

## Chapter 9

# John B. Watson: Profile of a Comparative Psychologist and Proto-Ethologist

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Often lost in the controversy over John B. Watson's later life are his major contributions to the study of instinctive behavior earlier in his career. As Samelson and Todd (both [this volume](#)) describe, he was pivotal in the development of comparative psychology and merits recognition as a proto-ethologist. Samelson's and Todd's analyses clarify how this work was compatible with early Watsonian behaviorism (Watson, 1913b, 1914). Still, some additional attention to the details of Watson's research in comparative psychology is warranted. I shall, therefore, review briefly some of his work, largely from the period of 1903-1915, in support of these generalizations. I shall also consider some of the attributes of comparative psychologists and ethologists and summarize some of Watson's work in relation to those attributes.

Comparative psychologists and ethologists study a variety of species, both domesticated and nondomesticated. Watson's research was with laboratory rats, three species of monkeys (e.g., Watson, 1908b), and four species of birds (two species of terns, chicks, and homing pigeons; e.g., Watson & Lashley, 1915). The comparison of closely related species, as in Watson's work with terns, is especially characteristic of later work in ethology. According to the editor of *Bird Lore*, "His papers should be examined by all serious students of birds" (Chapman, 1915, p. 461). Further, Watson was conversant with the literature on a much wider range of vertebrate and invertebrate species. He wrote critical book reviews and literature reviews of the work of such students of invertebrate behavior as S. J. Holmes, H. S. Jennings, J. Loeb, S. O. Mast, the Peckhams, and C. H. Turner (see Appendix, [this volume](#).) In calling for an experimental station for the study of animal behavior, Watson (1906a) noted the need for research on a wide range of species, especially insects and birds.

Comparative psychologists and ethologists study a full range of behavioral patterns, generally in relation to the natural lives of animals, often working in the field. The most relevant of Watson's work is the field research that he did during four summers on Bird Key, in the Dry Tortugas, off the coast of southern Florida. Watson reported on the status of the colony (Watson, 1907b), and studied a full range of behavior including eating and drinking, mating behavior, nest building, mate recognition, egg recognition, and daily activity rhythms (Watson, 1908a, 1909c; Watson & Lashley, 1915). An example of his proto-ethological care in description can be found in his report of food exchange during courtship in noddy terns (Watson, 1908a, p. 196). The focus of the research was on orientation and homing, a persistent problem in later ethology (Watson, 1908a, 1909a, 1910a, 1915a; Watson & Lashley, 1915).

Watson's appreciation of the field setting can be seen in his comments to Robert Yerkes on the four monkeys he brought and allowed to run loose on Bird Key. He wrote:

Conditions up North are not natural.... They are like kittens, romping and playing, tussling etc. I dislike to think of taking them back and trying to get reliable results in the laboratory.... there is a spontaneity here which I had never seen in the North—and I had things in good shape for the monkeys in the laboratory.<sup>1</sup>

Even in his laboratory work on learning in rats, Watson was concerned that the testing situation be appropriate to the animal under study. He noted that "every animal requires a set of problem-boxes particularly adapted to his anatomical structure and instincts" (Watson, 1907a, p. 424). His 1912 extrapolations to recommendations for researchers working with humans provides an

interesting emphasis on the individual differences among babies: "They might carefully note the individual tendencies, impulses, capabilities, and defects in each child, and could shape their methods for training intelligently" (Watson, 1912b, p. 382).

Comparative psychologists and ethologists study a wide range of problems of the evolution, adaptive significance, developments, and control of behavior. That Watson was interested in the evolution of behavior can be seen in his call for an experimental station (Watson, 1906a) and in his book chapter entitled "Concerning the Origins of Instincts" (Watson, 1914). He wrote of instincts as "phylogenetic modes of response" (Watson, 1914, pp. 106-7) and that the instinctive behavior may or may not be adaptive in the Darwinian sense (p. 106). Regrettably, however, at this point in his career Watson favored a Lamarckian view of inheritance and made no major contributions to the study of evolution.

By contrast, Watson's work on the development of behavior was substantial and important. In his doctoral dissertation (1903) he attempted to correlate the development of the nervous system with the development of learning ability; this work deserves recognition as a classic in developmental psychobiology. In other work Watson compared body growth in rats and humans (Donaldson, Dunn, & Watson, 1906) and studied the development of a young monkey (Lashley & Watson, 1913) and of noddy and sooty terns (Watson, 1908a). He observed imprinting in the young terns: "The birds have formed a great attachment for me. They will follow me all around the room" (Watson, 1908a, p. 240). He recommended that, if good results were to be obtained, the student of adult behavior should obtain animals when they were young (Watson, 1907d). Developmental studies would have been given prominence in his proposed field station for the study of animal behavior (Watson, 1906a).

