AP® PSYCHOLOGY
2002 SCORING GUIDELINES

Question 1

The human organism displays various reactions that are characterized by opposing tendencies. Use a specific physiological or psychological mechanism to explain how both aspects of opposing processes apply to EACH of the following.

- Appetite
- Autonomic nervous system
- Color vision
- Drug use
- Nerve firing

Scoring Rubric

Several points can be earned by multiple pathways, as indicated by lettered, numbered, or bulleted lists under the appropriate point. Lists of pathways represent the most common ways for students to score the point, and only one such pathway must be followed to earn the point. Answers must be presented in sentences, and sentences must be cogent enough for the 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 in question.

Appetite

Point 1. The student establishes how *opposing processes* relate to appetite by at least implying a *regulated tension* between

A. The two opposing factors of hunger (accept alternative descriptions like "being empty" or "start eating") and satiety (accept alternative descriptions like "fullness," "satisfied," or "stop eating"). Do <u>not</u> score single continuum responses like less hungry/ hungry or not hungry/hungry.
B. Two parts of the hypothalamus (the unabbreviated word "hypothalamus" must be used, but the parts may be unidentified or misidentified). The mention of the two parts is enough to score the point with no further explanation.
C. Weight moving away from and being drawn back to a set point.
D. Metabolic rate increasing and decreasing in response to physiological conditions.
E. Being hungry or not hungry—*only in the context of drive reduction theory* or the use of language that clearly implies drive reduction theory, like "reducing a drive."
F. The level of glucose, insulin, leptin, CCK or other appropriate chemicals rising or falling in relation to changing levels of appetite or hunger.

Do <u>not</u> award the point if a student provides *voluntary* eating choices a person might engage in (for example, a depressed person might choose to starve or overindulge).

Question 1 (cont'd.)

Point 2. The student identifies a specific mechanism for regulating the opposing tendencies. *Point 2 cannot be awarded unless the opposing process is established and Point 1 is awarded.* Appropriate mechanisms include:

A. The role of the brain. The general phrase "The brain controls appetite" is sufficient if Point 1 has been awarded, but do not score the point if the student refers to clearly inappropriate regions of the brain (for example, the cerebellum or the cortex). The point should be awarded if the student makes mistakes in regard to the hypothalamus (for example, the "preventricular nucleus of the hypothalamus").
B. Set point/metabolism.
C. Homeostasis or negative feedback system.
D. Drive reduction theory.
E. Glucose, insulin, leptin, CCK, or other endogenous chemicals related to appetite or hunger.

Do not award the point for stomach contractions.

Autonomic Nervous System

For these two points, the student must understand that the sympathetic nervous system arouses and the parasympathetic nervous system calms. This can be established with parallel essay structure (for example, "The autonomic nervous system has sympathetic and parasympathetic divisions which are responsible for arousing and calming).

Point 3. Sympathetic nervous system—term *and* some example or description required.

A. Arouses.
B. Fight or flight.

Point 4. Parasympathetic nervous system—term *and* some example or description required.

A. Calms.
B. Counteracts the effect of the sympathetic nervous system.
C. Returns the body to normal.

Color Vision

Point 5. Term "opponent process theory" *or* "opponent color theory" (not "opposing process," because it is a phrase that parrots the question) *or* "Hering's theory."

Point 6. Explanation *or* example that establishes opposition.

A. Cells oppose each other for particular colors.
B. Reference to color pairings (even if specific colors pairs are not mentioned or are wrong).
C. Color afterimages as an example to establish the negative, opposing, complementary, or different color nature of the afterimage (even if the specific color pairs are wrong).
D. Color blindness as an example of the opposing or complementary aspect of color deficiencies (even if specific color pairs are wrong).

Do not award the point for rods and cones.

Question 1 (cont'd.)

Drug Use

Point 7

A. The student refers to tolerance or withdrawal without describing an opposing or compensatory mechanism. Do not accept "addiction" or "dependence" here, because they are less precise psychological terms.
B. The student indicates that a drug (an outside, ingested agent rather than an endogenous chemical such as a neurotransmitter) produces a response. Do not score the point if the student:
   - Makes a value judgment or describes a general consequence (for example, "drug use is harmful") rather than describing a drug response.
   - Describes a cause of taking drugs rather than an effect (for example, "I take drugs because of peer pressure").

