Sensation and Perception

How is Perception different from Sensation?

Sensation refers to the raw sensory data the brain receives

Perception is the process of organizing, interpreting, and giving meaning to the raw data

The Stroop Effect:

Gestalt Psychology

- Gestalt psychologists believed that the brain creates a coherent perceptual experience that is more than simply the sum of the available sensory data

The brain imposed order on the data it received partly by distinguishing patterns such as figure and ground, proximity, similarity, closure, and continuity

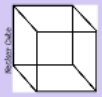
figure: entity perceived to stand apart from the background

ground: background against which a figure appears

Gestalt Principles of Grouping

Proximity

Similarity



Continuity

Closure

Sensation and Perception

Sensing the World Around Us

The Visual System

Sensation:

- the process by which our sense organs receive information from the environment

Perception:

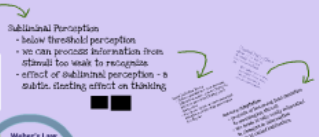
- the interpretation, analysis, and integration of stimuli involving our sense organs and our brain

Sensory Organs:

- Eyes (sight)
- Ears (sound)
- Nose (smell)
- Skin (touch)
- Taste buds (taste)

Subliminal Perception

- below threshold perception
- we can process information from stimuli too weak to recognize
- effect of subliminal perception - a subtle, riveting effect on thinking



Difference Threshold

- amount of change needed for us to recognize that a change has occurred
- this change is called Just Noticeable Difference (JND)

Sensory Thresholds:

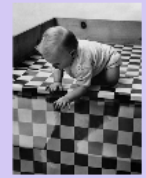
Sensory Thresholds

the various sense organs are actually quite sensitive to stimulation

Psychologists believe that there are actually at least a dozen distinct senses

Different types of stimuli activate different sense organs

Each stimulus can also be considered in terms of its strength or intensity



Depth Perception

- What would happen if you didn't have it?
- appears to be present in very young infants
  - The Visual Cliff experiment

What cues do we have for perceiving depth in the world?

Monocular Cues - requires the use of only one eye

Binocular Cues - requires the use of both eyes

Sensation and Perception

Monocular Cues

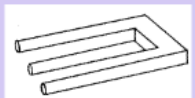
- Linear Perspective
- Relative Size
- Overlap (Interposition)
- Aerial Perspective
- Texture Gradient
- Motion Parallax
- Accommodation

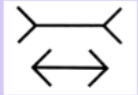
Binocular Cues:

- Convergence
- Binocular Disparity

Visual Illusions

Occur when we use a variety of sensory cues to create perceptual experiences that do not actually exist!





- occurs because a stimulus contains misleading cues that lead to inaccurate perceptions

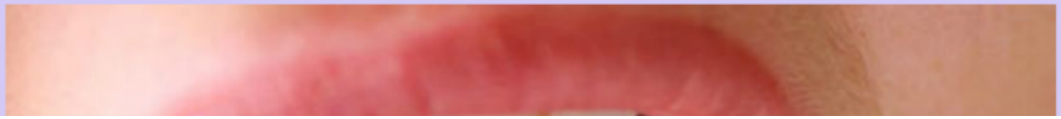
http://www.scientificpsychic.com/graphics/

Sensation and Perception

Sensing the World Around US

Sensation:

Without sensations to tell us what is outside our own mental world, we would live entirely in our own minds, separate from one another and unable to find food or any other basics that sustain life



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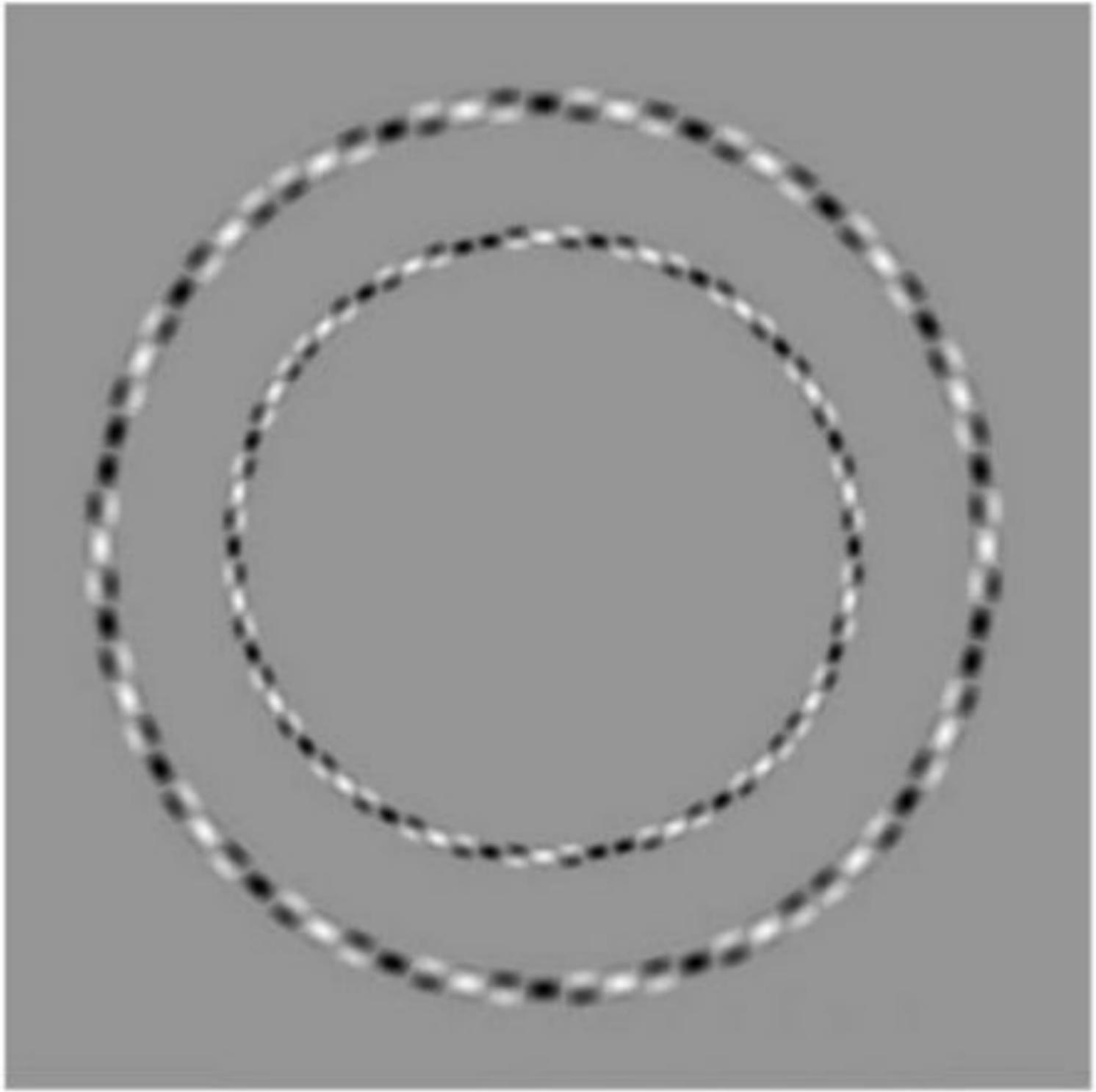
Sensing the World Around Us

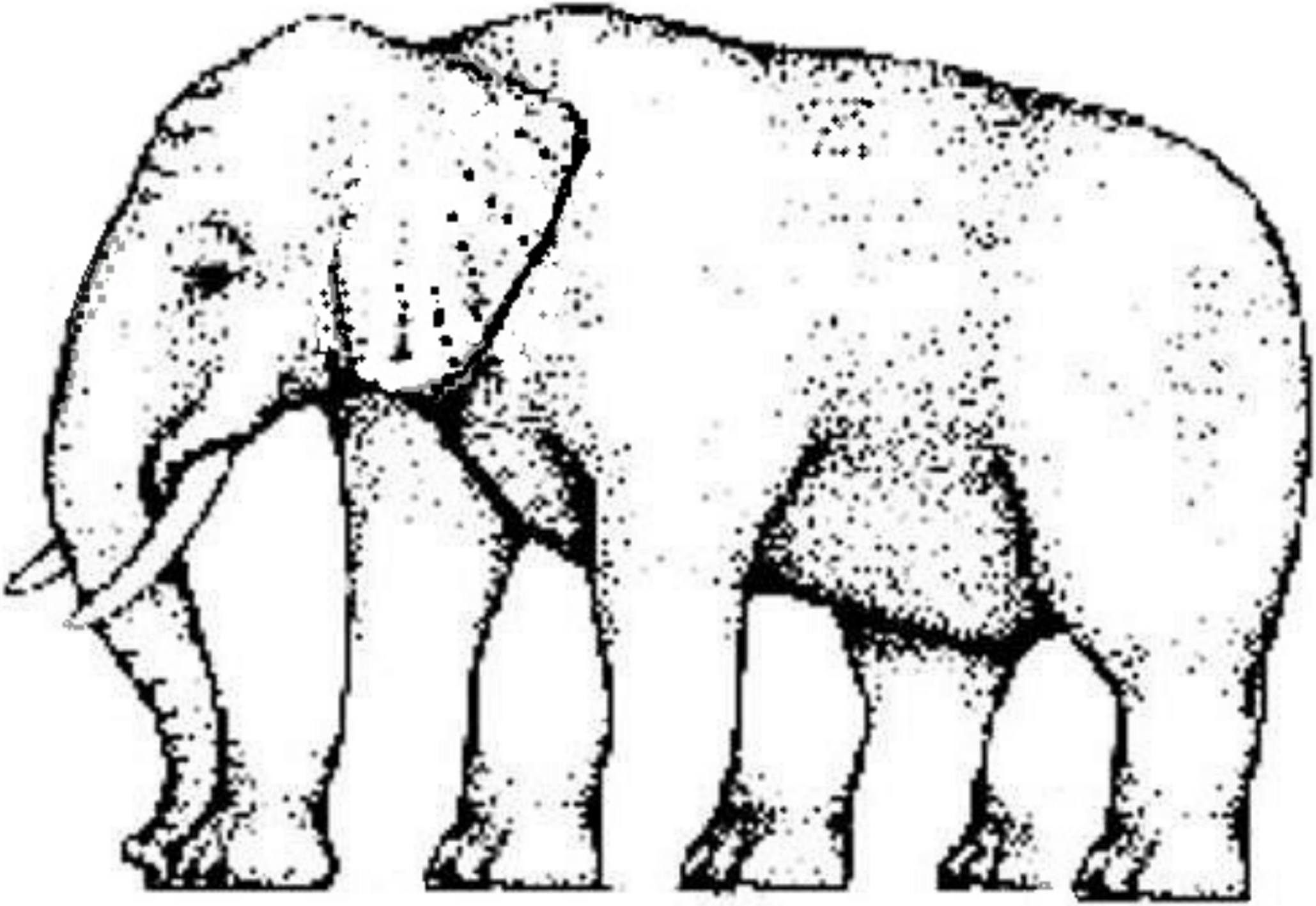
Sensation:

