

CHAPTER 4

EVOLUTION AND BEHAVIOR

TERMS AND PRINCIPLES

Natural selection
Theory of Evolution by Natural Selection
Purposivism
Habituation
Basic stimulus control
Feedback stimulus control
Proprioceptive stimuli

STUDY OBJECTIVES

1. What is the danger of passive life?
 - A. The muscles of passive creatures grow weak.
 - B. They will get sick and die if they eat too much.
 - C. They reproduce too much and get crowded.
 - D. They'll die if there isn't food nearby, since they don't move on their own.
 - E. They move so fast that they may slide right by good food.
2. What is an example of passive life?
 - A. Three-toed sloths.
 - B. North American wart hogs.
 - C. Amoeba.
 - D. Bacteria.
 - E. Ants.
3. In what way do passive students act like a passive bacterium?
 - A. They move so fast that they slide past information.
 - B. They think too much instead of moving.
 - C. They don't seek out the correct information.
 - D. They mate too much, and get crowded.
 - E. They don't pay attention to their teachers.

4. What do passive students fail to get? How does this affect the students' chances to succeed in college?
- Food. This makes survival less likely.
 - Information. This makes survival less likely.
 - Dope. This makes survival less likely.
 - Books. This increases the chances for survival.
 - Assignments. Not getting assignments makes survival more likely.
5. What are two types of actions that help very simple creatures get food?
- Thinking and planning how to get food.
 - Going to the supermarket and planning menus.
 - Deciding on, and desiring certain types of food.
 - Tasting and smelling food.
 - Moving and holding food.
6. What's a real example of fairly simple, active life?
- Polar bears.
 - Bacteria.
 - Frogs.
 - Panda bears.
 - Amoebas.
7. In what two ways might active students behave like the active amoeba?
- They move and they grab food.
 - They seek information and hold onto it.
 - They keep a wary eye on each other's lunch bag, and watch their own as well.
 - They pass folded notes in class and giggle a lot.
 - None of the above.
8. Does the behavior of active students increase their chances to survive?
- Yes.
 - No.
9. Review: What is a mutation?
- A change in the structure of a creature that may be inherited by offspring.
 - A feature of a creature that may be inherited by the offspring.
 - A change in a creature's actions.
 - A change in a creature's looks due to aging.
 - When a creature passes on what it has learned to its offspring.
10. What are two ways a mutation occurs?
- A creature either passes on its learning to offspring, or the offspring learn from another source.
 - By chance or by will of the creature.
 - By learning or by heredity.
 - Through purposivism or by teleology;
 - An area around a parent may change either during its lifetime, or at the birth of offspring, which may cause a change in the offspring.
11. Does a mutation help the offspring survive most of the time?
- Yes.
 - No.
12. Define natural selection.
- Choosing a spouse based on his/her natural talents.
 - Choosing something based on your first, most natural impression.
 - When some new features of a creature help it survive in the world of nature.
 - When a creature survives because it looks into the face of danger, and laughs.
 - Choosing something in an unbiased way.
13. Which of the following is an (are) example(s) of the forces of nature: 1) selecting out creatures that mutated a good feature; and 2) rejecting others that mutated a poor feature?
- Long-necked giraffes surviving because they could reach high tree leaves. And short-necked ones starving because they couldn't.
 - Leaping toads surviving because they could get away from harm. And non-leaping toads not surviving because they couldn't.
 - Ants surviving because they don't need much fuel. And dinosaurs dying out because they needed too much.
 - A & C.
 - A, B, & C.
14. Does evolution by natural selection tend to produce creatures best designed for their world?
- Yes.
 - No.
15. Why did Blacks evolve sickle cell anemia in West Africa; and why are they losing it in America?
- Because Blacks decided they didn't need it when they first came to America.
 - In West Africa, sickle cell anemia gave people better eyesight at night, making it

