

Rodent Simulations

Stimulus-Response, Laboratory Rats, and a Southern Lynch Mob

Let me begin with two disparate scenes of violence—one occurring in the animal laboratory, one at the hands of a white lynch mob—that Neal E. Miller brought together in his work. The first comes from one of his films (fig. 5), the second from one of his books. In the first, we watch as two albino rats stand on their hind legs, each gripping the other's shoulders with its front paws. They are powerfully illuminated by an offscreen light—nearly glowing—isolated within an absolutely dark setting. Placed in proximity to the camera, they occupy the center of the frame, as they breathe heavily in one another's arms, slowly slumping toward a metal grate at their feet. Suddenly, the soundtrack lights up with an incessant buzzing. And, almost as quickly, the rats' hair stands on end and their embrace shifts from tender to violent. They claw, tear, and bite one another. One falls on its back, belly up, as the other clammers on top to repeatedly scratch its face. Seconds later, the buzzing stops, and just as suddenly as they began, the rats cease their attack. They return to their slow, heavy, breathing—the paw of the floored rat immobilized midstrike, now resting gently on the face of its assailant. A jump cut occurs, in which the rats shift their position onscreen, and we watch as the rats are forced to repeat their attack again.

We are told by the film's title cards that this scene is “an example of a social response” to the behavioral principles of “motivation and reward in learning,” which is also the title of the film we are watching. Made in 1948 by the behaviorist Neal E. Miller, *Motivation and Reward in Learning* frames moments such as these as abstract instances of behavioral principles writ large. But when we extract such moments from the film's broader framework, they seem to contain both much more and much less meaning than what was initially intended for them. No longer illustrations of overarching scientific concepts, they become scenes that are both



FIGURE 5. Screen-grab from *Motivation and Reward in Learning* (Neal E. Miller, 1948).

cruel in their casual violence and purposeless in the absurd behaviors demanded of the onscreen rodents. After all, what truly is gained by demonstrating that rats in pain can be driven to fight one another?

The second scene is significantly more disturbing. It is described in “Analysis of a Lynching,” the penultimate chapter of a 1941 monograph coauthored by Miller and his longtime collaborator John Dollard called *Social Learning and Imitation*.¹ Coming after chapters with titles such as “Learning: Its Conditions and Principles,” “The Learning and the Generalization of Imitation: Experiments on Animals,” and “Copying: The Role of Sameness and Difference,” the chapter in question is situated at the end of a long scientific exegesis of learning and imitation in groups of laboratory rats and school children. Here, the authors put forth what was known as the “stimulus-response” theory of learning, in which organisms are prompted or “cued” to perform particular behaviors by having their “motivations” and “drives” repeatedly met through social systems of “reward.” These are the same concepts articulated in the title cards of *Motivation and Reward in Learning*.

But the tone of the book abruptly shifts in the chapter “Analysis of a Lynching,” in which the two scientists pivot from a behavioral analysis of group psychology to a deeply upsetting description of a 1933 lynching of a young Black man in the “Deep South.”² Nothing in the earlier portions of the book prepares the reader for this jarring dive into American racism and violence. Relying on an anonymous and anonymized account written by a “qualified white observer” for the NAACP, Miller and Dollard walk the reader through the white mob’s violence in excruciating and vivid detail. The intensity of this description breaks loose from the book’s previous dispassionate scientific language. The authors unflinchingly describe hours of torture, the “red hot irons” that were used to stab the victim, his castration, the cutting open of his stomach, the “slicing off” of his fingers and toes, the “simulated hanging” in which he was cut down before death to be “tortured more,” and the final dragging of his dead body behind a car.³ In another pivot, Miller and Dollard then return to the original framework and tone of the book, coding the actions of the mob

within their psychological concepts of “drive,” “motivation,” “cue,” and “reward.” Like the film *Motivation and Reward in Learning*, *Social Learning and Imitation* attempts to supply an intelligible explanation for the violence described in its pages. This explanation never addresses the sequence’s terror and horror, which are left hanging like a ghostly shroud over the remainder of the book.

Despite sharing a common thread of violence, these scenes are obviously vastly different. But Miller and Dollard tried to suture them together—making comparisons between experiments with laboratory rats, on the one hand, and American anti-Black lynchings, on the other. They attempted this through the creation of a common language and psychological framework that could be applied to both instances. In this chapter I focus on the development of this framework at Yale’s Institute of Human Relations (IHR), analyzing the scientific justifications and political ramifications of such a comparison. As part of this process, I argue that Miller transformed the filmed image of the rat into a type of abstraction, inspired by and interacting with other conceptual frameworks concurrently being developed in the social sciences. This transformation of individual rats into theoretical models of behavior, *as such*, allowed Miller and his peers to apply their laboratory findings to a vast variety of human and nonhuman social circumstances, which ultimately led to bizarre, unsettling comparisons like the one above. Despite their extreme incongruity, such comparisons became central components within behaviorism’s ascendant project, where comparative psychologists were crafting not only scientific theories but also policy recommendations and new forms of political rhetoric. Absurd as it may seem, linking lab rats to lynch mobs was an important force within American history.

The first section of my chapter focuses on Miller’s work combining Freudian terminology and Pavlovian experiments at the IHR in order to create a theoretical structure for psychologists and social scientists so that both could use his experimental findings. The second section details Miller’s collaboration with the prominent sociologist John Dollard, as they worked together to integrate experimental psychology with the theories proposed by neo-Freudian anthropologists in the 1930s, 1940s, and 1950s. I conclude by returning to Miller and Dollard’s comparison of the southern lynch mob and laboratory rats like those in *Motivation and Reward in Learning* in order to argue that the abstract image of the rat offered the scientists a means of converting racist murder into a naturally occurring act based in the human organism’s responses to its environment. Ultimately, this transformation hinged on the capacity to see albino rats as stand-ins for white southerners willing to engage in anti-Black terrorism.

