

# Human-Computer Interaction 2020

Class 10: HCI as a cognitive system (3)

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## Course description and aims

This course introduces the computer foundation, cognitive model, and design methods for human-computer interaction.

- 1) Introduction of multimodal processing, extended senses as VR/AR, and cooperative support techniques such as CSCW or groupware
- 2) Introduction of real-world computing such as the next generation of interactive systems.
- 3) Explanation of the cognitive model of interaction, sensation/perception, motion/control, and human communication.
- 4) Explanation of the human-centered design as a method of interaction design and its evaluation methods.

## Course schedule

- Class 8 HCI as a cognitive system (1)  
Cognitive interaction model of HCI
- Class 9 HCI as a cognitive system (2)  
Sensation and perception (Cognitive neuroscience)
- Class 10 HCI as a cognitive system (3)  
Sensation and perception (Cognitive psychology)
- Class 11 HCI as a cognitive system (4)  
Sensation and perception (Application to VR/AR)
- Class 12 HCI as a cognitive system (5)  
Motor control and interaction
- Class 13 HCI as a cognitive system (6)  
Human communication and interaction
- Class 14 HCI as a cognitive system (7)  
Summary



## Contents

1. Psychophysics
2. Gestalt Psychology (Introduction)
3. Gestalt Psychology (Law of Prägnanz)
4. Gestalt Psychology (Web design)
5. Affordance (Introduction)
6. Affordance (Web design)
7. Today's Report

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3. Gestalt Psychology (Law of Prägnanz)
4. Gestalt Psychology (Web design)
5. Affordance (Introduction)
6. Affordance (Web design)
7. Today's Report

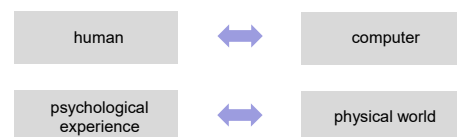
## Psychophysics

### Sensation and Perception — Introduction

Psychophysics studies the relationship between the physical world and our psychological experience. This relationship forms the fundamental part of HCI.



### Psychophysics



## Psychophysics

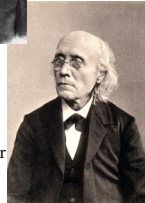
### Sensation and Perception — Introduction

Ernst Heinrich Weber (1795–1878) was one of the first researcher to approach the study of the human response to a physical stimulus in a quantitative fashion.

Gustav Theodor Fechner (1801–1887), a student of Weber, used Weber's findings to construct a psychophysical scale in which he described the relationship between the physical magnitude of a stimulus and its (subjectively) perceived intensity.



Weber



Fechner

[https://en.wikipedia.org/wiki/Weber%E2%80%93Fechner\\_law](https://en.wikipedia.org/wiki/Weber%E2%80%93Fechner_law)

## Psychophysics

### Sensation and Perception — Weber's Law

Weber's law expresses a general relationship between a quantity or intensity of stimulus and how much more needs to be added for us to be able to tell that something has been added.

The discrimination threshold  $\Delta S$  (the threshold for detecting an increment in the quantity or intensity of stimulus) changes depending on stimulus intensity  $S$  (how much there is before we add the increment).



<http://www.cns.nyu.edu/~msl/courses/0044/handouts/Weber.pdf>

## Psychophysics

### Sensation and Perception — Weber's Law

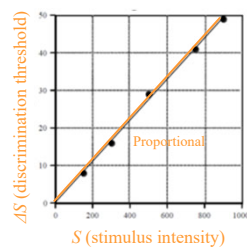
In experiment, we are interested in measuring  $\Delta S$  as a function of  $S$ . That is, we want to find the discrimination threshold  $\Delta S$  such that a stimulus with an intensity  $S + \Delta S$  is just discriminable from a stimulus of intensity  $S$ . Weber's law characterizes how the  $\Delta S$  depends on  $S$ . It states that

$$\Delta S = K_w S$$

$$(or \Delta S / S = K_w)$$

for some constant  $K_w$ . The constant  $K_w$  is called the Weber Fraction.

<http://www.cns.nyu.edu/~msl/courses/0044/handouts/Weber.pdf>



$$\Delta S = K_w S$$

$$(or \Delta S / S = K_w)$$

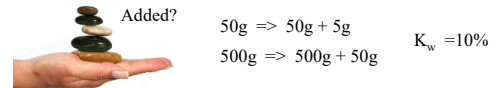
## Psychophysics

### Sensation and Perception — Weber's Law

Why Weber's law is useful?

If we know that Weber's law holds for two modalities, we can compare our sensitivity to changes along those modalities by comparing the Weber fractions. The Weber fraction is often expressed as a percentage. A Weber fraction of 1% indicates a fairly high sensitivity to increments, while a Weber fraction of 15% is rather poor and indicates lower sensitivity to increments.

If we know Weber's law holds and we know what the Weber fraction is, we can predict what the discrimination threshold should be—it's just the Weber fraction times the base intensity.



<http://www.cns.nyu.edu/~msl/courses/0044/handouts/Weber.pdf>

## Psychophysics

### Sensation and Perception — Part and whole relationship

Weber's Law

$$\frac{\Delta S}{S} = K_w = const$$

Part (discrimination threshold)      Whole (stimulus intensity)

Relationship between a part and the whole is always constant.

In our perception, the whole is always influencing to parts.

