B. F. Skinner’s Impact on Behaviorism in Psychology

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Abstract

B. F. Skinner is widely recognized and applauded for his contributions to the field of psychology. By exploring many of his more significant life events, Skinner’s impact can be more accurately comprehended. Although Skinner did not design behaviorism as its own field of study, his own unique form, radical behaviorism, has had widespread future implications, such as in education, management of aging, and creating a utopian society. Likewise, Skinner’s creation of radical behaviorism and his research conducted in his Skinner Box as well as the air crib, has supported numerous subsequent studies. As Epstein (1987) notes, there is practically a universal agreement that Skinner’s contributions have pertinent to the study of behavior. Skinner’s influence continues to be exhibited through the work of his supporters, his personal foundation, as well as current psychology students.

*Keywords:* Skinner, Behaviorism, Radical Behaviorism, Psychology, Conditioning, Reinforcement, Applied behavior analysis

B. F. Skinner’s Impact on Behaviorism in Psychology

 Skinner is arguably one of the most significant figures in psychology, specifically in regards to behaviorism. However, there are numerous aspects of Skinner’s life that many do not know and, in extension, they are unable to fully appreciate and understand his influence. From a humble beginning to a renowned career, Skinner’s research can be prominently observed in throughout his life.

**Early Life**

Burrhus Frederic (B. F.) Skinner was born late in the March of 1903. Initially born frail and near death, Skinner survived to become a healthy, although fussy, child (Skinner, 1984b). In the small railroad town of Susquehanna, Pennsylvania, Skinner’s parents raised him and his younger brother of two and a half years, Edward James Skinner, whom he affectionately called Ebbe. In many ways, Skinner’s early life was a typical small-town, American childhood (Nye, 1992). In fact, Skinner referred to his childhood as a generous world, in which nearly anything a boy could desire was obtainable (Skinner, 1984b).

 Skinner’s father, William Arthur Skinner, had ambitious political aspirations as a working attorney, while his mother, Grace Made Skinner, served as a strong matriarch of the family (Skinner, 1984b). It was from his mother’s maiden name that Skinner was called Burrhus, although many of his close friends amicably referred to him as Fred (Skinner, 1984b). Skinner’s parents both had a great appreciation for academics. Skinner and his brother were brought up under an old-fashioned and hard-working family model, which helped in fostering Skinner’s own work ethic. During his adolescence, Skinner was active and out-going, showing great enthusiasm in his academics. He notes that although neither of his parents were college graduates, it had always been expected that he would go to college (Skinner, 1984b).

**Education at Hamilton College**

Although Skinner initially showed interest in studying law as his father had, his interest shifted to literature quite abruptly (Skinner, 1984b). He continued his studies by attending Hamilton College, a small liberal arts school in upstate New York, where he would eventually receive his Bachelor of Arts in English. Although he excelled in his studies, Skinner was relatively alone with few friends. In an interview with Skinner he states that he felt he was living between two different sides of himself and while he had certain beliefs on who he would become, it was at Hamilton College that he ended up becoming someone completely unexpected (Bjork, 2006).

**Ebbe’s Death.** Unfortunately, Skinner’s college life included many hardships. Besides the incessant hazing he received as a freshman, during a visit home from school for Easter his brother, Ebbe, abruptly became severely ill. At the young age of sixteen, Skinner’s younger brother passed away from what initially was considered acute indigestion. However, later review of the autopsy report suggested that Ebbe had actually died from a cerebral hemorrhage, which was potentially triggered by a congenital weakness in a blood vessel (Skinner, 1984b). The death of Skinner’s brother had a devastating effect on the family, and especially on Skinner’s father, who wrote a book in the memory of his youngest son’s untimely passing. For Skinner, however, he never held the same connection with his brother as his parents had. Skinner felt that they were extremely different people as far as interests were concerned; yet the pain of loss was still as poignant. Skinner (1984b) referred to his brother’s death as an extremely distressing event, saying that after Ebbe’s death he was thrust into the position of a family boy that his brother had once maintained.

