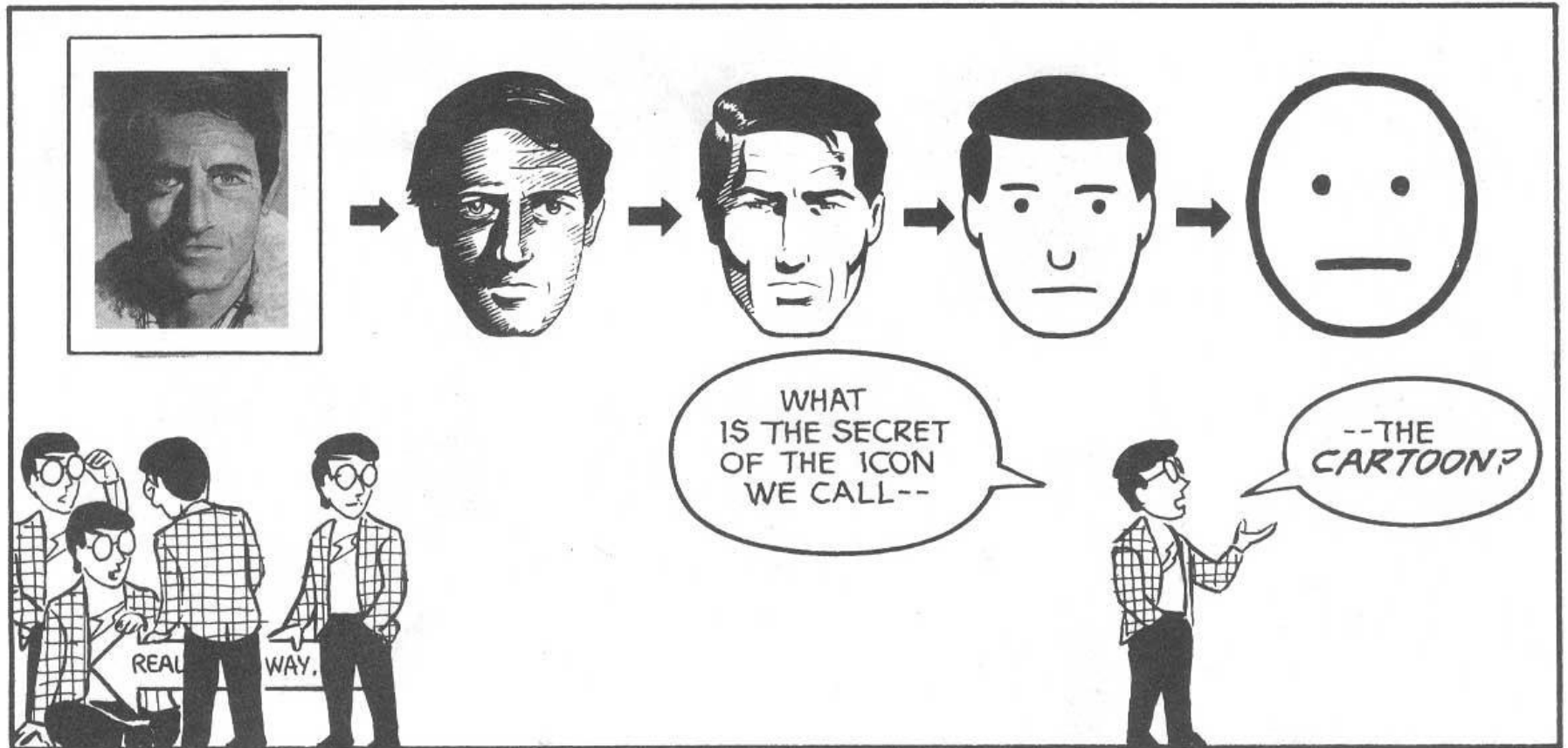
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Prehistoric art



