

PART TWO

Model Animals

Neal E. Miller's Motivation and Reward in Learning

TOWARD THE END OF THE EDUCATIONAL FILM *Motivation and Reward in Learning* (1948), the deep, melodic voice of the narrator concludes with a hint of self-satisfaction, which pierces through his otherwise matter-of-fact cadence. He states: “We have demonstrated that the satiated animal is not innately stupid or lazy. All he needs is a little motivation.” This is the key takeaway from the film: differences in behavior are not produced by inborn disparities, such as we saw in the last section with the theories of Yerkes, but rather are created by changes in an organism’s environment. Through a series of experiments, *Motivation and Reward in Learning* repeatedly demonstrates the filmmaker’s capacity to produce different behaviors in rats with changes to a modular testing apparatus. Motivated by hunger or by shocks from an electric grid at the bottom of the cage, a rat is trained to operate a lever, spin a wheel, chew a cord, and finally strike another rat. This cinematic rodent—an amalgamation of many profilmic rats—is shown to be as flexible as its surroundings, modeling how desire and behavior are changed by one’s environment.

Motivation and Reward in Learning was made at Yale’s Institute of Human Relations by the behavioral psychologist Neal E. Miller (1909–2002) and the educational filmmaker Gardner L. Hart for the purpose of demonstrating Miller’s laboratory research into the effects of stimulus-response reinforcement. In the following section, I trace the scientific theories and filmmaking practices that led to the production of this film, specifically focusing on Miller’s place in the history of filming behavioral research. Miller claimed that his cinematic work was an extension of his practice of scientific theorization. He thus sought to build images of animals that could function as abstract models, not unlike an abstract theory,



VIDEO 3. *Motivation and Reward in Learning* (Neal E. Miller, 1948).
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which could be applied to many different circumstances and situations pertaining to both humans and animals. What we will see in his film and others like it are strangely compliant and reasonable animals, who virtually disappear behind the ideas they are meant to represent. Unlike viewers exposed to the deep affective connections encouraged by Yerkes, viewers of Miller's film are meant to *use* the rats as models for thinking through other behaviors that are not presented onscreen.

Miller's films are thus an extension of the broader practice of scientific modeling. A rich conversation exists between historians of science focusing on the creation and dissemination of animal models in laboratory settings. As Robert Kohler demonstrates, model organisms have led to massive transformations in laboratory methods, experimental techniques, and daily labor of the increasing number of labs using them.¹ Similarly, Angela Creager's analysis of the Tobacco Mosaic Virus emphasizes the model organism's role as an *exemplar*, which brings together differing scientific disciplines; while Michael E. Lynch describes the ways that animals are transformed from living, emotionally complex creatures into what he calls "analytic animals" through the modeling process.²

But the role of film in these processes has yet to be fully explored. In this section, we will see that filming animals as a form of scientific modeling brought with it a set of unique affective challenges and concerns. As film scholars have shown, animals onscreen—like their emotive counterparts in the lab—have the ability to disturb both rationality and narrative by eliciting unwieldy emotional responses from spectators. Whether discussing Vivian Sobchack's analysis of animal death in

Jean Renoir's *Rules of the Game* (1939) or Akira Mizuta Lippit's characterization of the mercurial properties of the "animetaphor," animal images contain a disruptive potential, which, if not properly managed, can undermine a film's ability to tell a concise story.³ Such emotional intensities become doubly disruptive in a scientific film that is meant to appraise animals coolly and rationally. Therefore, animal modeling through film becomes a practice in managing and circumventing the emotions of audiences.

Each of the following three chapters provides a different lens for considering this process, focusing alternately on the contexts of ethnographic cinema, the genre of rodent scientific films, and discourses surrounding educational media. Throughout, we will see that *Motivation and Reward in Learning* represents both the ambitions and the excesses of a psychological model predicated on behavior being infinitely malleable. Film became an essential tool for demonstrating this plasticity, offering up moving records of changes in rodent behavior over time—a record that could be easily shaped and molded through the interventions of editing, cinematography, and narration.

This approach refreshingly avoided the essentialism of Yerkes and the eugenicists, but it also led to fantasies of absolute human engineering and control. The films studied in this section all produce strangely transparent rats, ones whose motivations can be clearly identified and whose responses can be easily measured. The onscreen rats in these films, who are presented as perfectly controlled life-forms, exist as ideals for behaviorism broadly applied to humans and animals. Against this streamlined articulation of the rat on film, we will see many accounts of actual rats and actual humans acting in surprising ways that confounded the scientists who sought to study them.