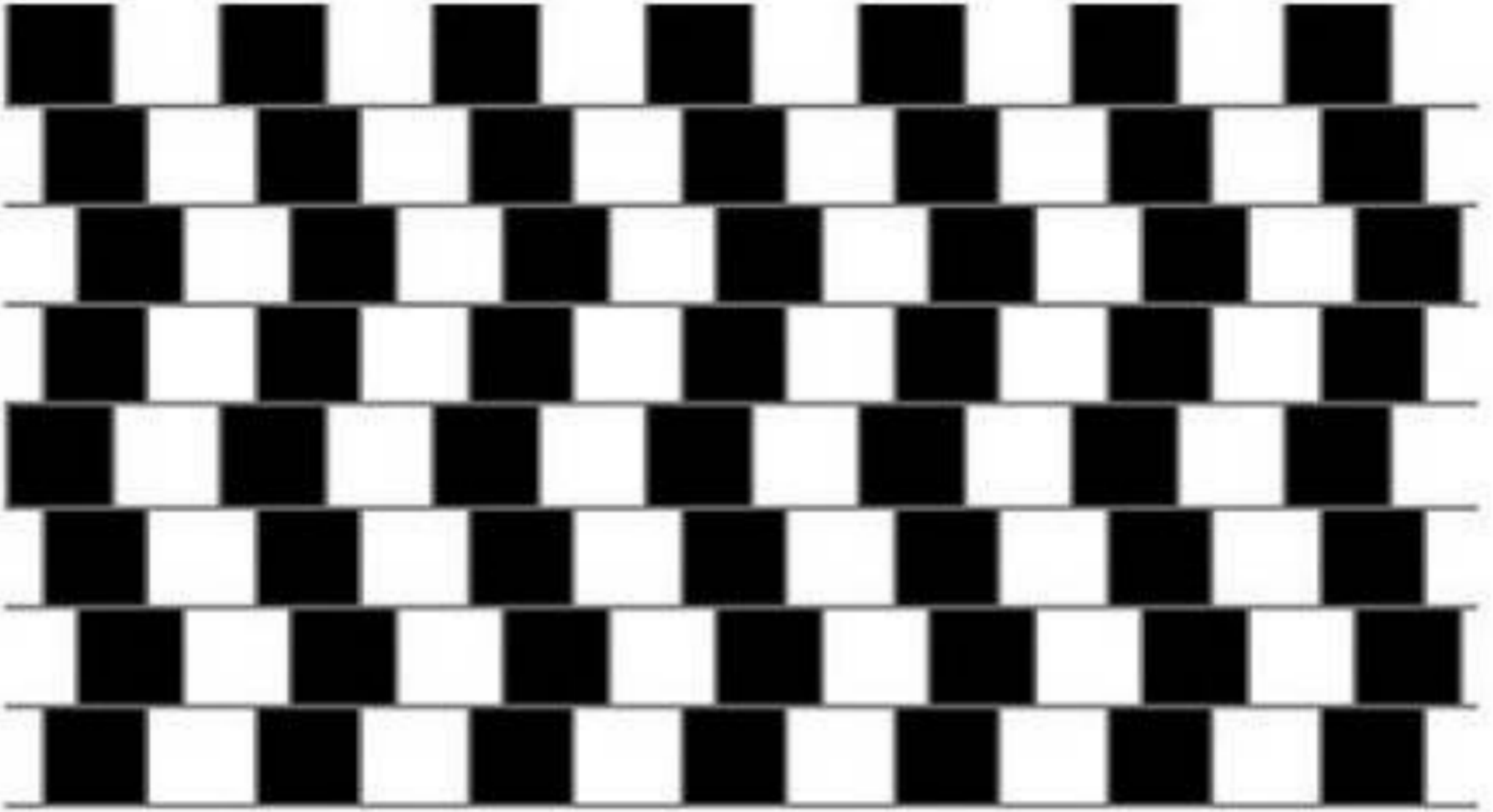
Without sensations to tell us what is outside our own mental world, we would live entirely in our own minds, separate from one another and unable to find food or any other basics that sustain life

Perception:

Without perception we would be unable to understand what all those sensations mean - perception is the process of interpreting the sensations we experience so that we can act upon them







Are the horizontal lines parallel or do they slope?

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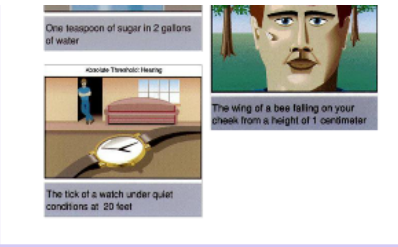

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Sensory Thresholds:

the various sense organs are actually quite sensitive to stimulation

Different types of

Psychologists believe that there are actually at least a dozen distinct senses

in addition to sight, sound, taste, smell, and touch:

- pressure, temperature
- pain
- kinesthetic
- vestibular

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Stimulation?

Different types of stimuli activate different sense organs:

Light stimuli activates sight

Sound stimuli activates hearing

sthetic
ibular

Each stimulus can also be considered in terms of its strength or intensity

How intense does a light stimulus need to be before it's capable of being detected, or how much perfume must a person wear before it is noticed by others?

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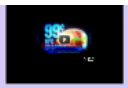

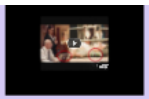

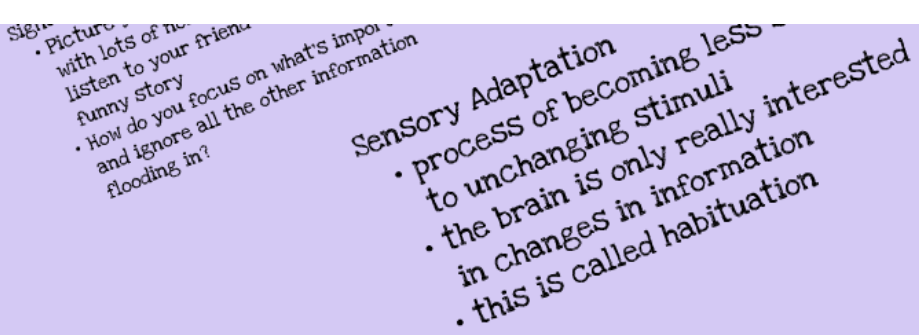

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Weber's Law

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Weber's Law

Principle that JND for any given sense is a constant fraction or proportion of the stimulation being judged

e.g. hold a 5 lb weight - you will notice is 1 lb is added; hold a 50lb weight, you will not likely notice if

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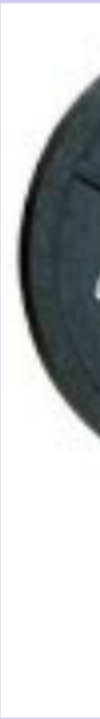
...timulation bei...

e.g. hold a 5 lb weight - you will notice is 1 lb is added; hold a 50lb weight, you will not likely notice if 1 lb is added but you will notice if 2 lbs are added



JND - minimum difference in stimulati
that a person can detect 50% of the ti

JND - minimum difference in stimulation that a person can detect 50% of the time

- for people to really perceive a difference, the stimuli must differ by a constant 'proportion' not a constant 'amount'

For example, if you are buying a new computer that costs $1,000 and you want to add more memory that increases the price by $200 (a 20% increase), you might consider this too much additional money to spend. However, if you were buying a $300,000 house a $200 feature may seem like nothing (.15%). It might take an additional $10,000 to make you stop and think if it's too much to spend. In this example, the amount stays the same ($200), but the proportion changes and that's what makes the perceptual difference.

Absolute Threshold

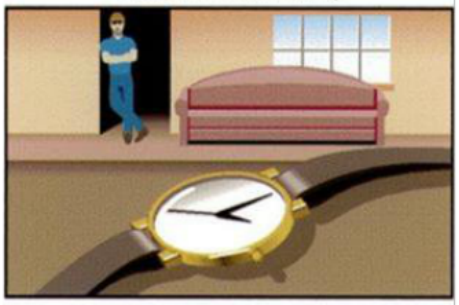
Absolute Threshold: Vision

A candle flame seen at 30 miles on a clear, dark night

Absolute Threshold: Taste

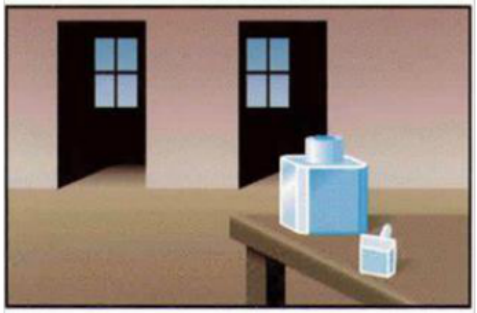
One teaspoon of sugar in 2 gallons of water

Absolute Threshold: Hearing



The tick of a watch under quiet conditions at 20 feet

Absolute Threshold: Smell



One drop of perfume diffused into the entire volume of a 3-room apartment

Absolute Threshold: Touch

The wing of a bee falling on your cheek from a height of 1 centimeter

Absolute threshold is the smallest intensity of a stimulus that must be present for the stimulus to be detected

Subliminal Perception

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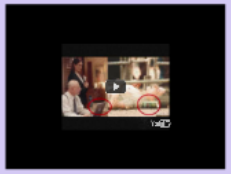
- we can process information from stimuli too weak to recognize
- effect of subliminal perception - a subtle, fleeting effect on thinking

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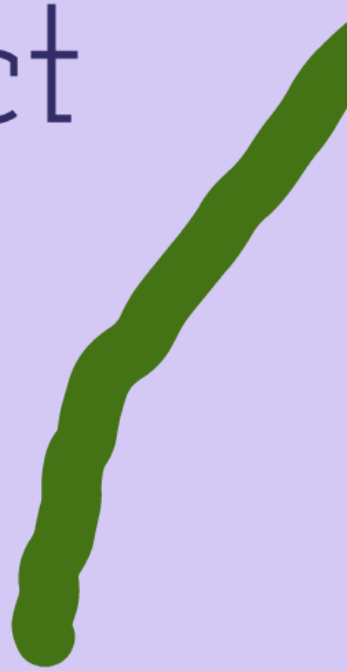
Signal Detection Theory

- Picture yourself in a crowded room with lots of noise - you are trying to listen to your friend telling you a funny story
- How do you focus on what's important and ignore all the other information flooding in?