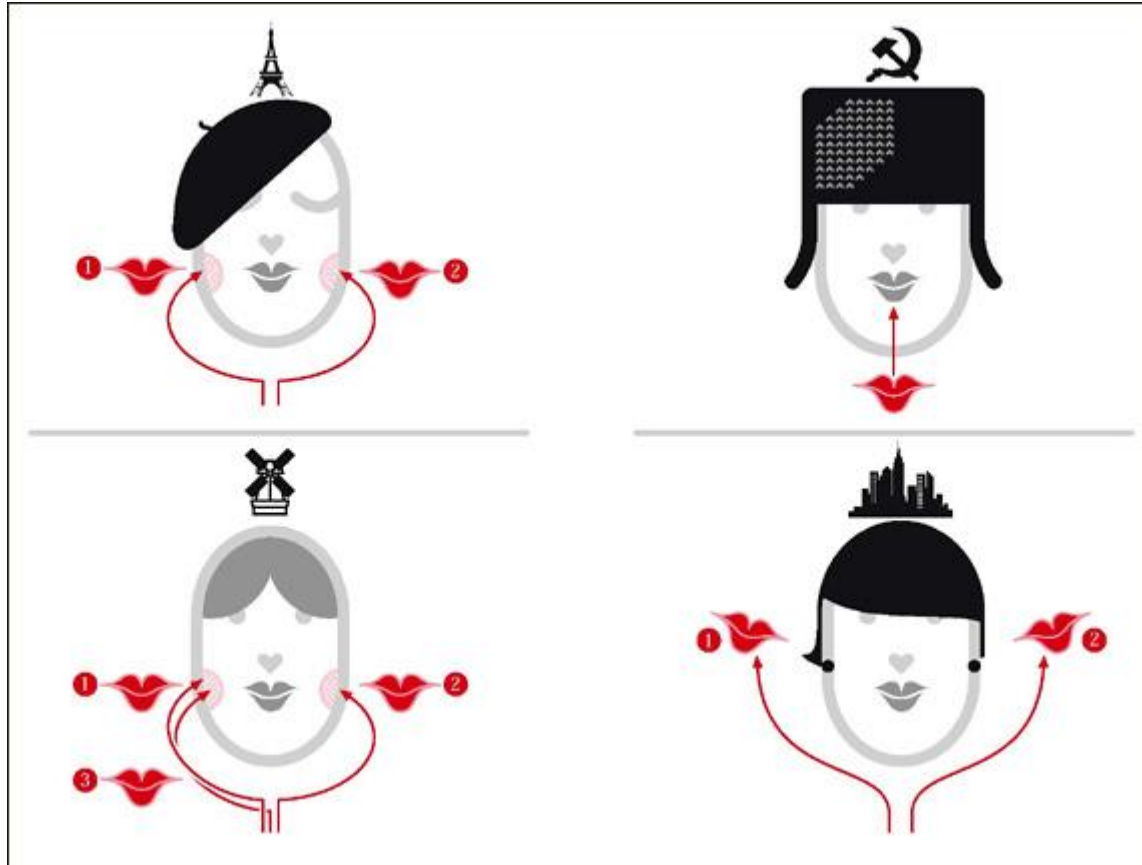
## 2. Isolation principle

### Comics



## 2. Isolation principle

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## 2. Isolation principle

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## 2. Isolation principle

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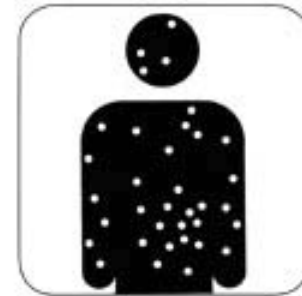
Orthopedic