**Writing Career**

Following the death of his brother, and with his degree in hand, Skinner resigned himself to writing newspaper articles on various topics while living in New York City (Skinner, 1984b). For a period he lived an unconventional lifestyle where he drifted from one area to another. During this period Skinner went through an identity crisis as he desperately attempted to find his niche. Although he is well known for his contributions to the study of psychology, Skinner’s interest did not begin in that field, but rather in literature. It is likely that Skinner’s decision to study psychology was little more than a coincidence and actually had little if anything to do with his literary experience (Coleman, 1985). Whether by some means of fate or by simply a young man’s waning interest in one area in exchange for another, Skinner slowly became entranced with psychology.

**Education at Harvard University**

After traveling in New York and Europe, Skinner decided to return to his academic roots and study at Harvard. There, Skinner would receive his Masters in psychology in 1930, and a year later, complete his doctorate (Skinner, 1984b). Enjoying the scholastic environment that Harvard had to offer, Skinner continued to work there for the next five subsequent years conducting animal research while being supported by numerous fellowships.

**Skinner’s Box.** While at Harvard, Skinner designed what he called an operant conditioning apparatus so that he could measure his animal subjects in a controlled and objective manner. However, today most people know this design as the renowned Skinner’s Box. While many associate Skinner’s Box with a white lab rat pressing a lever in an attempt to receive food, much of the research that Skinner conducted featured pigeons, which were his preferred animal subject. From his work on animals using the Skinner’s Box, Skinner theorized several important behavioral concepts that were imperative for learning novel behaviors, including reinforcement via operant conditioning, which Skinner summarized in his first book, written in 1938, *The Behavior of Organisms*. Within *The Behavior of Organisms*, Skinner discusses operant behavior and attempts to formulate laws regarding behavior. However, one of the more significant mentions was Skinner’s distinction between respondent behavior, which he characterized as a typical reflex, and operant behavior, upon which he based all of his work (Hilgard, 1988).

**Education at the University of Minnesota**

During Skinner’s time at Harvard University, the United States was undergoing a severe economic depression (Nye, 1992). With the sudden lack of available funding, Skinner lost his fellowships at Harvard and struggled to find any form of work. Although job prospects were bleak, Skinner was eventually presented with a teaching position at the University of Minnesota with a respectable salary (for the time) of nearly two thousand dollars (Nye, 1992). It was there at the University of Minnesota that Skinner would meet his future wife, Yvonne (Eve) Blue, a former English major at the University of Chicago. Though the couple had known each other for only a short time (only six weeks) before wedding, they had a strong and long-lasting relationship.

**Baby In The Box.** Together, the Skinners raised two daughters. The first, Julie, followed somewhat in her father’s footsteps by becoming a professor of educational psychology (Nye, 1992). The second, Deborah, the baby in the box, is better known for being a participant in some of her father’s original behavioral studies. Following Deborah’s birth, Skinner designed the baby-tender, which was later replaced by the term air crib, although at one point the term heir conditioner had been considered (Nye, 1992). This specially designed crib was comprised of a temperature regulated, enclosed space with a glass window, through which the infant could observe his or her surroundings (Nye, 1992). In distinction from his other controlled environment studies, namely Skinner’s Box, the air crib was not intended to study behavior nor manipulate it via operant conditioning or the rules of reinforcement (Bjork, 2006).

The air crib initially came to fame after appearing in the article, “Baby In a Box”, which was published by Skinner in the October 1945 issue of the *Ladies’ Home Journal*. Despite the obvious advantages of the air crib and the safety it provided, numerous people considered Skinner a cruel father and crazed scientist for raising his daughter in that manner (Nye, 1992). Many rumors started to arise that Deborah had gone insane and was being held in a psychiatric ward, or that she had committed suicide by gunshot due to being kept in the air crib as a child (Bjork, 2006). However, it was important to note that by no means was young Deborah neglected or ignored while placed in the crib. In fact, Deborah herself has rejected the claims of neglect, insisting that she had a perfectly happy childhood; her older sister, Julie, has even reported using an air crib for one of her own two daughters (Bjork, 2006). As a married woman, Deborah continues to have a healthy life and career as an author and artist in London.

