

AP® PSYCHOLOGY
2004 SCORING GUIDELINES

Question 2

Time is an important variable in many psychological concepts. Describe a specific example that clearly demonstrates an understanding of each of the following concepts and how it relates to or is affected by time. Use a different example for each concept.

- Critical period
- Fluid intelligence
- Group polarization
- James-Lange theory of emotion
- Presentation of the conditioned stimulus (CS) and unconditioned stimulus (UCS) in classical conditioning
- Refractory period in neural firing
- Sound localization
- Spontaneous recovery

General Considerations

1. The two overriding criteria for scoring each point are to demonstrate understanding of the concept and to relate the concept to time.
2. Because it is difficult to demonstrate understanding of some concepts (for example, the refractory period) with an example, well-phrased descriptions or definitions may be substituted for examples. However:
 - a. if a description and an example *directly contradict* one another, do not score the point.
 - b. if a good example is coupled with a weak or ambiguous description (or vice versa), score the point.
3. Information must be presented in context. That is, it must be clear that the student is discussing a particular point before the point can be awarded.
4. Answers must be presented in sentences, and sentences must be cogent enough for student's meaning to come through. Spelling and grammatical mistakes do not reduce a student's score, but spelling must be close enough so that the reader is convinced of the word.
5. A student will not be penalized for misinformation unless it directly contradicts correct information that would otherwise have scored a point.

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Question 2 (cont'd.)

Point 1: Critical period

The student **must both**:

1. establish the vital nature of critical periods in the developmental process by a description or example of how:
 - a. the selected critical period is *necessary* for healthy development, or
 - b. a disruption of the normal developmental process during the critical period leads to abnormal development, or
 - c. greater sensitivity to outside influences (such as drugs) during the critical period can negatively impact development.
2. identify an appropriate developmental time period to establish the critical period. For example, the time period may be identified as "childhood."

Typical examples:

1. "Baby ducks must imprint and begin to follow their mothers during a critical period shortly after their birth."
2. "Children are predisposed to learn language easily during childhood."
3. "Exposure to teratogens like drugs can interfere with normal prenatal development."

Traps:

1. Do not score the point if the student describes a time period but is missing the critical nature of the development which is to occur during that window ("Children learn language during childhood" does not score).
2. Do not score the point if a concept or theory (e.g., "imprinting," "language acquisition theory") is merely mentioned by name without a description or illustrating example.

Point 2: Fluid intelligence

The student **must both**:

1. include a *dynamic cognitive component* (e.g., reasoning ability, problem solving, flexibility, speedy information processing, etc.) in the example or description of fluid intelligence.
2. establish a time relationship appropriate to fluid intelligence by describing:
 - a. the decline of fluid intelligence over time, or
 - b. how people with greater fluid intelligence require less time to complete cognitive tasks such as problem solving.

Typical examples:

1. "Fluid intelligence, the ability to think and solve problems, decreases as one ages."
2. "People with less fluid intelligence take more time to solve puzzles than people with more fluid intelligence."

Trap: Do not score the point if the student confuses fluid intelligence with crystallized intelligence or general knowledge.

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Question 2 (cont'd.)

Point 3: Group polarization

The student **must** both:

1. establish that group polarization means that a group's predominant view, attitude, or opinion becomes stronger or more extreme. It is important that the student get across the idea of an intensification of a group's opinion rather than a person changing his or her attitude to become more like the group (conformity).
2. demonstrate an understanding that this happens after or as a result of time for group interaction or communication.

Typical examples:

1. "A jury often becomes more convinced of a defendant's guilt or innocence as deliberations continue."
2. "Prejudicial attitudes become more extreme when prejudiced people talk with each other."
3. "Opinions expressed in an Internet discussion group about terrorism become more extreme the longer the group is in existence."

Traps:

1. Do not give credit for answers that focus on other social psychological concepts such as conformity or peer pressure.
2. Do not give credit for the notion of forming two extreme views within a group or a "widening of the gap" phenomenon produced through interaction with others. Group polarization means the whole group moves in the same direction.
3. Do not give credit for a change in *behavior* unless a corresponding change of view, attitude, or opinion is also mentioned.