Sensory Ad

Cocktail Party Effect

allows you to 'tune in'
to a single voice and
'tune out' everything
else



also allows you to hear
your name even when
you are engaged in
another conversation

d telling you a

n what's important
ther information

to hear
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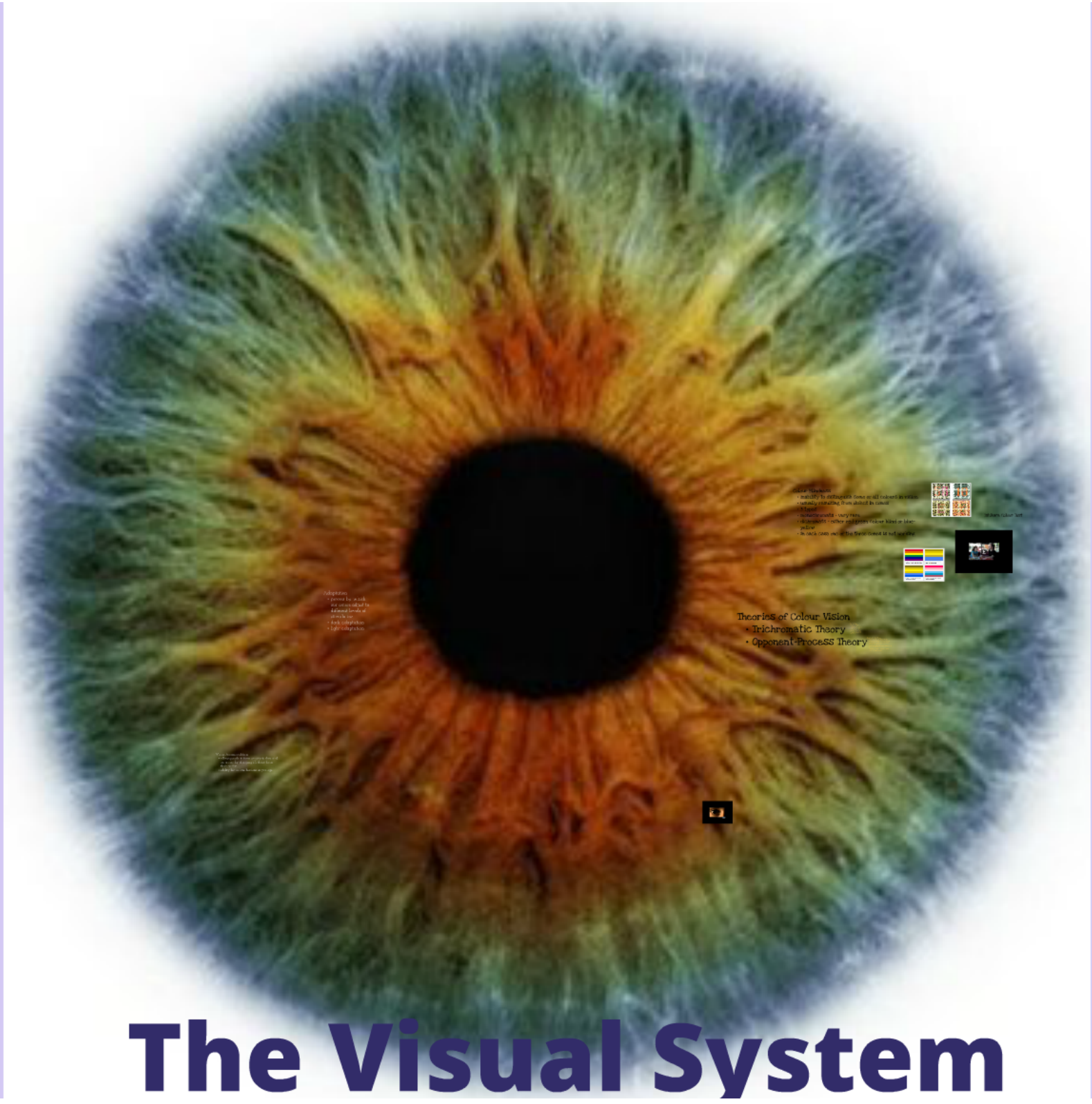
conversation

Sensory Adaptation

- process of becoming less sensitive to unchanging stimuli
- the brain is only really interested in changes in information
- this is called habituation

esho



The Visual System

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EDUCATION

Visual Accommodation

- allows people to focus on objects close and far away by changing it's shape from thick to thin
- ability lost as lens hardens as you age

Adaptation

- process by which our senses adjust to different levels of stimulation
- dark adaptation
- light adaptation

Theories of Colour Vision

- Trichromatic Theory
- Opponent-Process Theory

Trichromatic Theory
- proposes three types of cones: red, blue, and green, one for each colour of light
- cones fire their message to the brain's vision centres
- combination of cones and the rate they're firing that determine the colour that will be seen

Opponent-Process Theo
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- combination of cones and the rate they're firing that determine the colour that will be seen

Opponent-Process Theory

- there are actually four primary colours (red, green, blue, and yellow)
- if one pair is stimulated, the other cannot be working
- continual viewing of green fatigues the green receptors
- they don't respond to green, makes white light appear red

Colour Blindness

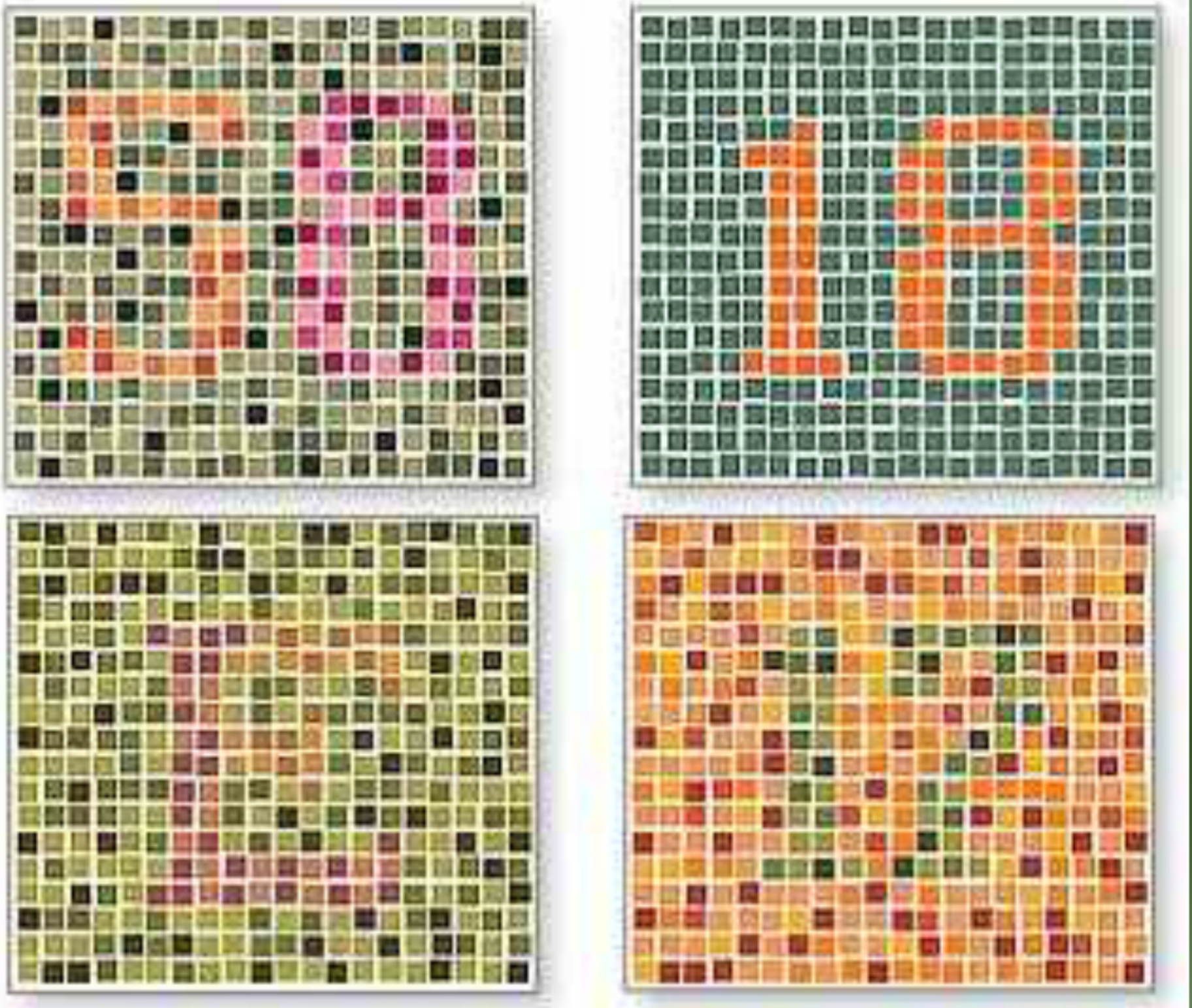
- inability to distinguish some or all colours in vision
- usually resulting from defect in cones
- 3 types
- monochromats - very rare
- dichromats - either red-green colour blind or blue-yellow
- in each case one of the three cones is not working

The colors of the rainbow as viewed by a person with no color vision deficiencies.

