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John B. Watson's Classical S–R Behaviorism

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John Broadus Watson was born in rural South Carolina in 1878 and died in New York City in 1958. In between, he held academic positions at the University of Chicago and Johns Hopkins University, where he excelled as a researcher and scholar, and executive positions at J. Walter Thompson and William Esty advertising companies, where he excelled as a businessperson. He was married twice, with two children from each marriage. As did B. F. Skinner, Watson advanced the possibility that a genuine science of behavior could benefit human welfare if that science was based on naturalistic principles instead of mentalistic social-cultural assumptions. However, Watson emphasized antecedent, mechanical causation, whereas Skinner emphasized contingencies and consequences. As a result, Watson's classical S–R behaviorism differs greatly from Skinner's behavior analysis, and Watson's approach falls well short of being a comprehensive behavioral orientation.

Keywords: B. F. Skinner, Behaviorist Manifesto, classical S–R behaviorism, Little Albert

John Broadus Watson was born on January 9, 1878, near Greenville, South Carolina. He died on September 25, 1958, in New York City. For at least the first 41 years of his life, when he was active in academia, he was one of the central figures in American psychology if not American intellectual history. The year 2013 was celebrated as the centennial year for one of Watson's best known papers, "Psychology as the Behaviorist Views It" (Watson, 1913b), which is sometimes referred to as the "Behaviorist Manifesto." The present article continues the review of his professional contributions and seeks to increase the understanding of his role in the historical and conceptual development of psychology, especially in regard to behaviorism.

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Biography

Personal

John Broadus Watson's life is well documented in Buckley (1989) and O'Donnell (1985), which are the sources of much of the information here. Watson's mother was Emma, a devout Baptist. His father was Pickens, a Civil War veteran on the side of the Confederate Army. John was the fourth of six children. John's mother named him after John Albert Broadus, a noted Baptist preacher and theologian of the South Carolina region.

Pickens had inherited a section of farmland from his father but failed to use it productively, owing to his penchant for whiskey and a wandering lifestyle. Emma held the family together during the many troubled times of their marriage. Her religious faith through Reedy River Baptist Church and steadfast commitment to her family stood especially tall. Despite Pickens's shortcomings as a spouse and parent, he and John were close when John was growing up. John credited his father with promoting John's various masculine skills and interests, such as handling tools, carpentry, half-soling shoes, and milking cows. Emma moved the family from rural circumstances to Greenville proper in 1890, perhaps seeking greater economic opportunities for the family. Unfortunately, the move proved too much for Pickens, who left the family for good in 1891. John was crushed and never forgave his father for abandoning him and the family.

John was a reckless youth with an acceptable but by no means superior academic record. After graduating from high school, he enrolled in Furman University, in recognition of Emma's Baptist connections. At Furman John studied psychology and philosophy, earning an M.A. in 1899. Emma preferred that he go on to become a Baptist preacher, but instead John took a job at Batesburg Institute, a one-room "academy" near Columbia in the central region of the state. There, he did everything from teaching to mopping the floors. Unfortunately, Emma became ill and died on July 3, 1900. Freed from his ties to South Carolina, John then began to expand his horizons. After communicating with one of his Furman philosophy professors, John decided to pursue further graduate training in philosophy and educational psychology at the University of Chicago. Another possibility was Johns Hopkins, but Hopkins required a reading knowledge of Greek and Latin. As an undergraduate at Furman, John had once studied all night with the aid of a quart of Coca-Cola syrup to pass language exams in Greek and Latin — the ingredients for Coca-Cola in those days included cocaine, and he was ill-inclined to put himself through that experience again. Chicago it was, and John began his studies there in the fall of 1900.

At the time Chicago claimed such renowned faculty as John Dewey, James Rowland Angell, and Jacques Loeb. Unfortunately, Watson decided that he just couldn't understand Dewey. Watson then shifted from philosophy to experimental

psychology, emphasizing the behavior of nonhumans, specifically rats. His decision to pursue research using nonhumans is perhaps not surprising, given his rural background. Overall, Watson's graduate academic program involved a major in experimental psychology under Angell, a first minor in philosophy under Dewey, and a second minor in neurology under H. H. Donaldson, accompanied by additional study in neurology under Loeb. Watson worked himself into a state of nervous exhaustion while a graduate student at Chicago, recovering when he vacationed for a month with friends at their cottage in Michigan. The experience broadened his appreciation of the practical implications of psychology. Watson completed his dissertation in 1903 in an area that in today's world might be called developmental psychobiology. Titled "Animal Education," it found that complex behavior in the white rat, specifically maze-learning, did not depend on mylenation in the rat's brain. He borrowed the sum of $350 from his adviser Donaldson to publish his dissertation, ultimately repaying him some 20 years later.

After receiving his Ph.D., Watson remained at Chicago as an instructor, teaching experimental psychology from the perspective of Wilhelm Wundt and conducting research. He also married Mary Ickes, daughter of a prominent Midwestern family, who had been a student in one of his classes. Watson and Mary had two children, Mary (b. 1905) — known informally in the family as Polly to distinguish her from her mother, and John (b. 1908) — known informally in the family as Little John to distinguish him from his father. Unfortunately, Watson's marriage with Mary was not a happy one. Watson was in an on again–off again relationship with a woman named Vida Sutton shortly before his marriage to Mary, and this prior relationship was one but not the only source of difficulty in his marriage (Buckley, 1989). Particularly troublesome was the resentment of the Ickes' family, who were convinced Watson was nothing but a southern gold-digger. Mary's brothers, John and Harold, were especially concerned about the union.

Watson spent the summer of 1904 at Johns Hopkins University in Baltimore perfecting his surgical skills. His diligence impressed those with whom he interacted, one of whom was James Mark Baldwin, chair of the Hopkins Psychology Department. The Psychology Department at Hopkins had languished since the departure of G. Stanley Hall for Clark University some fifteen years earlier, and the Hopkins administration had tasked Baldwin with reinvigorating it by seeking new faculty. Watson's positive summer experience with the faculty at Hopkins as well as his exemplary research credentials at Chicago made him an attractive candidate, and in the fall of 1907 Baldwin offered Watson a position in the Hopkins department. The offer so astounded Watson that he didn't respond immediately. Thinking their offer was insufficient, Hopkins increased it, and Watson accepted. Whereas previously he was a relatively low ranking and underpaid staff member at Chicago, Watson then became a full professor with a considerable increase in salary at one of America's most prestigious institutions.

Shortly after Watson joined Hopkins in the fall of 1908, controversy arose. Baldwin had earlier been noticed during a police raid at a Baltimore brothel. At first Baldwin's presence was minimized, but eventually it came to light. Hopkins was especially concerned with its reputation in the community, and Baldwin was pressured to resign, which he did. Watson admirably stepped in to fill the void in the Hopkins Department created by Baldwin's abrupt departure. Once again, Watson's professional standing increased dramatically.

Watson busied himself in a variety of research endeavors at Hopkins, finally settling on the conditioned reflex process as his principal interest. He served in the US Army during World War 1, working on such projects as screening aviators and studying the effects of oxygen deprivation on their skills. Unfortunately, he chafed under the authoritarian military hierarchy and antagonized his superiors. He was near an assignment closer to the front when the war ended in 1918 and he returned home. On the whole, Watson (1936) reported his military experience was distinctly unsatisfactory: "The whole army experience is a nightmare to me. Never have I seen such incompetence, such extravagance, such a group of overbearing, inferior men" (p. 278).

Upon returning to Hopkins, Watson set about trying to study human development, especially child development, from the point of view of behaviorism and the conditioned reflex. This interest led to the research on conditioned emotional reactions involving Little Albert (Watson and Rayner, 1920), about which more is said later in this article. As is well-known, Rosalie Rayner assisted Watson in this project. Rosalie was the daughter of a prominent Baltimore family. Her grandfather had been hugely successful in business — mining, shipbuilding, and railroads, and her uncle had been a United States senator. Rosalie graduated from Vassar in June of 1919, where she knew Mary Cover Jones, and entered Hopkins in the fall as a graduate student. She lived with her parents. By all accounts, she was lively and beautiful.

As suggested earlier, Watson's marriage to Mary Ickes was not harmonious. From its start Mary was skeptical about Watson's prior relationship with Vida Sutton. Then, as his professional career progressed first at Chicago and then Hopkins, his penchant for working long hours also took a toll. Buckley (1989, p. 125) reports that as the second decade drew to a close, Mary's interest in Watson had lapsed to that of being "purely maternal" and she viewed married life as "a bore." In short, his marriage was in disrepair. After Rosalie enrolled at Hopkins in the fall of 1919 and began to study with Watson, Watson and Rosalie fell in love. The Ickes family was absolutely enraged that Watson — whom they never liked in the first place — was tarnishing the Ickes family name by keeping close company with a female student while he was still legally married to Mary. As a result, the family began to pressure the Johns Hopkins Administration to fire Watson. Early on, Mary became suspicious Watson was having an affair, but lacked concrete evidence to justify taking any action. Mary's brothers conspired with Mary to get

the necessary evidence. The Watson family and the Rayner family saw each other socially, such as for dinner at the Rayner home. In a crucial part of the intrigue, after dinner one evening at the Rayner home, Mary suggested Watson and Rosalie adjourn to discuss scientific matters. Mary then complained of a headache and went to Rosalie's room to lie down. The headache was a ruse. While in Rosalie's room, Mary searched for and found evidence of the affair in the form of several love letters that Watson had written to Rosalie. Mary turned over the letters to her brother John. Around this time, Watson sought to have Mary travel out of the country so a divorce could be arranged, but she would not. They did agree to a separation in July, 1920. After gaining possession of Watson's love letters to Rosalie, the Ickes family took the letters to the Hopkins administration and continued to press them to fire Watson, this time with hard evidence of Watson's infidelity. The Hopkins administrators were sensitive about the university's public image because of the events associated with Baldwin's leaving some 11 years earlier, but were treading carefully because they did not want to embarrass the Rayner family, who had donated money to Hopkins. As the pressure mounted on Watson, he sought support from his colleagues both at Hopkins and around the nation, but found little outside of E. B. Titchener. Watson ultimately resigned from Johns Hopkins in October, 1920. He "was a product of schools and colleges," and "knew nothing of life outside the walls of a university" (Watson, 1936, p. 279). What was he to do?

