

Gestalt School on Learning

Chapter 10

1

History of Gestalt Psychology

1. Max Wertheimer, along with Kurt Koffka and Wolfgang Köhler founded the Gestalt School of Psychology and studied perceptual and other phenomena based on Kantian and other German philosophies. Their ideas started appearing in 1912.
2. Separated by WWI, three individuals united again to form the [Gestalt of the Berlin School](#), and stayed in Germany till the 1930s and then migrated to the US.

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History of Gestalt Psychology

3. In the US, Wertheimer at New School for Social Research, Koffka at Smith College, Kohler at Swarthmore College, and Lewin at Cornell and the University of Iowa continued to work on expanding gestalt ideas.
4. Gestalt school made enormous contributions to psychology. Their motto, "the whole is different from the sum of its parts", gained household popularity. Although they confronted opposition from behaviorism, their ideas inseeded current cognitive psychology.

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Max Wertheimer

1. Born Apr. 15, 1880 in Prague, Czechoslovakia.
2. Worked with Koffka and Kohler on Gestalt psychology. Their work was interrupted by WWI.
3. After war he joined Psychological Institute at the University of Berlin.



(1880-1943)

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Max Wertheimer

4. From 1929 to 1933, Wertheimer was a professor at the University of Frankfurt.
5. When Hitler became the third Reich, Wertheimer left Germany and came to the US on Sep. 13, 1933.



(1880-1943)

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Max Wertheimer

6. Joined New School for Social Research, New York.
7. With ill health, continued to work on problem-solving, and wrote *Productive Thinking* (1945) published two years after his death.
8. Died Oct. 12, 1943.



(1880-1943)

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Comparison of Schools

Structuralism	Behaviorism
Mind (Wundt)	Behavior (Watson)
Structuralists concentrated on the elements of mind (mind = sensations, feelings, and images).	Behaviorists believed in elements of behavior (behavior = S-R associations).
Believed that complex mental ideas were made up of simple ideas (see J. S. Mill).	Complex behaviors are made up of simple behaviors (reflexes).

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Comparison of Schools

Structuralism	Behaviorism
Introspection Observation and Experimentation	Observation and Experimentation
Whatever the phenomena of their study (mind or behavior), both schools of thought were similarly driven by a reductionist approach to break down mind or behavior into elements.	

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Gestalt Psychology

Structuralism	Behaviorism	Gestalt
Elements of mind	Elements of behavior	Mind or behavior must be studied in "wholes" , not as elements or parts.
Molecules of mind	Molecular behavior	Molar behavior or mind
Introspection Observation and Experimentation	Observation and Experimentation	Introspection Observation and Experimentation
Approach: Mental	Approach: Behavioral	Approach: Cognitive

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The word *Gestalt*

The German word **gestalt** can be translated to means form, pattern, configuration. This configuration or pattern offers an "organization" to perception which the individual experiences.

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Phi Phenomenon

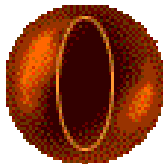
On a train ride, Wertheimer was struck by a curious phenomena of jumping lights from one pole to another. He quickly conducted experiments, and discovered **phi phenomenon**.



Phi phenomena: when two lights flash at a certain speed, we perceive a singular light oscillating back and forth.

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Phi Phenomenon: Rotating Hoop



Phi phenomena: The hoop above gives the impression that it is rotating on its axis.

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Phi Phenomenon: Movies

We experience phi phenomena when we watch movies. The movie projector presents a series of still picture in quick succession, giving us the illusion of motion.

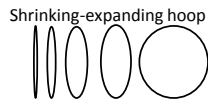


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Phi Phenomenon: Reality

Phi phenomena is a perceptual experience that is different from the sum of sensory elements.



Series of still pictures



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Phenomenological Experiences

This lead gestalt psychologists to question the reality of sensory and subsequent phenomenological (perceptual) experience. They proposed that perceptual experiences were not the sum of sensory elements.

Sensory Experience	Phenomenological Experience
Flashing lights, shrinking-expanding hoop, and still pictures	Apparent motion

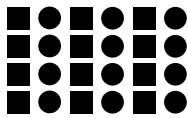
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Perceptual Organization

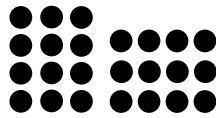
The question then was how was our phenomenological or perceptual experiences organized? What were the principles or laws that underlay our perception? Gestalt psychologists developed a number (over hundred) of laws that organized perception.

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Law of Similarity & Proximity



Similarity



Proximity

Similarity Pieces that are similar are grouped together. Most see vertical columns of circles and squares.

Proximity Near objects are grouped together. We perceive one group of circles going vertical the other horizontal.