The colors of the rainbow as viewed by a person with deuteranopia.

The colors of the rainbow as viewed by a person with protanopia.

The colors of the rainbow as viewed by a person with tritanopia.

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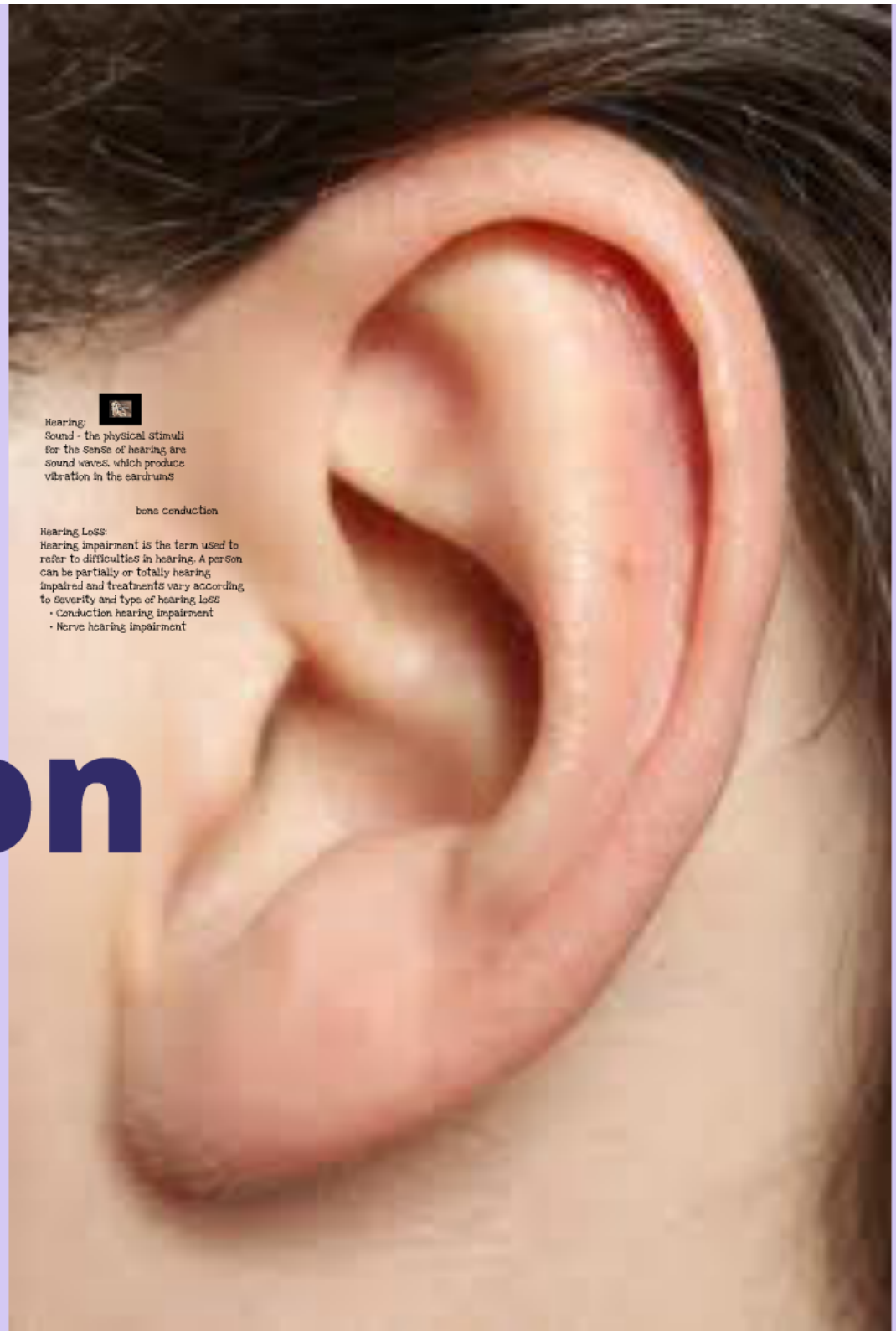

Hearing:
Sound - the physical stimuli for the sense of hearing are sound waves. which produce vibration in the eardrums

bone conduction

Hearing Loss:
Hearing impairment is the term used to refer to difficulties in hearing. A person can be partially or totally hearing impaired and treatments vary according to severity and type of hearing loss

- Conduction hearing impairment
- Nerve hearing impairment

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The largest of the
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to the eardrum.
YouTube

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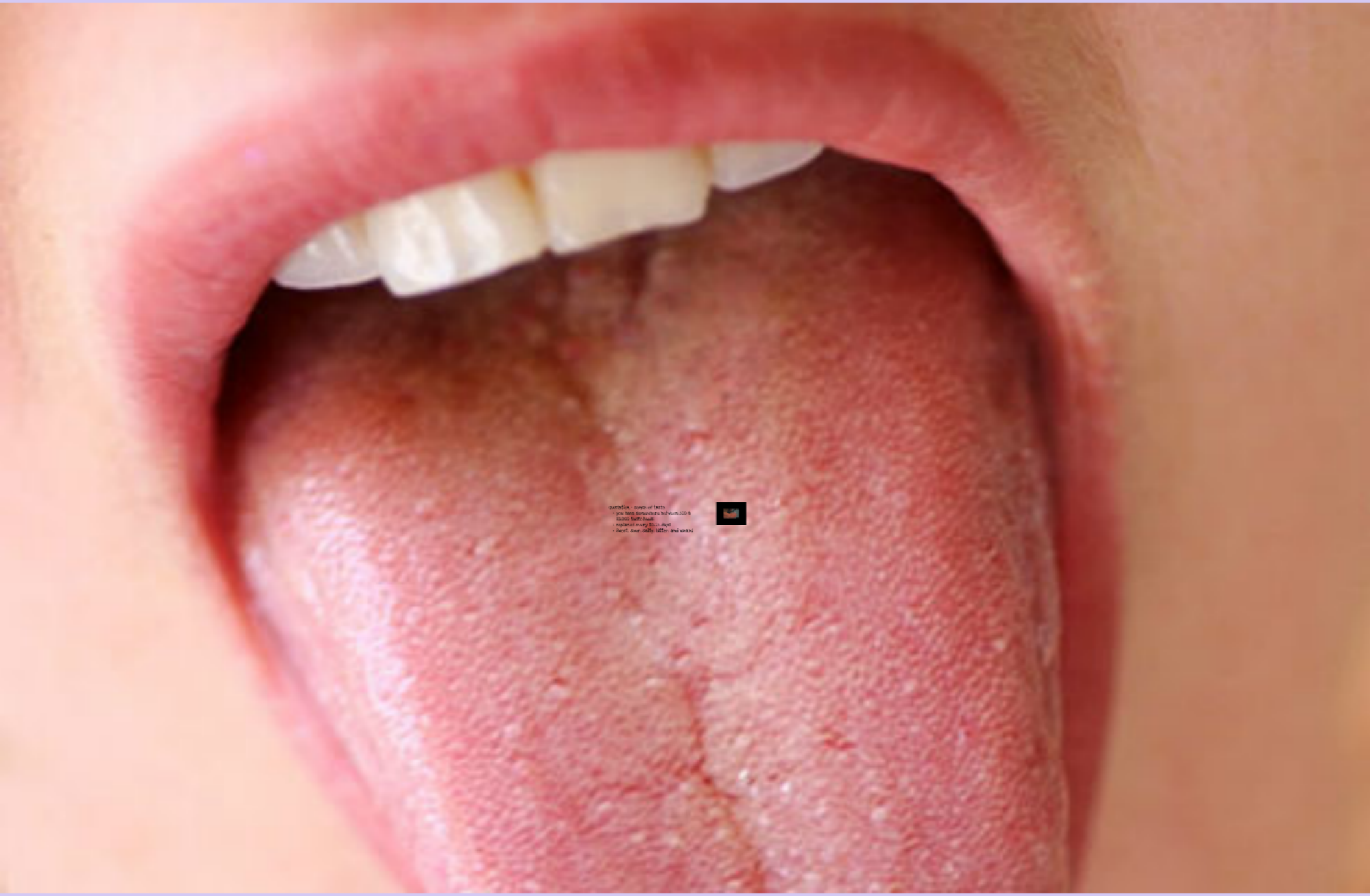

Gustation - sense of taste

- you have somewhere between 500 & 10,000 taste buds
- replaced every 10-14 days
- Sweet, Sour, Salty, bitter, and umami