Point 8. The student *describes* or *explains* how an initial drug process triggers an opposing or compensatory consequence. This can be done by

A. Defining
   - Tolerance (needing more of a drug over time to achieve the same effect).
   - Withdrawal (getting sick or developing symptoms when a drug is discontinued).
   - Addiction/dependence (developing a need for a drug).
B. Describing how the body produces an opponent response to drugs (for example, "the body compensates for a euphoria-producing drug by attempting to bring you back down [dysphoria]").
C. Explaining how a person may counter the effect of one drug by taking a drug with an opposite effect (for example, "a person can take caffeine to counteract the effects of barbiturates").

Nerve Firing

Point 9. The student *explains*

A. How a neuron fires through a process of depolarization, an inrush of ions, *or* an action potential. There may be some confusion of language (for example, by mixing the terms polarization and depolarization or by having the wrong charge on a particular ion) but as long as the *process* of a neuron firing is described in some way, award the point. Do not score for "firing" alone because it parrots language in the question.
B. The effect of excitatory neurotransmitters (accept "messages" or "signals") across the synapse *or* the release of neurotransmitters from the presynaptic neuron.

Point 10. The student *explains*

A. A neuron's response to firing through polarization (or repolarization), ions being pumped out, establishment of a resting potential, *or* refraction (or refractory period).
B. The effect of inhibitory neurotransmitters or reuptake at the synapse.

Do not award the point for the all-or-none principle.

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pg 1

YY

Opposing tendencies relating to appetite can be associated with the lateral ^medial nucleus and the ventro-medial nucleus. The lateral ^medial nucleus tells the brain that it is time to begin eating. It is the "start eating" control pad. If it is removed ~~animals~~ rats will hardly eat at all. On the other hand the ventromedial nucleus tells the brain to give "stop eating" orders and thus suppress a person's appetite. If this nucleus is removed a rat will eat continously, even if it has ~~already eaten~~. recently eaten.

The autonomic nervous system has opposing tendencies known as the sympathetic and ~~paras~~ parasympathetic systems. The sympathetic system is activated in times of stress. It increases respiration and sweating. It prepares the body for a "fight-or-flight" response. The parasympathetic system ~~rest~~ returns the body to ~~a state of~~ homeostasis after a time of stress. It allows digestion, heart rate, and other physiological processes to return to normal functioning.

The opponent-color processing theory says that there are 3 groups of opposing colors. This theory explains the phenomenon of afterimages. Colors are paired together such as red and green. After looking at a red spot on a page for 60 seconds, you will see green if you stare at a ~~whit~~ blank sheet of paper. Blue & yellow are

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2002 SCORING COMMENTARY

Question 1

Sample YY: Score High
All 10 points

point 1: "'start eating' . . .'stop eating'"
point 2: "brain to give 'stop eating' orders"
point 3: "sympathetic system is activated in times of stress. It increases respiration and sweating."
point 4: "parasympathetic system returns the body to homeostasis"
point 5: "opponent-color processing theory"
point 6: "colors are paired together such as red and green"
point 7: "a person using drugs initially will feel high"
point 8: "continues the drug use, the initial high gets weaker and weaker the negative feelings get stronger"
point 9: "when sodium ions are let in through the gates, the neuron becomes more positive and depolarizes"
point 10: "the gates are opened again allowing sodium ions to flow out of the cell making it slightly negative again"

Sample XX: Score Medium
Points 3, 4, 7, 8

point 1: insufficient information to score
point 2: cannot score without point 1
point 3: "sympathetic . . . heart rate increases"
point 4: "parasympathetic shuts this all down and heart rate decreases"
point 5: opponent process theory not mentioned
point 6: insufficient information to score
point 7: "tolerance"
point 8: a weak, but acceptable, definition of dependency is found: "body knows that the substance is bad for it, but it needs it anyway"
point 9: all-or-nothing does not score
point 10: insufficient information to score

Sample ZZ: Score Low
Points 7, 8

point 1: insufficient information to score
point 2: insufficient information to score
point 3: does not mention sympathetic
point 4: does not mention parasympathetic
point 5: does not mention opponent process theory
point 6: rod-cone discussion does not establish opponent process
point 7: "a stimulant causes a euphoric high"
point 8: "when the drug wears off . . . the individual feels a low and a craving"
point 9: insufficient information to score
point 10: insufficient information to score