Skinner’s overall interest in designing the air crib went far beyond just simplifying his own parental chores. At the time, World War II had recently ended and the desire to pursue the American dream, and specifically the American family, fueled the baby boom (Bjork, 2006). Although Skinner’s air crib was not as popular as he had initially imagined it would be, its general concept can be seen in various items today, namely in neonatal isolettes in infant and child care units (Morris, Smith, & Altus, 2005).

**End of Life**

In 1945, following his famous, or to some infamous, air crib, Indiana University assigned Skinner as chairman of the psychology department. Shortly afterwards Skinner was offered a position at Harvard University in 1948, where he would spend the rest of his life (Nye, 1992). Near the end of his life, Skinner remained active and made incredible strides as a professor, researcher, and author. Twenty-six years later, Skinner retired from his teaching position at Harvard, although his academic involvement continued, and in some ways, even increased (Nye, 1992). On August 18th, 1990 Skinner passed away at the age of 86 due to health complications associated with his leukemia and left behind a legacy in the field of behaviorism.

**Behaviorism**

Skinner is most notably known for his impact in the field of behaviorism. Behaviorism originally developed from functionalism, a philosophical theory that emphasizes the mind and psychological processes. Behaviorism focuses on the study of organisms’ responses to various stimuli under both controlled and uncontrolled environments (Winokur, 1971). In a basic sense, behaviorism is the physiological review of behavior. Specifically, the theory of psychological behaviorism revolves around the belief that all behavior can be explained through conditioning and reinforcement. However, it is important to note that many behaviorists have reservations regarding the psychological implications of behavior. Many actually argue that only quantifiable and observable behavior matters and that any consideration of a conscious involvement is ludicrous. In fact, according to many behaviorists, behavior can be adequately described without any mention of psychological or mental states (Winokur, 1971).

**Influences**

Several prominent psychologist and behaviorist influenced Skinner’s creation of operant conditioning and his unique form of behaviorism. Their work assisted in guiding Skinner’s theories as well as many of his research practices involving designing apparatuses to study behavior and the handling of animal subjects.

**Pavlov’s Influence.** Ivan Petrovich Pavlov, a Russian psychologist, served as an extremely influential figure. Pavlov conducted various studies on classical conditioning and is most well known for his study involving dogs. Skinner admired Pavlov treatment and use of animal subjects in his research, and although Skinner did not utilize classical conditioning as Pavlov did, but rather operant conditioning, Pavlov’s influence translated into Skinner’s work (Catania & Laties, 1999).

**Thorndike’s Influence.** Another one of Skinner’s notable influences was Edward Lee Thorndike, an American psychologist who focused on learning. A key element of Thorndike’s research was his use of animal subjects, specifically cats, in studying learning theories. His work was a prominent contributor in Skinner’s development of operant conditioning (Chance, 1999). Whereas Skinner established operant conditioning from his work on rats and pigeons in Skinner Boxes, Thorndike proposed the Law of Effect after placing cats in puzzle boxes. Within his theory, Thorndike proposed that behaviors followed by a positive response (i.e., the cat flipping a switch and escaping the puzzle box) would likely increase in frequency while those following a negative response would likely decrease in frequency, or potentially cease altogether (Chance, 1999).

**Watson’s Influence.** Skinner’s research was greatly influenced by several early behaviorists such as Edward Thorndike and Ivan Pavlov. However, arguably the most significant influence in Skinner’s life was that of John Broadus Watson, an American psychologist. Watson is considered by many the creator of behaviorism based on his article *Psychology as the Behaviorist Views It*, which is frequently referred to as “The Behaviorist Manifesto” (Winokur, 1971). In the article, Watson outlines the principles of all behaviorists and declared what he believed psychology should focus on. While Skinner admired many of Watson’s viewpoints, he did not agree with all of Watson’s behavioral theories. According to Winokur (1971), Skinner felt that Watson was premature in his proposal that psychology should be the science of behavior, as Watson did not have much evidence to support his proposal at the time.

