

Discriminative Stimuli Chapter 6

Operant conditioning tells us that if a behavior is reinforced, its frequency will increase. In other words, if a pigeon gets food after pecking a key, it will peck that key again. But what if pecking leads to food, but only when the lights are on. The bird will quickly learn that pecking when the lights are off will do no good and it won't peck when the lights are off. The lights then become a stimuli that says if the contingencies (if you peck – then you will get food) are either on or off. This type of stimulus is called a discriminative stimulus.

Discrimination learning can be quite complex. In a classic study, Herrnstein, Loveland, and Cable (1964) reinforced pigeons with grain for discriminating pictures containing human beings. The pigeons were reinforced for key-pecks only when they saw a picture containing a human. In other words, the bird's brains said: if people were in the picture, pecking leads to food. If people aren't present, pecking will NOT lead to food.

What was a classic study by Herrnstein and Loveland with pigeons?

Approximately half the photographs contained at least one human being; the remainder contained no human beings—in the experimenter's best judgment. In no other systematic way did the two sets of slides appear to differ. Many slides contained human beings partly obscured by intervening objects: trees, automobiles, window frames, and so on. The people were distributed throughout the pictures: in the center or to one side or the other, near the top or the bottom, close up or distant. Some slides contained a single person; others contained groups of various sizes. The people themselves varied in appearance: they were clothed, semi-nude, or nude; adults or children; men or women; sitting, standing, or lying; black, white, or yellow. (p.287)

Despite the variety of people and poses, all five pigeons learned to identify slides which contained humans. [when people were present, they pecked. When people were not present, they didn't peck] Their performance continued to improve over a period of months. When new slides were used, although the pigeons had never before seen them, the pigeons' responses were accurate. They identified the new slides containing humans.

Back in the late 1970s and early 80s, the Coast Guard thought they had a better way to search for people lost in the ocean. They tested using pigeons affixed to the underside of helicopters. Yes, like pigeons in the park. And, yes, it did work. The birds performed about twice as well as their human



counterparts at spotting “appropriate targets” on their first pass over an area.

The pigeons involved in the Project Sea Hunt, as the effort was known, were first sent to “basic training”. Pigeons were placed in training chambers with “peck keys” that released food when pressed. Once pigeons got the hang of the keys, their training boxes would be faced toward Kaneohe Bay, Hawaii, where a buoy with a radio-operated orange plate floated. Trainers would expose the orange plate and then reward the pigeon when it hit the keys, but it wouldn’t feed the pigeons if the plate wasn’t exposed. Over time, the target would be moved further away from the pigeons to train them to look further out to sea.



Once the birds passed this “basic training”, the top graduates would proceed to advanced training where the pigeons were actually placed in chambers mounted beneath a helicopter and had to find orange objects in the ocean. (life vests are orange). Each bird covered a 120-degree window, so a pod with 3 birds could see in 360 degrees.

In testing on the helicopter, the pigeons spotted the targets on the first pass 90% of the time. The human crew members were capable of finding the target on the first pass only 38% of the time.

By using the concept of a discriminative stimulus (pecking leads to food when orange is present but pecking doesn’t lead to food when orange isn’t present), we also know that pigeons can see colors.