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## How the Rat Turned White

By Kenneth Shapiro

This is the first in a three-part series on the use of animals in psychological research. In it, I describe how animals got into laboratories in the first place, and their purpose and life there. In the second, I will describe animal model research, the strategy whereby psychologists' develop nonhuman animal models to study human psychopathology. In the concluding piece, I will present a critique of this enterprise, using original data I gathered. The three articles are based on a forthcoming book, *Animal Models of Human Psychology: Science, Ethics, and Policy*.

*Down the metal chute he slid.... A moment before, in a hygienically sealed room at Charles River Laboratories...a white-coated technician had weighed him, checked his sex... and tossed him down the open chute, onto a soft wood-chip bedding.... Now a packer picked him up and loaded him, with nine other rats, into a cardboard carton.... At John Hopkins, the rat would have a tiny, precisely demarcated region of his brain chemically destroyed, to simulate memory loss suffered by human victims of Alzheimer's disease.... [S]cientists would run him through a maze designed to test his short-term memory. Ultimately, he would be decapitated and his brain analyzed. In the laboratory records that documented his daily care, brain surgery, maze performance, and death, he would be identified as No. 1913.*

From "Specimen No. 1913," by Robert Kanigel<sup>i</sup>

*Some years ago I had a rat named Weebee.... He was never caged, except to travel.... He had his own bed next to my pillow, along with his food dishes.... I'd talk to him, usually nonsense talk.... The more I chattered, the more his teeth clicked.... The onset of his teeth-clicking was gradual, beginning with just his lips moving.... Then he'd flick his little tongue out a couple of times, and the teeth-clicks and eye-bulges would follow. Because it really looked like he was trying to talk, I called this "Weebee-talk-with-eye-pops." He would usually do this on command. He'd be sitting in my hand, looking me in the eye, and I'd say, "Weebee talk with eye-pops?" a couple of times, and sure enough, he'd oblige me.... He lived just about 18 months.... I've never gotten over losing him.*

From "Weebee Talk," by Elizabeth L. Fucci<sup>ii</sup>

### **Rats and history**

In nature, rats have been marvelously successful, achieving world-wide distribution, in part through their ability to catch a ride with humans. That an insect bearing a bacterial disease (the bubonic plague) in turn hitch-hiked on them accounts for much of the negative popular view of these animals, historically and to this day.

The animals depicted in the two quotes above are not "wild" rats. They are the offspring of generations of rats selectively

bred to be studied in the laboratory. Why was this done and what is its effect on the science that created them -- and on them?

History, including the history of how rats and other animals came to be "laboratory animals," is not an account of the inevitable. It is not necessarily the case that modern psychological science must rely on the study of nonhuman animals. Certain circumstances led to that enterprise becoming an animal- and laboratory- based science.

### **The new science of psychology**

Emerging from arm-chair speculative philosophy in the late 19th century, modern psychology sought to emulate the natural sciences of the time, particularly physics. Early psychologists borrowed its philosophy of science (positivism) and its ambitious goals (the discovery of universal laws governing nature). Psychology would be an experimental science. This means that the investigator systematically varies the conditions under which the object of study occurs. To do so, he or she needs to control and manipulate the object and these conditions, and then to observe and measure the resulting changes. In this positivistic experimentalist enterprise the object of study is restricted to entities which can be directly observed from a detached or impersonal (objective) point and measured quantitatively.

In this initial period, these requirements greatly influenced what, where, and whom the new field would study. Psychology would study behavior, and, later, physiology, because these lent themselves to the criteria of being observable, measurable, repeatable (replicable), and, presumably, predictable

-- unlike the more elusive study of mind, experience, and the subjective.

### **The construction of the lab**

Where would these investigations take place? Not in the bedroom with its personal disclosures and intimacies, nor the family dinner table or the street corner with their complex interactions and negotiations, nor the classroom, which at least in theory is the dedicated site of that important psychological phenomenon learning, nor even the clinic where breakdowns in all of these are examined and treated. Early psychologists selected the laboratory as the "locus classicus for scientific psychology."<sup>iii</sup> Here they could exercise the requisite control over the object of study while viewing it dispassionately and at arm's length. Of course, there was a trade-off in this choice for control was gained at the cost of loss of realistic setting. Would findings in the lab play in Peoria (be extrapolable); would treatments and interventions developed in the lab be effective when applied in the real world? To this day psychologists argue these questions and the field now consists of a clinical-applied research enterprise as well as a laboratory-based one.

### **The construction of "laboratory animals"**

Who would be the objects of investigation? Humans were too complex, unpredictable, uncontrollable, and resistant to manipulation. In any case, society would not abide inducing suffering in them or keeping them in the lab for a lengthy stay against their will.