**Radical Behaviorism**

While Watson’s methodological behaviorism serves as the original form of behaviorism, the many inspired works including Skinner’s are collectively considered neobehaviorism. Neobehaviorism, or in reference to Skinner, radical behaviorism, is a combination of several behavioral theories including logical positivism, behaviorism, and operationalism (Schneider & Morris, 1987). The basic beliefs behind neobehaviorism was that in studying behavior, positivism should be upheld, elements must be operationally defined, and that in terms of learning behavior, animals should be utilized in research. It was in Skinner’s 1945 paper, “The Operational Analysis of Psychological Terms” that Skinner’s form of behaviorism was first considered radical (Schneider & Morris, 1987). In fact, some interchangeably use Skinnerian behaviorism and radical behaviorism. Although simply based on its name one could assume that radical behaviorism is drastically different from Watson’s behaviorism, there are many similarities between the two. First, both Skinner’s and Watson’s behaviorism maintain the same overall psychological goal of predicting and manipulating behavior (Schneider & Morris, 1987). Likewise, both behaviorists understood the role of psychological processes, although Skinner had stronger viewpoints on the analysis of mental states for behavior.

One of the major distinctions between Watsonian (methodological) and Skinnerian (radical) behaviorism was their stance on how environmental stimulus influenced behavioral responses. While Watson believed in John Locke’s stance of tabula rasa, that the mind is a blank slate and as such environmental factors hold little persuasion in terms of behavior, Skinner held the opposite position (Schneider & Morris, 1987). In contrast to Watson, Skinner believed that humans and animals alike have certain innate behaviors, which he surmised from a genetic standpoint following influence from Darwin.

**Operant Conditioning.** As briefly mentioned earlier, included in Skinner’s personal form of behaviorism were several concepts: operant conditioning, reinforcement, and extinction. In 1938, Skinner coined the term operant conditioning and, hence, many consider Skinner to be the father of operant conditioning (Nye, 1992). Operant conditioning is distinct from the classical conditioning that earlier behaviorist, specifically Watson, had proposed. Skinner studied operant conditioning using various research models, specifically his famed Skinner’s Box. In operant conditioning, Skinner focused on manipulating an operant, or behavior, through a positive reinforcement, which strengthens a behavior by providing a pleasant, or rewarding stimulus, or negative reinforcement, which strengthens a behavior by removing an unpleasant, or unrewarding stimulus (Nye, 1992). Eventually, as in the case of Skinner’s rats and pigeons, the organism learns from an accidental action (i.e., pressing a lever, or pecking a disc, and being rewarded with food), and after continuous reinforcement on an interval basis, the behavior is learned.

However, another important discovery was the ability to not only incite a behavior but also to inhibit it. To weaken a behavior, Skinner punished an organism by introducing a negative stimulus whenever they performed a given behavior (Skinner, 2012). By either pairing a particular behavior with a punishment, rather than reinforcement or simply removing the reinforcement altogether, the behavior often ceased. Skinner referred to the phenomenon in operant conditioning where the frequency of a behavior is decreased as operant extinction (Skinner, 2012). Conversely, utilizing punishment can have adverse effects on the organisms, namely by causing fear of the punishment which may result in aggressive outbursts. Likewise, after extinguishing a given behavior Skinner was capable of re-teaching it through the same principles of reinforcement (Skinner, 2012). Although Skinner’s research focused on the use of animal models, his research on operant conditioning had wide-ranging practical implications.

**Schedules of reinforcement.** One of the more crucial components of Skinner’s theory of operant conditioning and an organism’s likelihood of responding to reinforcement, or the behavior ceasing entirely, are the schedules of which a particular reinforcement is based on (Skinner, 2012). Skinner found that in learning a new behavior, the form of the reinforcement is critical. Skinner worked alongside Charles Bohris Ferster, an American psychologist, to devise several types of reinforcement including, continuous, fixed interval, fixed ratio, variable interval and variable ratio reinforcement; which influenced response rates (Ferster, 2002).

Arguably, the simplest schedule of reinforcement is a continuous reinforcement format. In a continuous reinforcement scenario, an organism is repeatedly reinforced following specific behavior (Ferster, 2002). This form of reinforcement has a slow response rate, such that the subject does not necessarily feel an impending pressure to perform the action with a short amount of time. However, the extinction rate is extremely fast in this form of reinforcement. In fact, the extinction rate for continuous reinforcement is the highest out of all the other forms of reinforcement. Distinct from the simplicity of continuous reinforcement, Skinner also designed a reinforcement based on a fixed or variable schedule, as well as an interval or ratio schedule.