## Psychophysics

### Sensation and Perception — Fechner's Law

Based on the Weber's law,

Fechner assumed that a change of perception ( $\Delta P$ ) is proportional to the change of stimulus ( $\Delta S/S$ ).

$$\Delta P = k \Delta S/S$$

Solving this differential equation, he obtained the following relationship.

$$P = k \log(S)$$

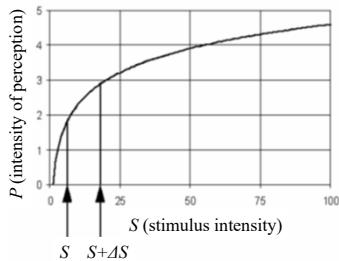
Fechner's law expresses a general logarithmic relationship between a intensity of stimulus ( $S$ ) and a intensity of perception ( $P$ ).

In fact, human perceptions of sight and sound work as follows: Perceived loudness/brightness is proportional to logarithm of the actual intensity measured with an accurate nonhuman instrument.

<http://www.cns.nyu.edu/~msl/courses/0044/handouts/Weber.pdf>

## Psychophysics

### Sensation and Perception — Fechner's Law



$$\Delta S = K_w S$$

$$P = \log(S)$$

<http://www.cns.nyu.edu/~msl/courses/0044/handouts/Weber.pdf>

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## Gestalt Psychology (Introduction)

### Introduction — Kurt Koffka

Gestalt psychology (German: Gestalt [ɡəˈʃtalt] "shape, form") is a theory of mind of the Berlin School of experimental psychology. Gestalt psychology tries to understand the laws of our ability to acquire and maintain meaningful perceptions in an apparently chaotic world.

The central principle of gestalt psychology is that the mind forms a global whole with self-organizing tendencies.

This principle maintains that when the human mind (perceptual system) forms a percept or gestalt, the whole has a reality of its own, independent of the parts.



(1886–1941)

Parts ↔ Whole  
qualitative difference

Gestalt psychology studies the "Whole."

[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Introduction)

### Introduction — Kurt Koffka

The original famous phrase of Gestalt psychologist Kurt Koffka, "The whole is other than the sum of the parts" is often incorrectly translated as "The whole is greater than the sum of its parts," and thus used when explaining gestalt theory, and further incorrectly applied to systems theory.

Koffka did not like the translation. He firmly corrected students who replaced "other" with "greater". "This is not a principle of addition" he said. The whole has an independent existence.



(1886–1941)

$$\sum (\text{Parts}) \neq \text{Whole}$$

Bottom-up      Top-down

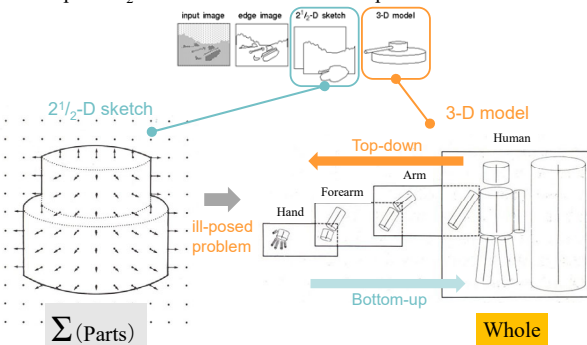
The whole is other than the sum of the parts.

[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Computational model of perception

### Computational Model — Step 3: 2½-D sketch

### Step 4: 3-D model



## Computational model of perception

### Computational Model

### — Interaction between top-down and bottom-up information




If there is no "whole" (top down information),  
there is no "parts" (bottom-up information).

## Gestalt Psychology (Introduction)

Introduction  
— Property 1: Emergence  
創発

What is this?

**Emergence of the Whole**  
The whole is emerged all at once.

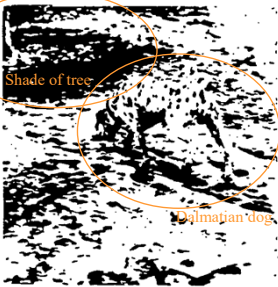


[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Introduction)

Introduction  
— Property 1: Emergence

This is the dog picture, which depicts a Dalmatian dog sniffing the ground in the shade of overhanging trees.



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)


## Gestalt Psychology (Introduction)

Introduction  
— Property 1: Emergence

How do you recognize this picture?

Case 1:  
The dog is recognized by first identifying its parts (feet, ears, nose, tail, etc.), and then inferring the dog from those component parts.

Case 2:  
The dog appears as a whole, all at once.



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Introduction)

Introduction  
— Property 1: Emergence


How do you recognize this picture?

Case 1:  
The dog is recognized by first identifying its parts (feet, ears, nose, tail, etc.), and then inferring the dog from those component parts.

Case 2:  
The dog appears as a whole, all at once.

↓

**Emergence of the Whole**



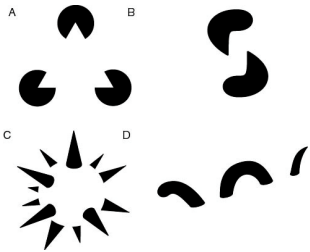
[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Introduction)

Introduction  
— Property 2: Reification  
物象化

What do you see in each picture?

