

"How did new theories in physics and psychology in the period from 1900 to the present challenge existing ideas about the individual and society?" (AP question #5, 2001)

New Theories in physics and psychology challenged the existing ideas about the individual and society in many ways. The existing ideas were mainly influenced by Newton in physics, and Locke in psychology. Their theories were accepted and taught in the individual's education. Science was considered to be progress. Before the turn of the century, new technology meant better living standards which meant progress. Locke's ideas of man being rational were thought to be true. At the turn of the century, the physics of Newton were extended by new ideas and theories. The foundation of physics created by Newton became much more complicated. These new theories in physics challenged the individual's former thought of science being progress. Science, before the turn of the century, improved society. Science after the turn of the century caused destruction and death. Weapons became such powerful tools which could destroy mankind. Focus in psychology turned to tension and repressed feelings. The irrational unconsciousness was a new area of interest. The influence of society on human behavior was considered a reason for repressed desires and emotions. Man was no longer rational or an individual. Life was now considered to have no purpose. New theories made what was once certain, now uncertain.

I. Existing Ideas (pre-1900)

A. Physics: Isaac Newton

1. Laws of Inertia and Motion

- i. Any massive object stays in its state of rest unless an external force acts upon it.
- ii. An external force produces acceleration.
- iii. For every action there is an equal and opposite reaction.

2. The atom was thought to be hard, solid, and unstructured.

3. Matter and energy are separate.

B. Psychology: John Locke

1. *Tabula Rasa* ~ "blank slate"

- i. information is gathered by experiences.
2. Men are rational beings.
3. *Systematic Doubt* ~ the questioning of if man's perceptions of an object hold truth or not.

II. New Physics

II. New Physics

A. Pierre and Marie Currie

1. They isolated *Radium*, a radioactive element.

B. Ernest Rutherford

1. Discovered the alpha and the beta rays in radioactive atoms.
 - i. This caused Rutherford to develop his theory of radioactivity.
 - ii. An atom consists of a nucleus containing protons, and the electrons travel in an orbit around the nucleus.

C. Max Planck

1. Demonstrated that energy was emitted or absorbed in specific and discrete units, a quantum, instead of being emitted smoothly as thought before.
2. Proved that energy is not distinguished from matter.

D. Albert Einstein

1. Space and time exist as a combined continuum rather than separately.
2. Theory of Relativity~ time, space, and motion are not absolute.
 - i. events are dependent on the observer.
3. Mass is a form of energy.
 - i. $E=MC^2$ (Energy = Mass multiplied by the Square of Light)

E. Heisenberg

1. Principle of Uncertainty~ It is impossible to establish simultaneously both the position and the velocity of the individual electron.
 - i. this showed that it is a matter of statistical probability rather than a matter of an exact determinable cause and effect.

F. Hahn and Strassman

1. Discovered that the atomic nucleus of the heavy radioactive element Uranium becomes unstable and splits in two when bombarded by neutrons.
 - i. This showed that the energy trapped within the atom can be released.
 - ii. If the atoms in a large amount of uranium are split in a chain reaction, enormous amounts of energy will be released.

G. The Manhattan Project~ the wartime effort to design and build the first nuclear weapons using the new technology from the discovery of fission.

1. The Uranium Committee was created to discuss the possibility of using radioactive materials to create a bomb of extreme power.
2. In 1942 the U.S. Army and General Leslie Groves was given control of the project. They were given almost unlimited powers.
3. Two isotopes were necessary~ uranium-235 and plutonium-239.
4. *Trinity* was the only nuclear test explosion. That was in 1945 in New Mexico.
5. The first uranium bomb was dropped untested on Hiroshima on August 6, 1945.

II. New Physics

A. Pierre and Marie Currie

1. They isolated *Radium*, a radioactive element.

B. Ernest Rutherford

1. Discovered the alpha and the beta rays in radioactive atoms.
 - i. This caused Rutherford to develop his theory of radioactivity.
 - ii. An atom consists of a nucleus containing protons, and the electrons travel in an orbit around the nucleus.