In a fixed interval reinforcement scenario, reinforcement occurs after a fixed amount of time if a behavior has been performed, although the amount of times that the behavior must be performed does not matter (Ferster, 2002). This form of reinforcement has a moderate response rate as well as extinction rate. In a fixed ratio reinforcement scenario reinforcement occurs only once a behavior has been completed a predetermined number of times (Ferster, 2002). This form of reinforcement has a high response rate, such that the subject will perform the desired action quickly as to receive reinforcement. However, as in the case of a fixed interval reinforcement schedule there is a moderate extinction rate.

In a variable interval reinforcement scenario, reinforcement is given following a random amount of time after a behavior has been performed, though the number of times the behavior must be performed is irrelevant (Ferster, 2002). This form of reinforcement has a fast response rate, such that the subject would attempt to perform the behavior as quickly as possible. However, the extinction rate is extremely slow, and in extension, challenging to extinguish due to its unpredictable nature. Similarly, in a variable ratio reinforcement scenario, reinforcement occurs after a seemingly random number of trials where the behavior is performed (Ferster, 2002). This form of reinforcement has an exceptionally fast response rate as well, though; the extinction rate is tremendously slow. By manipulating the schedules of reinforcement Skinner was able to study behavior at a greater depth as well as expand on his form of radical behaviorism.

**Critics of Skinner**

While Skinner had many supporters for his theories and general stance on behavior, many were vehemently opposed to his work. Many psychologist and behaviorist disagreed with radical behaviorism, and in some instances, neobehaviorism as a whole. In exchange, these individuals favored Watson’s original form of behaviorism and had only contempt for Skinner’s perspective and research.

**Max Black**

 One vocal antagonist of Skinner was Max Black, a British-American language philosopher, who held high criticisms of Skinner’s 1973 book, *Beyond Freedom and Dignity* (Czubaroff, 1988*)*. In *Beyond Freedom and Dignity*, Skinner deviates from the traditional Western metaphysics and values shared by Black and many others at the time and takes up a radical behaviorist position. Although, Skinner was aware of the mixed, and in some instances, openly hostile reviews of Beyond Freedom and Dignity, he paid little attention to the critique (Skinner, 1948a). In harsh opposition to Skinner’s viewpoint, Black wrote his own essay in which he disparaged Skinner while simultaneously making little effort to understand his stance or even analytically negate it (Czubaroff, 1988).

**Noam Chomsky**

 Another major critic of Skinner was Noam Chomsky, a renowned American philosopher. Chomsky strongly disapproved of Skinner’s position on behavior. In *The New York Review*, Chomsky violently attacked Skinner’s book, *Verbal Behavior* (Czubaroff, 1988). Regardless of the vicious assaults on his perspective regarding behavior, Skinner refused to respond to his critics, believing they did not accurately understand his position (Skinner, 1972). Arguably, Chomsky, as well as Black, did not fully comprehend Skinner’s perspective on behaviorism and conditioning and what was actually a misunderstanding ignited into severe criticism on everything Skinner proposed.

**Future Implications**

Although Skinner’s work over the years had earned him a number of critics, his overall goal was noble. He hoped to impact the world and create a more efficient society; free of the many issues constantly struggled with. Unlike many psychologists of the time who preferred basic science, Skinner wanted to apply his behavioral research to multiple facets of society as to benefit as many individuals as possible.

**Education System**

One of Skinner’s more relevant applications of his research on behaviorism was regarding education. Having an impressive educational background, and serving as a teacher for a time as well, Skinner felt that much of the educational system was lacking in efficiency (Nye, 1992). By means of operant conditioning, student performance, or teacher performance for that matter, can be increased or decreased. Skinner believed that effective teaching involved the use of priming, getting someone to behave in a certain way for the first time so that the behavior can be reinforced, and promoting that behavior (Nye, 1992). Skinner, however, realized that applying this effective teaching to educators in an average classroom setting was incredibly overwhelming for teachers, if not impossible.