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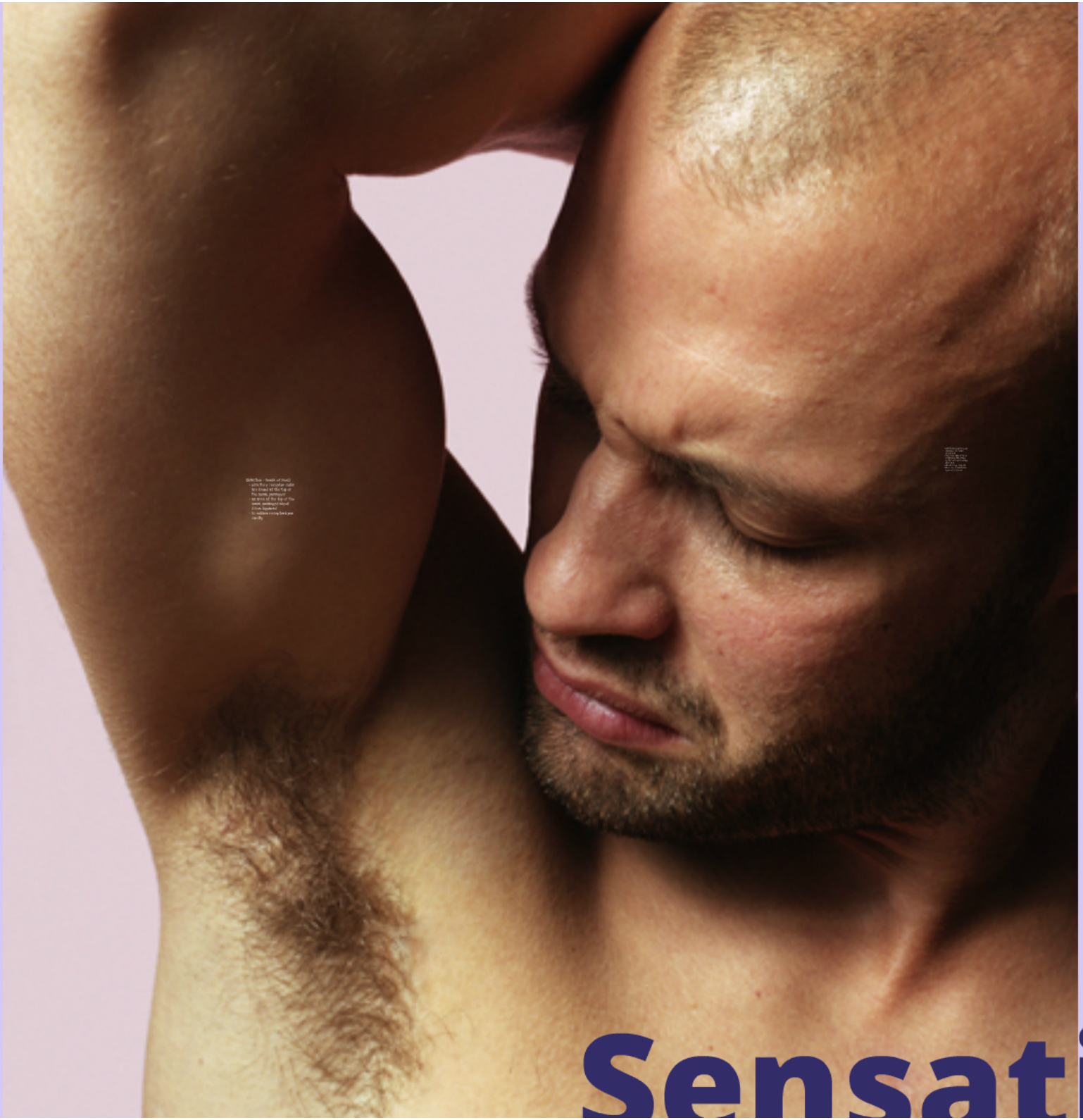

Sensation

Olfaction - Sense of Smell

- olfactory receptor cells are found at the top of the nasal passages
- an area at the top of the nasal passages about 2.5cm Squared
- 10 million receptors per cavity

- Olfactory receptor cells each have 6-12 hairs called cilia
- They send signals to the brain when stimulated by the molecules moving past them
- die off every 5-8 weeks
- there are at least 1000 types of receptors

- we are sensitive to touch, but also a wider set of stimuli such as pain, pressure, temperature, vibration
- e.g.

The senses of touch, pain, hot, cold, and pressure are located in your skin
  - each sense has its own special nerve receptors
  - a nerve sensitive to hot responds to heat
  - same holds true for other skin nerves, with the exception of pain
  - pain sensation will come from all types of nerves

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The Stroop Effect:
http://www.mcgrawhill.ca/college/olcSupport/feldman2/InterActive/ch3Stroop.html

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ect:
a/

MY WIFE AND MY MOTHER-IN-LAW
They are both in this picture — Find them

Constancy: size, shape & brightness

Size constancy: tendency to interpret an object as always being the same size regardless of the distance from the viewer

Shape constancy: tendency to interpret the shape of an object as constant, even when it changes on the retina

Brightness constancy: tendency to perceive the apparent brightness of an object as the same, even when light conditions change

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ch3stroop.html

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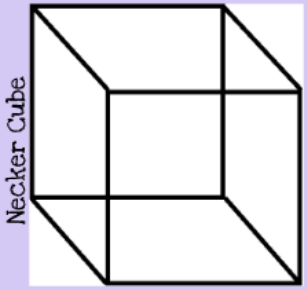
Figure: entity perceived to stand apart from the background
Ground: background against which a figure appears

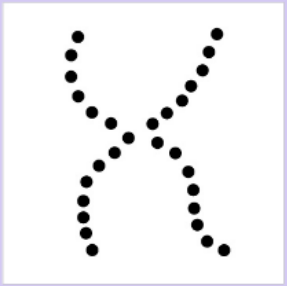
Gestalt Principles of Grouping

Proximity

Similarity



Continuity



Closure

what cues do we have

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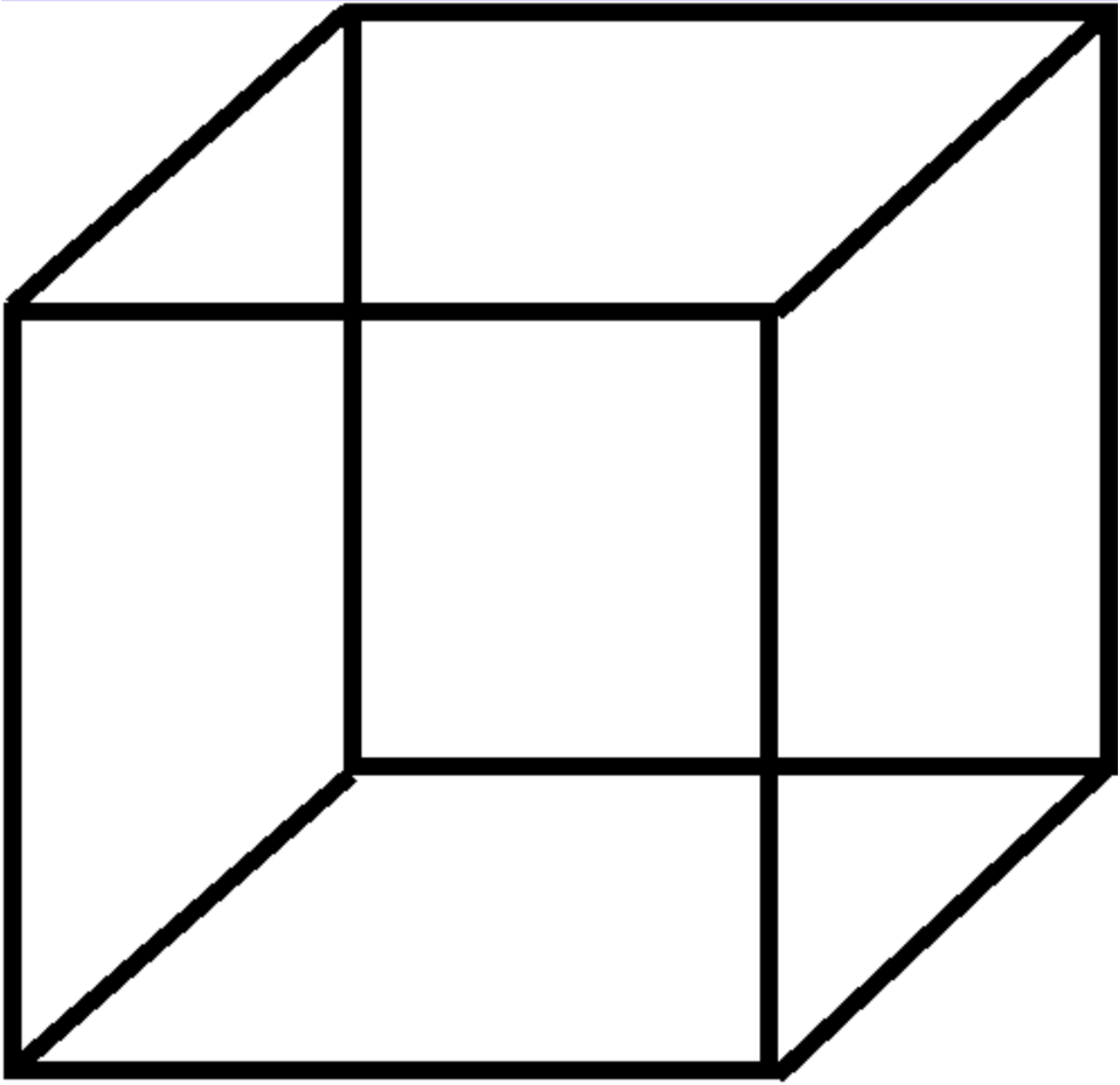

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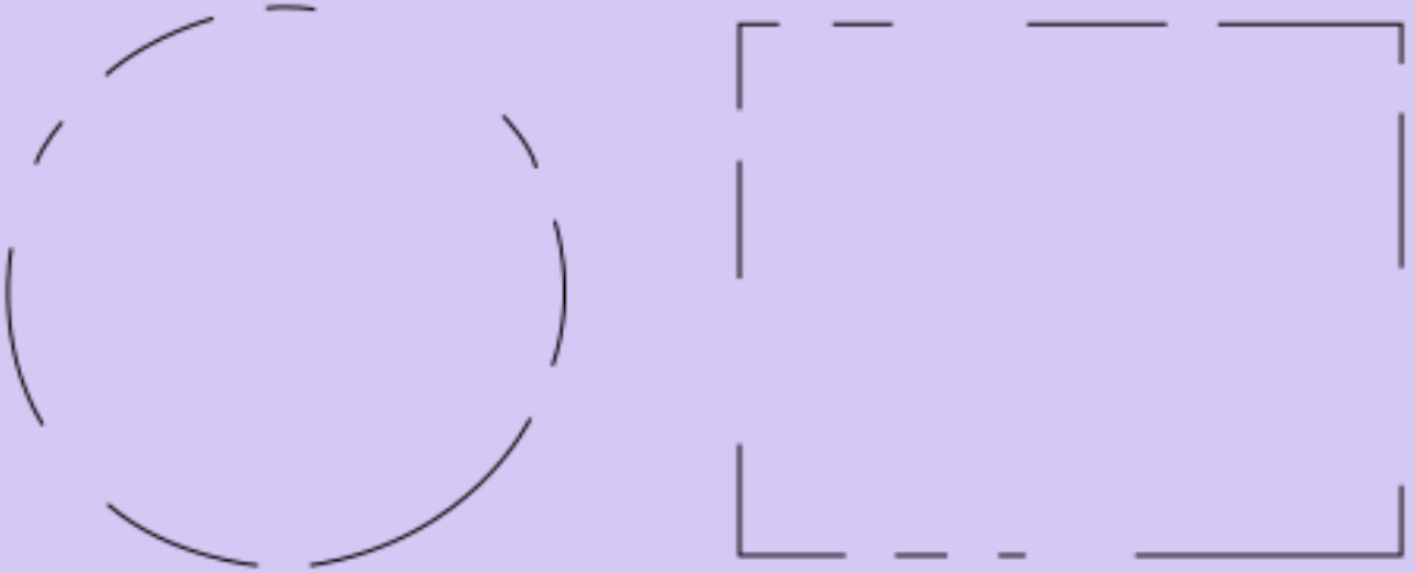