**Reification of the Whole**  
We see the object which does not exist as a part of the whole.



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

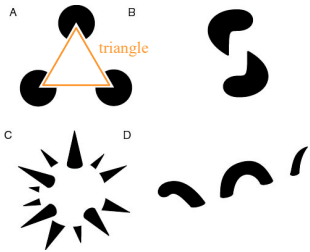
## Gestalt Psychology (Introduction)

Introduction  
— Property 2: Reification

Picture A:  
a triangle is perceived in picture A, though no triangle is there.

Picture B & D:  
In pictures B and D the eye recognizes disparate shapes as "belonging" to a single shape,

Picture C:  
In picture C a complete three-dimensional shape is seen, where in actuality no such thing is drawn.



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Introduction)

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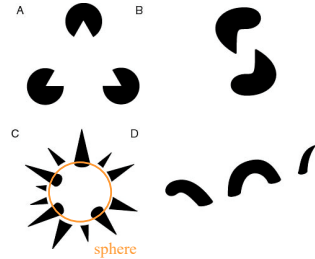
### Introduction

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[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Introduction)

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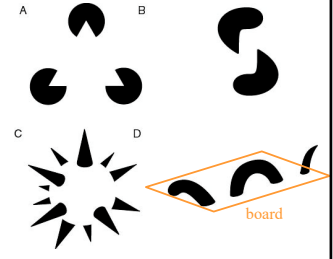
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## Gestalt Psychology (Introduction)

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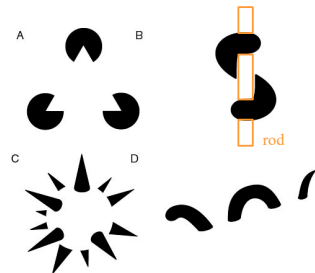
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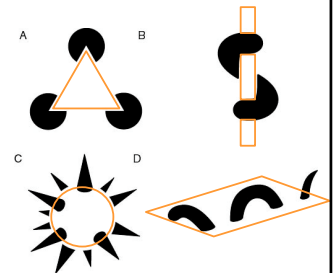
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### Introduction

#### — Property 2: Reification

Constructive or generative aspect of  
perception, by which the experienced  
percept contains more explicit spatial  
information than the sensory stimulus  
on which it is based.

Reification of the Whole



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Introduction)

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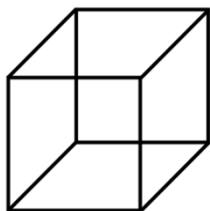
### Introduction

#### — Property 3: Multi-stability

多重安定性

In the following Necker cube and Rubin's Vase illusion,  
please concentrate to see one of the appearance.

How long could you keep the same appearance?



Multi-stability  
of the Whole



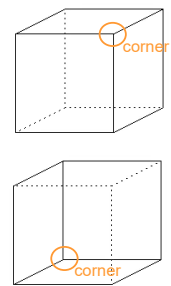
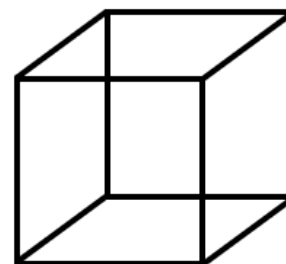
[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Introduction)

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### Introduction

#### — Property 3: Multi-stability



Necker, L.A. (1832). "Observations on some remarkable optical phenomena seen in Switzerland;  
and on an optical phenomenon which occurs on viewing a figure of a crystal or geometrical solid".  
London and Edinburgh Philosophical Magazine and Journal of Science 1 (5): 329–337

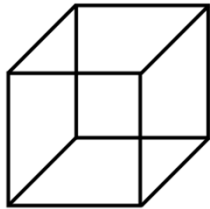
## Gestalt Psychology (Introduction)

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### Introduction

#### — Property 3: Multi-stability

Multi-stability (or multi-stable perception) is the tendency of ambiguous perceptual experiences to pop back and forth unstably between two or more alternative interpretations.



Multi-stability  
of the Whole



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Introduction)

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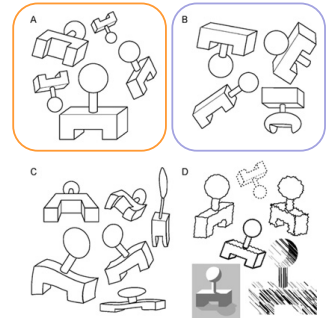
### Introduction

#### — Property 4: Invariance

不変性

The objects in A are all immediately recognized as the same basic shape.

The basic shape is immediately distinguishable from the forms in B.



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Introduction)

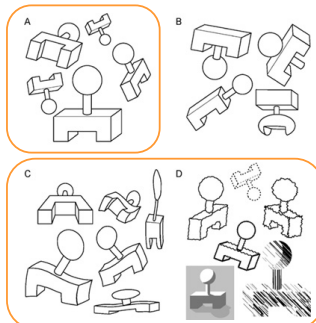
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### Introduction

#### — Property 4: Invariance

This basic shape is even recognized despite perspective and elastic deformations as in C,

and when depicted using different graphic elements as in D.