X - Ray/Screening



Dressing



Dermatology



Cardiology



Respiratory



Urology



Gastrology



Pregnancy



Medical examination



Operation theatre



Emergency

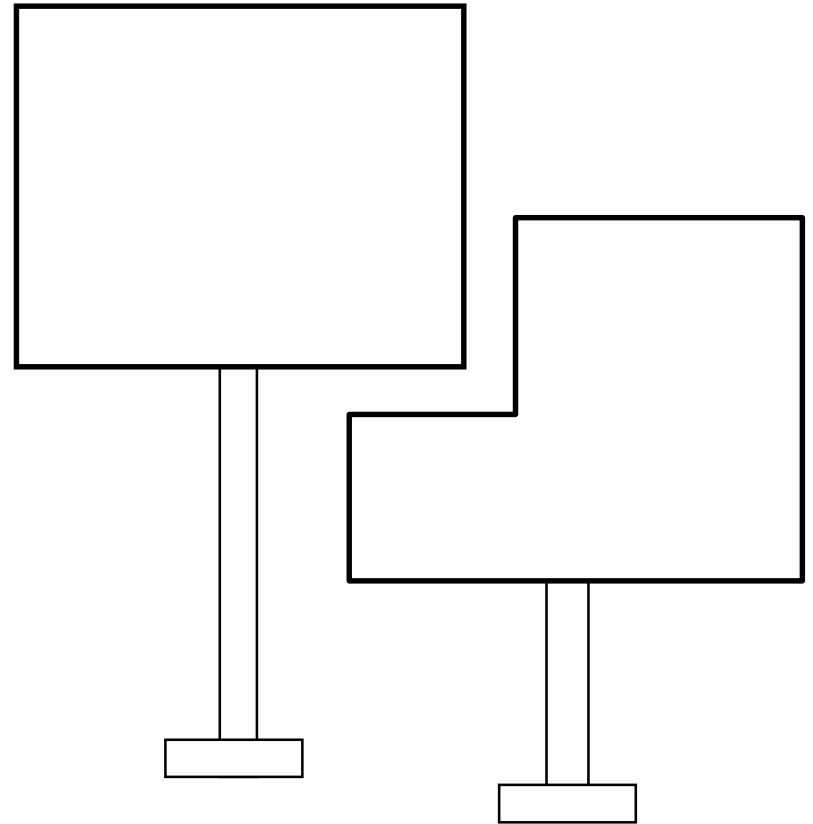
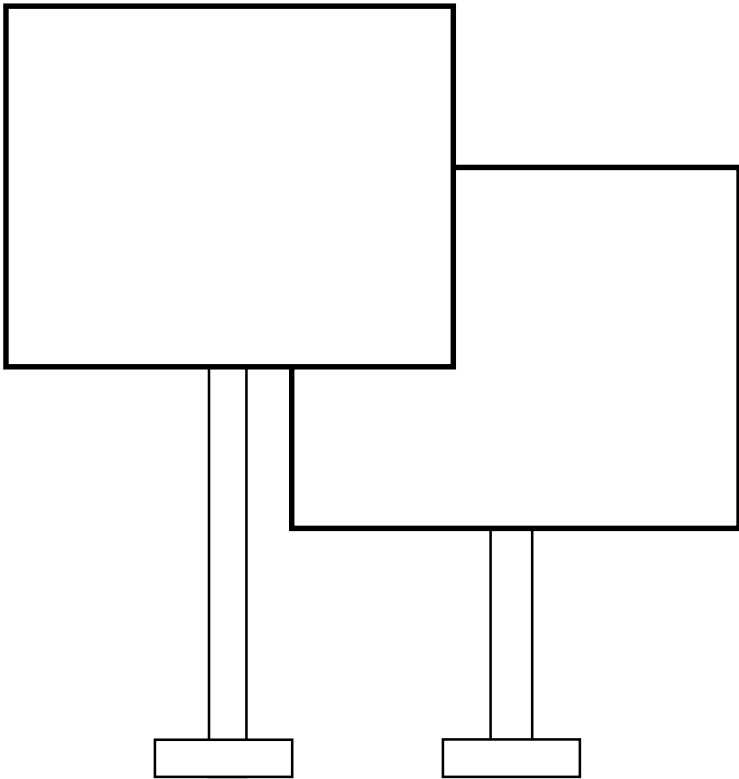
### 3. Contrast principle

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- 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