Stranded emotionally and unemployed as of October, 1920, Watson went to New York and lived with W. I. Thomas. Thomas had been on the faculty of the Sociology Department at Chicago during Watson's time there. Thomas had progressive social views and was interested in such controversial topics as the sociology of deviant behavior. Some of Thomas's more unconventional research activities were publicly criticized and brought to the attention of the Chicago administration. The Chicago administration was just as sensitive about its public image as the Hopkins administration would prove to be about their image in 1920, and pressured Thomas to resign. Thomas did so and moved to New York, where he began consulting with the J. Walter Thompson advertising company, who were very happy to have a distinguished academician work with them. Shortly after Watson moved to New York, Thomas introduced Watson to Stanley Resor, President of J. Walter Thompson, who was once again very happy to have a distinguished academician become associated with the firm. Watson then embarked on a new chapter in his life, this time in the private sector. Watson began at the ground floor in the fall of 1920, when J. Walter Thompson assigned him to study "the rubber boot market on each side of the Mississippi River from Cairo to New Orleans" (Watson, 1936, p. 279).

Meanwhile, the Ickes family, still determined to embarrass Watson, initiated formal divorce proceedings. Articles about the divorce were splashed across newspapers all along the east coast. Buckley (1989) cites text from Watson's purloined love letters that were offered in the proceedings as evidence of Watson's infidelity and included in the newspaper articles:

> [E]very cell I have is yours, individually and collectively. My total reactions are positive and towards you. So likewise every heart reaction. I can't be any more yours than I am even if a surgical operation made us one…. Could you kiss me for two hours right now without ever growing weary? I want you all 24 of the hours and then I'd quarrel with the universe because the days are not longer. Let's go to the North Pole where the days and nights are 6 mo. each. (JBW to RR, as cited in Buckley, 1989, p. 124)

Early in the proceedings, Rosalie wasn't mentioned by name, perhaps in deference to the status of her family. Rather, she was mentioned only as the object of Watson's affinity for a young socialite. Later she was identified as Rosalie but without her last name. Watson's divorce from Mary was granted on December 24, 1920. He then married Rosalie on December 31.

On January 1, 1921, J. Walter Thompson sent Watson out for two months "to sell Yuban Coffee to retailers and wholesalers in Pittsburg, Cleveland, and Erie" (Watson, 1936, p. 279). When Watson returned to Thompson, he worked in every department in the firm. In a further effort to familiarize himself with the demands of the private sector, he even went so far as to work outside of Thompson as a clerk in Macy's Department Store for two months during the summer of 1921 (p. 280). Having paid his dues, he assumed a position as vice-president of J. Walter Thompson in late 1924, where he "reigned as the 'chief showpiece' of the Thompson agency" (Buckley, 1989, p. 143).

Watson continued to be in the public eye in New York during the 1920s, even though he was no longer in academia. He gave numerous lectures, for example, at the New School for Social Research and at Cooper Union. In addition, Watson's business career flourished at Thompson. As Buckley (1982) and Coon (1994) have noted, his success in the private sector was not so much attributable to his applying psychological principles to advertising, relevant though those principles were. Many of those principles were already known and in use. Rather, his success was attributable more to sound data-based decision-making, targeting the marketing campaign to the characteristics of the audience, and so on.

Rosalie and Watson had two sons, William (b. 1921) — known as Billy, and James (b. 1924) — known as Jimmy. Around 1930, Watson purchased a very large estate, named Whipporwill Farm, located near Westport in southwestern Connecticut. A general book on Watson's viewpoint, titled *Behaviorism*, grew out of lectures he gave in New York in the early 1920s and appeared in print first in 1924 and again in 1925 (Watson, 1925). Watson dedicated the book to Stanley Resor of J. Walter Thompson. A revised edition was published in 1930. He and Rosalie published a book on childrearing in 1928 (Watson and Watson, 1928) that was a best seller, ultimately surpassed by Dr. Spock's book on the same topic. Watson gradually receded from lecturing and publishing as his business career progressed, although he did still contribute articles to the popular press, such as *Harper's* and *Ladies Home Journal*, during the late 1920s and early 1930s. Watson and Rosalie were also very active on the New York social scene.

Tragically, Rosalie contracted dysentery, possibly from eating contaminated fruit, and died on June 18, 1935. Watson was despondent but tried to carry on. He left Thompson for a position as Vice-president of William Esty, another advertising firm, in 1936, eventually retiring from Esty in 1945. His original estate was then too large for him, and in the early 1950s he moved to a smaller estate outside Woodbury, Connecticut. His last years were as a reclusive country gentleman. He was devoted to his animals, and often spent the night with them in his barn during the summer, to ensure they were appropriately cared for. He reportedly consumed alcohol to excess after his retirement, and Burnham (1994, p. 67) suggested that in 1955, three years before Watson's death, Watson's doctor would no longer let him drink. Nevertheless, Watson's death is usually attributed to cirrhosis.

On a more personal side, Watson was afraid of the dark and slept with a light on. He never had an automobile driver's license and didn't drive a car, although he did enjoy driving his speedboat on Long Island sound. He smoked Lucky Strike cigarettes while at Thompson, then switched to Camel when Esty took over that account. He drank only bourbon whisky — straight. He could be dogmatic about psychology, but otherwise was reasonably soft-spoken and reserved. He liked to tell dirty jokes. He was an uncompromising atheist. He was a conservative Republican who didn't care for politics and politicians and who railed against the entitlements of Roosevelt's New Deal. He had a grudging admiration for Sigmund Freud. He didn't like to wear hats. He liked sports, gardening, and all sorts of animals, especially his dogs. He was attractive to women, and although he flirted and was involved in lots of rumors, his son believed he wasn't a womanizer. He was as comfortable in a bucolic setting where he would use an outhouse as he was in a Park Avenue salon. He dressed impeccably for business in custom made shirts, suits, and shoes, but on his Connecticut estates he dressed as a Maine woodsman in apparel from L. L. Bean (Brewer, 1991, pp. 180–183; Hannush, 1987).

Family Matters

Unfortunately, the lives of Watson's children were terribly difficult. Polly, Watson's daughter with his first wife Mary, married an unsuccessful man whose life was a series of disappointments. Both Polly and her husband developed alcohol dependencies, resulting in a thoroughly dysfunctional home life. Polly's husband eventually took his own life. Polly also attempted three times to take her own life, but eventually resolved her personal difficulties. Polly's daughter is the noted actress Mariette Hartley, whose autobiography details the personal lives of both mother and daughter (Hartley and Commire, 1990). Little John, Watson's son with Mary, was never successful and was supported as an adult by his father, ultimately dying at a relatively early age from a bleeding ulcer.

Billy, Watson's elder son with his second wife Rosalie, and Jimmy, their younger son, were both shuttled through a series of boarding schools as youths.

Both also acted out as adolescents and were treated for depression. Billy ultimately took a medical degree and became a Freudian psychiatrist. Watson was pleased with Billy's medical training, but not his embrace of Freudian mentalism. Darkness plagued Billy throughout his life. One suicide attempt was unsuccessful when Jimmy intervened. However, about four years after his father died, Billy succeeded in taking his own life. Jimmy had similar difficulties, although at a lower order of magnitude. An extensive interview with Jimmy gives a great deal of background to life in Watson's family with Rosalie and afterwards (Hannush, 1987). At the time of the interview, Jimmy was a senior Vice-president at Hunt–Wesson Foods in Fullerton, California.

Watson had very definite ideas on how to raise children. To be sure, Watson wanted children to grow emotionally, to develop an ability to cope with the world, to be self-sufficient, and to have a considerable degree of self-esteem. How should such healthy children be raised? Watson's advice was to treat children objectively and firmly, as if they were young adults:

> Never hug or kiss them, never let them sit on your lap. If you must, kiss them once on the forehead when they say good night. Shake hands with them in the morning. Give them a pat on the head if they have made an extraordinarily good job of a difficult task. Try it out. In a week's time you will find how easy it is to be perfectly objective with your child and at the same time kindly. You will be utterly ashamed of the mawkish, sentimental way you have been handling it. (Watson and Watson, 1928, pp. 81–82)

Mary and Rosalie generally subscribed to this program, although Rosalie expressed her reservations as follows:

> In some respects I bow to the great wisdom in the science of behaviorism, and in others I am rebellious…. I secretly wish that on the score of [the children's] affections they will be a little weak when they grow up, that they will have a tear in their eyes for the poetry and drama of life and a throb for romance…. I like being merry and gay and having the giggles. The behaviorists think giggling is a sign of maladjustment. (Watson, 1930, p. 67)

Despite her words, Jimmy reported that Rosalie did not depart to any significant extent from Watson's prescriptions (Hannush, 1987).

