



## Chains of Fame (and Infamy)

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A chain is a series of events linked together. In *Behavior of Organisms*, Skinner described what he called The Law of Chaining: “The response of one reflex may constitute or produce the eliciting or discriminative stimulus of another” (1938, p. 32). A chained schedule of reinforcement is one in which topographically similar or dissimilar responses are chained together such that they produce, according to schedules of reinforcement, successive stimuli, with a response in the final link of the chain producing a reinforcer. Ferster and Skinner (1957) described the behavioral (mostly key pecks of pigeons) effects of arranging a variety of different schedules as different links in the chain. Debates continue to the present as to the relative efficacy of teaching multiple-link chains by starting with the first or last link of the chain. The former is labeled “forward chaining” and the latter as “backward chaining.”

A project on establishing a response chain was a part of the first “rat lab” course on behavior principles (Keller & Schoenfeld, 1949). Rats learned to respond one each of two different operanda in a fixed order, a demonstration that became a standard for subsequent iterations of rat lab exercises (e.g., Michael, 1963).

Perhaps the most widely cited example of response chaining was that described in something called “The Barnabus Study,” conducted at Brown University sometime in the late 1950s and reported widely in (mostly college) magazines and newspapers. It later was the subject of a 1979 film, “Barnabus: A study in complex behavior chaining” that was part of a film series on behavioral psychology produced by Northeastern University. The Barnabus Study was the brainchild of one of the first women behavior analysts, Rosemary Pierrel Sorrento, who subsequently taught at Columbia University and returned to Brown as Dean of its Pembroke College. Pierrel Sorrento trained several rats (like two of the three handyman brothers in the old Bob Newhart television series who also had the same name, the rats all were named Barnabus - in a recurring joke throughout the Newhart series, the viewer was reminded that the brothers both were named Darryl) on an elaborate chain comprised of several topographically distinct responses the completion of which in sequence ended in access to food. The apparatus that was constructed for the project is shown in Figure 1. Fortunately, it has been preserved as part of the permanent collection of the Center for the History of Psychology at the University of Akron in Akron, Ohio. [Barnabus Demonstration Box \(Maze\) with Motor \(A\) - Cummings Center Artifacts - University of Akron Digital Collections \(uakron.edu\)](https://www.uakron.edu/cumplings-center-for-the-history-of-psychology/artifacts/barnabus-demonstration-box-maze-with-motor-a-cummings-center-artifacts-university-of-akron-digital-collections)



Figure 1. The Barnabus Study apparatus. Thanks to The University of Akron Cummings Center for the History of Psychology

Another well-known example of response chaining was that reported by Epstein and Skinner as part of the Colombian Simulation Project (Epstein et al., 1984). [A Pigeon Solves the Classic Box-and-Banana Problem - YouTube](https://www.youtube.com/watch?v=...). They first trained pigeons on three separate tasks: standing on a box, pecking the box, and pecking a plastic banana. The

responses were trained in different orders for different pigeons. The experiment was something of a tongue-in-cheek-with-a-serious-message replication of the 1920s studies of Gestalt psychologist Wolfgang Kohler on “insight learning” in which a banana was suspended just out of reach of the chimps housed in the cage. Several boxes were placed in the chamber and, without specific training, the chimps eventually came to move and stack the boxes under the banana, stand on the stacked boxes, and on the, and retrieve the banana, as shown in Figure 2 and in the film clip at this web address: [Chimpanzee Insight \(Kohler Study Footage\) - YouTube](#). Similarly, after training the pigeon to engage each of the three objects, the banana was raised to the top of the chamber such that it could only be pecked by the pigeon moving the box under the banana and then standing on the box. It did so. In this manner, the three responses were “spontaneously” formed into a chain of successive responses that resulted in reinforcement.

Chains of responses are an important part of functioning outside the laboratory by not only humans, but also by nonhuman animals. The bane of many who enjoy watching birds gather at their bird feeders are the squirrels who navigate their way to the feeder and engorge themselves on the treats intended only for their feathered brethren. The lengths to which squirrels will go to access bird feeders has been the subject of many films and clips, revealing amazingly myriad intricate response chains these facile beasts will master. Such fetes more than matching the wits of the bird watchers who devise sometimes almost diabolical devices to foil such thievery. [Backyard Squirrel Maze 1.0- Ninja Warrior Course - YouTube](#).

## References

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Figure 2. Wolfgang Kohler's problem-solving chimpanzees.