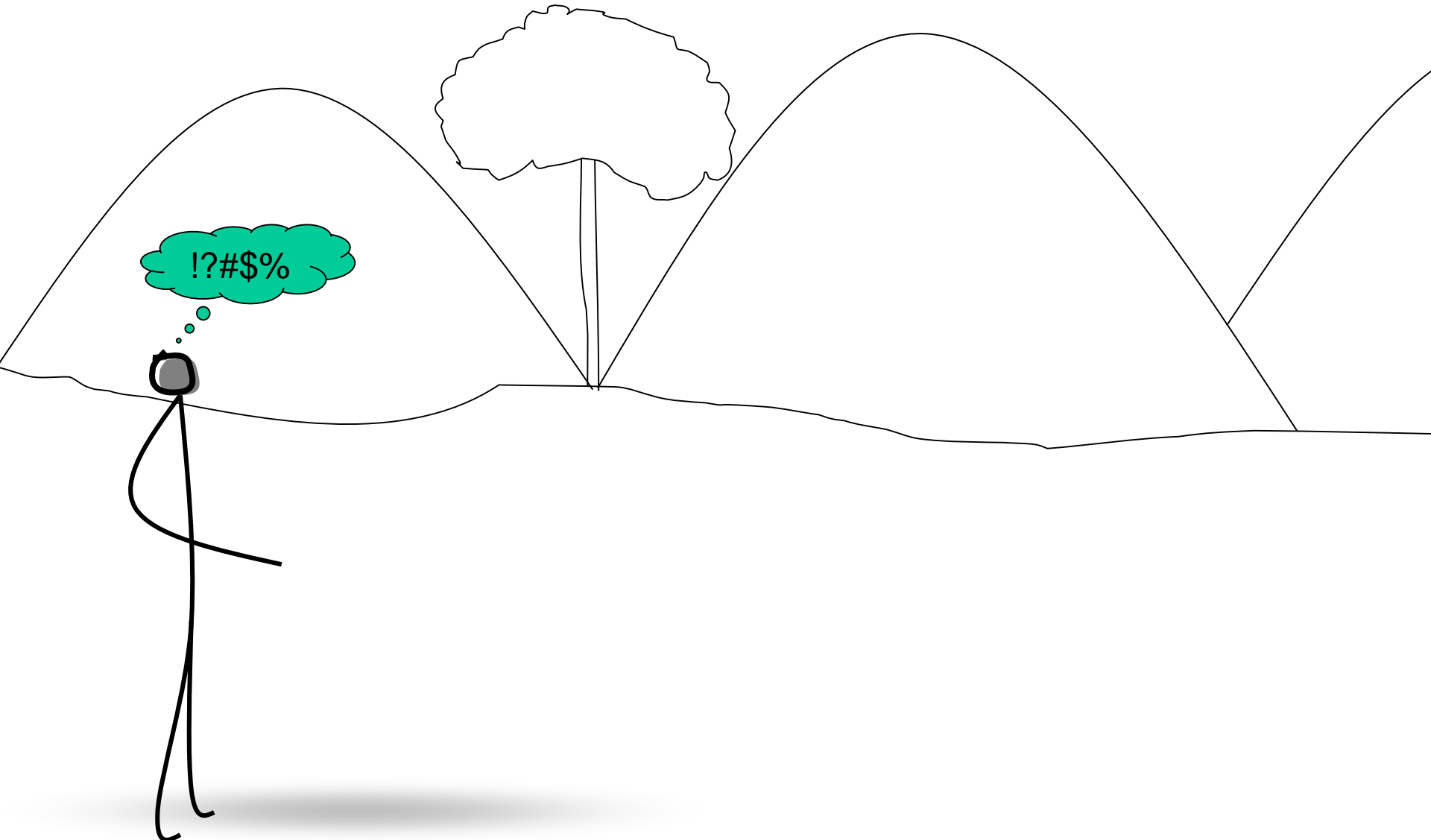
## 4. Viewpoint principle

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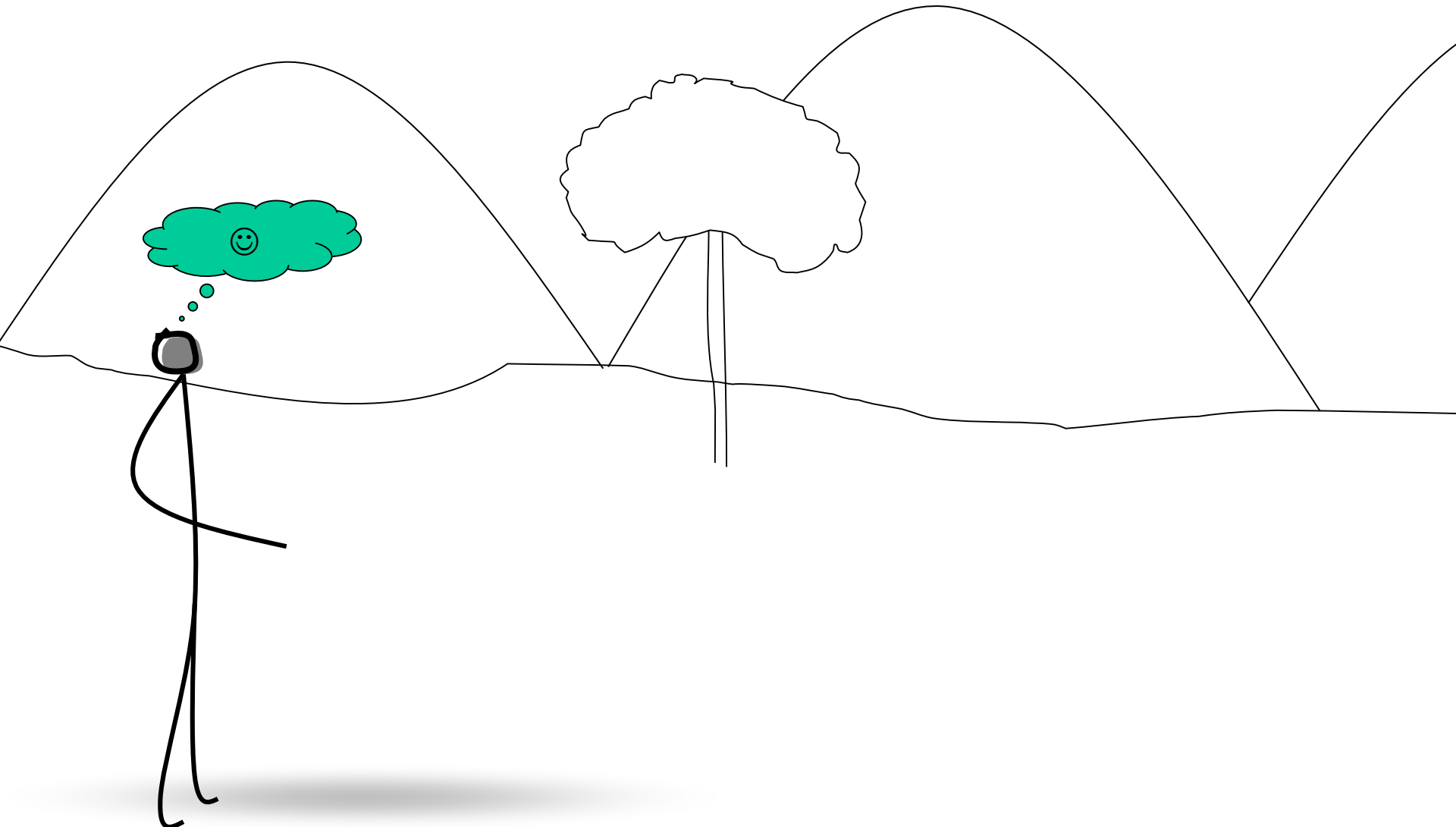
## 4. Viewpoint principle

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## 4. Viewpoint principle

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## 4. Viewpoint principle

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- Our visual system rejects unique viewpoints and prefers generic viewpoints
- In general, it abhors suspicious coincidences
- Avoid distracting visual conundrums







## 5. Metaphor

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- 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

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- 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 'chairness'