Motivation and Reward in Learning represents one side of this equation. As we will see, Miller’s film is not only about, or even *primarily* about, rats. It also holds speculative projections of human behaviors within its images, behaviors that the film was often used to explain in a variety of institutional and educational contexts (more on these in the next two chapters). Such metatextual applications of Miller’s

theories shaped the film's aesthetics as much as the rats' behavior did. It is in these uses, which exist at the intersection of behavioral psychology, anthropology, sociology, and educational theory, that *Motivation and Reward in Learning* takes on a set of startling political stakes, in which the conceptualization of race, species, and science are deeply interwoven. Understood in this context, the film depicts behavioral psychology's aspirations for the lab rat, a creature that could be transformed into a living metaphor for even the most intractable problems and could grant psychologists, sociologists, and anthropologists an amazing authority to explain, control, and describe.

Considering the interaction of sociology, anthropology, and behavioral psychology raises complex questions about the figure of the animal within social science discourse. In many ways, the lab rat provides an inverted image to the historical use of exotic animals in ethnographic films. As Fatimah Tobing Rony describes, animals in these films consistently position racialized anthropological subjects within an imagined "uncivilized" past (see chapter 3 for further discussion of Rony's position).⁴ But in the films made by behavioral psychologists, laboratory animals became stand-ins for the opposite of this, representing "civilization" and "progress." Miller and his peers paired their experimental rodents' adaptive behaviors with the high-tech space of the onscreen laboratory in order to visualize and control what they argued were the effects of culture. Here, unlike the Indigenous and Black subjects of ethnographic film, behavioral scientists had much to gain from their association with animals, creating a powerful circuit between white male scientists, laboratory settings, and nonhuman specimens. Indeed, the main comparison that these psychologists drew between rats and humans were not comparisons to racialized or ethnic "others" but rather to themselves and white society at large.

This relationship between the albino rat and the midcentury experimental psychologist scrambles many of the dynamics surrounding race and animals as they are usually described in critical animal studies. Most often, animalization is theorized as a primary tool for racial control and hierarchy, in which the oppression of, in particular, Black and Indigenous groups is premised on their asserted proximity to animality.⁵ Yet this schema has been called into question by recent animal studies scholars. Zakiyyah Iman Jackson, for instance, argues that anti-Blackness is actualized not only through the animalization of Black peoples but also paradoxically through their recognition as human subjects, which she argues "plasticizes" Blackness—forcing Black people into torturous positions betwixt and between racist conceptions of human and animal.⁶ Conversely, in this chapter we see that the animalization of white people does not necessarily lead to the relinquishment of the traditional power and authority that comes with the status of the "human." In a post-Darwin, post-Freud world, association with animal life could provide exculpatory cover rather than simple denigration. Unlike other animals, the laboratory rat became a symbol of rational rather than irrational behavior. Laboratory

scientists often welcomed their comparison with their lab rats, using it in Miller and Dollard's case to rationalize the horrific violence of white America, while simultaneously suggesting their own capacity to control this behavior and thus progress beyond such violence. Ultimately, as we will see, the cinematic creation of the lab rat into a universal model of behavior empowered scientific filmmakers like Miller to make sweeping claims about the relevance and application of their findings.

PSYCHOANALYZING PAVLOV'S DOG:
THE CREATION OF *MOTIVATION AND REWARD*
IN *LEARNING AT THE IHR*

How exactly were the desperate, scrambling rats of *Motivation and Reward in Learning* turned into such powerful icons? On its face, the film depicts animals performing a series of minor tasks—spinning wheels, pulling levers, biting cords—not influencing human history or society. The answer to this question lies in the scientific process of abstraction, where laboratory experiments are transformed into broadly applicable models and findings. Abstraction is a tricky and often contested subject in scientific practice, as it must be firmly rooted in empirical observations, findings, and measurements to be considered valid. Indexical mediums like film and photography are ideal spaces to create such empirically grounded models. Yet film also poses a problem for abstraction in its very density of details, which are specific to the moment being filmed. It is only through the labor of the experimenter and the intervention of the filmmaker that the complex, densely layered reality in front of the camera can become a streamlined model for broader concepts and ideas. For instance, Lisa Cartwright describes how Étienne-Jules Marey's chronophotographs use “flatness, segmentation, and planar division of space” to create what she calls “an aesthetic of abstraction.”⁷ Similarly, documentary scholar Malin Wahlberg argues that the space-time interventions made by scientific films not only control and measure the objects in front of the camera but also “may transform unassuming entities in nature into spectacular objects” through a process of “cinematic abstraction.”⁸ These and other forms of abstraction can be seen in *Motivation and Reward in Learning*, where Miller uses mise-en-scène, sound, cinematography, and editing of the film to visualize rats as abstract concepts.