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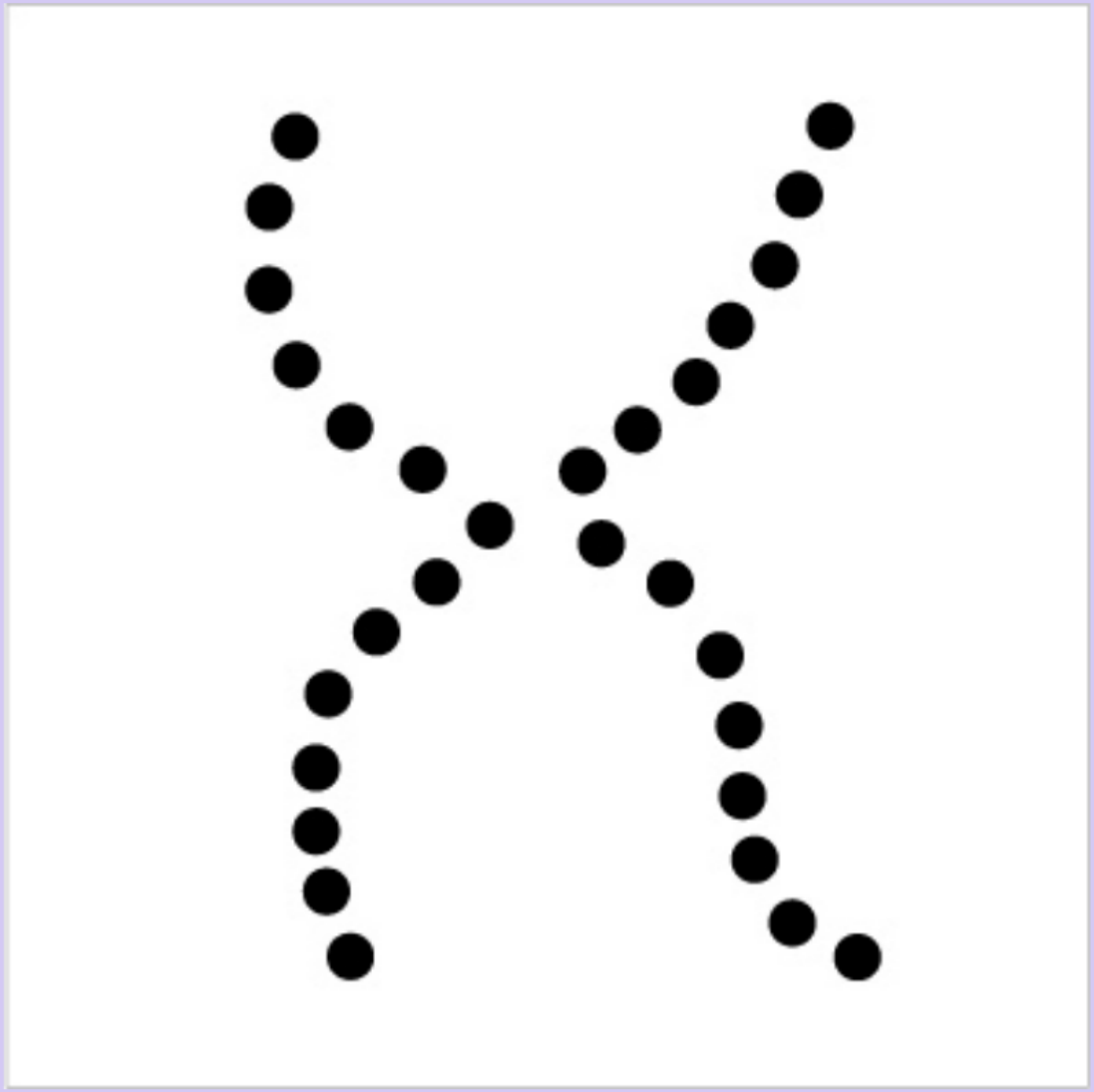
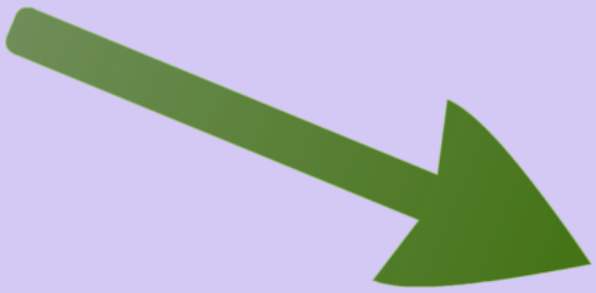


Depth Perception

- what would happen if you didn't have it?
- appears to be present in very young infants
  - The Visual Cliff experiment

what cues do we have for perceiving depth in the world?



Monocula

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one eye

Monocular Cues - requires the use of only one eye

Binocular Cues - requires the use of both eyes

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Monocular Cues

- Linear Perspective
- Relative Size
- Overlap (Interposition)
- Aerial Perspective
- Texture Gradient
- Motion Parallax
- Accommodation

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closer to the viewer

Texture Gra

the tendency for tex
surfaces to appear to
smaller and finer as
from the viewer incr

Linear Perspective

the tendency for parallel lines to appear to converge on each other

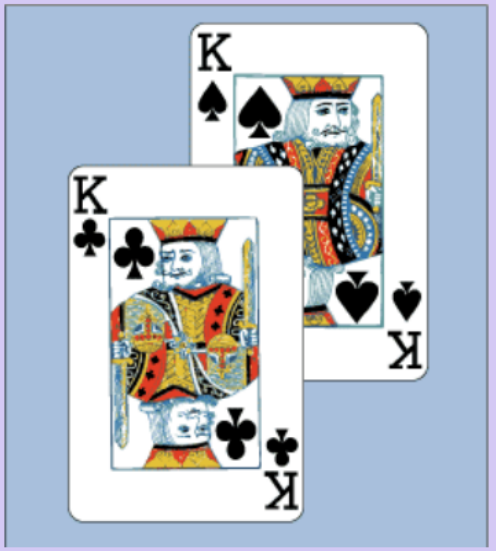
Relative Size

objects that you expect to be of a certain size appear to be small and therefore are assumed to be much farther away


DUNLOP

Overlap (Interposition)

assumption that an object that appears to be blocking part of another object is in front of the second object and therefore closer to the viewer



the haziness that surrounds objects that are farther away from the viewer, causing the distance to be perceived as greater

Aerial Perspective

Texture Gradient

the tendency for textured surfaces to appear to become smaller and finer as distance from the viewer increases

Motion Parallax

the perception of motion of objects in which close objects appear to move more quickly than objects that are farther away


YouTube

Accommodation

the brain uses information about the changing thickness of the lens of the eye in response to looking at objects that are close or far away

Binocular Cues:

- Convergence
- Binocular Disparity

Convergence:

the rotation of the two eyes in their sockets to focus on a single object, resulting in greater convergence for closer objects and lesser convergence if objects are distant