Enter the rat. It is important to understand that "laboratory animals" did not exist at that time. There were "wild," "farm," and "companion" animals, but not yet laboratory animals. A new category had to be constructed to fit the laboratory experimental situation. To create this class of animals required more than simply catching some wild animals and putting them in cages in the lab. Three strategies were developed and applied: selective breeding, certain forms of socialization (or desocialization), and innovative architectural features of the lab (stacked caging, restraining devices...). Through the combined effect of these, psychologists transformed *Rattus rattus* and *Norvegicus rattus* to the docile, manipulable white rat of the laboratory. An obedient animal is more readily influenced by the manipulations of the investigator. This allows the investigator to "discover" the laws of cause and effect governing behavior. The investigator provides the cause through his or her manipulations and then measures the resulting effects in changes in the animals' behavior and physiology. The enterprise requires that the investigator view and treat the lab animals as lacking in autonomy or agency. More generally, they are treated as if they lack the capacity to experience the world in any robust sense -- for example, as if they are unable to form intentions and to anticipate results.

As it is critical to the experimental method to reduce variability, psychologists also attempted to standardize the rats by eliminating their individual and even their species-specific behaviors and traits. This deindividuating and "de-specifying"

was also indicated because of the important goal of finding universal laws, of identifying processes and mechanisms of behavior and physiology that were true of all animals. In this perspective, the investigator refuses to view an animal as a particular individual or member of a species. This is not easy to do, as there is considerable pull to recognize and relate to these animals as individuals -- see the second introductory quote. However, other conditions help effect the reduction of an individual to an "organism," or a "preparation": a large number of animals is used and they live for a short time. Further, the investigator typically does not name individual animals; rather, they are given numbers (No. 1913). In place of a personal relation, he or she "relates" to an animal as data bearing on a particular behavioral or physiological mechanism.

The language of scientific reports shows these reductionistic maneuvers. Investigators describe what is done to the animals rather than what the animal is doing. The lab animal is not an agent or autonomous being but a product of the experimental manipulation. Behavior of the animal is described in terms that make the animal as individual dissolve. An act by the rat, say to avoid something (an aversive stimulus), becomes an "avoidance reaction." The rat does not act; rather, under certain stimulus conditions, the avoidance reaction is effected. Even the description of the animal as unwitting passive respondent focuses more on the technical procedures than on the behavior of the animal.

Another aspect of scientific report writing is a rhetorical laundering that sanitizes and minimizes animal suffering. Rather than describe the experience of the animal, the text directs attention to the apparatuses involved in its production. In the same way, the fact of the death of the animal is rhetorically skirted by technical description of measurements of body parts taken posthumously.

### **Animals as instruments**

One more feature of this laboratory science completes the construction of the rat in the lab from the rat in the wild. A predominant focus of the modern psychology was and is the development of apparatus and instrumentation through which experimental effects could be produced and measured. In effect, psychologists became engineers for whom the laboratory provided an ideal site in which technology to enhance and extend the limits of observation and instrumentation to record results of observations could be innovated. The new science's preoccupation with instrumentation and technology was built around laboratory animals. The tiers of animal cages, the mazes, the automated food dispensers, the Skinner box, the controlled environment (lighting, temperature, noise, bacteria), the electronic recorders, the stereotaxic devices, the plastic restraining tubes-- all were designed to snugly fit the laboratory animal. However, as I have been describing here, this fit was met in the other direction, as psychologists constructed "wild" rats to fit an increasingly instrumentalized laboratory life.

This preoccupation with technology and instrumentation blurs the boundary between instrument and object of measurement.

Consider a rat that is chronically implanted with an electrode in his or her brain and is connected by a tether to a machine that sends stimuli and receives and records responses. The rat is more a part of the instrumentation than a discrete object of study. The animal is a conduit, a vehicle, for the study of certain relations between brain function, external stimuli and movement. The rats are "**laboratory** animals" in the sense that they are *part* of the laboratory; they are part of this complex of sophisticated apparatus, instrumentation, and recording devices which constitutes the site and object of study. No longer individual animals, they are scientific instruments.

#### **The reality beneath the construction**

Despite this view and use of them, it should come as no surprise that laboratory animals are not "degenerate forms."<sup>iv</sup> Although constructed as instruments through selective breeding and the design of the laboratory, they still retain "complex behavioral systems such as territoriality, sexuality and aggression." For example, it has been shown that white laboratory rats allowed to live in a large outdoor enclosure quickly dig burrows just like their wild forebears, and produce offspring who survive a cold winter. Although formidable, the power of social construction is limited. Even when utilized and lived toward as instruments, these animals are sentient beings who are fully capable of suffering the deprivations, stresses, and pain to which they are subjected in the laboratory.

It also should come as no surprise that the lab technicians and those investigators who actually spend time with the animals form relations with them. A recent anthology explores what it refers to as the "inevitable bond" between scientist and nonhuman animals.<sup>v</sup> Clearly, human and nonhuman animals form complex affectively based relations. We can only understand them within and through those social structures. The ideal of a impartial, detached spectator observing an animal as preparation or instrument is thrown into question as is the strategy of developing animal models to study human psychology -- the subject of the next essay.

**References**

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