Point 4: James-Lange theory of emotion

The student **must** demonstrate, through description or example, that emotional experience is a two-step process whereby a physiological or behavioral response precedes the emotion. The student does not need to specify the original stimulus event.

Typical examples:

1. "I'm running from the mean dog, therefore I'm scared."
2. "I'm screaming, so I'm afraid."
3. "I'm crying, I must be sad."

Trap: Do not score the point if the student's answer implies that the physiological and emotional responses are happening simultaneously ("I'm crying and I am sad").

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Question 2 (cont'd.)

Point 5: CS—UCS

The student **must** use classical conditioning terms or an example to establish any one of the following:

1. the CS should come before the UCS, or
2. conditioning is weaker if the CS doesn't come before the UCS, or
3. conditioning is stronger with a short separation between the CS and the UCS, or
4. stronger conditioning occurs with repeated pairings of the CS and the UCS or if the CS and UCS are paired over time.

Typical examples:

1. "In Pavlov's experiment, the bell comes before the meat."
2. "Classical conditioning works best when the CS occurs shortly before the UCS."

Traps:

1. Do not score the point if a student uses the terms incorrectly in his or her example (e.g., do not score "In Pavlov's experiment, the UCS, a bell, is presented before the CS, food.")
2. Saying that the CS and UCS are "associated," "paired," or "correlated" does not establish that the CS comes before the UCS.

Point 6: Refractory period

The student must establish that it takes time before a neuron can ready itself to generate a second action potential ("fire again"). Note that:

1. if a student says the cell is "at rest" or "resting," he or she must differentiate between this rest and the cell's resting potential by noting that, during the refractory period, the cell is recharging, recovering, or unable to fire.
2. a student may use an analogy (e.g., "a neuron is like a camera flash" or "a neuron is like a toilet") to establish the point if the student establishes the notion of recharging.

Typical examples:

1. "The refractory period is the time it takes for a neuron to repolarize so it can fire again."
2. "A refractory period is like the time when a camera flash is recharging so it can be used again."

Trap: Do not score "The refractory period is when the neuron is at rest" because it does not establish the idea that the cell is readying to fire again.

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Question 2 (cont'd.)

Point 7: Sound localization

The student **must** both:

1. establish that sound localization requires input from both ears.
2. indicate that sound localization is possible because the sound waves reach the nearer ear before or in less time than they reach the more distant ear.

Typical examples:

1. "A sound to your left reaches your left ear slightly before it reaches your right ear, allowing us to determine the location of the sound."
2. "It is difficult to pinpoint a sound coming from directly in front or directly behind you because it reaches both ears at the same time."

Traps:

1. Do not score the point if the student refers to intensity or distance of a sound without noting the importance of a two-ear or binaural difference.
2. Do not score the point if the student refers to two ears without establishing the importance of a time differential.

Point 8: Spontaneous recovery

The student **must** establish both:

1. Reference to extinction, partial extinction, or the diminishing/decreasing of a response.
2. The recurrence of the response after a rest period. Do not score the point if the student is clearly confused about the stimulus that leads to the recovered response.

Typical examples:

1. "If Pavlov's dog's response to the bell was extinguished, it might return after a period of time passed."
2. "A pigeon in a Skinner box would stop pecking if it no longer received food. However, the next time it was placed in the box, it would begin pecking."

Trap:

1. Do not score the point if the student discusses reconditioning. ("The dog responded when Pavlov gave food again" or "the pigeon began pecking when the food reward was resumed.")
2. Do not score the point unless the student clearly establishes a rest period. "The response recurs later" does not score, but "the response comes back after a rest period" or "the response comes back the next day" are acceptable.

AP[®] PSYCHOLOGY
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Question 2

Sample: 2A

Score: 2

- Point 1: Scores because a time relationship is established when the student describes child development and then refers to a concept that is relevant for the notion of critical period.
- Point 2: Does not score because the student does not mention fluid intelligence in the essay.
- Point 3: Does not score because the explanation of group polarization refers to individual change, not group change.
- Point 4: Does not score because the student does not adequately explain the concept of James-Lange clearly enough to demonstrate knowledge of the connection between physiological response and emotional response.
- Point 5: Scores because the student describes clearly the importance of time in the development of a CS/UCS situation.
- Point 6: Does not score because the student does not mention the concept of refractory period.
- Point 7: Does not score because the student does not mention the concept of sound localization.
- Point 8: Does not score because the student does not describe the concept of spontaneous recovery from the point of view of conditioning.