Watson also was concerned with the immediate control of behavior. His dissertation was Watson's major contribution to the analysis of neural correlates of behavior. However, the analysis of the sensory control of behavior was a dominant theme throughout his work of this period. In his first book, Watson (1914) devoted nearly one hundred pages to sensory control. Watson (1903) reported what appears to be the first laboratory study of pheromonal communication in mammals. He was especially interested in vision, publishing papers on color vision in monkeys (Watson, 1909b), methods of studying vision (Yerkes & Watson, 1911), responses of rodents to monochromatic light (Watson & Watson, 1913), and the visual capacities of birds (Watson, 1908a; Watson & Lashley, 1915). Watson was concerned not only with sensory capacities, but with the particular senses used in the regulation of behavior, as in his work on orientation (e.g., Watson & Lashley, 1915) and on the sensory control of maze learning in rats (Watson, 1907a; Carr & Watson, 1908).

Comparative psychologists interact with biologists in working on animal behavior. Although he was sometimes critical of biologists' approach to behavior (e.g., Watson, 1907c), Watson did interact closely with biologists, as with his work on various journal editorial boards. He wrote that "I don't believe a man can truly study *behavior* without being versed both in Psychology and Zoology,"<sup>3</sup> and that "Comparative psychology is rather the common meeting ground of the psychologist and the biologist" (Watson, 1906b; see also Watson, 1910b).

Watson shared other characteristics with ethologists. Like them, he seemed to have a love of animals (see Hannush, 1987). Late in life Watson retired to farms and often was photographed with animals (see Buckley, 1989). Like ethologists, Watson recommended the "deprivation experiment" as the preferred method in studying instincts (Watson, 1912b, 1914).

Despite these many contributions, Watson was rejected by virtually all European ethologists. Konrad Lorenz (1981, 1985) reported having been made critical of Watson's alleged extreme environmentalism at the instigation of Karl Buhler. After the period covered herein, Watson shifted his interests to the study of human behavior and an emphasis on environmental determinants of behavior (see O'Donnell, 1985; Pauly, 1987; Samelson, [this volume](#)). However, as best I can determine, he never clearly reversed his position regarding instinct in nonhuman animals (Watson, 1927a, 1928). Rather, he reversed himself on an issue raised in the critical first paragraph of his 1913 manifesto—the issue of continuity in the control of behavior between humans and nonhuman—manifesto (see Logue, 1978, [this volume](#)). Yet he was perceived as arguing that all behavior in nonhuman animals is learned; that perception, or misperception, has guided many

evaluations of his work.

In response to a letter promoting Watson as a proto-ethologist, in 1982 Lorenz wrote me: "I begin with the confession that I am quite aware of having done some injustice to the behaviorists in general and to John Watson in particular. What I know about him, is only what Karl Buhler made me read of his works and this was calculated, I think, quite consciously to irritate me and raise my objections." But Lorenz reflected that "I feel that having done some *really ethological work on terns* (emphasis mine) he is more reprehensible for having held his later views."<sup>4</sup>

I would not argue that Watson's work in comparative psychology and ethology constituted his major career effort or had a major, direct effect on the development of European ethology. However, this work was important to Watson and to the development of the study of animal behavior, and deserves to be recognized more widely. Had Watson's career ended in 1915, he would be remembered as an important figure in the study of animal behavior. Further, though often forgotten, Watson viewed his work on instinct in animals as fully compatible with his developing behaviorism.

## Chapter 10

### John B. Watson's Early Scientific Career: 1903-1913

Robert Boakes

In 1903 John B. Watson completed his Ph.D. at the University of Chicago and published his first book—a monograph based on his doctoral research (Watson, 1903). In 1906 he was appointed to a full professorship at a major university at what even in that era was the unusually young age of 29. By 1913, when his first publication on behaviorism appeared, he had already become a leading figure in American psychology, sufficiently eminent to have been selected as a future president of the American Psychological Association (see Todd, [this volume](#)). This career development was not only rapid by today's standards, but notable to his contemporaries. To a certain extent it reflected his very considerable professional contributions to psychology (see Appendix, [this volume](#)). From the time he graduated until after he had left academic life, Watson remained deeply involved in the business of writing reviews, editing journals, and supporting colleagues. When scandal forced James Mark Baldwin to leave Johns Hopkins University in 1908, someone was needed in haste to take over the editorship of the *Psychological Review*. Watson was not only at hand, but already had a well-proven record for carrying out such a task in a highly effective way. This editorship—which Watson immediately recognized as a "fat juicy job" (Buckley, 1989, p. 60)—provided a key position for ensuring that Watson knew more about current developments in psychology than most of his contemporaries, and knew about them earlier.