Watson's ideas for social and family organization were indeed far-reaching. He wanted to establish a baby farm, where he could provide the environment in which to raise children according to his ideas. He further advocated training for women as wives and mothers that would be consistent with their new roles. They would be trained to better care for their children and husbands, where caring for their husbands very specifically included responding sexually to them. They would study cosmetics, how to stay thin, and how to be successful hostesses (Buckley, 1989, pp. 163–164). For Watson, Freudian theory was to be commended for calling attention to the possible development of pathological bonds between mother and child brought about by such incorrect interactions as breast feeding,

although the pathology of those interactions involved reflexes instead of personality structures.

Watson's Scholarly Accomplishments

The list of Watson's scholarly accomplishments is lengthy. Those accomplishments started in developmental psychobiology, then expanded into comparative psychology, then into conditioning, and finally into human development based on conditioning principles, especially concerning child development. This section gives a brief overview of his accomplishments.

While at Chicago, Watson undertook a series of studies on the sensory modalities that underlay maze learning in rats. With Harvey Carr, Watson first taught rats to learn a maze, then surgically removed one sensory system after another, hoping to identify which system was essential for maze learning. Removal of neither smell nor hearing nor vision nor taste interfered with subsequent performance. However, removal of the proprioceptive–kinesthetic modality did interfere. When Watson made the maze shorter or longer, he found that the rats' performances deteriorated. On the basis of these results, he argued that kinesthetic feedback was fundamental to learning (Watson, 1907b). Thereafter, the proprioceptive–kinesthetic modality played a pivotal role in Watson's thinking. Worth mentioning is that this matter has proved controversial in the history of learning theory. For example, Macfarlane (1930) found little influence of kinesthetic feedback in maze learning, at least as Watson had conceived of it.

In other scholarly activity, Watson examined color vision in a variety of nonhumans and decided that their color vision was extremely limited, if present at all. He published digests of research on a variety of topics (Todd and Morris, 1994, pp. 170–177). In investigations of imitation in monkeys, Watson (1914, p. 284) found that the monkeys did not generally imitate such food-getting behaviors as pulling in food with a t-shaped rake.

A well-known example of Watson's research involved examining various "instinctive" behaviors of sea birds, such as how terns migrate and how they recognize their nests and young when they return to their rookeries. Watson was unable to reach precise conclusions, other than the terns' behavior being some incompletely understood function of various environmental stimuli (Watson, 1907a; Watson and Lashley, 1915). For example, he concluded that the terns must rely on some other sense than vision. The surface of the ocean is so homogeneous and nesting areas were so crowded that distinctive visual stimuli were simply not apparent (Watson, 1909, p. 689). Rather, olfactory and auditory stimuli seem to be involved in various ways, although Watson did acknowledge that visual stimuli could be involved in some way he didn't recognize. Perhaps the most relevant message from this research is that so-called instinctive behavior doesn't emerge fully formed and remain fixed during the lifetime of an organism. Instead, it develops through interaction with

the environment and takes the form it does in relation to relevant environmental stimulation (Watson, 1914).

Early in the second decade of the twentieth century, the importance of conditioned reflexes was becoming apparent in psychology. Watson (1914) spoke approvingly of "Pawlow's method," using the preferred orthography of the time, although Watson seemed to view Pavlov's work more as a technique for assessing sensory capacities of subjects than as a general framework for studying behavior as a subject matter in its own right. Perhaps this emphasis is not surprising, given Watson's extensive history of studying sensory processes such as color vision in animals. Around the middle of the decade, Watson began to appreciate the full relevance of conditioned reflexes for his position. For example, after Watson was elected president of the American Psychological Association in 1914 on the basis of his growing professional status, his presidential address was titled "The Place of the Conditioned Reflex in Psychology" (Watson, 1916). This paper was essentially a progress report on some conditioning research he had undertaken with Karl Lashley in the preceding year. That research was largely inconclusive, perhaps because Watson failed to appreciate a variety of technical and methodological matters. Nevertheless, Watson was undaunted. Here was a formal technology that aligned quite comfortably with his commitments to objectivity and observation in the study of behavior.

Watson's scholarly research program was temporarily suspended during his military service in World War I. Once he returned to Hopkins, he devoted his full attention to developing a behaviorism based on conditioned reflexes and establishing it as the dominant orientation in psychological science. The methods from the animal laboratory would be applied with equal benefit to humans, making good on his proclamations from 1913.

As the second decade drew to a close, emotional responses were of central concern in child development, given the ascendancy of Freudian theory in psychology. Watson proposed an alternative: that human infants had three basic emotional responses. The first was fear, caused by loss of support or loud sounds. The second was rage, caused by restricting an infant's movements. The third was love, caused by stroking the skin, especially in sensitive erogenous zones. Through conditioning, the range of stimuli that called out these emotional responses expanded throughout one's life, thereby accounting for the diversity of human development. The canonical investigation in this area was Watson and Rayner's (1920) study of Little Albert, about which a great deal more is said later in the present article. At this point, suffice it to say that Watson wanted to demonstrate that he could create an emotional response through conditioning processes. Accordingly, he conducted conditioning trials in which an eleven month old infant named Albert experienced a loud noise, which unconditionally caused Albert to be afraid. Watson then presented the loud noise in the presence of a white rat. After a few trials Albert was fearful of the white rat as well. Watson believed he had proved his point. The research was more a "proof of concept" demonstration than a formally

designed experiment. The important feature of the demonstration was that it suggested emotional responses were learned habits, not instincts.

At the time of his research with Little Albert, Watson had gathered a lot of data on child development, but had not analyzed it. Watson left Johns Hopkins less than a year after completing the Little Albert project, and during that year was preoccupied with personal circumstances related to the dissolution of his marriage with Mary, his relationship with Rosalie Rayner, and the start of his advertising career. Some years would pass before he returned to the topic of child development. The project with Little Albert proved to be Watson's last formal research project in the academy.

As noted previously, even though Watson moved to New York and began his advertising career in 1920, he didn't immediately leave the pedagogical scene and often lectured at local universities. One such series of lectures provided the basis for his popular book *Behaviorism* (Watson, 1925). Watson's views on child rearing, incorporating the data he had gathered before Little Albert, were published with Rosalie as co-author under the title *The Psychological Care of Infant and Child* (Watson and Watson, 1928). The book was a hugely popular. Interestingly, a young man named B. F. Skinner was working in a bookstore in New York at the time of its publication and was scheduled to enter graduate school at Harvard University in the fall to study psychology. Skinner later reported he read *Psychological Care* in between serving customers (Moore, 2005). Whereas others were invoking instincts, a consistent theme in Watson's writing was the appeal to habits that developed through conditioning processes. A debate with William MacDougall, who favored the instinct approach, was published as *The Battle of Behaviorism* (Watson and MacDougall, 1929). Watson also published in nonscientific, popular outlets, such as *McCall's, Harper's,* and *Ladies Home Journal*. However, during the 1930s Watson became increasingly busy with his business career. His formal publications in professional disciplinary outlets had ended over a decade earlier with Little Albert, and by the end of the 1930s even his informal popular press writing virtually ceased.

Watson's Advertising Career

Watson pursued his advertising career just as assiduously as his scientific career (Buckley, 1982; Coon, 1994). Indeed, the readiness with which his science lent itself to application was a central concern for Watson. As suggested earlier, advertisers in Watson's time were well aware of such techniques as emotional appeals, implicit behavioral commands, and testimonials. What Watson did was employ these to their best advantage, and to emphasize empirical, objective, data-based judgments, such as achieved through market research. For example, advertisers had to know their audience, and to target their advertising campaigns to the demographics of the consumer market. Emotional appeals would be based on

knowledge of the stimuli that customarily elicited emotional responses in the targeted consumers, such as by targeting Unguentine first-aid cream toward mothers who needed to care for their children who might have cuts or scrapes. Testimonials enlisted well-known social figures such as Mrs. Marshall Field to promote Pond's Cold Cream (Buckley, 1982). One ad campaign for Pebeco toothpaste featured an attractive woman smoking a cigarette, in a vision of independence and assertiveness. Her words promoted the toothpaste to minimize the effects of smoking on one's breath and teeth. Another toothpaste campaign featured Watson himself discussing the contribution of salivary glands to the digestion of food, followed by his discussing the role of brushing the teeth in stimulating the salivary glands. Coffee was promoted as a stimulant to increase mental efficiency. In correspondence with R. M. Yerkes, Watson stated that "I believe you will be happier in business. I did not think that I would be, but now I would not go back for the world …" (cited in Buckley, 1982, p. 216). As Watson (1936) later put it, "it can be just as thrilling to watch the growth of a sales curve of a new product as to watch the learning curve of animals or men" (p. 280).

The Behaviorist Manifesto and the Columbia Lecture Series

Watson's famous article, "Psychology as the Behaviorist Views It," was published in 1913. The article was taken from a lecture delivered at 4:00 pm on February 24, 1913, in Room 401 of Schermerhorn Hall on the campus of Columbia University. The article is often characterized as the "Behaviorist Manifesto" and is responsible for launching the "Behavioral Revolution" as well as behaviorism as a distinct orientation in psychology. As with many other events in Watson's life, there is a story behind both the lecture and the article.