Miller and his collaborator, Gardner L. Hart, created *Motivation and Reward in Learning* to illustrate a fairly simple behaviorist thesis, which the film states in its first title card: “This film illustrates how behavior can be controlled by motivation and reward.” The meaning of this claim is outlined in the subsequent scenes. We are introduced to two male albino rats, symmetrically placed in cages on either side of the screen. The rat on the left busily investigates its empty surroundings, while the rat on the right lounges on a pile of food. The melodic and emotive male voice-over asks viewers, “What do you think is the reason for the difference

in their behavior?” Disembodied hands reach out from either side of the screen to open the cages, while the offscreen voice answers its own question: “The one on the left is hungry; the one on the right is satiated.” The active rat on the left escapes its cage, almost leaving the edge of the frame, but is caught and carried back by one of the hands. Meanwhile, the satiated rat on the right remains atop its pile of food. We are informed that this film will now conduct an experiment on how these differences in motivational “drive” lead to differences in learning. Both rats are transferred by the hands into a dual-compartmented apparatus, which, like the symmetrical cages, bisects the screen into left and right quadrants. The right-angle placement of the camera, the matte blackness of the background, and the isolated lighting of the experimental apparatus all create the sense of watching a two-dimensional plane, heightening the feeling of flatness in the projection of the image. We watch the two rats simultaneously on their separate segments of the screen, as the one on the left furiously investigates its new setting, while the one on the right settles down to sleep after some brief exploration. The film cuts to a close-up of the hungry rat on the left, cutting out the rat on the right. It details how the rat learns to operate the apparatus’s lever mechanism in order to receive food pellets through the chute below. The voice-over walks us through this process, as the rat goes from an active, exploratory set of behaviors around the entirety of its enclosure, to discovering the food lever and its connection to food, and finally to focusing all of its activity on repeatedly and systematically using this lever, leading to an extinction of all other “irrelevant responses.”

At the conclusion of this sequence, the camera pans right, and the voice-over asks, “Now, what do you think the satiated animal has learned to do?” It again answers its own question with an image of the second rat lying flat on the ground. A title card interjects: “Will the satiated animal learn if we give him a drive?” The film cuts to a new electronic device consisting of a voltmeter, a dial, and a button, which we are told will apply a “mild electric shock” to the bottom of the rat’s cage. The disembodied hands again return to operate this mechanism, pressing the button and adjusting the dial to modulate levels of electricity being sent to the cage. The audience experiences this electricity as a buzzing sound that increases in pitch as the dial is turned and is visually registered in the shaking movements of the voltmeter’s hand. The voice-over assures us that “the shock is adjusted to be annoying, but not painful.” We then cut back to the rat on the right, who instantly jumps high in the air with the beginning of the buzzing sound. Its hair stands on end as the rat continues to leap off the electrified grid on the bottom of the enclosure. The voice-over calmly observes: “Although the shock is not strong, you will see that it supplies enough drive to produce a radical change in the behavior of the satiated rat.” The film then takes us through a parallel process to the one seen previously, in which the rat learns to press a bar in order to stop the electric current. The voice-over concludes: “The satiated animal learns even more rapidly than the hungry one did. This is because the drive produced by electric shock is stronger

than hunger,” a claim that instantly calls into question the supposed “mildness” of the shock itself. Pain, the film suggests, is a powerful motivator.

Finally, the film concludes by rapidly cycling through this same process with a variety of other learned behaviors, including spinning a wheel, gnawing a rubber tube, and striking another rat (the example with which this chapter began). Along the way, a title card notes that the rats will often continue to produce the learned behavior long after the shocks have ended, suggesting that this is because “the animal keeps responding to an acquired drive of fear.” The film ends with a summary of its basic concepts. “Motivation” provides a “drive” to the animal’s behavior, which is satisfied by certain “rewards.” When these rewards are paired with particular behavioral acts, the animal quickly learns to repeat those acts. Throughout the entirety of the film’s running time, it maintains its structure and aesthetics—stark, well-lit black-and-white images, a centered frame focusing on the experimental apparatus to the exclusion of all other surroundings, restriction of the scientists’ presences to voices and hands that emerge from offscreen, and the use of narration and title cards to describe events and walk us through their intended meaning. Cumulatively, this aesthetic constructs an interpretive framework for viewers to understand what they are seeing, filtering the actions of the onscreen rats through the concepts provided by the offscreen scientists, who manipulate and define the rodents’ behavior in tandem with the structure of the film itself. What Miller observed as the logical rationale for the rats’ actions was embedded into the very form of the film itself.

Yet, on their own, these aesthetic aspects are not enough to explain Miller’s far-ranging application of his theories or why he chose to take this particular approach. We must also understand the scientific program and research context out of which the film emerged. It is from this metatextual framework of funding institutions, academic debates, and traditions of nontheatrical filmmaking that the film derives its explanatory authority as a scientific text. How the film was used is ultimately as important as what it depicts.

Miller’s behavioral theories were developed at Yale’s Institute of Human Relations, where they were then translated into scientific cinema. From its inception, the IHR was an extremely ambitious undertaking to create universalist theories. Established in 1929 with a grant from the Rockefeller Foundation totaling more than \$2 million, its main purpose was fostering communication and the free flow of information across specialized divisions of the Yale campus.⁹ An article in the *American Journal of Sociology* at the time described it as “an organization which might unite on the study of man, bringing to bear on him the resources and techniques of the biological sciences with their applied aspects as represented in medicine, and the social sciences with their applied aspects as represented in law.”¹⁰ By creating a holistic, interdisciplinary understanding of “the human” in general, as well as concrete policy recommendations in particular, the IHR attempted to unite theory and practice in governing human society.¹¹

The goals of the IHR were the product of its moment in the history of psychology. Jill G. Morawski argues compellingly that the IHR should be read as a product of the anxieties sociology and psychology faced in the early twentieth century.¹² She positions the institute as part of an ongoing crisis in nineteenth-century rationalism, brought about by unstable developments in psychology and evolutionary biology. The mass of slippery dynamics revealed by Freud and Darwin suggested that human activity was not the product of rational or moral decisions, or even simple physiological reactions, but rather the result of a dense web of interrelating stimuli affecting the individual, its environment, and its unconscious mind. Disparate attempts in different fields to account for this baffling complexity led to a prevailing sense that the social sciences—especially with regard to behavior—were unmoored from any empirical ground that might connect their various branches. Morawski positions the IHR as attempting to contain this disruption by consolidating the divergent approaches for studying human beings within the organizational structure of a modern bureaucracy. Here, through a conglomerate system of disciplinary bureaus and dedicated teams, the institute could tackle problems whose complexity now eluded any individual researcher.