Nonetheless, a long list of jobs well done on behalf of the profession and an effective personal style—the "superficial masculine sociability" noted by Burnham ([this volume](#))—are not usually sufficient to make someone eligible for the presidency of a scientific society. A distinctive contribution to the discipline is also usually required. It is arguable that the reputation he gained as a research scientist during the first ten years of his career amplified very considerably the general impact of his ideas on behaviorism. What, then, was the basis for this reputation?

The immediate impression one gains on examining Watson's first ten years of research is of its diversity. Almost the only feature common to his publications in this period is that they all involved nonhuman subjects. There is no major theme to his work that is readily apparent. Like his friend and close colleague, R. M. Yerkes, he used a range of species in his various experiments. But, where Yerkes was a comparative psychologist in the strict sense of attempting to understand psychological processes by means of systematic comparisons between species, Watson's switches from rats, terns, or monkeys at first appear impulsive and opportunistic (see Dewsbury, [this volume](#)). Where other famous contributions to animal psychology—from Pavlov to Tolman to Skinner—have provided justification for their beliefs in the fundamental contributions to psychology as a whole to be gained from studying nonhuman species, and maintained coherent research programs on the basis of such beliefs, Watson's attitude was quite different. He referred to the convenience of animals as subjects, and to his doubts about interpreting the results of experiments with human subjects because of all the variability of individual experience they bring into the laboratory. But that was about all. Instead, his general approach during this decade was that of a committed experimentalist who worked on well-defined empirical problems in psychology and happened to prefer using animals as subjects. At least, this is what is conveyed both by his publications of the time and his later comments (Burnham, [this volume](#); Watson, 1936) which raises questions of how the problems were defined: To what extent were the aims of Watson's research commonly accepted as being of high priority by his peers, and to what extent did his work have its own distinctive flavor? To what extent was his agenda set by others and to what extent was his research innovative?

To answer these questions requires at least a sketch of the state of animal psychology around the turn of the century. The background context was provided by post-Darwinian debate over the

evolution of mind. The argument that understanding the human mind could benefit considerably from systematic comparisons of the mental abilities of different species was sufficiently plausible for comparative psychology to gain a modest place, along with developmental psychology, in the expansion of experimental- mental psychology within North American universities that occurred toward the end of the nineteenth century (Boakes, 1984; O'Donnell, 1985). In the immediate foreground to Watson's research were two major developments.

The first was Thorndike's (1898) critique of the evolutionary viewpoint, based on his pioneering studies of learning using mazes and puzzle boxes. In addition to the classic analysis of problem solving in terms of trial-and- error learning resulting in stimulus-response connections, Thorndike reported a series of negative results that have had a greater impact on his immediate successors than his theory of habit formation. He failed to find any differences in learning ability across the four types of animals he studied: chicks, cats, dogs, and later, monkeys. He failed to find any evidence that his animals could learn either by imitation or by being passively put through a task. And he failed to find evidence for forgetting, let alone differences across species of a kind that might have stimulated comparative studies of memory. Thorndike challenged his successors to prove him wrong. Over the next decade almost all of the few psychologists who were interested in this issue and had at least some limited opportunity to work with animals rose to the challenge.

The second development was one that eventually provided much better opportunities for laboratory studies of animal behavior. The first paper reporting a study of learning in the rat was published by Small in 1900, the year Watson entered the University of Chicago. One of the part-time jobs Watson took on as a graduate student at the time was as caretaker to the second colony of laboratory rats existing in North America (Boakes, 1984; Watson, 1936). Watson would not have found working with animals so satisfactory if, like Thorndike, his experiments had depended on a few available pets or, like Yerkes, on species that were much more expensive and difficult to keep in any numbers.

If one now turns to the research Watson carried out prior to 1913, one can easily distinguish the issues set by others. His experiment on imitation learning in the monkey (Watson, 1908b) was one of many in this era (Boakes, 1984), and notable only in that the results made Watson more skeptical about such learning than most of his contemporaries. Similarly, he tested his monkeys on the problem- solving tasks that Hobhouse (1901) had introduced, and as a result of their failures (Watson, 1914), decided that Thorndike was right and Hobhouse wrong (though allowing that apes might have performed better). The aim of his series of experiments on maze learning in the rat (Carr & Watson, 1908; Watson, 1907a) was to discover the sensory cues—visual, smell, and so on—used by the rat; this problem had been set by Small (1900, 1901) in discussing the facility with which rats could learn to thread their way through a Hampton Court maze. Following his appointment at Johns Hopkins University in 1908, Watson put an enormous amount of effort into studying the visual abilities of rats and monkeys (Watson, 1909b; Watson & Watson, 1913; Yerkes & Watson, 1911). What was unusual about this research was the degree of dedication: Understanding the sensory abilities of different species was generally recognized as a preeminent goal for any kind of comparative psychology, but, apart from Yerkes, no contemporary seems to have had sufficient enthusiasm for the technically challenging and highly laborious work that was necessary for any thorough sensory research in that preelectronic era.