Perhaps the date of 1913 for Watson and the "Behavioral Revolution" is apocryphal. For example, as early as 1909 Watson expressed his views on the status of psychology in a letter to R. M. Yerkes: "My interests are all … where an objective standard of determination is possible and where interpretation takes the line of the importance of observed facts — for the theory of selection — facts — and interpretation possible without mentioning consciousness or deviating from a (wide) biological point of view" (JBW letter to RMY, October 29, 1909, cited in Buckley, 1989, p. 71). Just a few months later, Watson corresponded with Yerkes again: "I am a physiologist and I go so far as to say that I would remodel psychology as we now have it (human) and reconstruct our attitude with reference to the whole matter of consciousness …" (JBW letter to RMY, February 6, 1910, cited in Buckley, 1989, p. 71). Some years later Watson told Yerkes "Finally my stomach would stand no more and I took the plunge I did in 1912" (JBW letter to RMY, October 24, 1915, cited in O'Donnell, 1985, p. 80). Interestingly, with regard to the date of 1912, rather than 1913, Watson (1936) later stated that "I still believe as firmly as ever in the general behavioristic position I took overtly in 1912" (p. 281).

Watson's letters to Yerkes above suggest that much of the thought behind the lecture was apparent in 1912, if not even earlier.

According to Benjamin (1991) and Hollingworth (1913), Watson's lecture was part of the program for the meeting of the New York Branch of the American Psychological Association (APA). James McKeen Cattell of Columbia University had earlier started a regional association of APA in the New York area in response to the professional development of psychology in the United States. This New York Branch ultimately became the Eastern Psychological Association. Initially, the New York Branch met in conjunction with the New York Academy of Sciences. Beginning around 1902 and lasting until around 1920, the presentations of the New York Academy of Sciences were held at the American Museum of Natural History, whereas those related to psychology and the New York Branch were held at either Columbia University or New York University (Benjamin, pp. 1003–1004). During these years, psychology faculty from universities in the northeast, such as J. M. Cattell, E. L. Thorndike, and R. S. Woodworth from the Psychology Department at Columbia, were typically well represented in the psychology talks. Their topics ranged from measurement of scientific merit (Cattell) to variability of mental traits (Thorndike) to mental testing (Woodworth). Watson had lectured on the topic of vision at the 1911 meeting of the Branch. Benjamin also reports that the meetings frequently included out-of-town guests, such as those who might have been part of a university-sponsored program in the New York area (p. 1006).

Hollingworth (1913) further reported that the New York Branch met in conjunction with the Section of Anthropology of the New York Academy of Sciences on November 25, 1912, and February 24, 1913. The 1913 program of the New York Branch featured a number of well-known psychologists, such as R. Dodge, C. C. Trowbridge, R. M. Yerkes, and of course Watson. Hollingworth was secretary for the Branch, and his report included summaries of most of the presentations, except for Watson's, which by the time of Hollingworth's report had already appeared in *Psychological Review*.

Correspondence retrieved from the Columbia University archives provides further background to Watson's lecture.[1] In 1911–1912, plans were being made in the northeast United States (e.g., New York and Boston) to sponsor an International Congress of Psychology in 1913. The Congresses were held every four years, with the last congress having been held in 1909 in Geneva. Correspondence from Professor R. S. Woodworth, chair of the Department of Psychology at Columbia, to President Nicholas Butler of Columbia, dated October 27, 1911, reveals that

[1]The correspondence involving R. S. Woodworth, J. B. Watson, F. Fackenthal, and President Butler referred to in this section was retrieved on August 30, 2016, from Central files (General alphabetical files, Box 341, Robert Sessions Woodworth — Psychology Department chair), University Archives, Rare Book & Manuscript Library, Columbia University in the City of New York.

the Columbia Psychology Department had originally wanted to employ funds encumbered for a non-resident lectureship in Psychology to support the participation of a distinguished psychologist from abroad in the Congress. However, Woodworth indicated that he was recently told by Cattell that there was a "very strong probability that this Congress will be given up." At issue for Woodworth was the use of the funds if the Congress was in fact not going to meet. In the correspondence in question, Woodworth was most immediately concerned with the second semester of the 1911–1912 year, but Woodworth's concerns would also have applied to the 1912–1913 academic year.

By the fall of 1912, the organizers had decided the Congress was in fact not going to meet, and the matter of how best to use the funds from the lectureship arose again for the Columbia department. In correspondence from Woodworth to President Butler dated November 4, 1912, Woodworth informed President Butler that he has recently "had some correspondence with Professor John B. Watson of Johns Hopkins University relative to the Non-Resident Lectureship in Psychology for the current academic year," and Woodworth found that Watson was "willing to offer a course of lectures on Animal Psychology, a topic on which he is one of the leading authorities, especially since Thorndike is not now working in that line." Here Woodworth was again keen to make best use of the funds. To bolster his argument, he cited Edward Thorndike, a Columbia graduate although then in Teacher's College rather than the Department of Psychology, as a point of reference. Of particular interest is Woodworth's mention of a "course of lectures," beyond simply the single convention presentation at the New York Branch of APA. Thus, it appears that Watson would be serving double-duty in 1913. Watson had previously been part of the meetings, and was well known in the psychological community. If he received the lectureship, he could deliver a course of lectures under the auspices of the Psychology Department that would promote the good name and image of Columbia University, as well as contribute to the program at the meetings. Both were in keeping with established practice — recall Benjamin (1991) mentioned that faculty who were visiting universities in the region were frequent presenters at the meetings. In correspondence from Woodworth to President Butler dated November 8, 1912, Woodworth then formally approached Butler to gain approval for appointing Watson. In correspondence from Watson to Mr. Frank Fackenthal, Secretary of Columbia, dated November 23, 1912, Watson formally accepted the appointment. Worth noting here is that the year of Watson's acceptance (1912) is the same year that he identified for his "plunge" into behaviorism in his letter to Yerkes of October 24, 1915, and in his autobiographical statement (Watson, 1936), both mentioned earlier. Finally, in correspondence from Woodworth to Fackenthal dated November 25, 1912, Woodworth indicated the financial terms of Watson's appointment as two payments of $200 each.

Watson's formal acceptance of the appointment on November 23, 1912, is on the stationery of the International Congress, even though the organizers had already

decided the Congress was not actually going to meet in 1913. Watson was one of the organizers of the Congress, being listed on the stationery as Secretary of the Executive Committee. Presumably, the correspondence could just as well have been on Johns Hopkins stationery, as Watson was clearly an established faculty member there. Perhaps Watson wanted to lend further credibility to his correspondence, or perhaps he simply had the stationery readily at hand. In any event, Watson burned his professional papers toward the end of his life. As a result, his exact participation and thoughts in this whole series of events may never be known (see Buckley, 1989, p. 182).

In summary, Columbia University initially sought to use internal funds from a Non-Resident Lectureship to support the participation of a psychologist from abroad in the proposed International Congress in 1913. When plans for the Congress fell through, the funds were used to support Watson's course of lectures. The first lecture was given at Columbia University in conjunction with the meeting of the New York Branch of the APA. The remaining eight lectures were also given at Columbia, presumably in conjunction with Watson's appointment as a lecturer rather than with the meeting of the New York Branch.

Samelson (1981, 1984) reported that Watson's Manifesto actually did not provoke much response from his professional colleagues. Further, Benjamin (1991) suggested that no papers related to Watson's Manifesto were presented in later meetings of the Branch. Prior to 1913 Watson was one of the country's most distinguished animal–comparative psychologists, and the publicized theme of Watson's lectures at Columbia University, as well as most of their content, was animal research. However, the Manifesto railed against consciousness — a distinctly human concern, and signaled the beginning of a significant shift in Watson's interests, from nonhumans to humans. Logue (1994, pp. 111–113) outlined eight major points in the Manifesto: (a) psychology could reasonably adopt behaviorism as an –ism with a conceptually systematic orientation, (b) psychology with an orientation toward behavior as a subject matter in its own right was surely a natural science, (c) the theoretical goal of this orientation was the prediction and control of behavior (e.g., Watson, 1913b, p. 158), (d) prediction and control implied more than understanding, (e) behaviorism implied practical goals that were consistent with its theoretical goals, (f) consciousness and introspection were to be rejected as the principal subject matter and method of psychology, (g) the same methods could be used for human and nonhuman research, and (h) an organism's behavioral repertoire consists of both innate and acquired responses.

As noted earlier, Watson's first major book was *Behavior: An Introduction to Comparative Psychology* (Watson, 1914). *Behavior* was dedicated to his advisor H. H. Donaldson and J. R. Angell of the Chicago department. Table 1 below presents an overview of the relation among Watson's previous research and publishing record, his 1913 lecture series at Columbia University, and the chapters of his 1914 book.

As seen from the dates in Table 1, Watson gave eight lectures at Columbia University on successive Mondays and Tuesdays during February and March, 1913, and after a two week hiatus a ninth lecture in April. An announcement in the Sunday, February 23, 1913, edition of the *New York Times* lists the titles and dates of the first eight of Watson's lectures, and is the basis for the entries in Table 1. As is evident in Table 1, with the exception of Lecture One, these lectures largely drew on Watson's previous research experience and publishing record. Table 1 shows the topics of the lectures are also closely related to the topics of the chapters in Watson (1914).

