

B. F. Skinner from laboratory to life

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One of the conspicuous features of B. F. Skinner's life and work is the contrast between the cautious experimental research that brought him recognition as a laboratory scientist and the expansive social philosophy that later brought him wider renown. Indeed, Skinner's call for the redesign of culture on the basis of experiments with lower organisms in contrived environments has struck many of his critics as presumptuous or even bizarre. (Smith 1996, p. 56)

Presumptuous, bizarre – relatively mild epithets in the context of behaviorist B.F. Skinner's controversial career. For the views he expressed in his 1971 *New York Times* best-selling book *Beyond Freedom and Dignity*¹ he was characterized as a “fatuous opinionated ass,” an “apologist for totalitarianism,”² and “visibly insane”³ by incensed readers. So how did the cautious experimentalist, mild-mannered Harvard psychologist, inveterate gadgeteer, lover of Thoreau, and doting father of two come to incite such ire in his audiences?

For the last several years, this basic question has inspired a body of work in which I have analyzed B. F. Skinner's transformation from laboratory scientist to public intellectual (see Rutherford, 2000, 2003a, 2004). In this work, I have proposed that popular reactions to Skinner were far more nuanced than typical accounts have suggested, and that these highly varying responses could be understood only with reference to the divergent cultural, historical, and political discourses that informed them. That is, to make sense of the often contradictory portrayals of Skinner in the popular imagination, we needed to understand the popular imagination itself.

¹ For those unfamiliar with Skinner's book, he basically argued that since all behavior is ultimately controlled by environmental contingencies, free will is an illusion. Further, he insisted that we must give up our antiquated and sentimental belief in autonomous man and deliberately manipulate these controls to ensure the survival of the culture.

² B. Wascenacht to B. F. Skinner, September 10, 1971. HUG FP 60.20, Box 9, Folder: Psychology Today replies. Skinner Papers: Harvard University Archives.

³ Curtiss Ewing to the Editors of *Psychology Today*, August 16, 1971. HUG FP 60.20, Box 9, Folder: Psychology Today replies. Skinner Papers: Harvard University Archives.

As an example of this analysis, I have demonstrated that diverse reactions to Skinner's baby tender or air crib were embedded in a unique cultural milieu that simultaneously *praised* household technology as symbolic of the good life of 1950s America and *denounced* mechanized mothering under the influence of contemporaneous psychoanalytic and popular literature on child-rearing (Rutherford, 2003a). I have also shown how *positive* appraisals of Skinner's teaching machines in the 1950s and 1960s reflected Americans' Cold War-fuelled anxiety about losing the space race and the arms race to their Soviet nemesis, an anxiety which spawned a widespread educational technology movement in which teaching machines played a major role. At the same time, *negative* reactions reflected a mounting distrust of and resistance to technology culminating in the counterculture movement of the mid-to-late 1960s. These divergent assessments revealed both the perceived promise, and presumed peril, of the automated classroom. Skinner himself appeared in the popular press in a wide array of guises, from devoted father to cold-blooded scientist, from educational revolutionary to totalitarian, and from humanist to fascist (Rutherford, 2000).

In the course of examining Skinner's complex trajectory as a public intellectual, it became clear that a much larger story about the migration of his experimental science from the confines of the operant chamber to real-world application needed to be told. No synthetic, contextual account of this process has been undertaken, despite Skinner's prominence in the history of psychology. Although Skinner himself, as a result of his cultural status, served as the lightning rod for public opinion and criticism, hundreds of Skinnerian psychologists, enthralled by the precise science, technological potential, and melioristic underpinnings of Skinner's system, began using the principles of operant

psychology to refashion the human environment and change human behavior starting in the 1950s. This move from the laboratory to life unfolded most intensely in the ensuing two decades, and continues today.

A contextual, historical account of the evolution of B.F. Skinner's "cautious experimental research" from the confines of the operant chamber to the design of total environments for juvenile delinquents, prisoners, students, and psychiatric patients, to intentional communities and self-help programs, is the subject of my current project. I explore this evolution by gradually deconstructing the box in which Skinner generated his experimental results – the eponymously named Skinner box. I outline how Skinner's experiments with rats and pigeons in small operant chambers inspired experiments with human subjects in an ever-expanding Skinner box until, finally, the box itself disappeared.

One of my major premises in this account is that the most prominent aspect of Skinner's cultural legacy is not his experimental analysis of behavior, his philosophy of radical behaviorism, or his social philosophy - even though many of these contributions propelled his meteoric rise to public prominence in the early 1970s. Instead, I argue that Skinner's most enduring legacy is his *technology* of behavior. The ease with which his experimental principles could be lifted from the laboratory and applied to human problems aligned itself seamlessly with the American technological imperative, or, as historian of psychology William Woodward has put it, with "the American penchant for making and remaking the environment" (Woodward 1996, p. 8). In this project, I detail how the technological potential of Skinner's science drove an inexorable process that ultimately resulted in the complete deconstruction of the operant chamber, both literally

and figuratively. Where, when, why, and how did Skinnerian science move from the laboratory to life?