C. Max Planck

1. Demonstrated that energy was emitted or absorbed in specific and discrete units, a quantum, instead of being emitted smoothly as thought before.
2. Proved that energy is not distinguished from matter.

D. Albert Einstein

1. Space and time exist as a combined continuum rather than separately.
2. Theory of Relativity~ time, space, and motion are not absolute.
 - i. events are dependent on the observer.
3. Mass is a form of energy.
 - i. $E=MC^2$ (Energy = Mass multiplied by the Square of Light)

E. Heisenberg

1. Principle of Uncertainty~ It is impossible to establish simultaneously both the position and the velocity of the individual electron.
 - i. this showed that it is a matter of statistical probability rather than a matter of an exact determinable cause and effect.

F. Hahn and Strassman

1. Discovered that the atomic nucleus of the heavy radioactive element Uranium becomes unstable and splits in two when bombarded by neutrons.
 - i. This showed that the energy trapped within the atom can be released.
 - ii. If the atoms in a large amount of uranium are split in a chain reaction, enormous amounts of energy will be released.

G. The Manhattan Project~ the wartime effort to design and build the first nuclear weapons using the new technology from the discovery of fission.

1. The Uranium Committee was created to discuss the possibility of using radioactive materials to create a bomb of extreme power.
2. In 1942 the U.S. Army and General Leslie Groves was given control of the project. They were given almost unlimited powers.
3. Two isotopes were necessary~ uranium-235 and plutonium-239.
4. *Trinity* was the only nuclear test explosion. That was in 1945 in New Mexico.
5. The first uranium bomb was dropped untested on Hiroshima on August 6, 1945.

6. A plutonium bomb was dropped on Nagasaki.
7. The USSR and the USA both detonated the "H" bomb by 1954.
 - i. The "H" bomb was more than 1,000 times greater than the atomic bomb dropped on Hiroshima.
 - ii. The powerful bomb created a fear, because it was realized that the USA and the USSR could destroy all of mankind with their new weapons.

III. New Psychology

A. Sigmund Freud

1. Psychoanalysis

- i. Patients could talk openly and spontaneously about themselves.
- ii. It allowed suppressed experiences to be brought into the conscious.

iii. Freud discovered that sexual matters were significant.

2. Infantile Sexuality~ even in infants sexual energy and drive exists.

3. Dreams allow the unconscious or repressed wishes and desires to play out in the mind.

4. The mind is the location of struggle between the id, superego, and ego.

i. Id~ unethical, primitive instincts, aggression, physical and sensual pleasure, and irrational.

a) Eros~ life

b) thanatos~ death

ii. Superego~ moral expectations of behavior placed on a person by society.

iii. Ego~ the conscious, in between the id and superego: Allows a person to self restrain.

5. Freud stated that repressed emotions are a prerequisite for society. If self restraint were not exercised then society would be in chaos.

6. Human beings are not essentially rational.

7. Freud even questioned childhood innocence by coming up with the theory of infant sexuality.

B. Ivan Pavlov

1. Human behavior can be explained on the basis of conditional responses.

2. Responses are not conscious behavior. They are automatic because they are learned by one's early environment and training.

3. Discovered this theory by ringing a bell when he was going to serve his dogs food. The dogs became conditioned to salivate whenever a bell was rang.

C. Carl Jung

1. The human subconscious contains inherited memories from previous generations.

2. Collective memories along with personal experience of a person constitutes his soul:

D. Gestalt

1. Developed by Kurt Koffka, Wolfgang Kohler, and Max Wertheimer.
2. They stated that the purpose of psychology is to study human thought and behavior as a whole rather than separate it into isolated instances of stimulus and response.
3. The events in the brain have a structural correspondence to psychological events.

E. Behaviorism

1. Developed by John Watson and Burrhus Skinner.
2. This theory explains the behavior of humans and other animals in terms of the physiological responses of the organism to external stimuli.
3. "operant conditioning" learning occurs as a result of the organism responding to its environment.