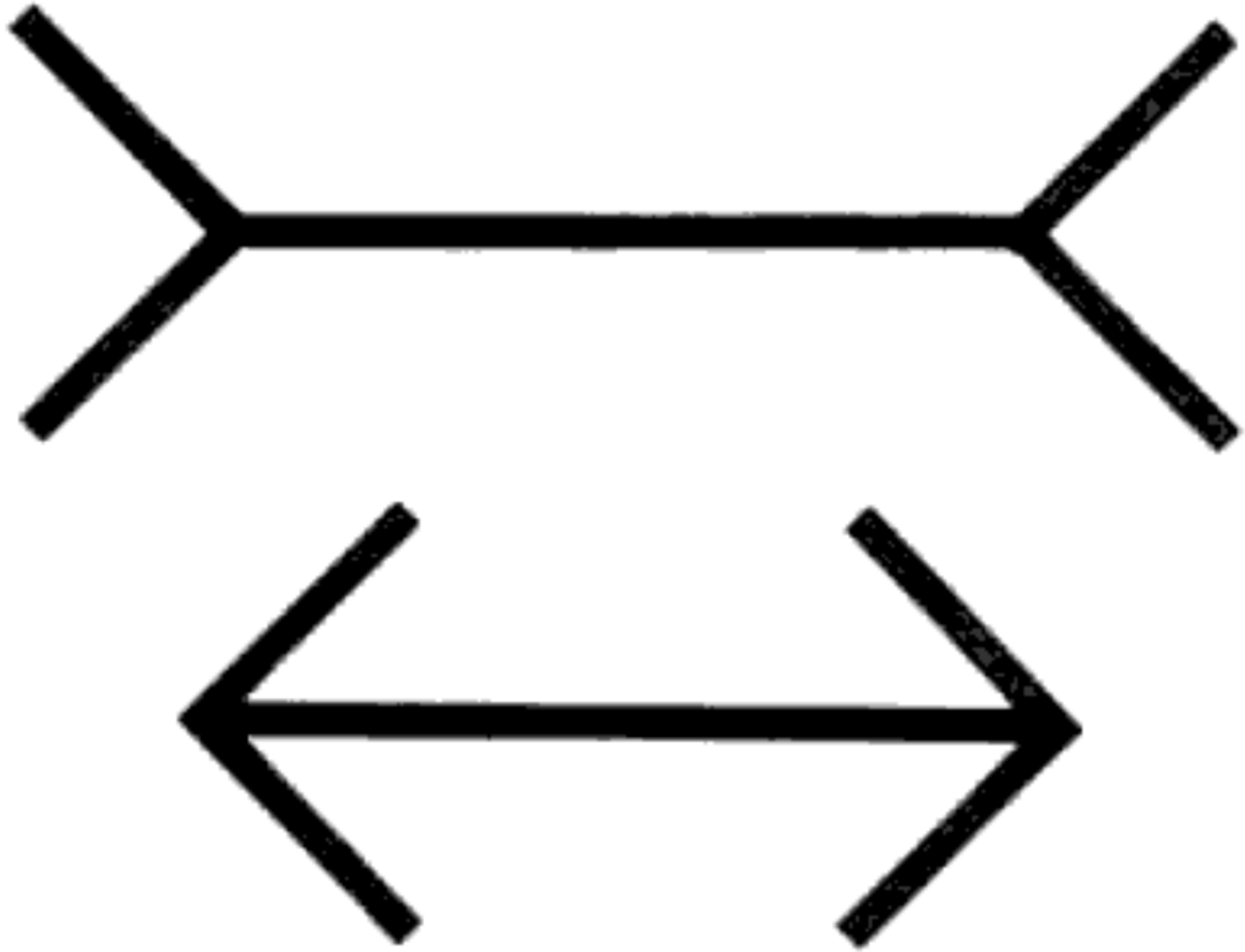
Binocular Disparity

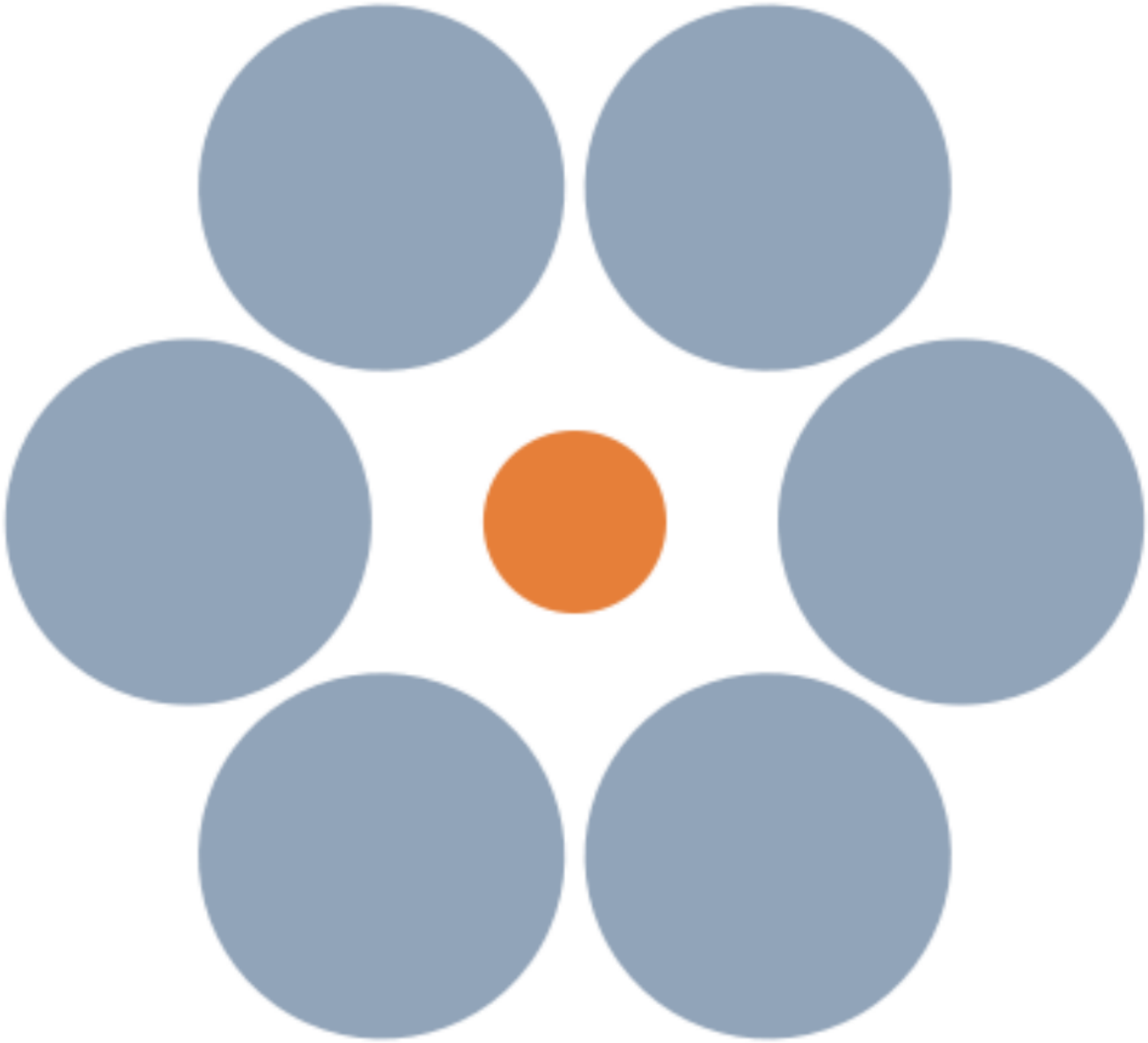
a scientific way of saying that because the eyes are a few centimeters apart, they don't see exactly the same image

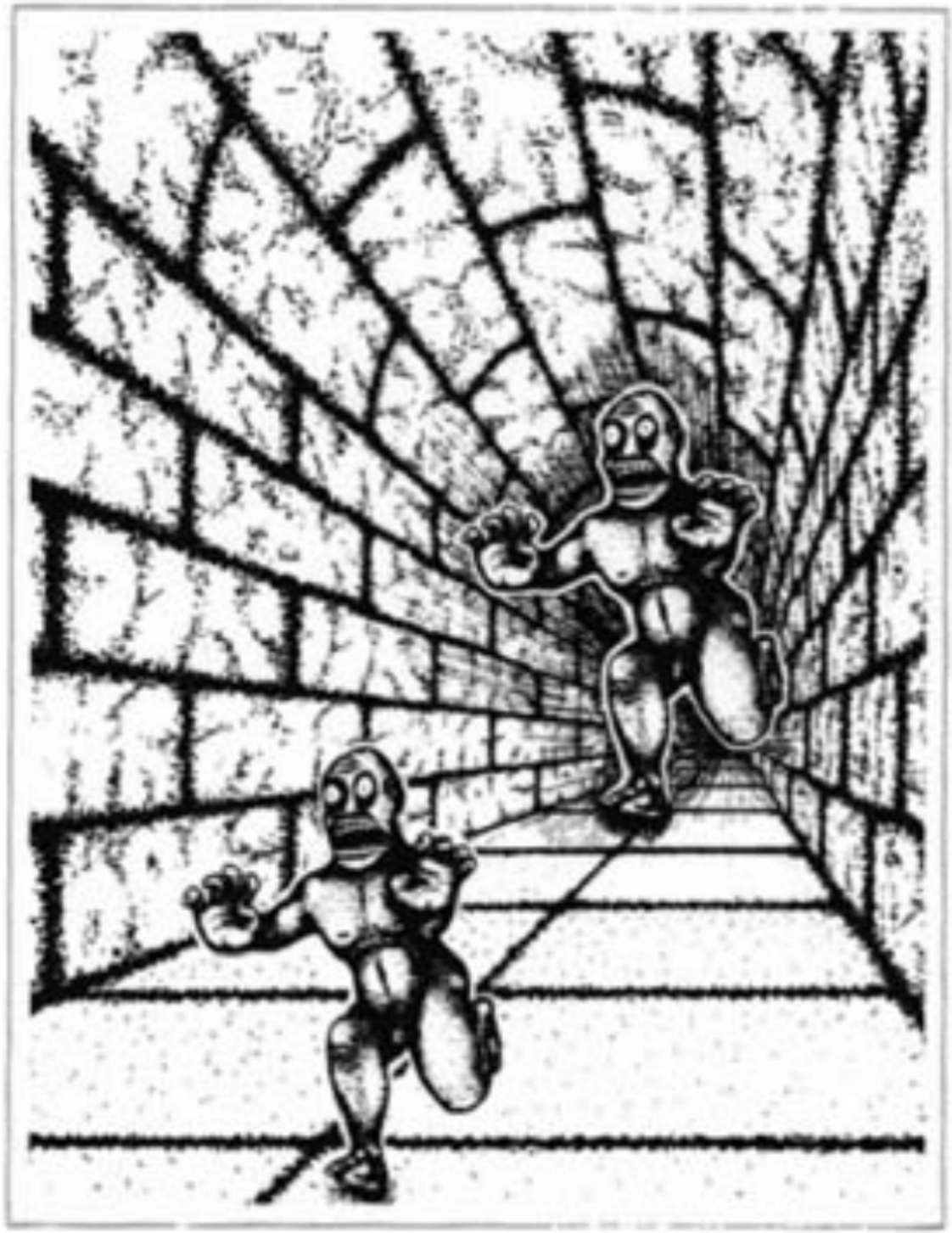
Visual Illusions

Occur when we use a variety of sensory cues to create perceptual experiences that do not actually exist!