- more likely that they could get away from wild creatures.
- C. The air in West Africa is very humid, and people with sickle cell anemia are able to get the oxygen out of humid air better, making it more likely for them to survive.
- D. Sickle cell anemia makes people immune to sleeping sickness caused by West African flies, flies which don't exist in America.
- E. Sickle cell anemia allows people to tolerate the heat and survive in West Africa; but such intense heat is not present in America.
16. Which of the following is a case of natural selection affecting the way people perform in college?
- A. People with glasses doing better in college than people without them.
- B. Hard-working people doing well in college, and people who don't work hard doing poorly.
- C. People who have scholarships doing well in college and people who don't doing poorly.
- D. A & B.
- E. B & C.
17. How might natural selection of people who do well in college result in the evolution of more students who perform well?
- A. People with bad eyesight passing this feature on to their offspring.
- B. The lowering of standards in college courses.
- C. College teachers becoming more and more softhearted when it comes to grading students.
- D. The brains of hard-working students mutate while they are in college, they pass this mutation on to their offspring; and the brains of the offspring direct them to work hard in college.
- E. Hardworking students in college teach their offspring to work hard, so when the offspring go to college, they also perform as well as their parents.
18. Define purposivism.
- A. Thinking that our acts are caused.
- B. The notion that events are caused.
- C. The idea that evolution occurs through natural selection.
- D. Thinking that there is no reason for events that occur.
- E. The notion that events have purposes that cause them to occur.
19. Which of the following is a statement about evolution that is an example of purposivism?
- A. Evolution occurs through natural selection.
- B. Creatures evolve because those with good features survive.
- C. Saying that evolution has a cause.
- D. Saying that evolution is related to survival.
- E. Creatures evolve in order to make their species better.
20. Which of the following statements is a better way to talk about causes than an appeal to purpose?
- A. The reason events happen is because of causes in the future.
- B. Creature's act to attain goals.
- C. Causes of events occur before the events.
- D. Nature is guided by purpose to a known end, the perfect state.
- E. Events are caused by the results of those events.
21. What two classes of events cause creatures to move?
- A. Motives and purposes.
- B. Desires and feelings.
- C. Lack of fuel and harmful conditions.
- D. Lack of harmful conditions and fuel.
- E. Causes and reactions.
22. How does motion help the creature survive when it's in a harmful condition or running low on fuel?
- A. Its chances of getting out of trouble or finding fuel are greater.
- B. Most creatures can absorb the energy of their own motion, and grow stronger under such conditions.
- C. It doesn't. Motion doesn't help survival because all it does is use up fuel.
- D. The creature can use its motion to get what it wants.
- E. None of the above.

23. Why would a creature that was always in motion be less likely to survive?
- It would waste fuel, and might not get enough fuel to survive.
 - It would get too much fuel and burst.
 - The creature would not get away from harmful states.
 - The creature would not be exposed to harmful states often enough.
 - It would not be happy enough to want to survive.
24. Which of the following is an (are) example(s) of the two basic causes of motion affecting human action?
- People who sit down in easy chairs after dinner and watch TV.
 - People who like math, and solve many math problems.
 - People who run out of burning buildings.
 - A & B.
 - A & C.
25. Which of the following is a case where people don't take action even though a harmful event may be on its way?
- People who take naps in a hammock.
 - People who speed up their cars when they see the police after them, in the rearview mirror.
 - People who keep on taking a nap in their house when the house has caught on fire.
 - A & B.
 - B & C.
26. Define habituation.
- Increased response to a state of affairs due to prolonged exposure to that state.
 - Decreased response due to lack of fuel for a long period of time.
 - Getting used to doing something after doing it for a long time.
 - Losing interest in doing something that was once rewarding.
 - Decreased response to a state of affairs due to prolonged exposure to that state.
27. How can habituation help a creature survive?
- It lessens stress and anxiety caused by harmful states.
 - By getting out of harmful states of affairs.
 - The creature will not run out of fuel in harmful states.
 - By helping creatures find more food.
 - It makes creatures more aggressive.
28. Which of the following is an instance of habituation to pain?
- Someone who stops moving after waking up in traction, in the hospital, after an auto crash.
 - Criminals who keep on running away from the police even though they've been shot.
 - No longer being distracted by a loud stereo after letting it bother you for a while.
 - Seeing better in a dark room after being there a while.
 - B & C.
29. Which of the following is an instance of human habituation to distraction?
- The pain from a sprained ankle going away after a few days.
 - Not noticing an oncoming train while walking on the railroad tracks for the first time in your life.
 - Not noticing that your mouth is burning after drinking a cup of coffee that was too hot.
 - Trying to start your car over and over again on a cold morning, not giving up despite repeated failure.
 - Being able to study in the presence of a blaring stereo.
30. State the two basic ways stimulus control differs from the basic causes of motion.
- 1) Basic stimulus control causes the creature to move, but the causes of motion don't. 2) Basic stimulus control doesn't control the form or path of a response, but the causes of motion do.
 - 1) Basic stimulus control affects the course of motion, but the causes of motion don't. 2) Basic stimulus control doesn't cause the creature to move, but the causes of motion do.
 - 1) Basic stimulus control affects sex acts only, but the causes of motion affect all acts. 2) Basic stimulus control is related to survival, but the causes of motion aren't.
 - 1) Basic stimulus control is purposive, but the basic causes of motion aren't. 2) Basic stimulus control is due to intentions, but the basic causes of motion aren't.
 - B & C.
31. Which of the following is an (are) example(s) of basic stimulus control which help creatures survive?
- Creatures who go toward warm places