Invariance of the Whole

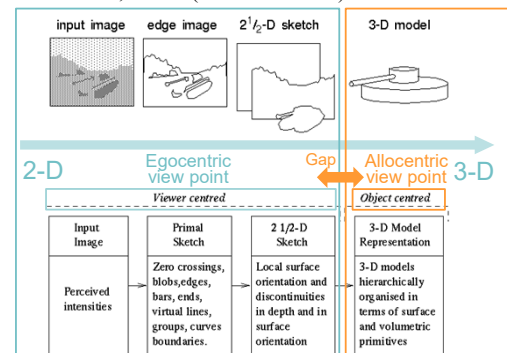
[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Computational model of perception

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### Computational Model

#### — David Marr, Vision (MIT Press 1982)



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## Gestalt Psychology (Law of prägnanz)

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We understood the importance of the whole.  
But the next question is “how to create the whole?”



### Law of Prägnanz

1. Proximity
2. Similarity
3. Closure
4. Symmetry
5. Common Fate
6. Continuity
7. Good Gestalt (figure-ground relationship)

[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Law of prägnanz)

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### Law of Prägnanz

#### — 1. Proximity

近接

In the following figure that illustrates the Law of proximity, there are 72 circles, but we perceive the collection of circles in groups.



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Law of prägnanz)

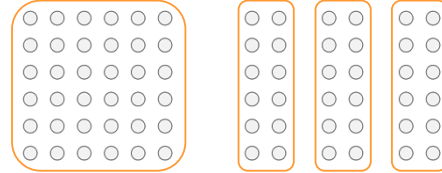
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### Law of Prägnanz

#### — 1. Proximity

Specifically, we perceive there is a group of 36 circles on the left side of the image, and three groups of 12 circles on the right side of the image.

➡ Law of Proximity



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Law of prägnanz)

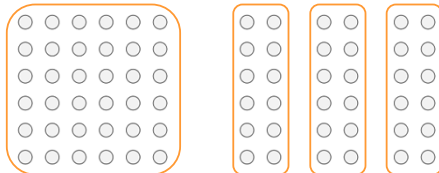
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### Law of Prägnanz

#### — 1. Proximity

The law of proximity states that when individuals perceive a set of objects **they perceive objects that are close to each other as forming a group.**

➡ Law of Proximity



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Law of prägnanz)

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### Law of Prägnanz

#### — 1. Proximity

We can see, as example here below, the logo Mystery Island created by Gert van Duinen. In an easy and brilliant way the designer use the proximity law to create a shape of an island and its reflection on the sea. This is the perfect combination of the brand name and the customer activity, dance music producer. The lines creating the island are clearly recognizable as equalizer lines.

In the Foodmobile logo (Designer: ru\_ferret) we found a group of single objects, representing foods (bread, fish, vegetables are clearly recognizable) which grouped for proximity create a car shape.



<http://www.instantshift.com/2011/09/19/the-close-relationship-between-gestalt-principles-and-design/>

## Gestalt Psychology (Law of prägnanz)

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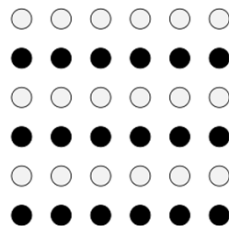
### Law of Prägnanz

#### — 2. Similarity

類同

The figure portrays 36 circles all equal distance apart from one another forming a square. In this depiction, 18 of the circles are shaded dark and 18 of the circles are shaded light.

How do you see this figure?



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Law of prägnanz)

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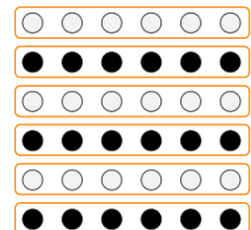
### Law of Prägnanz

#### — 2. Similarity

We perceive the dark circles as grouped together, and the light circles as grouped together forming six horizontal lines within the square of circles. This perception of lines is due to the law of similarity.



Law of Similarity



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)



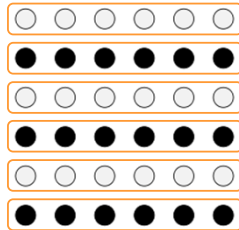
## Gestalt Psychology (Law of prägnanz)

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### Law of Prägnanz — 2. Similarity

The law of similarity states that **elements within an set of objects are perceptually grouped together if they are similar to each other**. This similarity can occur in the form of shape, color, shading or other qualities.

#### Law of Similarity



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Law of prägnanz)

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### Law of Prägnanz — 2. Similarity

In the Capture logo, created by Quadrika, the Similarity Law is clearly applied. The Law of Similarity works well when designing logos because it is based on repetition of shape, size, color, texture, value or orientation.

The logo is featured by colors and shape similarity. The visual part of the Capture logo shares with the textual part a kind of viewfinder which is the same of the C and E letters.



<http://www.instantshift.com/2011/09/19/the-close-relationship-between-gestalt-principles-and-design/>

## Gestalt Psychology (Law of prägnanz)

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### Law of Prägnanz — 3. Closure

閉合

How do you see the following figure?

The following figure that depicts the law of closure shows what we perceive as a circle on the left side of the image and a rectangle on the right side of the image. However, gaps are present in the shapes.



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

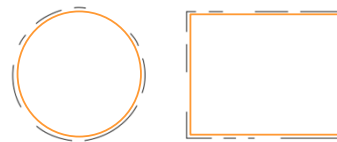
## Gestalt Psychology (Law of prägnanz)

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### Law of Prägnanz — 3. Closure

The law of closure states that **individuals perceive objects such as shapes, letters, pictures, etc., as being whole when they are not complete**. Specifically, when parts of a whole picture are missing, our perception fills in the visual gap. Research shows that the reason the mind completes a regular figure that is not perceived through sensation is to increase the regularity of surrounding stimuli.