Film was used at the IHR to pursue these goals through a variety of different approaches, and its members include a wide array of innovators in scientific film. Arnold Gesell was associated with the institute while shooting his child development films, which, Scott Curtis argues, were meant to transform ephemeral psychological subjects into concrete, measurable observations.¹³ Alice Keliher, who oversaw the Human Relations Series of Films, was hired by the IHR just after completing her degree in education and helped produce many of Gesell's films. In Keliher's own work for the Human Relations Series, Craig Kridel sees an attempt to aid progressive classrooms by encouraging more holistic approaches to students as individuals.¹⁴ Additionally, beginning in 1935, Mark A. May, the educational film advocate and proponent of human engineering, became director of the IHR at the same time that he was deeply involved with the widespread implementation of film in the classroom (more on this in chapter 6). Film historian Charles Acland finds that through this work, "May and the organizations he led helped establish the procedures for participation in screen-mediated publics," transforming what was initially conceived as a public service into the hegemonic business of educational technology.¹⁵ As we can see from these examples, the meaning of "human relations" as a field, and the question of how film might relate to this amorphous concept, was articulated differently by different researchers within the sprawling, loose network of the IHR.¹⁶

Motivation and Reward in Learning is a unique iteration of the IHR's mandate. Unlike Gesell, Miller did not see film as a means of tangibly recording his subjects so that they could be observed more fully. Indeed, he actively dismissed this idea.¹⁷ Similarly, his commitment to behaviorist psychology precluded the approach of open-ended provocation adopted by Keliher. Instead, film for him was an example

of what his teacher, the neobehaviorist Clark Hull, called an “integrating device,” meant to theorize principles that could be broadly applied in a variety of fields.¹⁸ Like the institute-wide memorandums, projects, and symposiums, this film was meant to smoothly cross-pollinate ideas to a variety of differently specialized audiences of scientists and students. Its images were intended to be broad enough to evoke ideas that could be applied throughout the social sciences rather than replay particular instances or narratives. As such, it perfectly visualized the IHR’s goals of a totalizing interdisciplinarity and the generalization of terms and findings that such an approach necessitates.

By the mid-1930s, the project of stitching together the IHR’s various factions was of vital institutional importance, as it had become clear that the institute was not fulfilling its overarching promise, a fact that threatened its further funding.¹⁹ Sponsored faculty had been using their funds to pursue pet projects with little to no coordination between them and the IHR’s administrators. Consequently, when Mark A. May assumed directorship of the IHR in 1935 his primary task was to unify its various parts.²⁰ To aid in this process May enlisted Yale psychologist Clark Hull, who gathered together a group of young researchers for a series of seminars dedicated to the creation of an integrated research technique, which would use “motivation” as a singular topic to bring together studies from many different fields.²¹ Films of research were solicited and screened in these seminars, including those of Miller and Robert Yerkes. Here, as elsewhere at the IHR, film was used to present findings to other scholars, transporting rooms full of researchers to the screened image of the lab to watch experiments firsthand, while also inviting them to articulate what they saw within their own disciplinary terms and pursuits in the discussions that followed. Film’s mobility and accessibility were thus operationalized within the extensive bureaucracy of the IHR to build interdisciplinary lines of communication, thought, and conversation.

Motivation and Reward in Learning depicts Miller’s chief scientific contribution to this collaborative project: quantitative experimental findings from the animal laboratory. The film creates an image of animal behavior that depicts the internal states studied by many psychologists and social scientists, while also appealing to the empiricism of experimentalists, bridging a primary divide within the study of human behavior across disciplines. To accomplish this in his written research, Miller relied on a guiding theoretical approach that unusually combined the ideas of Ivan Pavlov and Sigmund Freud. As he colorfully described his own work for the *Journal of Abnormal and Social Psychology*, it was “a slender bridge” connecting “the analysis of the bizarre dreams of Freud’s patients to the electric recording of the salivation of dogs in Pavlov’s soundproof laboratory.”²² Suturing together such divergent frameworks was no easy task, requiring Miller to construct a unique explanation for his use of animals in the lab that resulted in less of a methodological integration than an alternating shift in register and language to accommodate both Freudian and Pavlovian theories.

Motivation and Reward in Learning features laboratory experiments that draw primarily from Pavlov's widely known research into canine behavior, which had provided a model for empirically testing the responses of living beings to their environment at the turn of the century.²³ Beginning with Robert Yerkes's initial translation of Pavlov's writing in 1909, the Russian scientist's work was well established as a major influence on American behavioral psychology by the 1930s.²⁴ His central experiments from 1891 to 1900 focused on the behavior of dogs that were conditioned to respond to a metronome as if it were food.²⁵ This was achieved through a series of repeated tests in which dogs were fed concurrently with the sound of the metronome. Eventually, they began to salivate any time a metronome was started, even in the absence of food. Ultimately, these experiments were taken to demonstrate the extreme influence of the environment on even the most involuntary of behaviors, eradicating the line between instinctual and learned actions. Pavlov's vastly influential "conditioned reflex" hypotheses inspired generations of psychological experimentalists, including Miller.