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opposing colors as well as black and white. ~~According to this theory you can not see both pairs of colors at the same time.~~

An opposing tendency explanation for drug use can be found in a theory of motivation. This theory assumes that for every thrilling action that occurs an immediate counter action follows. A person using drugs initially will feel a high but that will be followed by a stronger counter action, the ~~sympot~~ symptoms of withdrawel. As the person continues the drug use, the initial high gets weaker and weaker while the negative feeling gets stronger and stronger. This leads to an addiction as the user wants to attain their greatest high, but this will never happen because the negative opposing feeling is actually becoming stronger, every time they use the drug

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P93 YY

Nerve firing displays opposing tendencies when an action potential occurs. A neuron has a slightly negative polarization. When Sodium ions are let in through the gates, the neuron becomes more ~~positive~~ positive and depolarizes. This causes an action potential which is an all-or-none phenomenon. The neuron either fires or it does not. If the neuron fires the gates are opened again allowing sodium ions to flow out of the cell making it slightly negative again. There is a brief resting between firings, called a refractory period. Then the first stage of the opposing tendencies can occur again.

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XX

The human organism displays various reactions that are characterized by opposing tendencies. One of these opposing ~~te~~processes is seen through the autonomic nervous system. The autonomic nervous system is made up of the sympathetic and the parasympathetic. The sympathetic ~~is~~ nervous system is in response to intense stimuli. Heart rate ~~increases~~, pupils get ~~smaller~~ larger, more adrenilin is produced and pumped through the body. To counteract the parasympathetic shuts this all down and the heart rate decreases, ~~eyes~~ pupils ~~re~~ become smaller & adrenalin is decreased.

Drug use also shows opposing processes in that ~~the~~ body knows that the substance is bad for it, but it needs it anyway. The body develops a tolerence and an addiction to the drug which later could cause medical damage. Also people know the dangers and adverse side effects, but want to continue using the drug, some for social resons, some ~~for~~ for physiological reasons.

Color vision uses opposite receptors in that it uses both rods and cones to recept the black and white parts and the color components. Rods recept the black & white while cones recept the color to relay them to the occipital lobe of the brain to be processed.

Nerve firing involves the principle of "all or nothing." Either the action potential is

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XY

completely fired or none of it is fired. None is fired during the recovery stage directly after a firing. Terminal buttons fire neurons across the synaptic gap to be recieved by the dendrites.

Appetite involves opposite tendancies in regulating hunger. The hypothalamus, which regulates hunger can be triggered by the sight, mention or smell of food even if the person isn't "hungry". Appetite is not necessarily based on a need for nutrients, although most of the time it is.

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PS1

(1) Opposing tendencies present in appetite reactions occur during the psychological disorder of bulimia. The craving of food causes a binge on food, the opposing mechanism then follows, Instead of digesting the nutrients the hunger in the body craves for, the individual purges and thus, no nutrients can be taken in. The opposite ~~The autonomic nervous system has opposing tendencies because~~ tendency is ~~bulimia~~ obesity. An individual has food craving when the body does not need nutrients but the individual eats the food anyway, ~~an unnecessary amount.~~

The autonomic nervous system works to respond to the brains commands in the cerebellum ~~however~~, ~~sometimes~~ the system responds to increased threat with the Fight or Flight response. A tendency used to protect the individual. The opposite mechanism is when the autonomic nervous system shuts down or freezes up during a threatening situation.

Rods help ~~color~~ vision in black and white and they are mostly on the outside of the retina. They help in peripheral vision. Cones are the opposite physiological tendancy as they are in the center of the

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ication.

Drug use trigger opposing mechanisms as, for instance, a stimulant causes a euphoric high and increased heart rate. The opposing tendency being when the drug wears off, the body slows down to a depressed state ~~until~~ and the individual feels a low and a craving for the high again. The withdrawl is the opposite tendency to the high felt during drug use.

Nerve firing occurs when a stimulus is felt and the brain interprets it, a bottom-up type processing. Bottom up processing ~~is~~ is the natural tendency of the body. The opposing tendency is when a limb is severed, but the individual still feels it. The phantom feelings of top down processing. This is the opposite because ~~while~~ while the ~~body doesn't~~ nerves don't feel the stimulus, the brain still interprets it anyway.