Table 1

The Relation among Watson's Previous Research, his 1913 Lecture Series, and his 1914 Book

Watson's Previous Research	**1913 Lecture Series**	***Behavior* (1914)**
	Lecture One: Psychology as the behaviorist views it (February 24, 1913)	Chapter One (first half)
Lab (maze) and field (Tortugas) studies; studies of sensory capacities	Lecture Two: Problems (February 25, 1913)	Chapter Two: Lab vs field studies, sense-organ processes, instinctive functions, learning, correlations between structure and function
Problem boxes from dissertation; maze studies with Harvey Carr	Lecture Three: Methods and apparatus (March 3, 1913)	Chapter Three: Vision, locomotion, problem boxes, mazes
	Lecture Four: Methods and apparatus (March 4, 1913)	Chapter Three
Literature from 1910–1911–1912 on the behavior of vertebrates; color vision, other senses	Lecture Five: Sensory responses in vertebrates (March 10, 1913)	Chapter Eleven
	Lecture Six: Sensory responses in vertebrates (March 11, 1913)	Chapter Eleven
Homing in terns; imitation	Lecture Seven: Instincts and habits (March 17, 1913)	Chapters Four, Five, Six, Seven, Eight
	Lecture Eight: Limits of training (March 18, 1913)	Chapter Nine
	Lecture Nine: Image and affection (April 3, 1913)	Chapter One (second half)

Of interest for present purposes is the relation between Lectures One and Nine of the Columbia series and Chapter One in Watson (1914). As noted, Lecture One — the Manifesto — was given on February 24, 1913. A printed version appeared in *Psychological Review* a few months later. In keeping with contemporary format, the version published in *Psychological Review* is here cited as Watson (1913b). A slightly modified version also appeared as the first half of Chapter One in Watson (1914). Lecture Nine, "Image and Affection in Behavior," was given on April 3, 1913. A printed version appeared in *Journal of Philosophy, Psychology and Scientific Methods* a few months later. In keeping with contemporary format, the version published in *Journal of Philosophy, Psychology and Scientific Methods* is here cited as Watson (1913a). A slightly modified version also appeared as the second half of Chapter One in Watson (1914). Apparently Lecture Nine was not contemplated at the beginning of the lecture series, as it was not included in the *New York Times* announcement of February 23, 1913. At this writing, four matters are unclear regarding Lectures One and Nine: (a) why the content of Lectures One and Nine emphasized the behavior of humans and criticisms of psychology as a science of mental life, when the intervening seven lectures emphasized the behavior of nonhumans; (b) why the meeting of the New York Branch of APA is not mentioned in the published version of Lecture One (Watson, 1913b) as the occasion for the lecture; (c) why there was a gap of two weeks between Lectures Eight and Nine; and (d) why a footnote in the published version of Lecture Nine (Watson, 1913a) states that the lecture was given to the "Psychological Seminary" at Columbia University, when this group is not mentioned elsewhere in connection with the lecture series.

Watson and Little Albert

Watson returned from his military service during World War I determined to pursue research on how conditioning processes influenced human development. Upon returning to Johns Hopkins he arranged access to humans through Phipps Clinic with the assistance of Adolph Meyer, a senior colleague. Freudian clinical presence was being felt in psychology at the time, and despite Watson's recognition of Freud, Watson wanted to develop an alternative approach to human development based on conditioning principles, rather than on a mental personality theory, especially when it came to the role of emotional reactions.

The Project Itself

The project with Little Albert was conducted in two phases, separated by a period of over two months (e.g., Beck, Levinson, and Irons, 2009). In early December of 1919, Watson and Rosalie Rayner conducted what in contemporary terms would be baseline trials. In these trials, Albert, who was then slightly less than nine months old, was presented with a variety of objects: blocks, a marble, a

crayon, a rabbit, a dog, a monkey, masks with and without hair, cotton wool, and of course a white laboratory rat (Beck, Levinson, and Irons, p. 606). Watson and Rayner filmed these presentations, and the films show Albert did not fear the white rat. Independently of these presentations Watson and Rayner determined that Albert would become afraid when one of the experimenters made a loud sound behind Albert by striking a suspended steel bar, four feet long and three-fourths of an inch thick, with a hammer. Watson and Rayner then conducted a series of conditioning trials with Albert a few months later, when he was a little more than 11 months old. The last of these trials appears to have been in March of 1920 (Beck, Levinson, and Irons, p. 607). As Watson and Rayner (1920, p. 4) described the procedure, when Albert reached for the rat with his left hand, the bar was struck immediately behind his head. Albert then fell forward and buried his face in the mattress. He did not cry on this first trial. When the process was repeated, the infant jumped violently and began to whimper. Worth noting is that as this procedure is described, it is operant punishment, not classical conditioning, because the loud sound was contingent on Albert's reaching for the rat, not independent of it. Further trials indicated Albert did not reach for the rat, as he had initially, but crawled away as soon as the experimenters showed him the rat. Watson believed that his "proof of concept" work validated his whole approach, though he argued in much stronger terms than "proof of concept."

Albert was almost nine months old when the work started, eleven months old when conditioning trials began, and over twelve months old when the work was completed. Watson and Rayner (1920) described him as a stolid and unemotional infant. His mother was a wet nurse in a children's facility to which Watson had arranged access and Albert had been reared almost from birth in a hospital environment. Interestingly, Albert and his mother relocated at the end of the project, and Watson never got a chance to remove the emotional response he had created. As an undergraduate at Vassar, Rosalie Rayner had studied with Mary Cover Jones, and subsequent work by Mary Cover Jones, on which Watson collaborated, demonstrated both the creation and removal of the emotional response in an infant named Peter (Jones, 1924). However, Bregman (1934) and Valentine (1930) reported less success in their efforts to investigate similar processes in children.

Whatever Happened to Little Albert?

Who then was Little Albert, and what became of him (e.g., Harris, 1979)? Unfortunately, these questions can only be answered on the basis of circumstantial evidence. Beck, Levinson, and Irons (2009) suggested that Little Albert was actually named Douglas Merritte, son of Arvilla Irons Merritte, and Douglas died at the age of 6, possibly of encephalitis or meningitis. The circumstantial evidence favoring their interpretation is that Douglas was born in 1919, making him the same age

as Albert; Arvilla was employed as a wet nurse at the children's facility; and she moved away to take a position as a nurse for a family at about the time Albert was recorded as leaving the children's facility. A member of the family that employed Arvilla was ill with meningitis, and Beck, Levinson, and Irons suggested that Douglas contracted his illness from the family member and ultimately died from it. Beck, Levinson, and Irons further suggested Watson might have whimsically chosen to give the pseudonym of Albert B. to Douglas because of Watson's namesake: John *Albert B*roadus. Beck, Levinson, and Irons acknowledged that another candidate for Albert's mother was Pearl Barger, who was employed at the children's facility at about the same time as Arvilla and left at about the same time. However, they could not find sufficient evidence in birth records after several hundred hours of searching to support Pearl as Albert's mother. Consequently, they argued in favor of Arvilla as the mother and her son Douglas as Little Albert.

In contrast, Powell, Digdon, Harris, and Smithson (2014) suggested that Pearl Barger was indeed Albert's mother. The circumstantial evidence favoring their interpretation is as follows. Whereas Beck, Levinson, and Irons (2009) were unable to find any record that Pearl had given birth to a baby boy named Albert at a time that made him the same age as Watson's Little Albert, Powell et al. did find the record of the birth of a baby boy to Pearl in 1919. However, according to Powell et al., a man named Charles Martin was the father of Pearl's baby boy, and Pearl didn't marry Charles Martin until 1921. At the time of the marriage, their son's name was listed as William A. Martin, where the A stood for Albert, and the son was known as William for the rest of his life. Before the marriage, the child may have been known as Albert Barger, consistent with his being Little Albert B. Pearl died in 1939, and William Albert Martin died in 2007. Powell et al. further argued Watson had never used pseudonyms in his research, the age in months and days that Watson and Rayner (1920) reported for Little Albert at the end of the study is closer to William Albert's age than to Douglas's age, and Little Albert's weight as reported in Watson and Rayner and as judged from film of the research is closer to William Albert's weight than to Douglas's weight. Thus, Powell et al. argued that the totality of the evidence indicates William Albert Martin was a better candidate than Douglas Merritte for being Little Albert. Readers are free to make their own judgments, but Powell et al. appear to have convincingly addressed the variety of points that Beck, Levinson, and Irons raised originally.

Was Watson a Methodological Behaviorist?

In a widely cited article, Bergmann (1956, p. 265) argued that second only to Freud, Watson was the most important figure in the history of psychological thought during the first half of the twentieth century. Bergmann went on to argue that Watson's "contribution was not … his materialism or *metaphysical*

behaviorism — i.e., the thesis, which is merely silly, that there are no minds — but, rather, his *methodological behaviorism*" (p. 269, italics in original). Bergmann then defined the thesis of methodological behaviorism as follows: "It must *in principle* be possible to predict future behavior, including verbal behavior, from a sufficiency of information about present (and past) behavioral, physiological, and environmental variables" (p. 270, italics in original). As a result of Bergmann's article and many others, the common perception is that Watson was indeed a methodological behaviorist, and moreover that Watson's orientation constitutes the very definition of what behaviorism should be.

Many contemporary theorists reflect the popularity of cognitive approaches to psychology and rank behaviorism at the bottom of the scale of acceptable scientific viewpoints. These same theorists then rank Watson at the bottom of acceptable psychologists, as a champion of behaviorism. An alternative is to see these matters as considerably more nuanced. A suitable starting point for a review is to expand the definition of methodological behaviorism beyond that of Bergmann (1956).

According to an expanded definition, methodological behaviorism is the prescriptive thesis that (a) psychological theories and explanations, as well as the concepts they deploy, should always appeal to publicly observable events, variables, and relations, rather than mental causes; because (b) science requires agreement; and (c) observables rather than mental causes can be agreed upon. Nevertheless, psychological theories and explanations developed under the auspices of this thesis could be empirically adequate. On this view, if mental causes exist, they contribute nothing unique that could not also be known through the epistemological leverage that publicly observable behavioral, physiological, and environmental variables provide. This thesis emerged during the first quarter of the twentieth century, precisely when Watson was professionally active. However, Moore (2011/2012) has argued that this thesis has been interpreted in several different ways in the last one hundred years.