Film was also a central method used to popularize Pavlov's theory. The pioneering Soviet filmmaker Vsevolod Pudovkin cinematically rendered the conditioned reflex hypothesis in his 1926 film *Mechanics of the Brain*, which was created to spread Pavlov's groundbreaking theories across the vast expanse of the Soviet Union.²⁶ This film's aesthetics provide important context for understanding the ways that *Motivation and Reward in Learning* both adapted and altered Pavlov's approach.²⁷ To visualize the scientific concept of "conditioned reflexes," Pudovkin cinematically and corporeally rearranges the bodies of several dogs. A series of insert shots detail a fistula, which has been installed in one dog's cheek to reveal its salivation responses. The film additionally enhances the dog's transparency through an animated rendering displaying the stimulus of an electric shock as it travels to the brain and is turned into a response. These are just a few of the ways the dog's behavior is revealed through Pudovkin's use of film form. The title cards that label and explain the action; the editing that creates a logical cause and effect between the metronome and the dog; and the camera placement that encloses and specifies the pertinent information—all mold the dog into a cinematic subject that manifests the central experimental subject of behaviorism. Ultimately, *Mechanics of the Brain* visualizes the dog's response to its environment as a quantifiable pattern that can be recorded and analyzed. The film therefore creates a cinematic image for behavioral sciences by transforming the dog's image into a logically operating mechanical system.

Just as Miller set out to adapt Pavlovian theory with his experimental work, *Motivation and Reward in Learning* alters the aesthetics of *Mechanics of the Brain*. Pavlov had an avowed disdain for the methods of psychology, which led to the exclusion of all internal states from the testable space of the lab and also the diegetic space of Pudovkin's film. Unlike the Yerkes films discussed in chapter 2, *Mechanics of the Brain*'s onscreen dogs are meant to be merely mechanisms, without evoking any particular psychological or ideational state. But



VIDEO 4. *Mechanics of the Brain* (Vsevolod Pudovkin, 1926).
DOI: <https://doi.org/10.1525/luminos.145.4>



Motivation and Reward in Learning shifts this representation of scientific animal subjects, deploying Freudian descriptions of internal states even while continuing to use Pavlovian experimental methods and thereby establishing the onscreen rats as simple characters rather than machines. As the film's title prominently proclaims, motivations rather than mechanisms are the subject of Miller's cinematic laboratory space. This switch from mechanized to motivated behavior relies heavily on the film's title cards and narration, which, unlike *Mechanics of the Brain*, associate the film's images of particular behaviors with discrete desires on the part of the rat. For instance, while *Mechanics of the Brain* contains many close-ups, these are largely restricted to insert shots that simply highlight pertinent details, such as the amount of saliva collected by the dog's fistula, which are then noted in the film's titles. *Motivation and Reward in Learning*, by contrast, contains many seemingly unmotivated close-ups of rats' faces as they perform their learned tasks. These shots do not provide viewers with more factual information about the experiment in the way that those in *Mechanics of the Brain* do. Rather, they serve to personify the changes in the rat's internal motivation, inviting audiences to search the rat's face for signs of changes in its drive. The film's titles then supply a corresponding behavioral concept, providing a linguistic handle to describe the interiority evoked in the previous scene. In many ways, this process mirrors the production of identification seen in the Yerkes films, except that Miller's film is far more constrained in the inferences that it allows. While interest in the rats' internal experiences are elicited by film's use of the close-up, this same interest is constrained and delimited through the title cards, which provide simple neutral descriptors for their behavior. The rats do not "beg" the way Yerkes's chimps do, but they may be "irritated," "satiated," or "frustrated." By coding the findings of Pavlovian experiments with the vocabulary of Freud, and shifting the format of the film to emphasize the rats as characters with identifiable desires, Miller claimed to present the psychological motivations of lab animals as empirical and testable subjects.

But the language of drives and repressions that Miller appropriated from Freud was created to discuss *human* patients, and it, too, needed to be altered to fit Miller's use of it. For his part, Freud was noncommittal about what the psychological

lives of animals might precisely consist of. His primary methodology—the talking cure, which was premised on in-depth conversations with patients—necessarily excluded animals. Furthermore, in *The Interpretation of Dreams* (1899) and *Civilization and Its Discontents* (1930) Freud suggests that animals exist in a state outside the repressions caused by society, where desires remain unblemished by the restrictions of cultural taboo and tradition.²⁸ This would seem to have placed animals outside the scope of Freud’s psychology—as inaccessible objects to a discipline founded on the symbolic interpretation of verbal descriptions and memories. As Freud wrote: “What animals dream of I do not know.”²⁹ But in Miller’s work the animal’s lack of social conditioning does not exclude it but rather makes it an *ideal* experimental subject. As he and Dollard explain in *Social Learning and Imitation*, animals are readily accessible blank slates that can have the restrictions of society inscribed on them through laboratory experiments.³⁰ Miller and Dollard thereby reframed the Pavlovian experiment as the initial steps in the complex process of sublimation and repression that Freud saw as essential for creating the mature social subject. Introducing an animal into an experimental apparatus was made conceptually comparable to the introduction of a human individual into the constrictions and confines of society.