Sample: 2B

Score: 8

- Point 1: Scores because the student indicates a time frame and the idea that if it doesn't occur during that time, there are consequences.
- Point 2: Scores because the student describes fluid intelligence as processing speed and then describes the influence of age on that process.
- Point 3: Scores because the student describes group polarization by using the example of a view that is held by the group being strengthened over time.
- Point 4: Scores when the student describes the correct order of stimulus, response, emotion.
- Point 5: Scores because the student accurately describes an appropriate CS/UCS pairing and describes repeated exposures (time) as a feature in that relationship.
- Point 6: Scores when the student describes a time during which the neuron cannot fire and relates it to the refractory period in human sexuality.
- Point 7: Scores when the student describes the timing differences that act as cues to localize sound in space.
- Point 8: Scores when the student accurately describes classical conditioning, extinction, and then recovery.

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Question 2 (cont'd.)

Sample: 2C

Score: 5

- Point 1: Scores because the student establishes both a time period (childhood) and a function that needs to happen during that period (language development).
- Point 2: Scores because the student describes problem solving and then a change in ability due to age.
- Point 3: Does not score because group polarization is not described appropriately. The student is describing groupthink.
- Point 4: Scores because the student describes a behavior, physiological response, and then an emotion.
- Point 5: Scores because the student describes the appropriate order of CS/UCS and relates that to the importance of time in the development of that concept.
- Point 6: Scores because the student describes a time during which a neuron is unable to fire as the K⁺ needs to "build back up" in order to fire again.
- Point 7: Does not score because the student describes a non-binaural cue to determine location.
- Point 8: Does not score because the student is referring to the concept of relearning rather than spontaneous recovery.

Time is an important variable in numerous psychological concepts. In the concept of critical period, time is the crucial factor. There is a crucial amount of time that an event can take place, defining a critical period. In a child's development, for example, language is learned during a critical period, when ~~however~~ a child's brain is most receptive to language acquisition. If the language is not learned in that critical period of time, language will be extremely difficult for the child to obtain.

~~A~~ Group polarization is affected by time. People have a tendency to be pulled to the ~~same~~ side of the group that is in the majority. If a person feels torn between his own beliefs and the group's beliefs, he may be more inclined to move to the group's beliefs because of the factor of time. The individual experiences pressure to decide ~~on~~ on a belief as seconds and minutes tick away, so the pressure of time helps the group polarization effect to work.

In classical conditioning, the unconditioned stimulus must be presented less than one second after the conditioned stimulus in order for it to be effective.

Write in the box the number of the question you are answering on this page as it is designated in the examination.

In spontaneous recovery, a period of time must pass in order for spontaneous recovery to be made evident. During spontaneous recovery, a person suddenly brings back to conscious awareness memory from a distant experience, several months or years in the past.

In the James Lange Theory of emotion, a person's emotions cause a behavior. If the concept of time were not present, this theory would be null.

The critical period is a time interval in development when certain information or behaviors may be acquired ($\frac{1}{2}$ only in that certain time frame). For example, Konrad Lorenz studied birds and found that imprinting occurs within the first few minutes ~~after~~ ^{after} birth. This shows the necessity of time. It is important to study this topic to understand the nature of some of our developments.

Fluid intelligence is the mind's knowledge of speed $\frac{1}{2}$ quick information and our ability to process it. My grandma has problems reading new books and learning new languages because Fluid intelligence decreases as we age. This shows the importance of time relating to intelligence. It is necessary to gain knowledge early in life and later accept our decrease in "speedy" intelligence.

Group polarization is the tendency for ^{a group} ~~for~~ when left without a mediator, to go to extremes on discussions or arguments. I am against the death penalty. I meet with 5 others who agree w/ me and we discuss the issue. After 3 hours we are done $\frac{1}{2}$ I am even more (much

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more) pro-life. It is important to note that we had time enough to discuss and to go to ~~the~~ extremes of our opinions.