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Pointillism

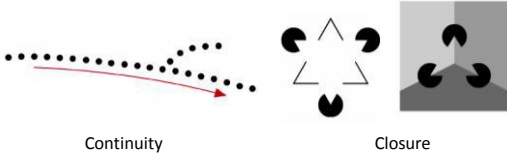


Yellow inset blown for details.

Painters like George Seurat have used laws like similarity and proximity to paint his pictures. *Sunday afternoon at the Grand Jatte*.

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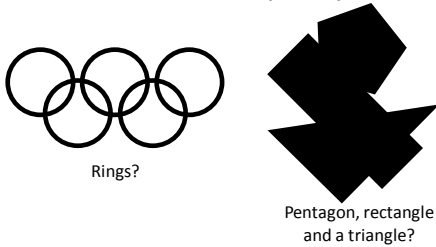
Law of Continuity & Closure



Continuity Pieces in smooth continuation are grouped together. Most people view the lower line next to the red arrow as continuous.

Closure Missing elements are supplied to complete a familiar figure. We perceive an illusory triangle and a pyramid in kanizsa triangles. ¹⁹

Law of Simplicity



Simplicity Pieces are organized in simplest possible ways. Most people view five rings (left) and a triangle, pentagon and a rectangle (right). ²⁰

Law of Figure & Ground



Vase or Faces?

Figure and Ground When viewed as figure, faces or vase stands out in front of the background. This perception is not stable and oscillates back and forth between faces and vase. ²¹

Law of Prägnanz

1. Law of Prägnanz (Prägnanz mean “essence”) is an overriding principle that envelops all perceptual laws.
2. The law is defined as a tendency that makes every psychological event simple, concise, symmetrical, harmonious and complete.
3. Not only was this law used as a guiding principle for studying perception, but also memory, learning, personality and psychotherapy.

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Law of Prägnanz

4. Thus, law of prägnanz makes our physical environment meaningful, and in many ways also our behavioral and social environments. Bringing meaning and completeness to our beliefs, values, needs, and attitudes.
5. The tendency (essence) that makes psychological, behavioral, or social events meaningful is based on field forces our brain generates.

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Kurt Zadek Lewin

1. Born 9 Sep. 1890 in Mogilno, Poland.
2. Did his PhD from University of Berlin under Carl Stumpf.
3. Migrated to the US in 1933.
4. Worked at Cornell, and for the Child Welfare Research Station at the University of Iowa.



(1890-1947)

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Kurt Zadek Lewin

5. Later became the director of the Center for Group Dynamics at MIT.
6. Worked with Connecticut State Inter Racial Commission to combat religious and racial prejudices. Developed **sensitivity training**.



(1890-1947)

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Kurt Zadek Lewin

7. Recognized as the "founder of social psychology".
8. Formed a theory of human motivation around field theory.
9. Died in Newtonville, Massachusetts in 1947.

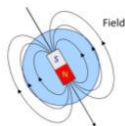


(1890-1947)

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Field Theory

1. Gestalt psychology borrowed the concept of field theory from physics. In its simple form one can think of a magnet that generates a magnetic field.
2. A **field** can be defined as a dynamic, interrelated system, where one part influences other parts in the system.



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Field Theory

3. So field theory in gestalt psychology assumes that behavior and cognitive processes are part of a field that affect each other. These processes can be memories, beliefs, perceptions, physiology, etc.
4. Any change in one process changes the whole pattern. World looks different on an upset stomach or a sad memory.
5. A field can exist at many levels. Perceived environment can be a field. All people in the environment can be another field, etc.

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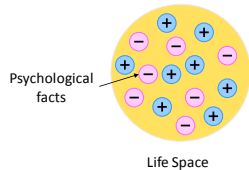
Motivation: Field Theory

1. Kurt Lewin formed a theory of human motivation which was built around field theory.
2. Human behavior, he suggested, at any given time is determined by total number of **psychological facts** (field).
3. A psychological fact is anything a person is conscious of including being hungry, being in a physical location, or having money, or being conscious of some memory.

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Motivation: Field Theory

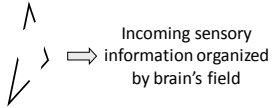
4. All conscious psychological facts makes our **life space** which continuously change. Some facts exert positive influence on us, while others have a negative affect. Interaction of these facts determines behavior.



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Brain

1. Brain is a physical system that acts (as if generating a magnetic field) on incoming sensory information (iron particles) to make it more meaningful and organized.
2. Brain's ability to do so is neither learned nor inherited. This ability is inherent to any physical system, brain is one of them.



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Brain

Gestaltists	Behaviorists
Brain plays an active role.	Passive receiver of sensations.
Makes sensory information more meaningful.	Switchboard. Storehouse of sensory information.
Making information more meaningful affects the behavior of the individual.	Brain does not affect behavior. Whistle does no control the speed of the locomotive.