In this presentation, I abridge this larger project by selecting three episodes in the evolution of Skinnerian psychology from a cautious science to a widespread technology of behavior. These episodes, chosen for both their epistemic and literal significance, exemplify the gradual expansion and ultimate deconstruction of the Skinner box. First, I describe a room-sized Skinner box for human subjects constructed by Skinner's student Ogden Lindsley at the Harvard Behavior Research Laboratory in the late 1950s. Next, I examine a building-sized Skinner box designed by Harold Cohen at the National Training Institute for Boys in Washington, DC. Finally, I illustrate the complete deconstruction of the Skinner box by describing how Skinnerian principles were used in self-help in the 1960s and 70s. Finally, I conclude by assessing the impact and current status of Skinner's technology of behavior, and suggest that we might rethink the over-simplified claim that behaviorism is dead.

Although college professors are fond of repeating a received view of the history of psychology in which Chomsky slayed Skinner with his scathing review of *Verbal Behavior*, Skinner's 1957 treatise on language, and that by the 1960s the bright lights of the cognitive revolution had emancipated psychology from the dark age of behaviorism, historians have recently begun to point out (e.g., Leahey, 1992) that this is a grossly over-simplified version of the recent past. Although alluring for dramatic pedagogical purposes, these accounts fail to hold up an accurate mirror to history. My account adds to these revisions of Skinner's fate by examining the evolution and impact of his technology of behavior as it moved from the laboratory to life.

*I. From Pigeons to People:
Ogden Lindsley and the Room-Sized Skinner Box*

Ogden Lindsley was a frequent participant in Skinner's Pigeon Lab staff meetings in the basement of Harvard's Memorial Hall between 1951-1964, first as a graduate student and then as a post-doctoral fellow. Lindsley had entered psychology after a harrowing experience as a German prisoner of war, whereupon he had vowed to spend the rest of his life having fun and studying people. Despite his obvious interest in human behavior, Lindsley began his research career in psychology by investigating the operant behavior, not of man, but of man's best friend. For his dissertation, Lindsley designed and built the first Skinner box for dogs.

In his efforts to help Lindsley acquire a dissertation project, Skinner had directed him to Walter Jetter at the Boston University Medical School. Jetter held a grant from the Atomic Energy Commission to study the effects of irradiation on the physiology, exercise, and behavior of beagles. As his contribution to this project, Lindsley designed an operant chamber in which the canine subjects were required to paw-press a panel for portions of raw hamburger. Using a large sample of two-year old male beagles, Lindsley established reliable response rates and then taught the dogs to stop pressing the panel when a light flashed and when a buzzer signaled a loud horn blast. He then examined the effects of various drugs on the operant response rates, visual discrimination, and conditioned suppression that he had established.

Despite his enthusiasm for the beagle work, Lindsley remained more interested in human than in dog behavior. During the course of his meetings with Skinner to discuss his research, they often strayed from beagle behavior to the topic of schizophrenia. Lindsley became fascinated by an operant explanation of psychotic behavior:

Fascinated, I promised Fred that if he could get funds, I would give human free operant research with psychotics five years of my life. If it didn't pan out, my parachute plan was to go to Ringling Brothers Circus and shape Gargantua the gorilla to play a piano and simple card games. I ended up spending eleven and a half years studying psychotics from the back wards of Metropolitan State Hospital. (Lindsley, 2001, p. 138)

In June of 1953, Lindsley's dream of studying people was realized. With grant money from Harvard and the Office for Naval Research, he set up shop in an abandoned hydrotherapy unit in the basement of the Metropolitan State Hospital in Waltham, Massachusetts. Lindsley quickly converted it into a state-of-the-art experimental space, including two six-foot-square operant chambers equipped with plunger operanda and magazine delivery chutes designed to administer a variety of reinforcements to human subjects in what looked like a fairly straightforward human Skinner box. The plungers were connected through programming relays and timers to cumulative recorders situated in a hallway adjacent to the experimental rooms, which Lindsley came to call "Apparatus Alley." Eventually, the lab became known as the Harvard Medical School Behavior Research Laboratory (for a more detailed account of the laboratory, see Rutherford, 2003b).

In one of their first publications, Lindsley and Skinner described the experimental procedure for introducing human subjects to the Skinner box. Patients were brought down to the laboratory and were shown a variety of potential reinforcers including candy, cigarettes, and coins. They were prompted to select their preferred reinforcer. They were then led to the experimental room where, in the case of severely catatonic patients, they were shown how to operate the plunger that would deliver the reinforcer. Better-functioning patients were allowed to explore the room freely until they spontaneously hit upon the plunger and began pulling it. Subjects were then left alone in the room and their

responses on different schedules of reinforcement were recorded. Skinner and Lindsley concluded that the effects of the schedules on the behavior of their subjects were orderly and similar to those found in rats, pigeons, and dogs. They then recommended using these response rates as baselines for investigating the moment-to-moment effects of psychotropic drugs.