According to *Motivation and Reward in Learning*, rats have clear motivations that drive them, and their motivations are integral parts of the experimental scene. These drives are redirected by the apparatus to produce behaviors that the film’s intertitles label as closer and closer to those of social interactions. Within the context of Miller’s research program, we can see that viewers were meant to see these images as primal scenes of animal life being introduced into the structures of culture, depicting the first halting steps in the process of socialization. When we view the anxious rat ceaselessly spinning the wheel even after the electric shocks have ended or the heavy breathing of the battling rodents who take a moment to pause between jolts, we are not meant to see an animal transformed into a machine—as in *Mechanics of the Brain*—but rather an animal that has been transformed into a humanlike subject. This process is aided by the film, which directs the audience to understand and consider the emotional states of the rat. Such observations were then compounded within Miller’s disciplinary context, where the events in these images were directly described as depicting the animal’s initial, desperate, and painful metamorphosis into an approximation of the civilized individual.

By producing internal emotional states as categorizable, visible, and testable subjects within the body of laboratory animals, and by reconceiving the experimental apparatus as a simulation of society, Miller’s film transforms individual psychology into a behavior that could be observed, optimized, and, finally, controlled. As historian of science Rebecca Lemov observes, claiming to experiment with internal states ensured that “the laboratory would be more surely connected to the world outside.”³¹ Miller’s coauthored publications lay out this logic clearly, finding echoes of his experiments in a variety of human scenarios, including

laboring at one's job, moving to a new neighborhood, and going on a date, among others.³² Indeed, in an attempt to further the IHR's pursuit of applied science, his experiments with lab rats led to a series of practical recommendations for the US military in training soldiers to harness their own fears on the battlefield in 1943.³³ The primary generalization on which *Motivation and Reward in Learning* is premised—in which the rats' behavior is equated with the abstract process of becoming a social subject—ultimately justified the application of Miller's behavioral theories in a wide arena of social settings. If experiments with laboratory rats were analogous to the introduction of an organism into society, the explanatory power of these experiments was vast.

“ANALYSIS OF A LYNCHING”:
THE TRANSFORMATIVE POWER OF THE LAB RAT

A startling confession is buried in “Analysis of a Lynching.” Most likely written by Dollard, the chapter seems to refer to an experience he had while researching his highly influential 1937 book *Caste and Class in the American South*. He writes: “One of the writers has himself felt the morbid rise in interest and tendency to go along and at least watch, which was aroused at the perception of a lynching mob in action. Without this experience, he would have affirmed that he could show only unqualified horror at such a sight.”³⁴ Dollard thus suggests that not only was he fascinated by observing a lynching but that he also felt compelled to join and “at least watch,” suggesting, of course, that he might have done much more than just watch.

The paragraph ends with this confession, which is never returned to in the text. Instead, the authors move on with their attempt to use Miller's behaviorist concepts of “drive,” “cue,” and “reward,” to code the NAACP account of the anonymized 1933 lynching, supposedly explaining how white members of the mob were driven in their violence by elements in the surrounding circumstances and culture of the South. Although the book does not return to Dollard's confession, it seems clear that Dollard is comparing his experience of attraction to the lynch mob to those of these other white members of the mob. Here, the transformative power of observations in the lab is on full display. The author's “morbid desire” to join the lynch mob is no longer a troubling sign of his own contribution to a society premised on racial terror but rather is rationalized and explained as part of the eternal dynamics of living organisms. The lynching itself is also transformed—now a “behavioral event” instead of an “unqualified horror”—following the predictable rules of individual-group dynamics. Finally, laboratory rats in behaviorist experiments are also transformed, made suddenly analogous to the acts of the southern lynch mob.

Dollard and Miller articulate their shared vision for the study of behavior most fully in *Social Learning and Imitation*. Their argument is built on three core case studies: learning and imitation with rats in a maze, children at a school, and white

participants in a lynching. The first and the last of these act as opposing poles in complexity, fervor, and nuance. Through the comparison of rat-child-lynching, Miller and Dollard seek to establish the universality of behavioral psychology's principles, presenting behaviorist experiments as capable of explaining even the most incomprehensible and horrifying acts. Mirroring the framework of Miller's film, *Social Learning and Imitation* positions the rat as an unsocialized form of life.³⁵ Here, culture is conceived as a corollary to the design of an experimental apparatus. As the authors state: "Culture, as conceived by social scientists, is a statement of design of the human maze."³⁶ This analogy allows Miller and Dollard to use lab rats as facsimiles for the otherwise prohibitively complex behavior of humans in social settings. Early chapters outline how thirty-two Wistar rats were tested to see if imitation could be learned, generalized, and reproduced, with the conclusion that specific imitation responses can be induced given the right "drive," "cue," and "reward."³⁷

Social Learning and Imitation concludes by applying these same principles of imitation to Dollard's main area of research: race relations in the American South, specifically the murder of a young Black man by a lynch mob in an anonymous southern town. Miller and Dollard's description of the lynch mob is based on an anonymized 1933 account produced by a "highly qualified white investigator" for the NAACP, which chronicles the town's homicidal response to the alleged murder of a white woman by a Black man.³⁸ Using the behavioral theories featured in *Motivation and Reward in Learning*, Miller and Dollard map the town's preexisting culture of racism, a pattern that shapes each of its inhabitants.³⁹ Through this process, the authors break down and recode the horrors of the lynching as the outcome of predetermined responses that occur in human organisms to the drives, cues, and rewards supplied by the southern milieu. Like the rats' primary drives for food and relief, Miller and Dollard argue that the primary drive in the lynching was the town's white residents' fear, caused by prevailing economic and sexual anxieties and prejudices. The setting of the American South, according to the authors, drives these white southerners to participate in the lynching through a series of prompts and rewards for doing so. These include deep-seated racist fears, the economic and sexual infrastructure of the South, law enforcement's cooperation in and implicit permission for lynchings, and the amplifying effects of media coverage and word of mouth. The South thus becomes akin to the experimental enclosure of *Motivation and Reward in Learning*, a setting that acts on its living inhabitants, thereby shaping their behavior like those of the rats.

