

Edward Lee Thorndike (1874–1949)

Biography

Thorndike was born in Lowell, Massachusetts. His father was a Methodist minister who ran a strictly religious household. Thorndike attended Wellesley College where he promptly left his religious upbringing behind. There he read James's *Principles of Psychology* and was inspired to enroll at Harvard to study psychology. Münsterberg was back in Germany when Thorndike arrived at Harvard, so he took his courses from James. He also began the animal research that was to make him famous. Originally, he had planned to conduct research on children, but was unable to get his project approved. So, he decided to look at maze learning in newly hatched chicks. He was inspired by the earlier observations of Romanes and Morgan. Thorndike wanted to explore learning more thoroughly and do so experimentally. He had to conduct the research with chicks in the basement of William James's house because his landlady would not allow him to keep chicks in his apartment. The results he obtained were promising; his chicks did seem to run his simple mazes (constructed out of old textbooks) more quickly with experience. He was living hand to mouth at Harvard, however, so when Cattell offered him a fellowship at Columbia he moved there, taking a few of his best chicks with him.

Contributions

At Columbia, he finally secured laboratory space in the attic of Schermerhorn Hall, then and now the home of the psychology department. In that attic he began a new series of experiments designed to look more carefully at the problem of learning. He built a series of puzzle boxes from which either cats or dogs could only escape by learning to operate the mechanism. Some boxes required the animal to step on a treadle, others required them to pull on a loop, and still others required a sequence of steps. He kept his animals hungry and allowed them to eat once

they had escaped from the puzzle box. Years later, his son (R. Thorndike, 1991, p. 145) wrote about his father's mechanical ability, "if you look at pictures of the equipment that he used in his original animal experiments you realize that they would have shamed Rube Goldberg." (Rube Goldberg (1883–1970) was an American cartoonist who drew incredibly convoluted and inane machines designed to accomplish simple tasks with great difficulty.) Nevertheless and despite their primitiveness, Thorndike's puzzle boxes yielded extraordinary and original results. He noticed that cats first attempted a large number of fruitless actions in their attempts to escape. Gradually, those actions disappeared. Nearly always, cats made a chance discovery of the action that operated the escape mechanism. When he returned the cats that had discovered the trick for escaping from a particular puzzle box, they exited the box more and more quickly. In other words, their latency decreased. A cat that had been returned to the puzzle box many times escaped almost as soon as it was put in. From his latency data, Thorndike constructed the first **learning curves**. Those curves highlighted behaviors and not ideas as the basic data for psychology.

Unwittingly perhaps, Thorndike laid the groundwork for Behaviorism, psychology's next school of thought. He continued his animal experiments for a few years and discovered that once a particular cat or dog learned to escape one of his puzzle boxes they could again escape it even when placed there after a long time. Furthermore, the behaviors that failed to lead to escape never returned. He thought of the behaviors that led to escape as being "stamped in" and those that did not as being "stamped out." He also investigated whether his animals could profit by instruction. They did not. He was surprised to discover that his cats and dogs learned to escape no faster when their paws were moved by him to make the requisite response. His major contributions however were his laws of learning, the most important of which was his *law of*

effect (Thorndike, 1911, p. 244):

Of several responses made to the same situation, those which are accompanied or closely followed by satisfaction to the animal will, other things being equal, be more firmly connected with the situation, so that, when it recurs, they will be more likely to recur; those which are accompanied or closely followed by discomfort to the animal will, other things being equal, have their connections with that situation weakened, so that, when it recurs, they will be less likely to occur. The greater the satisfaction or discomfort, the greater the strengthening or weakening of the bond.

Another law Thorndike proposed was the *law of exercise*. That law stated that learning would last longer when animals were exposed to more instances of a stimulus (the puzzle box) and a response (escaping). As Robinson (1981, p. 409) pointed out, “There is little in either of these ‘laws’ that could not be gleaned from Locke, or Hume or Bentham or, for that matter, Aristotle . . . The difference . . . is that the laws in Thorndike’s case are supported by experimental findings.” Again, Thorndike was anticipating Behaviorism. His S-R (stimulus-response) connections would become one of the mainstays of later behavioral psychology. Thorndike also worked with a number of monkeys. For them, he made the puzzle boxes so they would have to open them in order to obtain some food. He discovered that their learning curves were much steeper, meaning they learned faster. He abandoned that line of research because of the difficulty of handling them; had he continued he might have discovered that monkeys learn differently than do cats and dogs. When Cattell suggested that he begin to work with children, Thorndike left animal work behind for over 30 years. His work with children led to tremendous success in the applied areas of testing and educational psychology.

After he left Columbia as a student, he worked for a year at the College for Women of Western Reserve College (now Case Western Reserve University) in Ohio. He returned to Columbia, but not to the psychology department. Instead, he became a member of their Teachers College, a position he held until he retired in 1939 (although he continued to work until his death ten years later). Thorndike and Woodworth (1901) conducted an influential study on transfer of training from one domain of human learning to another (e.g., from Latin to math). Their results showed no such transfer took place, and their work led to radical revisions in school curricula. Similarly, Thorndike approached the design of children's dictionaries. Before his analysis of them, those dictionaries were simply abridged versions of adult's dictionaries. Working with Clarence Barnhart, they created new children's dictionaries where the words used to define terms were all simpler than the term itself and where pictures were used extensively along with sentences designed to illustrate the meaning of terms.

Thorndike also was one of the first successful developers of tests. He was so successful that he was one of the first psychologists to make a substantial income from his work outside of academe. He applied his statistical methods to vocational guidance and academic success too. That work yielded low correlations for workers followed over a nine-year period, but higher correlations for students who reached college (R. Thorndike, 1991). Thorndike remained active until his death in 1949. He lived to see psychology grow from its American infancy until its post-World War II boom years.

In 2020 the Board of Trustees of Teachers College, Columbia University voted, unanimously, to take Thorndike's name off of one of its buildings. In an announcement from the president and trustees, they stated: "While Thorndike's work was hugely influential on modern educational ideas and practices, he was also a proponent of eugenics, and held racist, sexist, and antisemitic

ideas.” They added that Teachers College was not erasing Thorndike’s name from its history, and that the former building plaque would be moved elsewhere on campus. The college’s history, they added, should be faced with honesty, bravery, and with humanity.