#### Law of Closure



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Law of prägnanz)

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### Law of Prägnanz — 3. Closure

The closure rule is of very common use in logo creation to create memorable design. An extremely famous logo based on closure is the WWF Panda. The logo IBM too, composed by eight solid lines, separated by empty space, is based on closure law. The three letters are not really there. Our brain perceives it by closing the letters shape.



<http://www.instantshift.com/2011/09/19/the-close-relationship-between-gestalt-principles-and-design/>

## Gestalt Psychology (Law of prägnanz)

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### Law of Prägnanz — 4. Symmetry

対称

How do you see the following figure?

The following figure depicting the law of symmetry shows a configuration of square and curled brackets. When the image is perceived, we tend to observe three pairs of symmetrical brackets rather than six individual brackets.



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)



## Gestalt Psychology (Law of prägnanz)

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### Law of Prägnanz

#### — 4. Symmetry

The law of symmetry states that **the mind perceives objects as being symmetrical and forming around a center point**. It is perceptually pleasing to divide objects into an even number of symmetrical parts. Therefore, when two symmetrical elements are unconnected the mind perceptually connects them to form a coherent shape. Similarities between symmetrical objects increase the likelihood that objects are grouped to form a combined symmetrical object.

#### ➡ Law of Symmetry



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

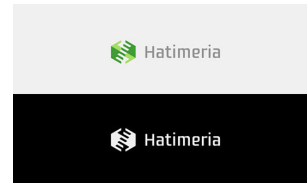
## Gestalt Psychology (Law of prägnanz)

MIYAKE LAB

### Law of Prägnanz

#### — 4. Symmetry

The Hatimeria logo, from Midgar is a clear example of symmetry law. The software house wants stress the great attention they put in building long-lasting partnerships with customers. The logo symbols are two hands joined together. The two hands are symmetrical designed to form stairs leading upwards. Symmetry creates a redundancy and predictability of visual information.



<http://www.instantshift.com/2011/09/19/the-close-relationship-between-gestalt-principles-and-design/>

## Gestalt Psychology (Law of prägnanz)

MIYAKE LAB

### Law of Prägnanz

#### — 5. Common Fate

共通運命

How do you see the right figure?

We perceive elements of objects to have trends of motion, which indicate the path that the object is on.

The law of common fate states that **objects are perceived as lines that move along the smoothest path**.



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Law of prägnanz)

MIYAKE LAB

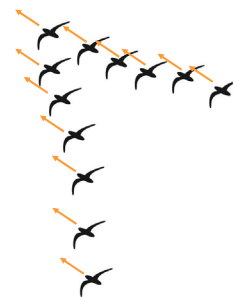
### Law of Prägnanz

#### — 5. Common Fate

The law of common fate implies the grouping together of objects that have the same trend of motion and are therefore on the same path.



#### Law of Common Fate



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Law of prägnanz)

MIYAKE LAB

### Law of Prägnanz

#### — 5. Common Fate

In the Melbourne 2010 Cycling Championship logo the spots are affected by a common fate. The lines created by the colors move in the same direction creating a dynamism which let the observer perceive a common fate of movement.



<http://www.instantshift.com/2011/09/19/the-close-relationship-between-gestalt-principles-and-design/>

## Gestalt Psychology (Law of prägnanz)

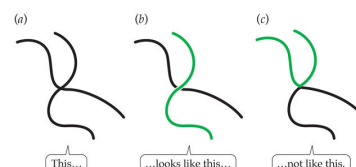
MIYAKE LAB

### Law of Prägnanz

#### — 6. Continuity

連続

In cases where there is an intersection between objects, individuals tend to perceive the two objects as two single uninterrupted entities. Stimuli remain distinct even with overlap. **We are less likely to group elements with sharp abrupt directional changes as being one object.**



#### ➡ Law of Continuity

[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

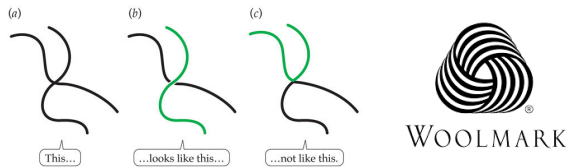
## Gestalt Psychology (Law of prägnanz)

MIYAKE LAB

### Law of Prägnanz — 6. Continuity

The law of continuity states that elements of objects tend to be grouped together, and therefore integrated into perceptual wholes if they are aligned within an object.

#### ➔ Law of Continuity



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Law of prägnanz)

MIYAKE LAB

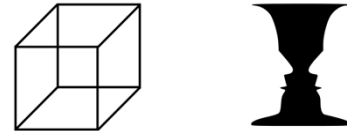
### Law of Prägnanz — 7. Good Gestalt (figure-ground relationship) よい形

The law of good gestalt implies that as individuals perceive the world, they eliminate complexity and unfamiliarity so they can observe a reality in its most simple form. Eliminating extraneous stimuli helps the mind create meaning.

This is related to figure-ground relationship.

The law of good gestalt focuses on the idea of conciseness, which is what all of gestalt theory is based on.

