In Response

Las Vegas Knows Better

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Writers of psychology textbooks, or teachers for that matter, clearly have a problem. In trying to relate the meaning of basic laboratory research to the public or beginning student it is reasonable to draw analogies to things familiar. Treacherous waters are entered, however, when either the speaker or listener converts the analogy into an equation. Complexities, which are essential to understanding a phenomenon, are swept under the simplistic rug.

One area of research which has been the recipient of this conversion process is schedules of reinforcement. Poppen (1982) has provided a thorough examination of the fixed-interval scallop, so often present in infrahuman performance, yet so often absent in the behavior of humans. Complexities such as an extensive history with temporal contingencies, particularly in the case of adults, the addition of stimuli such as external time markers (watches), and other reinforcement schedules acting concurrently, all serve to modulate the effects of the simple fixed-interval schedule. Small wonder that humans seldom scallop.

Another example of an inaccurate schedule analogue concerns the variable-ratio (VR) schedule. Textbooks which introduce the experimental analysis of behavior (e.g., Osborne & Powers, 1976; Martin & Pear, 1978; Schwartz, 1978) cite the slot machine as an example of a device which programs VR reinforcement. Las Vegas knows better and I thought that Skinner (1953) after he introduced the analogy, had sufficiently disclaimed it, but apparently not.

A VR schedule is defined as a schedule in which reinforcement is produced by

a fixed number of responses—but, this fixed number may change after each reinforcement. Thus, a VR schedule is composed of a number of different-sized fixed-ratio (FR) schedules. As in an FR schedule, the hallmark of the VR schedule is that each response brings the subject closer to reinforcement. However, every response, except for the one which actually produces reinforcement, has a 0 probability of being reinforced.

Because I was curious about how slot machines worked, I dismantled one mechanical one-arm bandit (single-subject design). When the handle is pulled and released, a number of things happen. A spring is stretched and then released. As the spring is released it drives a series of gears which turn the wheels which display the cherries, lemons, etc. The speed of the rotation of the gears is controlled by a system consisting of a hydraulic plunger and a butterfly wheel. When the speed of the gears slows down to a certain point, a lever falls into place locking the wheel. This sloppy mechanical system insures that the rate at which each wheel slows down (and thus where it stops) is variable from one handle pull to the next.

Thus, slot machines, at least the mechanical variety, operate according to a schedule known as a constant-probability schedule (Brandauer, 1958). Every response has an approximately-constant probability of being reinforced. Recall that in the VR schedule, responses have either a 0 or 1 probability of being reinforced. Unlike responses in a VR schedule, however, each handle pull does not bring you closer to reinforcement under the constant-probability schedule.

In the above instance, the leap from the laboratory to the outside world produced a technical error, which some may call minor. The larger issue, which Poppen clearly and I think importantly makes, is

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that of oversimplification. When we take the leap from the laboratory, and fail to see what we have been led to believe we should see, the validity of our science is prematurely placed in jeopardy. The myriad of differences which distinguish both contingencies and performance in the laboratory from those in the environment beyond the laboratory must first be untangled before adequate judgments about validity can be made.

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