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Brain-Mind Problem

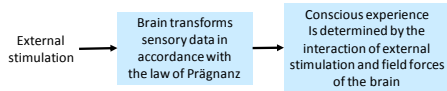
Different schools of thought have addressed the issue of brain (body) and mind relation, and have come up with different answers.

1. Behaviorists did not believe in mind or consciousness, therefore ignored it.
2. To voluntarists, mind alters sensory information to initiate behavior.
3. Structuralists believed, passive sensation made mind with no association with behavior (epiphenomenalism).

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Brain-Mind Problem

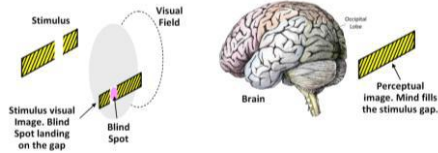
- For gestaltists, sensations were altered by mind (law of prägnanz). Active processing in the brain generated the mind, or physiological processes in the brain were mirror image of mental events and vice versa (**isomorphism**).



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Blind Spot and Closure

Since our brain (mind) can alter sensory information. Neuroscientists have demonstrated that omission in sensory information when lands on our blind spot or scotomas can be filled in (law of closure) to construct mental images.



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Reality and Environment

- Because mind or consciousness transforms sensory information, **objective reality** is never experienced directly. What we gather then is our **subjective reality** and our behavior is dependent on it.
- Thus we live in two kinds of environments, **geographical environments** which we physically share with others, and **behavioral environment** which consists of our perceptions, attitudes, beliefs, and values etc., which is not shared with others.

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Gestalt Principles of Learning

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Wolfgang Köhler

1. Born Jan. 21, 1887 in Tallinn, Estonia.
2. Studied at the University of Tübingen (1905-06), University of Bonn (1906-07) and the University of Berlin (1907-09).
3. From 1910-13, worked as an assistant at the Psychological Institute in Frankfurt .



(1887-1967)

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Wolfgang Köhler

4. Köhler became the director of the Prussian Academy of Sciences anthropoid research station (Tenerife, 1913), where he studied learning in apes.



(1887-1967)

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Wolfgang Köhler

5. Köhler wrote *The Mentality of Apes* (1917/1925) and *Simple structural functions in the chimpanzee and in the chicken* (1917/1938).
6. Became the director of the Psychological Institute at the University of Berlin (1920-1935).



(1887-1967)

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Wolfgang Köhler

7. Moved to US (1935) as a professor at Swarthmore College.
8. Became the president of American Psychological Association (1959).
9. Died on Jun. 11, 1967 in Hanover, New Hampshire.

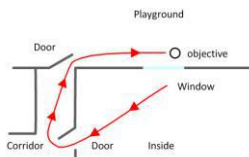


(1887-1967)

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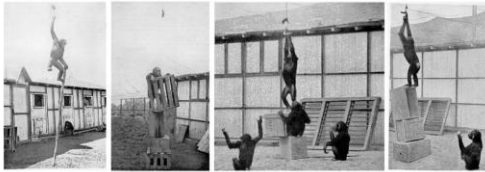
Detour Problems

To study insightful learning, Köhler tested apes and chickens with detour problems. He found animals learn with insight, however, there were species differences in the ability to solve them, apes did better than chickens.



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Reaching Problems



Chica using pole to obtain food

Grande using boxes to obtain food

Grande using boxes to obtain food (Stage 1)

Stage 2

Köhler tested apes with reaching problems (vertical) in open field. Animals vicariously and behaviorally tested their solutions for presented problems. ⁴³

Reaching Problems



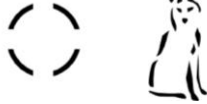
In other kinds of reaching problems a horizontal orientation was utilized. Sultan, Köhler's smartest ape is seen getting food by assembling sticks. ⁴⁴

Perception and Learning

1. For gestalt psychologists learning was a special problem of perception. Problem (to learn), caused perceptual disequilibrium, which motivated the organism to solve it. Problem solution restored perceptual equilibrium and brought motivational relief ([Zeigarnik Effect](#)).
2. While solving insightful problems, Köhler observed, animals would take long period of contemplation in which they would run [vicarious trial-and-error](#) sessions. When correct solution was discovered, insight occurred. ⁴⁵

Perception and Learning

3. What brings the solution to the problem, is law of prägnanz. Prägnanz, simplifies perception (perceptual equilibrium), and brings solution to the problem, with a satisfying “aha” experience.
4. So law of closure, brings comprehension to meaningless arcs and blotches and makes the figures meaningful.



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Insightful Learning: Characteristics

1. Transition from presolution to solution is sudden and complete.
2. When solution to the problem dawns, performance is smooth and without errors.
3. Insightful learning leads to longer retention.
4. The principle gained by insight is easily applied to other problems (transfer of training).