**Teaching Machines.** To solve this educational problem, Skinner proposed that teaching machines be implemented into classrooms in place of teachers (Nye, 1992). These computerized teaching machines would be programmed with material to teach individual student on an interval basis, such that after the student was considered to master one aspect of a lesson they would be moved on to the next aspect at their own pace. Furthermore, with teaching machines, students would not be limited to the knowledge of the teacher, but only the availability of the program being taught and the educational level that it would reach (Nye, 1992).

While many worried about the potential repercussions of Skinner’s proposed teaching machines, namely the loss of jobs for teachers, it should be noted that Skinner did not necessarily want to get rid of teachers (Skinner, 1984a). Rather, he wanted teachers to take on more of a counselor-type role where they could spend more time with students on a social basis. Skinner urged schools of education to change their emphasis and to instead train teachers to use computerized teaching technology (Nye, 1992).

**Managing Old Age**

In regards to behaviorism, Skinner’s interests were wide-ranging. Skinner implemented operant conditioning and other behavioral laws to assist not only in the lives of others but also his own daily routine. To further discuss the potential implications of behaviorism in aging, Skinner wrote an “Intellectual Self-Management in Old Age” in 1938 (Nye, 1992). Likewise, shortly after writing his article Skinner wrote *Enjoy Old Age* alongside Margaret E. Vaughan, which featured a larger font to assist elderly individuals whose eyesight may be failing (Nye, 1992). With particular emphasis on managing and controlling one’s own behavior, Skinner applied his philosophies in various aspects of his life, particularly as he aged.

**Utopian Society**

Beyond the education system, old age and various other implications, Skinner wanted to change the world entirely. He had a vision for a society built around the principles of behaviorism. By conditioning society as a whole to perform positive responses and behaviors he believed that societal issues such as war, overpopulation, resource waste, and pollution could be alleviated (Nye, 1992). Skinner noted that through experimental and analytical studies regarding behavior, there is evidence that the environment and behavioral consequences are essential in determining individuals’ actions (Nye, 1992). In essence, rather than attempting to solve major world problems by trying to change individuals’ cognition, Skinner proposed changing the contingencies of reinforcement that are at the root of these major societal issues.

Skinner, however, was not ignorant to the fact that these changes in society would be difficult to implement, especially when considering that the consequences that typically follow negative behaviors are reinforcing (Nye, 1992). To achieve this change, Skinner believed that society would have to rid itself of interferences by religious institutes and the government, as well as monetary systems which only serve to further benefit in the reinforcement of negative behaviors (Skinner, 1987). Though many consider Skinner to be a proponent of a strict, totalitarian or fascist society where individualism is thrown out in place of blind allegiance, Skinner actually was much more open and flexible in his beliefs regarding the potential formation of a utopian society. In fact, Skinner envisioned a society where empirical approaches would be implicated and, in extension, would maintain a utopia like setting (Morris, Smith, & Altus, 2005).

**Walden Two.** Skinner proposed his vision of an ideal utopian society in his 1948 novel, *Walden Two*. Skinner’s novel was widely popular amongst the public selling hundreds of copies, and eventually thousands, each year (Altus & Morris, 2009). However, with *Walden Two*’s recognition came critiques. The novel was extremely controversial and many considered it a dystopian world that Skinner would dictate through his behavioral research (Altus & Morris, 2009). While there were various misconceptions regarding *Walden Two*, it should be noted that the novel served as one of Skinner’s most significant proposed applications of behavioral analysis.

**Conclusion**

Having made numerous contributions in the field of psychology, specifically for many behavioral psychologists, that while extremely philosophical were also capable of being applied to individuals and society as a whole, Burrhus Frederic Skinner served as perhaps one of the most distinguished psychologist in present history (Morris, Smith, & Altus, 2005). His work, undoubtedly, shaped many of the modern day applications of behavioral research in animal studies. Today, the B.F. Skinner Foundation, which is headed by Skinner’s daughter Julie, is still promoting his work as well as supporting new analytical investigations based of Skinner’s research. In order to fully understand Skinner’s influence on behaviorism it is important to consider his life as a whole. As behavioral psychology continues to expand as an independent field of study, the initial works of Skinner, alongside his own influences, will continue to be marked as a core part of the behaviorism.

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