James-Lange theory of emotion is the theory that first our body is ~~physically~~ physically aroused and then we feel our "emotion". I am driving when a deer jumps into my lane. My hands sweat and my parasympathetic nervous system goes into overdrive. Then I say to myself, "Ah! I'm scared! Frightened!..." Time is essential because we must ~~have~~ be aroused for a short period of time before we ~~can~~ realize our "emotion".

~~Classical~~ Classical conditioning is a type of learning which involves the association of 2 stimuli. ~~For~~ For example, I originally ~~drooled~~ ~~ate~~ would drool whenever I ~~ate~~ ate veggie pot pie for school lunch. After repeated pairings of seeing the lunch lady first and then ~~the~~ eating the veggie pot pie, I began drooling whenever I saw the lunch lady. However, once I went to a new school, I would visit the lunch lady, but eat no pot pie.
After time, I would no longer drool at the sight of

Mrs. J. This is why a conditioned stimulus (seeing the lunch lady) must be followed by an UCS (eating the veggie pot pie). If not, over time, the CR (response) (doodling when I see Mrs. J) may go extinct.

Refractory period in neural firing is the ~~the~~ time interval in which no neurons may be ~~depolarized~~ ~~depolarized~~ depolarized. This ~~is~~ is important in measuring the amount of time which must be left in between firing. This can be seen in research by Johnson & Master about the 4 stages of sexual arousal (excitement, plateau, orgasm, & resolution). During the resolution period, the male goes into a refractory period.

Sound localization is our ability to find the direction of sound by recognizing the amplitude of the waves. For example, Dr. ~~Freud~~ ^{Sigmund} ~~Freud~~ Jr. (my therapist) ~~is sitting at the desk~~ has me lay in a chair while he speaks to me. Though I cannot see him, by the ~~an~~ intensity of his voice, I can determine if he is on my left or my right. Time is necessary to be able to differentiate between my 2 ears. The wavelengths reach my rt. ear faster and so

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I know he is scared on my rt.

Spontaneous recovery once again deals with Ivan Pavlov's classical conditioning. After a conditioned R has gone extinct, ~~it~~ ~~it~~ it may suddenly reappear so time later. My eyes water when I cut onions, soon my eyes water at the sight of the knife. After some time, however, this association disappears. 2 years later I happen to see a knife ~~when~~ ^{when my} friend is cutting onions. My eyes water once again. Time is crucial because only a certain amount of time may pass between extinction & recovery.

The Critical period is a time period in a child's development that is essential for developing language, theorizes Noam Chomsky. If a child is neglected during or misses this period, he/she would lack in language acquisition. A child who is undernourished during the critical period would not acquire language and struggle the rest of their life. Fluid intelligence refers to the ability to change techniques ~~in~~ in changing situations in problem solving. This ability decreases over time. A 90 year old man who could easily solve long problems when he was younger will take longer to solve similar problems now. Group Polarization ~~is~~, along with Janus's Groupthink, refers to the tendency of groups to make extreme choices. ~~They~~ They limit their choices and spend little time evaluating them, and often go to extremes. A group of kids looking for fun will spend little time evaluating the effects of the choice to vandalize property, and will do it irrationally. The James-Lange theory ~~refers~~ refers to the idea that ~~the~~ the body undergoes a physiological change which is later labeled as an emotion. A man who hears a loud bang would undergo epinephrine release and fight-or-flight, then after a little time would label the emotion as "scared." The presentation of the CS should come ~~at the same time as the~~ ^{at} the same time as the UCS. The association will be weakened if an extended amount of time happens between the CS & UCS in Pavlov's Classical Conditioning. The refractory period in a neural firing is a necessary ~~period~~ period of time for K^+ and Na^+ ions to build

back up in a neuron before another action potential can occur.

→ A dog receiving food should hear the tone of the bell at the same time as being presented food for the best association to occur.

Sound localization is seen when a person can hear a sound and based on the amount of time it took them to hear it, judge where it came from. A man in ~~the~~ can hear thunder and from the amount of time it took him to hear it, judge how far away a storm is.

Spontaneous recovery happens instantly after a number of years of extinction. A CR will occur instantly when a person is met with a CS and UCS, like a man who heard toilets flushing every time before a feeling scalding water in his shower at college, forgetting the response after college but having it immediately return to him upon moving to a house in which toilets can be heard while he showers and feels scalding water.