#### ➔ Law of Good Gestalt



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

## Gestalt Psychology (Law of prägnanz)

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### Law of Prägnanz — 7. Good Gestalt (figure-ground relationship)

By following the Figure-Ground Law in the Feathers & Fur logo, designed for a pet store from Lumo, the observer can recognize a parrot and a dog's face into the mark. Another example is the logo of Kölner zoo.



[https://en.wikipedia.org/wiki/Gestalt\\_psychology](https://en.wikipedia.org/wiki/Gestalt_psychology)

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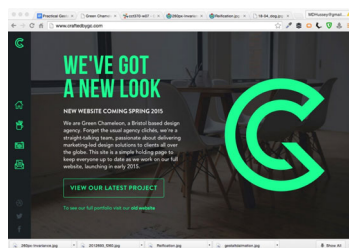
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## Gestalt Psychology (Web design)

MIYAKE LAB

### Application to Web Design — Ex.1: Law of Similarity

As shown in the following example from design agency Green Chameleon, the navigation icons all look different. However, the similarities in color, size, spacing, and placement of icons all suggest that each icon represents the same level of navigation (top-level).



<http://craftedbygc.com/>

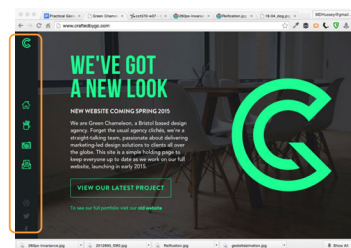
<http://thenextweb.com/dd/2015/03/17/how-to-apply-optical-illusions-to-web-ui-design/#gref>

## Gestalt Psychology (Web design)

MIYAKE LAB

### Application to Web Design — Ex.1: Law of Similarity

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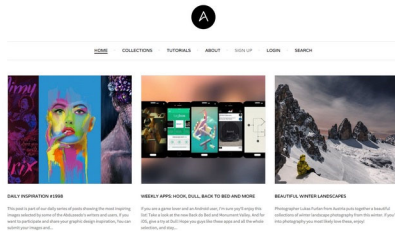
<http://thenextweb.com/dd/2015/03/17/how-to-apply-optical-illusions-to-web-ui-design/#gref>

## Gestalt Psychology (Web design)

MIYAKE LAB

### Application to Web Design — Ex.2: Law of Closure

The grid layout from Abduzeedo below is an example of Closure. Even though there's no clear borders on each piece of content, the alignment helps our eyes complete the "grid" created by each of the three images. As such, we see three columns of text instead of one large chunk.



<http://abduzeedo.com/>

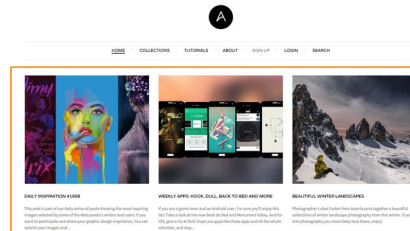
<http://thenextweb.com/dd/2015/03/17/how-to-apply-optical-illusions-to-web-ui-design/#gref>

## Gestalt Psychology (Web design)

MIYAKE LAB

### Application to Web Design — Ex.2: Law of Closure

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<http://abduzeedo.com/>

<http://thenextweb.com/dd/2015/03/17/how-to-apply-optical-illusions-to-web-ui-design/#gref>

## Gestalt Psychology (Web design)

MIYAKE LAB

### Application to Web Design — Ex.3: Law of Continuity

Law of Continuity has the most obvious effect on site navigation, since items on the same horizontal plane appear to have the same level of hierarchy. In the below navigation example from CreativeBloq, you can see that all navigation items on the first line represent types of content. All navigation items on the second line represent categories of content. The site doesn't need to call out this difference since it's communicated through the principle of continuation.



<http://www.creativebloq.com/>

<http://thenextweb.com/dd/2015/03/17/how-to-apply-optical-illusions-to-web-ui-design/#gref>

## Gestalt Psychology (Web design)

MIYAKE LAB

### Application to Web Design — Ex.3: Law of Continuity

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<http://www.creativebloq.com/>

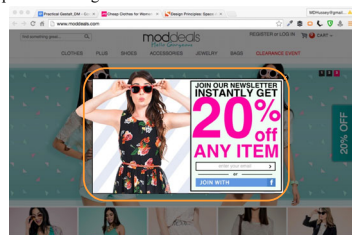
<http://thenextweb.com/dd/2015/03/17/how-to-apply-optical-illusions-to-web-ui-design/#gref>

## Gestalt Psychology (Web design)

MIYAKE LAB

### Application to Web Design — Ex.4: Good Gestalt (figure-ground relationship)

In the following example, Moddeals shows a common pattern that exploits the figure-ground relationship. When the newsletter ad appears, the rest of the page goes darker, pushing in into the background. Additionally, the user can still scroll the page, however the newsletter ad remains in a fixed position, cementing it as the figure set apart from the ground.



<http://www.moddeals.com/>

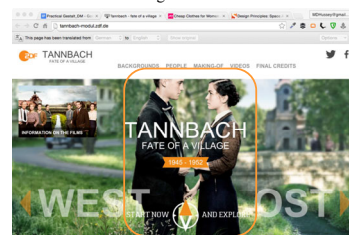
<http://thenextweb.com/dd/2015/03/17/how-to-apply-optical-illusions-to-web-ui-design/#gref>

## Gestalt Psychology (Web design)

MIYAKE LAB

### Application to Web Design — Ex.5: Good Gestalt (figure-ground relationship)

To emphasize the human relationship in the film, the designer makes the two people sharp against an unfocused background. Through the use of color and typography, the actual interface becomes the "primary figure" with the couple becoming the "secondary figure". As a result, the user visually connects with the couple but still understands how to navigate the site.