There are two interlinked themes in Watson's research that distinguish it from that of his peers. One is a concern with development. Following his supervisors' suggestion, his doctoral research examined the learning ability of rats at different ages (Watson, 1903). He was impressed by the learning ability of very young rats, but aside from a study by a student, Jessie Allen (1904), neither he nor any contemporary followed up on this work, until he had the opportunity to study terns during his summers on the Dry Tortugas (Watson, 1908a). Here one of his major early concerns was the role of learning in the behavioral development of the young birds. Later, he and Lashley also studied the development of young monkeys (Lashley & Watson, 1913). Watson's related concern was with the relationship- between instinct and learning, which took an active form again mainly with the terns, in which he observed and recorded instances of imprinting of the kind Spalding (1873) had described. The conceptual framework Watson brought to this issue owed a great deal to Morgan (1896), whose discussion of the distinction between instinct and habit was



well known at this time. The major lesson Watson gained from his occasional studies of these issues was of the large degree of variation in the plasticity of behavioral development across species.

It is also interesting to look at issues of the time in which Watson did not become personally involved, even though he was fully aware of them and took great interest. One had to do with the development of more complex learning tasks that moved beyond procedures introduced by Thorndike, notably the delayed reaction task and the multiple-choice discrimination. The former allowed testing of an animal's ability to respond to stimuli that were no longer present and thus provided a way of studying what was later called "short-term memory" (Cole, 1907; Hunter, 1914). The latter provided a way of studying an animal's ability to learn to respond on the basis of relationships such as the leftmost of a set of positions as opposed to a particular position (Hamilton, 1911; Yerkes & Coburn, 1915). Watson appreciated the potential significance of these developments, as well as the methodological shortcomings of the original experiments (Watson, 1914, pp. 224-27), but never carried out experiments of this kind himself. A further omission is any substantial contribution to theories of learning. The frequency principle that he advocated in *Behavior: An Introduction to Comparative Psychology* (1914, pp. 251-76), which is sometimes associated with Watson, was developed by his former student, Harvey Carr (1914).

In summary, Watson's early scientific career was that of a productive experimentalist who worked mainly on what were broadly accepted as the two major empirical issues in comparative psychology of that era: establishing the sensory abilities of nonhuman species and testing Thorndike's claim that animal intelligence consisted of no more than the development of motor habits. On the latter issue, Watson's view appears to have shifted gradually from expecting that experimental evidence might well prove Thorndike wrong to acceptance that he was probably right. This shift is one that many of his successors followed over the next seventy years or so (Macphail, 1982). Watson's unusual concern with development and with the relationship between instinct and learning was pursued only intermittently, when opportunities happened to arise, and in a relatively unsystematic way.

In the light of this sketch, some comment is appropriate on aspects of Watson's later career raised by other contributors. One is the question as to why from 1913 he started to carry out research with human subjects and carried out very few further experiments with animals. Samelson ([this volume](#)) suggests that this may have been a form of "burnout." This suggestion might be plausible if Watson's scientific work had taken the form of a consistent series of experiments that had come to a dead end. But, as noted above, Watson's research had always jumped from one issue to another. Two other factors may have been at least as important as the recent experience of extremely laborious experiments that yielded little return (Watson & Watson, 1913).

One was the increasing pressure as his status increased to demonstrate the validity of his claims that animal research was useful to psychology as a whole. In Watson's dealings with university administrators and in his applications for research grants, he continually needed to make promises about the future usefulness of psychology (Buckley, 1989, pp. 62-63). His repeated claims that, for example, the comparisons of massed versus spaced practice in maze learning in rats would benefit education might carry more conviction if such factors could be shown experimentally to influence some form of human learning, even if this were skill in archery or dart throwing (Lashley, 1915).

The other factor was the opportunity presented by his move to Johns Hopkins Medical School to examine behavioral development and interaction between instinct and learning in a new kind of experimental subject, the human infant. In his approach to this study there is no abrupt change, but continuity from the research he had previously carried out with terns and monkeys.

Although this research had hardly started (Watson & Morgan, 1917; Watson & Rayner, 1920) before he had to leave university life, it was sufficient to convince him of the relative lack of importance of instincts (as then conceived) in human development, a further step away from tern behavior. Thus, although the incorporation of a strong environmentalist element into his behaviorism did not occur until the 1920s, this does not really indicate the radical shift in Watson's outlook that Logue ([this volume](#)) and Todd ([this volume](#)) detect. Instead, it marks the full public emergence of a theme in his work that had been present since his thesis research: that early experience has a marked effect on subsequent development to an extent that varies widely

across species, with humans exhibiting the most extreme form of plasticity.