Ultimately, this brand of research, which emphasized the social construction of behavior above all, yielded essential insights about the cultural fabrication of race and class, but it also projected a world in which people were as responsible for their actions as rats being shocked in a maze and where the invasive manipulation of both humans and rats was the optimal approach to bringing about social and political change. Film served these theories uniquely by creating modifiable simulations of animal behavior, which could be read as models of human culture. These celluloid specimens exist as important historical examples of attempts to visualize cultural difference, supplementing the much more widely discussed films being produced by anthropologists of the time.

The albino rats that starred in all these films were seasoned professionals in the art of performing for scientists. The rodent's rise as the exemplary experimental animal began in the latter half of the nineteenth century, and by the 1930s, lab rats were well-established tools for the life sciences.⁴ Unlike other prominent contenders, such as dogs and rabbits, rats came with a ready-made narrative of expendability, marked as a pest, vermin, and disease carrier. From the mid-nineteenth century to the early twentieth, in the era of Francis Power Cobbes and the Brown

Dog Riots, heated debates over the issue of vivisection were held publicly and at times exploded into violence.⁵ In this setting, the rat was a far less controversial choice than other domesticated animals for the often excruciatingly painful procedures performed in the lab.

Behaviorist experiments contributed to a further consolidation of experimental species, in which rats took center stage.⁶ John Watson, behaviorism's founder, adopted lab rats as his experimental animal of choice from the beginning.⁷ By the time Miller, Orval Hobart Mowrer, and others were making their films, the Wistar rat was a product of more than sixty years of experiments with heredity and genetics and was being advertised as the ideal form of experimental life.⁸ Wistar rats came with guidebooks for handling and keeping, as well as the promise of being built for the lab.⁹ Created through innovations in inbreeding, the Wistar company guaranteed that all its rats were essentially the same, offering a neutral form of repeatable experimental life, which would produce broadly applicable findings when handled properly. The result of this history was an organism that was considered disposable, standardized, and extremely flexible. It could be used to endlessly test different theories while also providing a universal consistency in deadly experiments that often destroyed their experimental subjects.

Chapter 4 explores how Miller created his laboratory practice, both in response to Freudian theories of psychology and Boasian theories of anthropology. Within this context, he developed a particular brand of filmmaking that figured onscreen rats as models of internal drives and desires, as well as the differing effects of culture. I conclude this chapter by considering Miller's attempt to use his rat experiments to schematize the lynching of a Black man in the South. Chapter 5 continues to analyze the image of the rat, placing *Motivation and Reward in Learning* within the context of the many laboratory rat films produced from the 1930s through the 1970s. Here, I consider the act of cinematic modeling as a form of affective interaction, in which the lives, behaviors, and feelings of animals and humans are intermingled. I argue that through the distribution of the films and the application of findings from experiments depicted in these films, whole segments of society were brought into this relational process that Donna Haraway describes as "shared suffering."¹⁰ Finally, chapter 6 is dedicated to analyzing the use of the behaviorist films in the classroom as a tool for altering student behavior. In educational institutions, film was used to alter behavior in ways that were theorized as analogous to the behavioral alterations that behaviorists made to their rats in the lab. Yet, as we will see, both rats and students remained resistant subjects that never fully complied.

In the end, *Motivation and Reward in Learning* reflects both the hopeful and the disturbing possibilities of Miller and his peers' use of rats as stand-ins for humans. On the one hand, and in its most upsetting form, this work transmutes the worst qualities of both laboratory animals and human culture onto one another. This can be seen in the use of Miller's research to dissect the murderous actions of a southern lynch mob. Here, it is suggested that laboratory rats could one day be

made to reenact the most horrifying violence—the lynchings, the genocides, the pogroms—of human history, while simultaneously suggesting that the actual perpetrators of these crimes had as little control over their actions as a rat desperately looking for food.

But on the other hand, this work also contains a novel approach to thinking through human history, one that is potentially open to nonhuman authors and actors. At their best, these films of animal research can be read as a kind of collective dreaming, the products of animal behavior, scientific theory, and mechanical objectivity in the mid-twentieth century. In our current moment, when the ravages of climate change call into question the continued existence of both a sense of the future and the existence of nonhuman animals, the potential to open up speculation in this way is all the more poignant. The modeling practices of Miller and his peers might ultimately be a dead end in the history of science and film, but there are still important lessons that might be learned from their failure.