Miller's rat experiments were used in social science settings most consistently through his partnership with Dollard. Beginning in the early 1930s, and spanning more than a decade, this collaboration produced three books and many articles.⁴⁰ Dollard's interest in biological research and inborn drives was sparked by his training as a Freudian psychologist, which, according to Miller, gave Dollard a "vivid view of people with their biological drives and instincts struggling to adjust to the

cultural demands of their society.”⁴¹ Over his long career, Dollard increasingly read social behavior as the struggle between individual inborn desires and preexisting cultural structures. “Each person,” he wrote, “is a record of a battle” between childhood desires and social order.⁴²

Within social science circles of the “culture and personality school” of anthropology, Dollard participated in conversations that were focused on the use of Freudian psychology in ethnographic research.⁴³ Largely reacting against theories of racially determined intelligence, especially those espoused by Robert Yerkes, and spurred on by the emergent political realities of New Deal America, the culture and personality school was a diverse group of anthropologists who rose to prominence arguing that race is a social construct.⁴⁴ Inspired by the work of Franz Boas, the most prominent members of the culture and personality school were Zora Neale Hurston, Ruth Benedict, and Margaret Mead.⁴⁵ Dollard’s *Caste and Class in a Southern Town* was also considered a major contribution to the culture and personality school.⁴⁶ This movement was premised on combining psychoanalytic categories with ethnographic fieldwork to generate studies of “national character” and “patterns of culture.” Such “patterns” were thought to be abstract cultural formations that preexist and socialize individuals differently depending on the community into which they are born.⁴⁷ Here, the process of socialization, particularly in childhood, was considered key for understanding differences between cultures.

From the beginning, the culture and personality school developed its ideas in conversation with behavioral psychology.⁴⁸ Indeed, Ruth Benedict depicted her own work as a consequence of Pavlovian behaviorism, which she saw as posing primary challenges to the ways that “instinctive” and “culturally conditioned” behavior had been categorized in the past.⁴⁹ If circumstances could alter even basic physiological functions (such as a dog’s salivary responses), it becomes increasingly difficult to separate inborn nature from the effects of cultural conditioning. Benedict expanded by observing that contemporary Western culture, unlike Pavlov’s dog, created a circumstance where identifying singular conditioning stimuli became impossible owing to the complex networks of modern media, standardization, and social structure. She argued that modern human beings are constantly being conditioned by an immersive technoculture that surrounds them. As a solution, Benedict proposed “primitive cultures” as an ideal setting for study, focusing on examples from Native Americans in New Mexico. Labeling such settings anthropological “laboratories,” she argued that the relative separation and “simplicity” of these societies allowed for the isolation of cultural themes as discrete objects of study.⁵⁰ Here, despite her protestations to the contrary, Benedict’s theories imported many of the central racist tenets of social Darwinism into the culture and personality school.

Throughout his career at the Institute of Human Relations, Dollard pursued this interaction between behaviorism and anthropology. He first arrived at Yale in 1932 for an influential early conference run by another of Boas’s students,

Edward Sapir—a connection that would eventually lead to Dollard being hired at the IHR—and he continued to have a long-standing contact with many of Boas's students, especially Margaret Mead.⁵¹ Prompted in part by Dollard, the IHR's seminars became a central setting for synthesizing the theories and methods of Boasians with the theories and methods of behavioral psychologists. In 1940, Mead was invited to present to a small group of IHR researchers (including Miller and Dollard) by Mark May, who wrote to her that many members were requesting she discuss "socialization" as a topic "that concerns us very much." Mead herself was deeply influenced by the totalizing concept of "Human Relations," which Hadi Gharabaghi argues was the rationale undergirding her thinking about documentary film.⁵² Under the influence of Clark Hull and Miller, Dollard began increasingly to discuss the primary terms of the culture and personality school in the context of animal laboratory studies, framing his research into southern racism with behaviorist terms used for describing the abstract relationship between an animal and its environment. As he begins a 1938 essay on the subject of "race prejudice": "Prejudice reactions cannot be separated from the responses of the organism to its total environment and can only be seen adequately when the nature of this process of socialization is clearly held in mind."⁵³

In addition to countless books and essays, the culture and personality school created a body of ethnographic films that dramatically reshaped the genre and about which contemporary film scholars have dedicated significant effort to study and critique. These films include Boas's own cinematic field notes of the Kwakiutl (*Kwakaka'wakw*) of the Pacific Northwest in 1930, Hurston's fascinating and complex films of Black communities in the American South, and Mead and Gregory Bateson's multiple filmed ethnographies.⁵⁴ With the exception of Hurston's work, these films share the conceptual goal of using discrete photographic images to create a generalized notion of a cultural whole.⁵⁵ As Jay Ruby writes of Boas's films of the *Kwakaka'wakw*: "The footage only makes sense if one believes that behavioral events removed from their normal social and physical context retain sufficient validity to reveal patterns of culture."⁵⁶ Similarly, Margarete Mead and Gregory Bateson describe their visual ethnography as not about the particular practices and lived experiences of a culture but about how these practices and experiences "embody that abstraction which (after we have abstracted it) we technically call culture."⁵⁷ Mead and Bateson most frequently achieve abstraction through a process of synthesis and comparison, in which the same behavior—say, bathing a baby—is filmed in a variety of different cultural settings, which are then cross-referenced with each other. Fatimah Tobing Rony describes this abstraction process as really a process of *extraction*, in which Mead's and Bateson's films erase all traces of a country's political history, the spiritual content of filmed rituals, and the signs of the film's production process.⁵⁸ Like the aesthetic interventions made in *Motivation and Reward in Learning*, these ethnographic filmmakers actively produced the abstraction of "patterns of culture" in their films through formal interventions,