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Insightful Learning

Thorndike	Köhler
Thorndike did not find any insightful learning in animals.	Köhler clearly showed insightful learning in animals.



If essential portions of the apparatus could be seen by the animals, they would have tackled the situation with insight.

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Insightful Learning

Thorndike

Köhler

Thorndike did not think that animals or humans could learn principles (see belongingness and principle of polarity).

Köhler suggested animals learn principles (gestalts) with insightful learning.

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Relational Principle: Transposition

Köhler argued that animals learn principles once insightful learning was achieved. For example chickens (and apes) learnt a relational principle (transposition) when they correctly discriminated between a darker and a lighter colored square.



Phase 1: Training

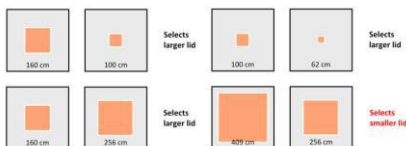


Phase 2: Testing

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Behaviorist's Rebuttal

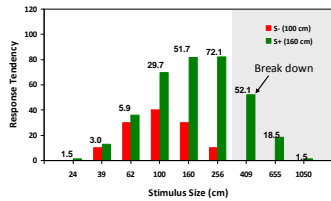
Kenneth Spence (1942) rebutted and experimentally showed that discrimination in animals (chimps) was based on behavioral factors like habit strength, inhibition, and stimulus generalization, and not a relational principle.



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Behaviorist's Rebuttal

Differences between stimulus generalization distributions for larger and smaller lids lead to selection of the larger lid up to a point, after which the smaller lid was selected (Spence, 1942).



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Kurt Koffka

1. Born Mar. 18, 1886 in Berlin, Germany.
2. Earned his PhD under Carl Stumpf 1909.
3. Koffka worked with Wertheimer and Kohler at University of Frankfurt till 1912, but then moved on to University of Giessen (1912-1924).

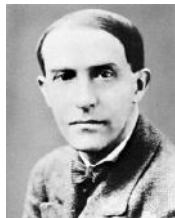


(1886-1941)

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Kurt Koffka

4. When migrated to US he remained at Cornell (1924-25), University of Wisconsin-Madison (1925-27), and eventually to Smith College (1927-41) till his death.
5. Died Nov. 22, 1941, Northampton, Massachusetts.



(1886-1941)

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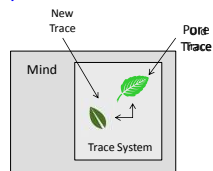
Memory Trace

1. Since brain modifies all incoming sensory information, many think that this arrangement may have little room for making memories.
2. Koffka (1935), attempted to clarify that with a concept of **memory trace**. When an experience terminates its effect remains as a **trace** in the brain and affects future experiences.

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Memory Trace

3. A process (trace) caused by an experience in “pure” form happens only once. Thereafter it each new experience (trace) interacts with an old trace forming a **trace system**.



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Education & Productive Thinking

1. Wertheimer in *Productive Thinking (1945)* used gestalt principles towards education. He contrasted productive thinking from **rote learning**, for latter was without understanding, rigid, easily forgotten, and could be applied in a limited fashion to other situations.
2. When learner uses **problem solving** he learns with understanding using gestalt principles. Learning is flexible, remembered for a long time, and can be applied to various other situations (transfer of training).

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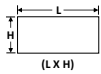
Education & Productive Thinking

3. To generate productive thinking, students should arrange and rearrange the problem in many ways until the solution emerges based on understanding.
4. Wertheimer added that learning with logic or S-R associations would lead to limited learning. He came up with a number of examples to show that.

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Finding Areas

Students can be taught to find areas of rectangles by using algebraic formulas like length X height (L X H). However, when students are given nonstandard figures, such formulas lead to erroneous answers.



Formula does not
Works for
nonstandard figures



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Ready !

The correct way to learn to finding areas is to understand the concept of unit area or a grid. Unit area can then be applied to any standard or nonstandard figure, to calculate its area.



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Ready !

Rote Learning

1 4 9 1 6 2 5 3 6 4 9 6 4 8 1

Write the number

Rule Learning

1 2 3 4 5 6 7 8 9
1 4 9 16 25 36 49 64 81

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Evaluation

Contributions	Criticisms
Criticism of molecular approach of S-R behaviorism.	Explaining learning in terms of meaning and organization were meaningless in the behavioral context.
Brain as a system used to organize sensory experience.	Gestalt psychology never attained mainstream status as a learning theory.
Organizational processes in Gestalt psychology had impact on perception, learning, and psychotherapy.	

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Questions

26. Explain transposition both from the point of view of Gestalt psychologists and behaviorists. Which seems more correct to you?
27. What is law of Prägnanz? What is meant by it being the overriding principle in Gestalt theory?

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