On the basis of one of these interpretations, which is here called the "original interpretation," psychologists should only describe relations between publicly observable stimuli and responses in an S–R model, and remain silent on everything else. Psychologists could even assume that mental causes existed, even though such causes should not be directly included in psychological theories and explanations. Anything directly about the mental should be dealt with by another discipline, perhaps philosophy or religion, but not science, which needed agreement through observability. Psychologists could further assume that explanations developed under this interpretation would be empirically adequate, just as Bergmann (1956) suggested. As noted earlier, mental causes for Bergmann did not contribute anything unique or that could not be known in other ways, at least in principle.

The original interpretation of methodological behaviorism came about because the views of psychology that prevailed in the last quarter of the nineteenth century and the first quarter of the twentieth century (e.g., structuralism, functionalism)

assumed psychology to be the science of mental life, for example, as investigated through introspection. However, these views were regarded as vague, ambiguous, unreliable, and generally ineffective because they appealed to events, variables, and relations that were unobservable and couldn't be agreed upon. For example, what did it mean to say a psychologist was introspectively assessing the "texture" of the "sensation of green"? The original interpretation of methodological behaviorism arose in an attempt to resolve these concerns, by emphasizing publicly observable events, variables, and relations that commanded agreement. Instead of talking about mental sensations, methodological behaviorists argued psychology could study the relation between the observed physical magnitude of a stimulus, as measured using common laboratory instruments, and a discrimination response on a numerical rating scale. Here, both independent and dependent variables circumvented the introspective problem because they were observable and could be agreed upon. Bergmann's (1956) statement of methodological behaviorism is consistent with this original interpretation. It accepts talk of the mind — Bergmann said to do otherwise would be "silly" — but his theories and explanations don't appeal directly to mental unobservables, rather only to observables, especially physiological variables (Moore, 2001). Following from Bergmann, researchers and theorists could construct a standard deductive–nomological argument. In this argument, observable variables in a statement of antecedent conditions served as a minor premise, and some suitable law as a major premise. When an appropriate deduction followed, the argument could then be taken to have explained–predicted the behavior in question, and to have corroborated the law. At first glance Bergmann's methodological behaviorism appears to be scientifically sound. Theories, explanations, and predictions need not appeal to mental unobservables.

The problem with accepting the approach above as scientifically sound is that the approach implicitly admits mental variables as initiating causes of behavior, with resulting inaccuracies in prediction and control. To be sure, predictions about behavior at time T can sometimes be made on the basis of a sufficiency of information about observable behavioral, physiological, and environmental variables, say at time (T – 1). Unresolved is the process by which those variables came to possess the predictive relevance they did at (T – 1). Recall that for Bergmann, to ignore or deny the mental was silly. To satisfy the requirements of a science, Bergmann assumed the observable variables could be taken as proxies for the unobservable mental causes for the purpose of prediction and explanation. However, this approach means that mental causes endow the observable variables with their predictive relevance. Thus, this approach ends up assigning at least some initiating power to mental causes. It does not consider whether naturalistic relations in space and time are responsible for the predictive relevance of the observable variables, and if so, by what process those variables acquire their function. Without some knowledge of this process, and indeed control of that

process, any prediction can at best be only correlational and highly probabilistic, rather than causal. Therein lies the problem.

Where then does Watson stand in regard to this original interpretation of methodological behaviorism? In his early writing, Watson was somewhat equivocal. For example, Watson (1913b) suggested that "I believe we can write a psychology … and … never use the terms consciousness, mental states, mind, content, introspectively verifiable, imagery, and the like" (p. 166); "consciousness may be said to be the instrument or tool with which all scientists work. Whether or not the tool is properly used at present by scientists is a problem for philosophy and not for psychology" (p. 176); "psychology as behavior will, after all, have to neglect but few of the really essential problems with which psychology as an introspective science now concerns itself" (p. 177). At face value, such statements might be taken as possibly consistent with the original interpretation of methodological behaviorism above, namely, that psychologists should remain silent on the mental because it wasn't publicly observable.

In his later writing, Watson was far less equivocal. For example, Watson (1925) argued as follows: "Behaviorism claims that 'consciousness' is neither a definable nor a usable concept; that it is merely another word for 'soul' of more ancient times. The old psychology is thus dominated by a kind of subtle religious philosophy" (p. 3). Here, Watson actively rejected appeals to the mental, rather than recommended psychologists simply remain silent on the mental. Watson said the source of such mental talk was clear: "medicine men, soothsayers, dream interpreters, and prophets" (p. 4) who were influenced by dualistic medieval conceptions of nature, rather than scientists. It was not so much a matter of observability but rather consistency with a natural science orientation. Hence, Watson went much further than the original interpretation, with its views of mental causes as primary and observable behavioral, physiological, and environmental variables as merely derivative of the mental and correlational.

Chapter XI of Watson (1925) provides additional evidence of Watson's position on unobservables and hence the original interpretation of methodological behaviorism. In this chapter, Watson presented his analysis of complex, temporally extended forms of behavior, and how thinking might be related to those complex forms of behavior. Working within the framework of S–R relations and antecedent, mechanical causation, Watson argued that a given stimulus might elicit a range of responses throughout our bodies, for example, in motor, verbal, and visceral systems. Some responses are overt and observable to others, whereas others are implicit and not "observable" to anyone other than the person engaging in them. Importantly, the responses have implicit stimulus properties, which can be sensed kinesthetically. Watson then argued that implicit stimuli from responses in these systems become substitutes for other stimuli and call out ensuing responses. Watson (p. 206) offered the example of a pianist who plays a melody on the piano. When the melody is initially encountered on a printed sheet

of music, the first note on the sheet is the observable visual stimulus that calls out the first response of the pianist's hand and fingers, the second note calls out the second response of the pianist's hand and fingers, and so on. After the notes have been played a large number of times, Watson argued that the implicit kinesthetic stimulus from playing the first note, rather than the visual stimulus of the note, is sufficient to call out playing the second note and so on, resulting in a smooth, coordinated movement. Watson (p. 188) further argued that language follows a similar pattern, in which saying the first word in a sentence provides the stimulus for saying the second, saying the second word provides in turn the stimulus for saying the third, and so on.

Watson (1925, p. 214) continued by arguing that the thinking process in humans begins when some external stimulus calls out one or more responses, in one or more of the motor, verbal, or visceral systems. Some of these responses are implicit, and the relevant implicit stimuli from the implicit responses, either singly or in combination, call out subsequent implicit responses, and the stimuli from these responses in turn carry the chain of events through to its conclusion, presumably with an explicit, overt response. To use contemporary terms, Watson offered a "box-and-arrow" analysis of the whole sequence of events. In any case, the important part of Watson's approach is that he was arguing at a descriptively consistent level of analysis. All of the events to which Watson appealed are in the one, behavioral domain. However, all of these events are not publicly observable. Some are implicit and unobservable. Thus, Watson was clearly writing in a way that is not consistent with the original interpretation of methodological behaviorism.

The story now needs to be completed. Moore (2013c) has argued that although the original interpretation still has some advocates, it began to lose favor around 1930. Certainly by 1950 a second interpretation had largely replaced the first. As evident from the dates of this second interpretation and Watson's professional career in psychology, Watson had left the discipline and was not involved with this second interpretation.

The second interpretation was that psychologists could legitimately include unobservables in their theories and explanations after all, but only if those unobservables were designated as theoretical constructs and operationally defined in terms of observables. The operational definition specified the publicly observable factors entailed in the measurement of the construct. A construct might well be held to refer to some unobservable mental or cognitive phenomenon, but the operational definition made the construct scientifically legitimate because it could now be agreed upon. For example, the construct could be operationally defined in terms of (a) behavioral measures (e.g., taking reaction time to indicate the speed at which some mental process is presumed to operate, taking a discriminative response or a judgment on a rating scale to indicate the magnitude of the subjective sensation) or (b) physiological measures (e.g., making physiological recordings to indicate neural correlates of mental processes). In this way unobservables are included only

indirectly, not *directly*, and the approach is taken to satisfy scientific concerns. Worth noting is how Bergmann (1954) himself put it: "Applied to psychological concepts, operationism becomes methodological behaviorism" (p. 213).

The common method was to infer an O variable ("organismic") inside the organism as a theoretical construct (logical construct, theoretical term, hypothetical construct, etc.). The purpose of the construct was to mediate the relation between S and R. By mediate is meant that observable external stimuli activate or trigger one or more unobservable intervening or mediating structures that are causally connected in some complex but systematic way to an ensuing observable response. The result is that the subject is held to be in direct contact with only the mediating mental structure or state, not the observable external environment. A generic name for this approach is mediational S–O–R neobehaviorism. A mediational approach with operationally defined theoretical constructs remains the most popular because it allows researchers and theorists to have their cake (mental causes) and eat it, too (be considered scientific). Suitable historical examples here are Tolman's learning theory, as well as the Hull–Spence approach. Contemporary examples are the mediational approaches of social psychology and personality theory. Again, the mediating O variables in this mediational approach are explicitly of a nonbehavioral ontology.