<http://tannbach-modul.zdf.de/>

<http://thenextweb.com/dd/2015/03/17/how-to-apply-optical-illusions-to-web-ui-design/#gref>

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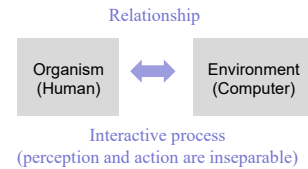
## Affordance (Introduction)

### Introduction

#### — What is Affordance?

An affordance is a relation between an environment (an object) and an organism that affords the opportunity for that organism to perform an action.

This term "affordance" is recently evolved for use in the context of human-computer interaction (HCI) to indicate the easy discoverability of possible actions.



<https://en.wikipedia.org/wiki/Affordance>

## Affordance (Introduction)

### Introduction

#### — What is Affordance?

For example, a knob affords twisting, and perhaps pushing, while a cord affords pulling. As a relation, an affordance exhibits the possibility of some action, and is not a property of either an organism or its environment alone.



The handles on a tea set provide an obvious affordance for holding

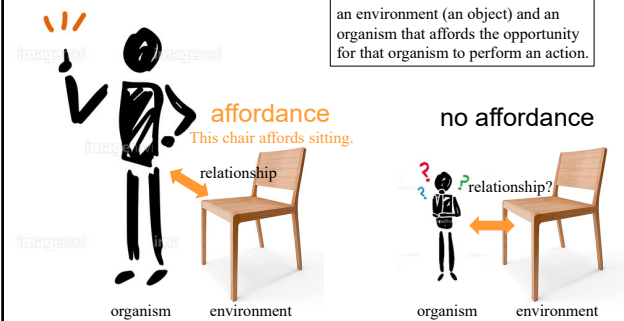
<https://en.wikipedia.org/wiki/Affordance>

## Affordance (Introduction)

### Introduction

#### — What is Affordance?

An affordance is a relation between an environment (an object) and an organism that affords the opportunity for that organism to perform an action.



## Affordance (Introduction)

### Introduction

#### — What is Affordance?

An affordance is a relation between an environment (an object) and an organism that affords the opportunity for that organism to perform an action.

affordance

no affordance



This stairs afford walking up.



## Affordance (Introduction)

### As action possibilities

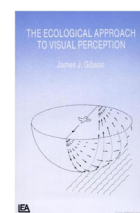
#### — James J. Gibson

Psychologist James J. Gibson originally introduced the term in his 1977 article "The Theory of Affordances" and explored it more fully in his book "The Ecological Approach to Visual Perception" in 1979.

He defined affordances as all "action possibilities" latent in the environment, objectively measurable and independent of the individual's ability to recognize them, but always in relation to agents and therefore dependent on their capabilities. For instance, a set of steps which rises four feet high does not afford the act of climbing if the actor is a crawling infant.



(1904–1979)



Gibson, J.J. (1979). The Ecological Approach to Visual Perception. Boston: Houghton Mifflin

<https://en.wikipedia.org/wiki/Affordance>

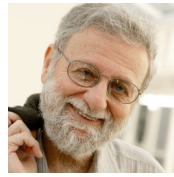
## Affordance (Introduction)

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As perceived action possibilities  
— Donald A. Norman

Donald Norman appropriated the term affordances in the context of human-machine interaction to refer to just those action possibilities that are readily perceivable by an actor.

Through his book "The Design of Everyday Things" (1988), this interpretation was popularized within the fields of HCI and interaction design. It makes the concept dependent not only on the physical capabilities of an actor, but also the actor's goals, plans, values, beliefs, and past experiences.



J. J. Gibson → Affordance

D. A. Norman → Affordance

<https://en.wikipedia.org/wiki/Affordance>

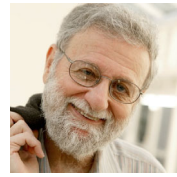
## Affordance (Introduction)

MIYAKE LAB

As perceived action possibilities  
— Donald A. Norman

If an actor steps into a room containing an armchair and a softball, Gibson's original definition of affordances allows that the actor may throw the chair and sit on the ball, because this is objectively possible.

Norman's definition of (perceived) affordances captures the likelihood that the actor will sit on the armchair and throw the softball. Effectively, Norman's affordances "suggest" how an object may be interacted with. This means that he proposed a design method to realize useful affordances.



J. J. Gibson → Affordance

D. A. Norman → Affordance + Design

<https://en.wikipedia.org/wiki/Affordance>

## Affordance (Introduction)

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As perceived action possibilities  
— An example of bad design (Door knob)

no affordance



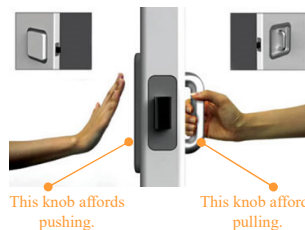
<https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/affordances>

## Affordance (Introduction)

MIYAKE LAB

As perceived action possibilities  
— An example of good design (Door knob)

affordance



This knob affords pushing.

This knob affords pulling.