- when they lack fuel, and fuel is in warm places.
- B. Creatures who go toward cold places when it's so hot that it's harmful.
- C. Creatures whose rate of motion goes up when they lack fuel or are in a harmful state.
- D. A & C.
- E. A & B.
32. Define basic stimulus control.
- A. Control of a response by reward.
- B. When a stimulus controls increases or decreases in a creature's motion.
- C. Control of the form or path of a response by a stimulus.
- D. When a harmful stimulus increases a creature's motion.
- E. Control of the speed of a response by a stimulus.
33. Which of the following is a case of feedback stimulus control?
- A. A creature whose path of motion is changed by a strong gust of wind.
- B. Creatures whose path of motion is changed by a tidal wave.
- C. Creatures whose rate of motion goes up when they lack fuel.
- D. A creature who bumps into a log, and then goes off on a new path.
- E. A creature who runs into a rock, and keeps running into it on the same path of motion.
34. Define feedback stimulus control.
- A. A stimulus resulting from a response that changes the form or path of the next response.
- B. Control of the form or path of a response by a stimulus.
- C. A stimulus resulting from a response that keeps the form or path of the response the same.
- D. When increases in a response are controlled by lack of fuel.
- E. A type of motion controlled by stimuli from harmful states.
35. What creatures have feedback stimulus control?
- A. Only amoebas.
- B. Animals with big brains.
- C. Almost all of them are passive life creatures.
- D. All moving creatures that have survived.
- E. Only those that have highly evolved nervous systems.
36. What would happen to a moving creature not controlled by feedback stimulus control?
- A. It would have to think its way out of tough problems.
- B. It would get too much food.
- C. It would reproduce a great deal.
- D. It wouldn't survive.
- E. Such a creature would become aggressive much of the time.
37. Which of the following is an (are) example(s) of feedback stimulus control in college?
- A. Students who run to eat lunch when they didn't have breakfast.
- B. Students who work harder in a class after getting a poor grade on the first test.
- C. Students who ignore teacher comments on their papers.
- D. A & B.
- E. B & C.
38. Which of the following is an instance of people using feedback stimulus control?
- A. People who keep bumping their heads on a low ceiling over and over again.
- B. People who do better and better on essay tests because they ignore the teacher's comments on their papers.
- C. People who take the keys out of their car after having it stolen when they left the keys in.
- D. People who keep getting sick over and over again from drinking too much.
- E. All of the above.
39. Are people who use feedback stimulus control more likely to survive than people who don't? Why?
- A. Yes. When acts are guided by past feedback, people act in ways more helpful to themselves.
- B. Yes. Since feedback stimulus control doesn't change actions, it helps survival.
- C. No. Feedback stimulus control doesn't change wrong acts, so it doesn't help survival.
- D. No. People who use feedback stimulus control aren't mentally healthy.
- E. No. Studies show that people who don't use feedback stimulus control live longer than those who do.

40. Which of the following is an (are) area(s) where feedback will help you survive?
- Being a student in college.
 - Working at a job.
 - Teaching in college.
 - A, B, & C.
 - None of the above.
41. Which of the following are sources or types of feedback useful for a business manager?
- A chart showing the number of products made by a plant.
 - A graph showing the expenses of a company.
 - A talk with workers about production problems.
 - A chart showing the absence rate of workers.
 - All of the above.
42. Which of the following are sources and types of feedback useful for a college teacher?
- A talk with students about the fairness of exams.
 - A chart showing the number of errors made by students on quizzes.
 - An evaluation of the teacher's class by students.
 - A graph showing the number of students who dropped the teacher's class.
 - All of the above.

CONCEPTUAL EXERCISE

Snore, the bat, was on a collision course with the tallest structure on the BSU campus, the poetry building. Snore was blind, like the rest of its species. It made a high-pitched sound 50 feet from the tower, which echoed back quickly. Snore veered to the right, making another sound. This time there was no echo, so it stayed on course.

- What type of control caused Snore to veer off when it approached the poetry building?
 - Feedback stimulus control.
 - Lack of fuel.
 - Habituation to pain.
 - Habituation to distraction.
 - Mutation control.
- What caused Snore to change its course of motion?
 - Guilt.
 - Fear.
 - The echo from the sound.

- Fright stimuli.
- The knowledge that staying on course would result in a collision.

Gore was flying high above the smooth blue water of the lake. It had been two days since Gore had fed. The surface of the lake rippled gently. A fish was swimming, waving its body close to the surface. Gore angled downward like a swift, silent dive-bomber, darting into the water at full speed. A few seconds passed before Gore emerged from the lake with the fish in its beak, wriggling, desperately trying to escape the death grip. Gore flew toward the shore. The fish stopped moving after a few minutes, though still alive, as Gore neared land.

- Which of the two basic causes of motion affected Gore's acts?
 - A harmful state.
 - A stimulus.
 - Basic stimulus control.
 - Lack of fuel.
 - The killer instinct.
- What type of control was causing Gore's specific act of flying downward toward the lake?
 - Lack of fuel.
 - Basic stimulus control.
 - A harmful state.
 - Feedback stimulus control.
 - All of the above.
- What is the term for explaining the fish's acts as "wriggling, desperately trying to escape the death grip"?
 - A causal explanation.
 - A good explanation.
 - A religious explanation.
 - A scientific explanation.
 - A purposive explanation.
- What caused the fish to stop moving after a while, even though it was still alive?
 - Basic stimulus control.
 - Lack of fuel.
 - The death wish.
 - Habituation to pain.
 - Habituation to distraction.

THOUGHT QUESTIONS

1. In this chapter we have compared biological natural selection with human social selection. How are these two types of selection alike, and how do they differ?
2. In some science fiction stories, humans of the future are pictured as having big brains and fantastic abilities. Why is evolution of this type unlikely to occur with humans?