FIGURE 6. Screengrab from *Bathing Babies in Three Cultures* (Margaret Mead and Gregory Bateson, 1951).

as well as theoretical frameworks, which allowed documentary footage to become a “behavioral sequence” bespeaking larger, often ahistorical, notions of cultural identity.⁵⁹ The stated goal was to look beyond the specificities captured by the film to see the otherwise invisible “culture” undergirding them.

Film was thus used to transform anthropological fieldwork into the laboratory-like practice that Ruth Benedict envisioned. It could isolate and remove human behavior from the complex network of interactions that surrounded it. It allowed these behaviors to become repeatable experiments that could be mined in the future for the purposes of confirmation or for new investigations.⁶⁰ And, finally, it allowed for an empirical “cross-referencing” of behaviors to locate patterns of culture through the comparison of specificities in each individual action.⁶¹ By cinematically isolating individual behaviors, such as ear-piercing or bathing, different practices were compared across cultures, meant to illustrate the psychological effects of these differences in custom.

Created in response to these ideas, *Motivation and Reward in Learning* accelerates the abstraction process by removing all references to particular human cultures or activities. Like Mead’s and Bateson’s films, such as *Trance and Dance in Bali* (1952), *Childhood Rivalry in Bali and New Guinea* (1952), and *Bathing Babies in Three Cultures* (1954 [fig. 6]), Miller’s is an attempt to visualize the process of socialization in which individuals are incorporated into a preexisting cultural milieu.⁶² But through the metaphoric readings of the onscreen rat, Miller was capable of creating abstractions far beyond those sought by Mead and Bateson. Indeed, Miller’s rats stand in as *universal* depictions of the socialization process rather than as patterns for any particular culture or people, a fact that can be seen in Dollard’s extensive application of Miller’s framework.

“Analysis of a Lynching” illustrates the overarching ambitions of Miller and Dollard’s work in their attempt to synthesize their respective projects. The comparison between electrocuted rat and lynch mob was meant to function as an extreme example of the explanatory powers of behavioral psychology and laboratory research. Such an approach was in some ways surprisingly effective, allowing Miller and Dollard to identify elements of structural racism that led to the lynching. But, at the same time, the perpetrators of the lynching itself are generally divested of any agential role in the act itself, driven to their murderous behavior

as unwittingly as the rats in the lab are made to strike one another. As William F. Pinar argues, Dollard, and the many later works that were influenced by him, represents lynching as a “southern variation of the human condition,” an uncontrollable human response rooted in dynamics outside their individual choices.⁶³

Much has been written about the use of animality to position nonwhite groups as “less than human,” through the comparison between them and nonhuman animals. Yet here we see an inverse potential, in which whiteness’s status *as animal* is posited and mobilized by a dominant scientific discourse. Like Zakiyyah Iman Jackson’s analysis of white violence during slavery, human/animal distinctions are used here to explain, and to some extent justify, brutal acts of racialized violence. But, unlike the model Jackson describes—where white supremacy offers a proscribed humanity made plastic by the “authorized killing, consumption, and disposability of fleshy existence”—the comparison here between human and animal is made as an alibi for white violence, now recognized as brutal, horrific, and inhuman(e).⁶⁴ The relief that Dollard describes in his introduction to the chapter, where his desire to join the lynch mob in its “unqualified horror” is finally explained, points to the extreme power of this comparison, allowing racism to be an expression of unfortunate-yet-ingrained elements of human and nonhuman animal behavior.

Thus, in Miller’s work the lab animal inverts the standard relationship between animality and reason. Its proposed simplicity—its dependence on primary rather than secondary drives—and its containment within the controlled laboratory environment made it an ideal symbol of rational behavior. In a post-Freud, post-Darwin world—where the murky and perverse desires of the unconscious mind and the complex web of historical and social interrelations between individual and environment baffled empirical research—being driven by food or hunger was a relatively straightforward, reasonable, and rational desire. Here, the reasonable lab rat was an instrument for containing the unreasonable unconscious and its often-brutal actions. This pursuit is best exemplified in the juxtaposition of the lab rat and the lynch mob, where the capacity to comprehend the lab rat in all its simple reasonableness promised to assuage the uncontrolled sadism of white America’s racist subconscious—the deepest depths of its anti-Blackness.

None of the lynching’s horrors are directly on display in *Motivation and Reward in Learning*. Yet they, and many other “behavioral events,” persist in the emptying out of the rat of any interiority besides that which is strictly defined by the film itself. *Motivation and Reward in Learning*’s isolated image of the lab rat, existing in the highly stylized and hyperrational world created by the film, is malleable, reasonable, and controllable in a way that the lynching’s details are not. The film abstracts the electrified rats as they battle one another, desperately spin a wheel, or learn to operate a mechanical lever until they represent the rudimentary outlines of other, much more complex and uncontrollable, human behaviors. Occupying

the position of both empirical observation and rational thinking, these images join together social and experimental sciences to offer a totalizing theory of behavior. Cinematic rats became embodied concepts, living breathing models that bestow great power to explain and rationalize the world at large on those who can use and define them, a process we will continue to explore in the next chapter.