F. Humanism

1. Developed by Abraham Maslow and Carl Rogers.
2. This theory states that man makes rational conscious decisions regarding their lives.
3. Individuals tend to reach toward their greatest potential.

G. Existentialism

1. Developed by Jean-Paul Sartre.
2. Denied the existence of God and believed that life holds no meaning.
3. Man is not an individual.
4. Existentialists mock the idea of obtaining a fully satisfying and complete life.
5. It is the human condition to desire.

New theories in physics destroyed the certainty and faith that society had in science. It no longer meant progress but destruction also. Before the turn of the century, thoughts towards the individual were influenced by Locke. Man was a rational being. New theories challenged the old ones of man being rational. The individual was now thought to be naturally irrational and complex, full of repressed emotions and pressure from society. Sartre brought in existentialism which caused new ideas of religion and life. Man is not thought to be an individual and everybody is the same. Life has no meaning and God does not exist. The foundation of physics, created by Newton, was questioned and even extended by scientist such as Einstein and Planck. Weapons with unprecedented power were created, such as the nuclear weapons like the ones dropped on Hiroshima and Nagasaki. Freud challenged Locke's ideas of rationality. These new theories led the way for even more discoveries in science and human behavior.

2. Collective memories along with personal experience of a person constitutes his soul.

D. Gestalt

1. Developed by Kurt Koffka, Wolfgang Kohler, and Max Wertheimer.
2. They stated that the purpose of psychology is to study human thought and behavior as a whole rather than separate it into isolated instances of stimulus and response.
3. The events in the brain have a structural correspondence to psychological events.

E. Behaviorism

1. Developed by John Watson and Burrhus Skinner.
2. This theory explains the behavior of humans and other animals in terms of the physiological responses of the organism to external stimuli.
3. "operant conditioning" ~ learning occurs as a result of the organism responding to its environment.

F. Humanism

1. Developed by Abraham Maslow and Carl Rogers.
2. This theory states that man makes rational conscious decisions regarding their lives.
3. Individuals tend to reach toward their greatest potential.

G. Existentialism

1. Developed by Jean-Paul Sartre.
2. Denied the existence of God and believed that life holds no meaning.
3. Man is not an individual.
4. Existentialists mock the idea of obtaining a fully satisfying and complete life.
5. It is the human condition to desire.

New theories in physics destroyed the certainty and faith that society had in science. It no longer meant progress but destruction also. Before the turn of the century, thoughts towards the individual were influenced by Locke. Man was a rational being. New theories challenged the old ones of man being rational. The individual was now thought to be naturally irrational and complex, full of repressed emotions and pressure from society. Sartre brought in existentialism which caused new ideas of religion and life. Man is not thought to be an individual and everybody is the same. Life has no meaning and God does not exist. The foundation of physics, created by Newton, was questioned and even extended by scientist such as Einstein and Planck. Weapons with unprecedented power were created, such as the nuclear weapons like the ones dropped on Hiroshima and Nagasaki. Freud challenged Locke's ideas of rationality. These new theories led the way for even more discoveries in science and human behavior.

Bibliography~

Chase Renick's seminar (AP Question #4 1974)

Chris Sonne's seminar (AP Question #6 1986)

Kagan, Donald and Steven Osment and Frank M. Turner. The Western Heritage, 7th ed. Prentice Hall. New Jersey: 2001.

Merriman, John. A History of the Modern Europe. W.W. Norton & Company, Inc. New York:1996.

Palmer, R.R. and Joel Colton. A History of the Modern World, 7th ed. McGraw-Hill Inc. United States of America: 1992.

Coffin, Judith G. and Robert E. Lerner and Standish Meacham and Robert C. Stacey. Western Civilizations.

Question 1 (1991)

Question 2 (1988)

Question 3 (1985)

Question 4 (1982)

Question 5 (1980)

Question 6 (1978)