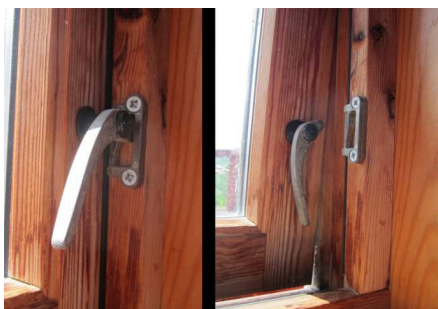


<https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/affordances>

## Affordance (Introduction)

MIYAKE LAB

As perceived action possibilities  
— An intuitive everyday design: Window lock



<https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/affordances>

## Affordance (Introduction)

MIYAKE LAB

As perceived action possibilities  
— An intuitive everyday design: Car door handles



<https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/affordances>



## Affordance (Introduction)

MIYAKE LAB

As perceived action possibilities

- An intuitive everyday design: Waste box



<https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/affordances>

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## How to create affordance?



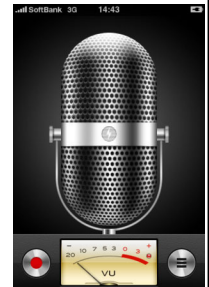
## Affordance (Web design)

MIYAKE LAB

As perceived action possibilities

- An intuitive interface element: **Skeuomorphic Design**

Skeuomorphism is a term most often used in graphical user interface design to describe interface objects that mimic their real-world counterparts in how they appear and/or how the user can interact with them.



<https://www.interaction-design.org/literature/topics/skeuomorphism>

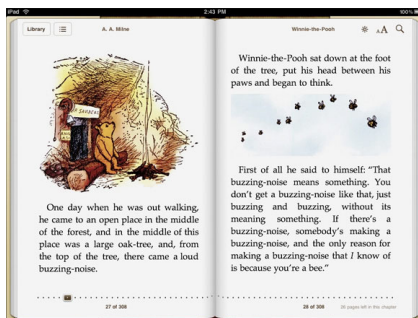
Voice memo of iPhone

## Affordance (Web design)

MIYAKE LAB

As perceived action possibilities

- An intuitive interface element: **Skeuomorphic Design**



iBooks

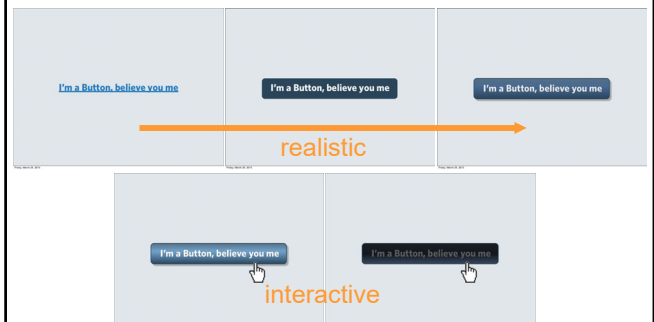
<https://www.interaction-design.org/literature/topics/skeuomorphism>

## Affordance (Web design)

MIYAKE LAB

As perceived action possibilities

- An intuitive interface element: Button on display



[http://www.slideshare.net/andrewmaier/affordances-in-modern-web-design/51-Zimbra\\_Microsoft\\_Outlook\\_Affordance](http://www.slideshare.net/andrewmaier/affordances-in-modern-web-design/51-Zimbra_Microsoft_Outlook_Affordance)

## Affordance (Web design)

As perceived action possibilities  
— An intuitive interface element: Button on display

**realistic**      **interactive**

## Affordance (Web design)

As perceived action possibilities  
— An intuitive interface element: Button on display

Skeuomorphic Design  
↓  
Flat Design

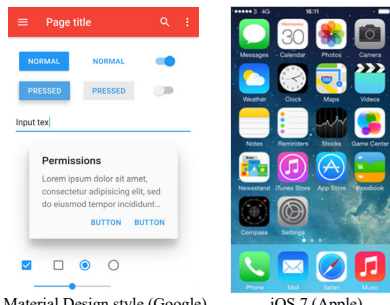
<https://www.toptal.com/designers/ui/button-design-dribbble-timeline>



## Affordance (Web design)

As perceived action possibilities  
— An intuitive interface element: **Flat Design**

Flat design is a style of interface design emphasizing **minimum use of stylistic elements** that give the illusion of three dimensions (such as the use of drop shadows, gradients or textures) and is focused on a minimalist use of simple elements, typography and flat colors.




Material Design style (Google)      iOS 7 (Apple)

<https://www.interaction-design.org/literature/topics/flat-design>

## Affordance (Web design)

As perceived action possibilities  
— An intuitive interface element: **Flat Design**



metaphoric

<http://sarahjustine.com/2013/03/17/featherweight-ui-a-free-vector-based-and-retina-ready-ui-kit-with-bonus-mini-tutorial/>

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## Today's Report

Review Report #3  
2020.06.04


Question: Please pick up one homepage, and analyze it from the viewpoint of Affordance or Gestalt Psychology.

File format and length of report: PDF file and less than 400 words  
(If you prepare in Japanese, length is less than 1 page in A4 format)

Deadline: 2020.06.11(Thu) 12:00

Submit to: Please send your report to the following address,  
OCW-i

Others: Your name and student ID number should be included in the report



Thank you for your attention!

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