

TABLE 22A.1
Results of Conditioning Trials

Trial number	Type of stimulus			Subject's reaction	
	Noise	Dropped ball	Both	Hand in	Hand out
1					
2					
Etc.					

- Stand behind the box with your noisemaker hidden from the subject's view. Now drop the ball through the hole *at the same time* you make a noise with your noisemaker. Do this several times in a row. The subject probably will not be hit more than once or twice. Record the subject's reaction and the stimulus used for each trial.
- On the next trial, instead of dropping the ball, just make the noise. Record your results.
- Randomly change the order of the stimuli used. Try some trials with both, several with just the noise alone, and several with just the ball. Record the results.
- Wash your hands before leaving the laboratory.

Analysis

- Compare your results with those from the rest of the class. Do you observe a pattern in the subjects' reactions?
- Are there any differences in the results? If so, can you suggest why?
- Do you think another stimulus besides noise would work the same way? Why or why not?

Investigation 22B ♦ Trial-and-Error Learning

This investigation will allow you to experience how trial-and-error learning operates. You will do something differently from the way you are used to doing it and will examine the learning process that occurs.

Materials (per team of 2)

small mirror
stopwatch or clock with a second hand
20 star diagrams

4 pieces of graph paper

4 to 6 books (enough to make the screen in Figure 22B.2)

Procedure

- Decide who will begin as the experimenter and who will be the subject. You will change roles later.
- Divide the 20 star diagrams into two sets of 10. Number each set from 1 through 10. On each diagram, choose one of the star points and label it *start* (Figure 22B.1). Do this for all 20 figures.
- Construct a screen using the books. Make two piles of books, and lay the last book across the top of the two piles (Figure 22B.2). Leave enough room for your arm to fit through the space between the two piles of books.

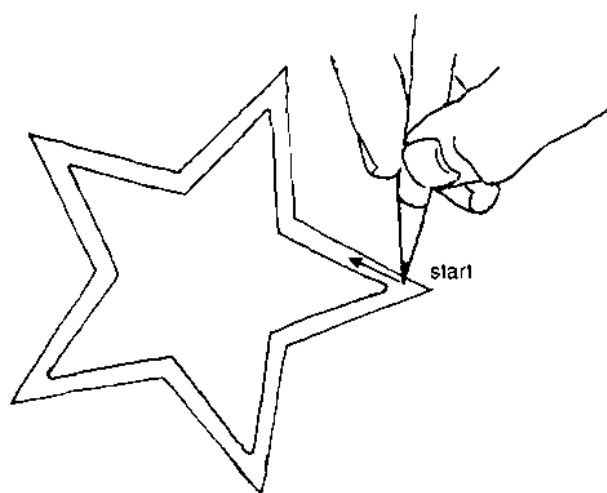


FIGURE 22B.1

Star diagram with start position labeled.

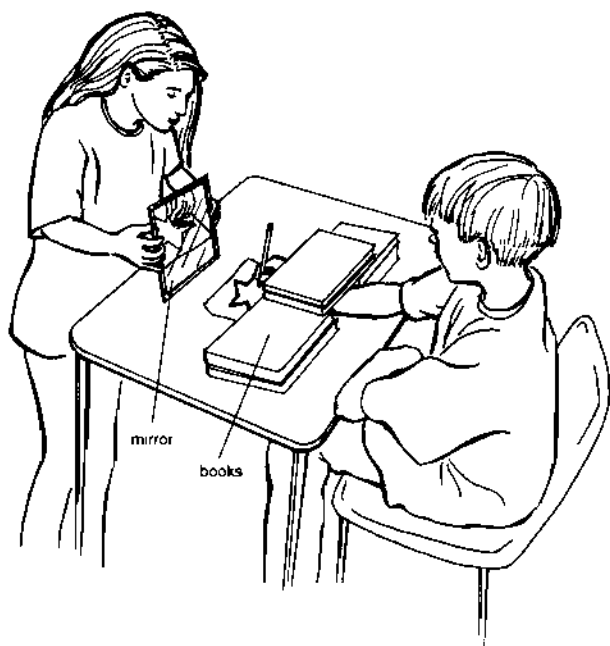


FIGURE 22B.2

Outlining a star reflected in a mirror.

4. In your logbook, prepare a table with three headings: *Trial number*, *Number of errors*, and *Time in seconds*.
5. The subject will sit with his or her arm between the piles of books and will outline the star on the diagram without looking directly at the paper. The experimenter will hold a mirror in which the subject can see the reflected star diagram. The experimenter will time how long it takes the subject to outline the star.
6. The subject should begin at the point on the diagram labeled *start* and draw a line all the way around the star, trying to stay within the lines. The subject should look *only* at the reflection of the star diagram in the mirror held by the experimenter.
7. The experimenter should record in seconds how long it takes the subject to complete the outline of the star.
8. Repeat this procedure for the other nine figures. For each diagram, record the time to completion.
9. Change roles with your partner. Repeat steps 6 through 8.

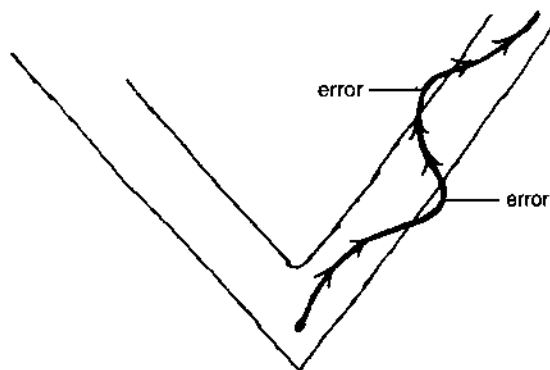


FIGURE 22B.3

Illustration of errors.

10. When you and your partner have completed all 20 trials, count the number of errors in each trial. An error is counted every time the subject's pencil line went outside the lines of the star diagram and returned. See Figure 22B.3 for an illustration of errors.
11. After you have counted the errors for each trial, graph the results for the ten trials you completed as the subject. Your partner will do the same for the other ten trials. Label the horizontal axis *time* and the vertical axis *number of errors*.

Analysis

1. Examine the number of errors for each of your ten trials, and compare those with the time it took you to complete the outline. What, if any, evidence indicates that learning occurred?
2. Compare your graph with those of your partner and with the other teams. Is there any pattern in the data? Explain your answer.
3. Summarize the results of this investigation in terms of trial-and-error learning. Use your data to support your conclusions.

Investigation 22C ♦ A Field Study of Animal Behavior

The study of an organism's behaviors in an ecosystem is called ethology. These behaviors include its responses to the abiotic environment, to other species, and to other members of its own species. You can learn a great deal about an