- occurs because a stimulus contains misleading cues that lead to inaccurate perceptions







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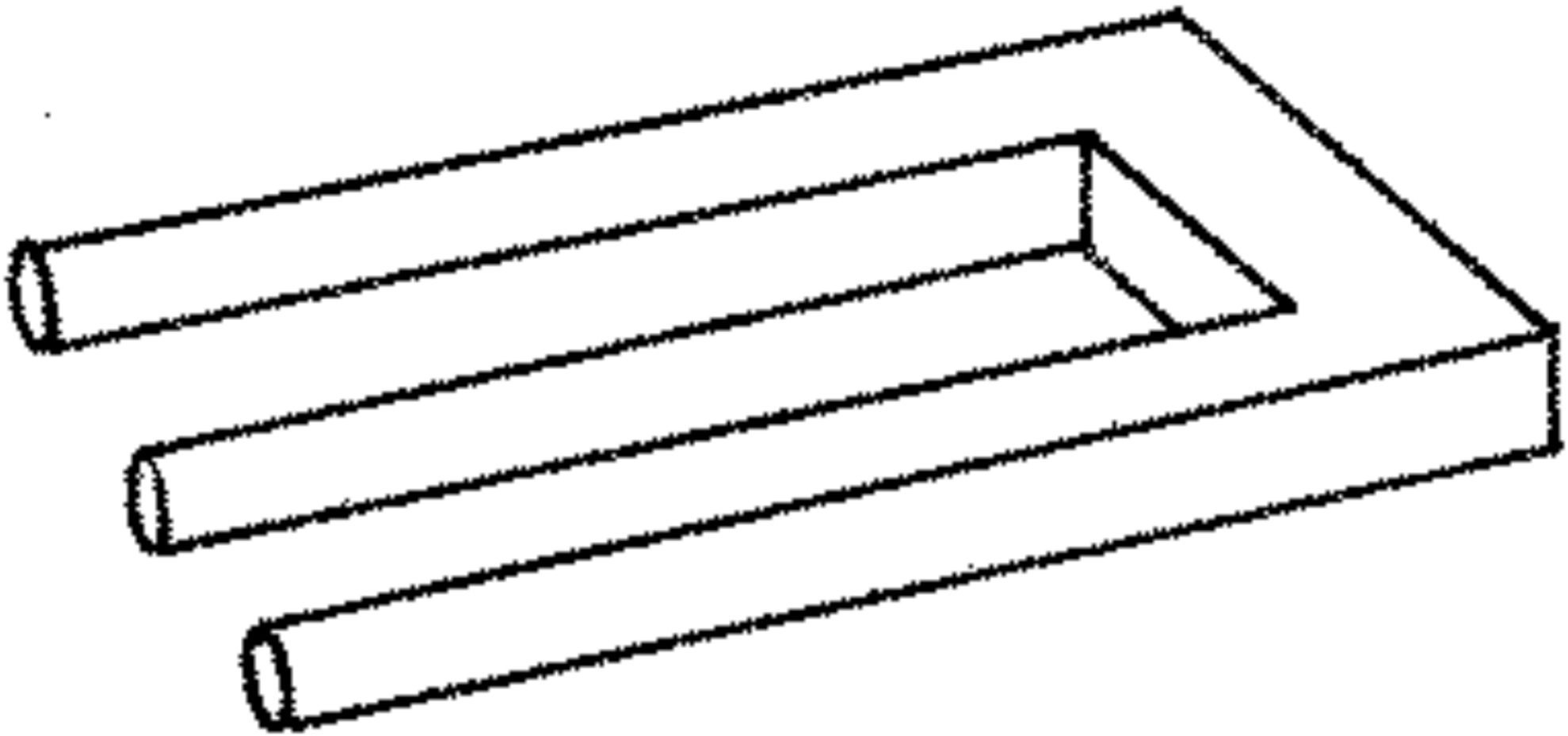

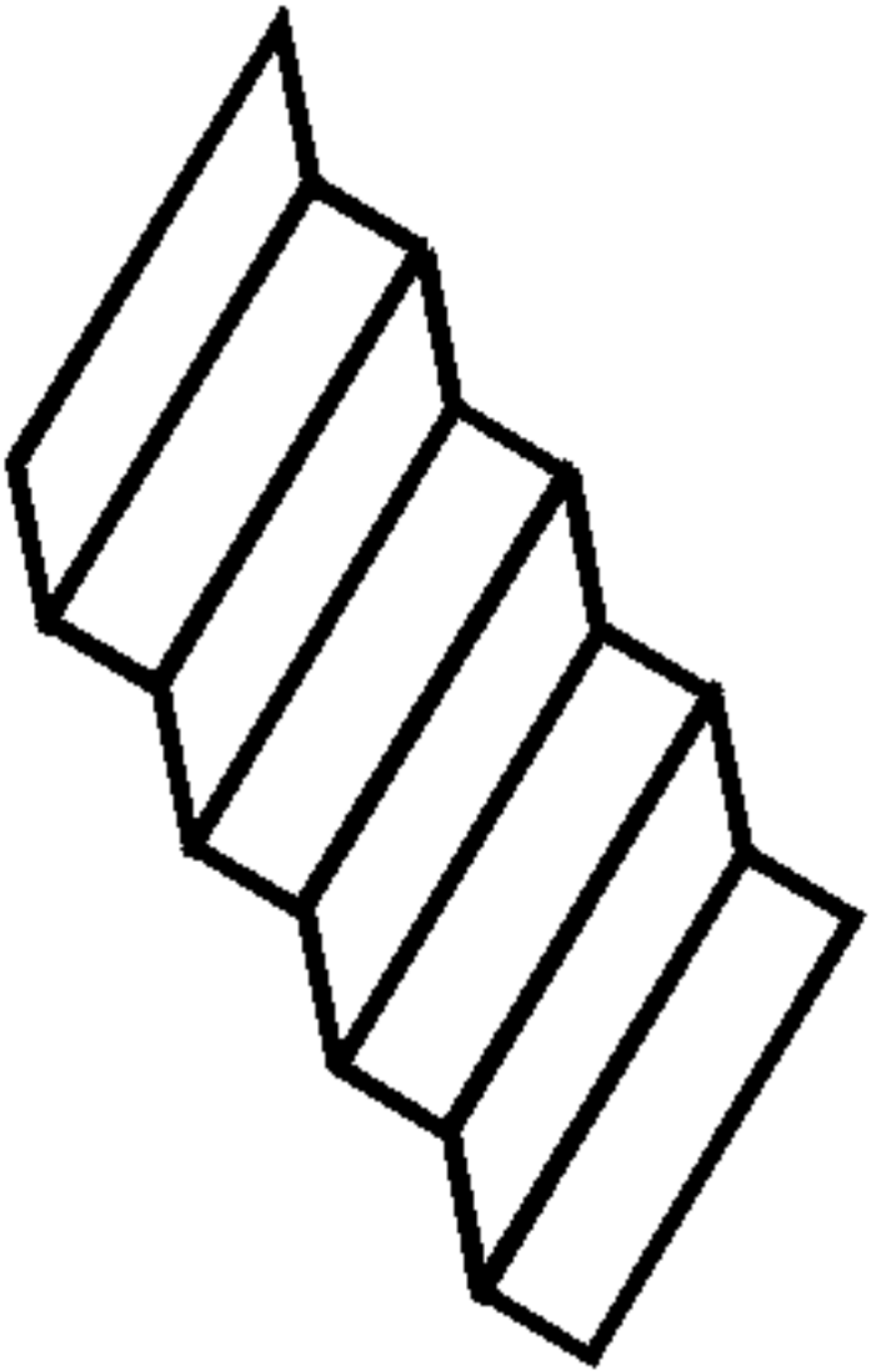

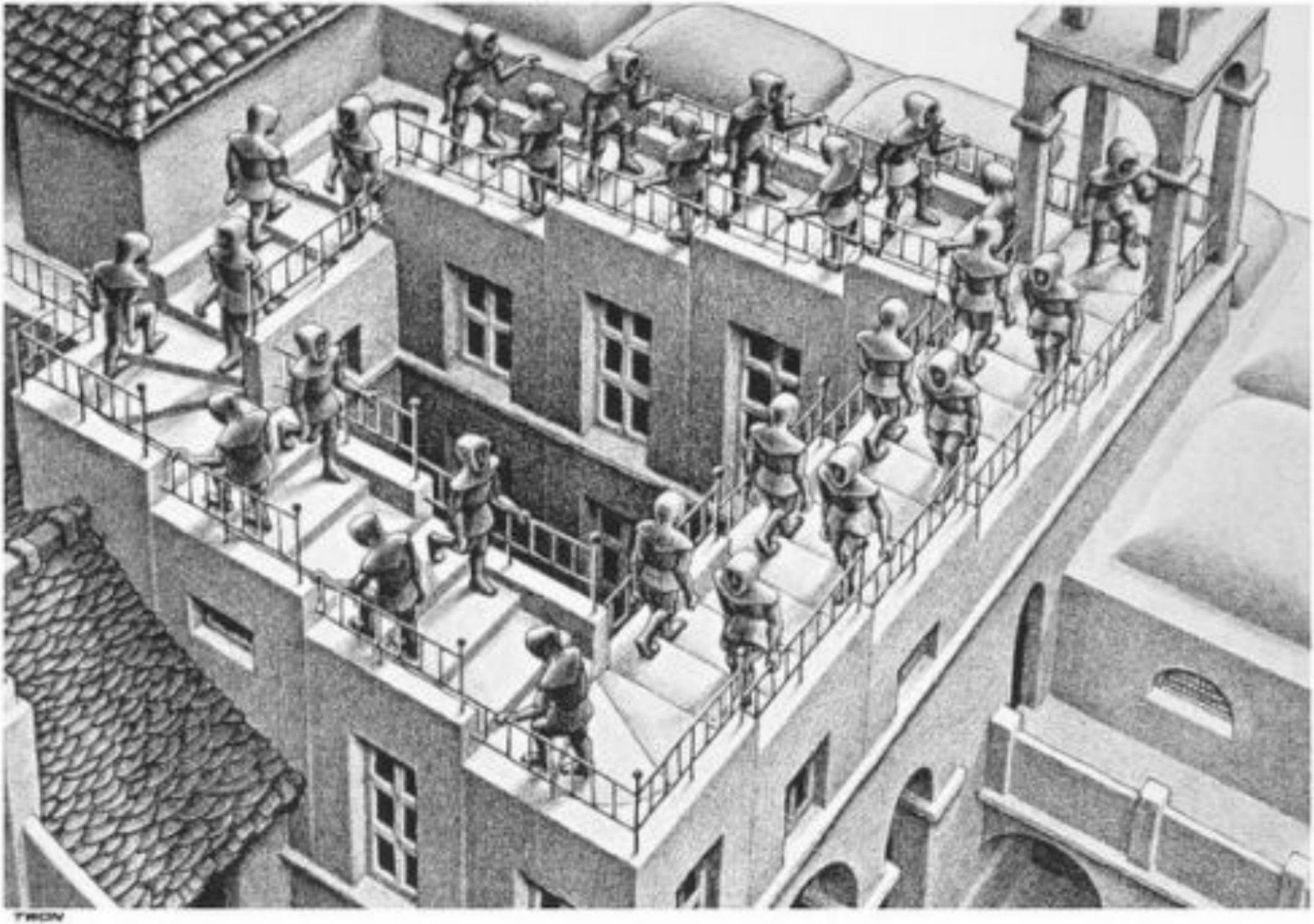

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