How did this second interpretation come about? As suggested earlier, by the 1930s many psychologists came to think that the original interpretation of methodological behaviorism was far too restrictive and not scientifically satisfactory after all — it couldn't parsimoniously accommodate the richness and flexibility of behavior. Something more epistemologically sophisticated than the observables of an S–R model seemed to be necessary. Watson was often an unstated target of such attacks. After all, many psychologists said, other sciences seemed to have advanced by postulating unobservables in the form of theoretical constructs. Shouldn't psychology be allowed to do the same?

The second interpretation then came into favor when psychologists realized that new ideas about theory development based on operationism did not require the psychologists to remain silent on the mental after all. Including mental causes was judged to be scientifically legitimate and not to conflict with the thesis of methodological behaviorism if those causes were operationally defined in terms of observables. This indirect approach allowed psychologists to agree upon their meaning, and allowed for the entire enterprise to be considered scientific. Had Watson continued in academic psychology to these years, he likely would have objected as fiercely to this second interpretation as he did to introspective psychology and the concern with mental life. Presumably, Watson would have argued that if psychologists wanted to accommodate the richness and flexibility of behavior — and he certainly would not have wanted to deny that behavior was rich and flexible, the recourse was to more closely examine the antecedent stimulus situation for previously unrecognized independent variables — even if those variables

were implicit, rather than to insert mediating organismic variables of a mental ontology into the analysis. Again, the second and even later interpretations are the ones that are currently the most debated (Moore, 2008, 2011/2012, 2013c), but they came after Watson had left academic psychology. Accordingly, they don't specifically apply to Watson.

Notwithstanding the foregoing review, Watson's (1925) account of complex, temporally extended behavior is empirically inadequate. For example, Lashley (1951) argued that kinesthetic feedback was actually not rapid enough to do the job Watson demanded of it: pianists can strike a second note before kinesthetic feedback from striking a first note can have the stimulating effect Watson attributed to it. Additionally, cognitive psychologists have routinely disparaged any form of behaviorism on the assumption that it is committed to the faulty sequential organization of language and other complex, temporally extended acts based on kinesthetic feedback that Watson proposed (see Moore, 2013a, 2013b). Recursive and passive voice sentences are usually cited.

Despite the inadequacies of Watson's position, Bergmann (1956) simply missed the point about Watson. Clearly, Bergmann accepted the conventional assumption that the mental domain was a legitimate domain that differed ontologically from the behavioral domain. Bergmann's preference was for a form of psychophysiological parallelism. Bergmann's own commitment to methodological behaviorism was largely an attempt to be scientific by circumventing direct talk of the mental because the mental was unobservable and couldn't be agreed upon. An alternative is to be concerned about the source of control over scientific verbal behavior (Moore, 2013a, 2013b). Is a source of control to be found in the operations and concepts of natural science, or in mentalistic social–cultural traditions, mischievous linguistic processes such as reification, and appeal to inappropriate metaphors (e.g., Moore, 2013a, 2013b)? Watson clearly argued for the natural science approach. In doing so, he cannot reasonably be regarded as a methodological behaviorist.

The Relation Between Watson and Skinner

In an autobiographical piece, Skinner (1967) wrote, "I never met or even saw Watson, but his influence was, of course, important" (p. 410). Both Watson and Skinner are customarily identified as behaviorists, but what is the relation between them and their forms of behaviorism? Some personal similarities between Watson and Skinner are relevant to begin the review.

Personal Similarities

First, both had unconventional routes to psychology. Watson's was through philosophy and education: "Where to go to a university? My old philosophy professor,

G. B. Moore, had gone to the University of Chicago. He told me of Dewey. I was more interested in philosophy than psychology at that time" (Watson, 1936, p. 273).

Skinner (1979) described how he came to psychology after failing at literature. In his initial literary pursuits, Skinner wanted to write objectively about the human condition and the meaning of life. He didn't succeed. Why? He decided he didn't know enough about human behavior. How would he remedy his shortcoming? He would go to graduate school in psychology and learn more about behavior. The rest is history (see also Moore, 2005).

Second, both became dissatisfied with the status quo in psychology early in their careers and sought to promote an alternative. For example, the date of 1913 is commonly associated with the inception of Watson's behaviorist thinking, but as suggested earlier, Watson actually began thinking in behavioral terms well before 1913. Watson's letters to R. M. Yerkes, previously cited, are illustrative. For example, Watson wrote he thought of himself as a physiologist and wanted to "remodel psychology" and "reconstruct our attitude with reference to the whole matter of consciousness" (JBW letter to RMY, February 6, 1910, as cited in Buckley, 1989, p. 71). Skinner commented in a remarkably similar way in a letter in December, 1928, to Percy Saunders, a faculty mentor during his undergraduate years at Hamilton: "I have almost gone over to physiology, which I find fascinating, but my fundamental interests lie in the field of psychology, and I shall probably continue therein, even, if necessary, by making over the entire field to suit myself" (Skinner, 1979, p. 38).

Third, even though Watson and Skinner never met, there is a measure of intellectual contact between them, albeit indirect. The contact involves *Dial*, a highly respected periodical of literary criticism during the 1920s, and Bertrand Russell, the eminent philosopher, social critic, and polymath. Russell was apparently attracted to the objective, empirical nature of Watson's form of behaviorism, and Russell and Watson corresponded frequently. Russell sent Watson early drafts of one of his important books, *Analysis of Mind* (Russell, 1921), and Watson (1922) later reviewed it for *Dial*. Russell (1926) also reviewed Ogden and Richards' (1923) *The Meaning of Meaning* for *Dial*, and in his review stated that "It will be seen that the above remarks are strongly influenced by Dr. Watson, whose latest book, *Behaviorism*, I consider massively impressive" (p. 121).

Skinner graduated from college in 1926 and struggled to become a writer, as suggested above. Among the sources he read during his struggles was *Dial*, in which he read Russell's review of Ogden and Richards (1923). According to Skinner (1979), "After reading the review, I bought *Behaviorism* and, a year or so later, Russell's *Philosophy*" (p. 10). As Skinner put it, Russell had at least "taken Watson seriously, and so did I" (Skinner, 1972, p. 103). Russell's *Philosophy* was published in late 1927, and Skinner read it in early 1928. Around this time, Skinner decided to abandon literature in favor of psychology. Skinner's early acquisitions that supported his choice of psychology were Russell's *Philosophy*, Watson's *Behaviorism*, and Pavlov's (1927 *Conditioned Reflexes*.

Similar Views of Psychology as a Discipline

Behavior as a subject matter in its own right. A first similarity between Watson and Skinner is that both regarded behavior as a subject matter in its own right, rather than as an expression of some underlying, inner causal process from another domain. Indeed, some forms of behavior may not even be observable to others. Watson referred to these responses as "implicit" responses. Here is a relevant passage from Watson's (1925) writing:

> The two commonsense classifications of response are "external" and "internal"— or possibly the terms "overt" (explicit) and "implicit" are better. By external or overt responses we mean the ordinary doings of the human being — he stoops to pick up a tennis ball, he writes a letter, he enters an automobile and starts driving, he digs a hole in the ground, …. We do not need instruments to make these observations. On the other hand, responses may be wholly confined to the muscular and glandular systems inside the body.… The internal or implicit responses are difficult to observe, not because they are inherently different from the external or overt responses, but merely because they are hidden from the eye. (p. 15)

Watson continued in the same tradition as follows:

> The whole group of visceral, temperature, muscular and glandular stimuli, both conditioned and unconditioned, present inside the body, are just as truly objects of stimulation as are chairs and tables. They constitute the other part of man's (each man's) environment — his internal environment, an environment not shared by others…. The organism, being stimulated always by both environments simultaneously, naturally never is responding at any one time just to the inside or just to the outside. (p. 160)

For Watson (1913a), these implicit responses could be very personal:

> I have been rather surprised that no one has connected pleasantness with the activity of the receptors stimulated by the tumescence and unpleasantness with those stimulated by a shrinkage of the sex organs. (pp. 426–427)

Finally, Watson's (1925) view of thinking is well publicized:

> The behaviorist advances the view that what the psychologists have hitherto called thought is in short nothing but talking to ourselves…. [W]e can say that "thinking" is largely subvocal talking — provided we hasten to explain that it can occur without words. (pp. 191, 215, italics in original)

Several passages from Skinner's writing are comparable:

> When we say that behavior is a function of the environment, the term "environment" presumably means any event in the universe affecting the organism. But part of the universe is enclosed within the organism's own skin. Some independent variables may, therefore, be related to behavior in a unique way.… With respect to each individual, in other words, a small part of the universe is private.

> We need not suppose that events which take place within an organism's skin have special properties for that reason. A private event may be distinguished by its limited accessibility but not, so far as we know, by any special structure or nature. (Skinner, 1953, p. 257)

Further, Skinner's views on thinking were similar in some respects to Watson's:

> Usually, however, the term [thinking] refers to completed behavior which occurs on a scale so small that it cannot be detected by others. Such behavior is called covert. The commonest examples are verbal, because verbal behavior required no environmental support and because, as both speaker and listener, a person can talk to himself effectively; but nonverbal behavior may also be covert.... (Skinner, 1974, p. 106)

Throughout, the compatibility between certain of their views on the nature of behavior, both overt and covert, is evident.

Anti-mentalism. A second similarity between Watson and Skinner is that both were strongly anti-mentalistic. Here are two representative passages from Watson:

> All of these tendencies, initiated by the psychologists themselves, lead directly over to our principal contention, viz., that there are no centrally initiated processes. (Watson, 1913a, p. 423)

> Chapter X: Talking and thinking, which, when rightly understood, go far in breaking down the fiction that there is any such thing as "mental" life. (Watson, 1925, p. 180)

Similarly, Skinner (1969) said "A radical behaviorism denies the existence of a mental world" (p. 267). Elsewhere, Skinner (1974) argued "The extraordinary appeal of inner causes and the accompanying neglect of environmental histories and current setting must be due to more than a linguistic practice. I suggest that it has the appeal of the arcane, the occult, the hermitic, the magical — those mysteries which have held so important a position in the history of human thought" (p. 162), again in keeping with Watson's words of five decades earlier.

Views of religion. A third similarity between Watson and Skinner concerns their views of religion. Watson was an avowed atheist. For example, in an interview with John Burnham conducted in 1955 (Burnham, 1994), Watson emphasized his personal views on religion. As Burnham stated: "Before we began, Watson wanted me to know that despite his age, he did not believe in God. Only after that was clearly established could the interview proceed" (Burnham, 1994, p. 67).

In related fashion, Skinner (1984) commented on his religious beliefs as follows:

> My early religious experience was important…. I was taught to fear God, the police, and what people will think…. When I was very young, hellfire was the great punishment, and I escaped to agnosticism. (pp. 402-404)

Interest in prediction and control. A fourth similarity between Watson and Skinner is that both were interested in the prediction and control of behavior.

The opening words of Watson's (1913b) Manifesto are well known: "Psychology as the behaviorist views it is a purely objective branch of natural science. Its theoretical goal is the prediction and control of behavior" (p. 158).

And here is Skinner (1953):

> We are concerned, then, with the causes of human behavior. We want to know why men behave as they do. Any condition or event which can be shown to have an effect upon behavior must be taken into account. By discovering and analyzing these causes we can predict behavior; to the extent we can manipulate them, we can control behavior. (p. 23)

The behavioral nature of language. A fifth similarity between Watson and Skinner concerns the behavioral nature of language, although they differed when it came to the underlying processes. Here is Watson (1925):

> Now exactly the same thing happens in word behavior. Suppose you read from your little book … "Now–I–lay–me–down–to–sleep." The sight of "now" brings the saying of "now" (response 1), the sight of "I," response of saying "I" (response 2) and so on throughout the series. Soon the mere saying of "now" becomes the motor (kinaesthetic) stimulus for saying "I," etc. (p. 188)

In this passage, Watson advocated an approach to language based on the principles of classical S–R conditioning, where each word is a stimulus for the next, like beads on a chain.

Once again here is Skinner (1957):

> Much of the time, however, a man acts only indirectly upon the environment from which the ultimate consequences of his behavior emerge. His first effect is upon other men. Instead of going to a drinking fountain, a thirsty man may simply "ask for a glass of water" — that is, may engage in behavior which produces a certain pattern of sounds which in turn induces someone to bring him a glass of water.… [T]he glass of water reaches the speaker only as the result of a complex series of events including the behavior of a listener…. (pp. 1–2)

In this passage Skinner also advocated a behavioral approach to language. However, that approach is based on operant processes involving contingencies and consequences, and is quite unlike Watson's appeal to eliciting S–R processes.

Differences

Despite such similarities, to equate Watson's behaviorism with contemporary behavior analysis is decidedly incorrect. First and foremost, Watson was a classical S–R behaviorist. Watson's principal behavioral process involved antecedent, mechanical causation: "[B]ehavioristic psychology has as its goal *to be able, given the stimulus, to predict the response — or, seeing the reaction take place to state what the stimulus is that has called out the reaction* (Watson, 1925, p. 16, italics in original). Watson then buttressed his conception of antecedent causation with

principles of frequency and recency. His principle of frequency meant roughly that the response called out most frequently by a stimulus will be the response called out when the stimulus is next presented. His principle of recency meant roughly that the response called out most recently by a stimulus will be the response called out when the stimulus is next presented. Watson's contemporary Thorndike had emphasized hypothetical neural connections between antecedent stimulus and response that the satisfying feeling of consequences stamped in or the annoying feeling of consequences stamped out, but Watson (1925) would have none of it:

> Most of the psychologists, it is to be regretted, have even failed to see that there is a problem. They believe habit formation is implanted by kind fairies. For example, Thorndike speaks of pleasure stamping in the successful movement and displeasure stamping out the unsuccessful movements. Most of the psychologists talk too, quite volubly about the formation of new pathways in the brain, as though there were a group of tiny servants of Vulcan who run through the nervous system with hammer and chisel digging new trenches and deepening old ones. (p. 166)

In contrast, Skinner (1969) emphasized contingencies and consequences, rather than exclusively antecedent, mechanical causation:

> An adequate formulation of the interaction between an organism and its environment must always specify three things: (1) the occasion upon which a response occurs, (2) the response itself, and (3) the reinforcing consequences. The interrelationships among them are the "contingencies of reinforcement.…" The interrelationships are much more complex than those between a stimulus and response, and they are much more productive in both theoretical and experimental analyses. (pp. 7–8)

Although Watson endorsed evolutionary theory, contemporary behavior analytic positions on selection by consequences, emitted operant behavior, analytic and explanatory concepts based on their operant function, and verbal behavior as operant behavior clearly differ from Watson's position.

Child-Rearing

Watson's theory of child-rearing was controversial, and in some cases catastrophic for his children. As indicated earlier, Jimmy attributed the difficulties he and his brother experienced as children precisely to their father's way of raising them. A legacy of depression and suicide is surely challenging for a parent.

In contrast, Skinner's two daughters have rich and fulfilling lives. Elder daughter Julie is a retired professor of Educational Psychology of distinguished professional standing. Younger daughter Deborah is an artist with considerable artistic credentials and a studio in London (Buzan, 2004).

Summary and Conclusions

Skinner (1974, pp. 2–3) opened his book *About Behaviorism* with a list of twenty common misunderstandings of behaviorism. Skinner went on to suggest Watson's form of behaviorism, as exaggerated, superficial, and premature as it was, might be the source for some of those misunderstandings, but in any case the misunderstandings aren't relevant to Skinner's own form of behaviorism, behavior analysis.

To be sure, the forms of behaviorism advocated by Watson and Skinner differed in many respects. Yet, neither Watson nor Skinner ignored feelings, reduced humans to mere robots that reacted mechanically to stimuli, ignored innate endowment by claiming that all behavior was learned, ignored the creativity of higher intellectual processes, or ignored the richness, wonder, and beauty of human accomplishments, for example, in literature and the arts. Such statements are examples of the misunderstandings that Skinner (1974) cited. Rather, a more accurate view is that both Watson and Skinner provided alternative interpretations of these matters.

Watson was in many ways a polemicist. He battled against the concern with mental life, for example, as revealed through introspection which prevailed in his time. In particular, he took a thoroughgoing behavioral approach, anticipating Skinner's behavior analysis in certain respects. Most notably, behavior was a scientific subject matter in its own right, not simply an expression of mental phenomena wherein resided the real explanatory power. Accordingly, for both Watson and Skinner a science of behavior was a genuine possibility, and with a science of behavior came the prospect of a better future for humans. Watson's (1925) seminal passage is well known:

> Give me a dozen healthy infants, well formed, and my own world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select — doctor, lawyer, artist, merchant-chief and yes, even beggar-man thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors. (p. 82)

Of course, Watson's passage here is intended to be provocative, and the next sentence is only rarely included when the preceding passage is cited: "I am going beyond my facts and I admit it, but so have the advocates of the contrary and they have been doing it for many thousands of years" (p. 82).

Important for present purposes is that both Watson and Skinner embraced a social activism based on behavioral principles. Watson was unapologetic in his writings:

> I think behaviorism does lay the foundation for saner living. It ought to be a science that prepares men and women for understanding the first principles of their own behavior. It ought to make men and women eager to arrange their own lives, and especially eager to prepare themselves to bring up their own children in a healthy way. (Watson, 1925, p. 248).

So also was Skinner unapologetic:

> The application of the physical and biological sciences alone will not solve our problems because the solutions lie in another field…. In short, we need to make vast changes in human behavior, and we cannot make them with the help of nothing more than physics or biology, no matter how hard we try…. What we need is a technology of behavior. (Skinner, 1971, pp. 4–5)

Once again, some compatibility between Watson and Skinner is evident.

Despite the similarities noted earlier in this article, Skinner (1974) suggested that a scientific analysis of behavior has made dramatic progress since Watson's time. Most notably, the thesis of selection by consequences, as represented in an operant contingency of reinforcement, has supplanted the emphasis on a push–pull type of antecedent, mechanical causation found in Watson's well-intentioned and optimistic approach. Because Watson did not grant the legitimacy of operant processes, his ideas are only of limited contemporary value, much as ideas from 1913 in physics, chemistry, and biology are of only limited contemporary value in those disciplines. Nevertheless, the present argument is that Watson deserves a well-recognized place in the history of psychology, and his commitment to antecedent causation does not negate his optimism about a genuine science of behavior and the possibility of a positive contribution to human welfare that such a science affords.

When Watson died, Skinner wrote an obituary that appeared in *Science*. Worth noting is that Skinner (1959) closed the obituary as follows:

> And so it came about that Watson was to be remembered for a long time, by both laymen and psychologists alike, for a too narrow interpretation of self-observation, for an extreme environmentalism, and for a coldly detached theory of child care, no one of which was a necessary part of his original program. His brilliant glimpse of the need for, and the nature and implications of, a science of behavior was all but forgotten. Perhaps history is ready to return to a more accurate appraisal. (BFS, 1959, obituary on JBW in *Science*, reprinted in *Cumulative Record*, 1972, p. 558)

These words remain as important today as when Skinner wrote them.

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