From 1958-1965 Lindsley received National Institute of Mental Health grants for projects entitled “Screening potential stimulants on inactive psychotics” and “Drug-sensitive free-operant measures of psychosis.” The late 1950s and early 1960s were truly a golden age for operant research on drug effects. To accommodate this research, Lindsley’s human-sized Skinner boxes became increasingly elaborate. He equipped each room with electrical mats to record pacing, and mounted voice-operated relays on the ceiling to record vocal hallucinations. With typical enthusiasm he noted, “The technique of direct, continuous, and simultaneous recording of symptomatic and nonsymptomatic responding is the most sensitive index we have yet developed for screening psychotherapeutic compounds” (Lindsley, 1962, p. 378). The genius lay in the method, and the method was intimately tied to the apparatus. Almost all of the behavior inside the room-sized Skinner box could be recorded and measured.

Although the Behavior Research Laboratory shut its doors by 1965 and Lindsley pursued other projects, the expansion of the Skinner box to accommodate the human subject had begun. If a room-sized operant chamber could work, what about a building-sized box?

*II. Expanding the Human Skinner Box:
Harold Cohen and the CASE Project*

Harold Cohen was perhaps an unlikely architect of a building-sized Skinner box. A former student of R. Buckminster Fuller at the Institute of Design in Chicago, Cohen was neither a direct student of Skinner nor a psychologist. However, he was an educator who was keenly interested in the influence of the physical environment on human behavior and human learning. After graduating from the Institute of Design in Chicago, Cohen was recruited to Southern Illinois University (SIU) where he was charged with setting up a design school. Once there, however, he ended up designing a school.

Soon after arriving at SIU, Cohen met and was heavily influenced by a cadre of Skinnerian psychologists. Teodoro Ayllon and Nate Azrin were there, and were setting up their pioneering token economy program for hospitalized schizophrenics at nearby Anna State Hospital (see Ayllon & Azrin, 1968). The outspoken Israel Goldiamond was also on faculty at the university. From these men Cohen was introduced to operant psychology and its applications, and was especially impressed with the effectiveness of positive reinforcement in bringing about behavior change. He observed Ayllon and Azrin's token economy at Anna State and learned about contingency management. Thus, when the president of Cohen's university approached him with the dilemma of what to do with the large numbers of high school students who, although guaranteed a spot in the state university system, were literally not making the grade, Cohen combined his design skills with his newly acquired knowledge of operant psychology and took up the challenge of designing a total learning environment. With a class of about 65 students selected from the lower one-third of Illinois' graduating high school seniors, Cohen designed the "Experimental Freshman Year" program in which attempted to boost the performance of the state's low-achievers. A key feature of his program was individual

cubicles which were essentially large cardboard booths providing a controlled environment for studying and learning – cardboard Skinner boxes.

Cohen was thus converted to the Skinnerian approach and subsequently left SIU for a position at the recently-founded behavior analytic Institute for Behavioral Research (IBR) in Silver Spring, Maryland. Many of the projects run under the auspices of the IBR were educational and community-based. The federal government was pouring more money into research on crime and delinquency in the aftermath of the urban riots and civil unrest of the mid-1960s. Cohen was the beneficiary of some of this federal largesse. Soon after he arrived at the IBR he was awarded grants from the Office of Juvenile Delinquency and Youth Development of the Department of Health, Education, and Welfare. With this grant support, he put his interest in education, his experience at SIU, and his knowledge of behavioral principles to work at the National Training School for Boys (NTS), a prison and reform school for juvenile delinquents in Washington, DC.

Cohen and his colleagues arrived at NTS with grant money and an ambitious mandate: to take a random sample of NTS inmates from all grade levels, place them in a total learning environment, and, over the course of one year, prepare as many of them as possible either to be able to return to the public school system or pass a high school equivalency exam. They called their project Contingencies Applicable to Special Education – or CASE – and immediately began a pilot implementation. There were two key components of the program. The first was a token economy in which the students could earn points for academic performance. The second was the design of the physical environment itself, which was arranged to maximize academic achievement and to provide numerous opportunities for reinforcement.

To implement the program, the participants were housed in a completely separate building on the NTS grounds – their own, elaborate, multi-level Skinner box. The building, Jefferson Hall, became Cohen’s building-sized behavioral laboratory. He quickly discovered that it was an ideal site for his research. As he put it:

When we first started CASE I, I was worried whether we could work in a “penal institution.” I had preconceptions about prisons and what constituted a free or restricted environment. I soon learned what the medical profession had learned long before me – that the prison environment presents one of the finest laboratories for human research that is available for researchers in a free society. I soon realized that the university places more constraints on educational research than does the Federal Bureau of Prisons. (Cohen, 1968, p. 23).

Thus, under the fairly unrestrictive aegis of the Federal Bureau of Prisons, Cohen was able to randomly select 41 participants for the program. Most of the boys had dropped out of school before being committed to the NTS for a variety of crimes including homicide, robbery, rape, and automobile theft. Once selected for the program, the boys were extensively evaluated and tested to ascertain their existing levels of academic ability across a variety of subjects. They then received individualized educational packages consisting of programmed courses, regular texts, and lecture classes. The only way to earn points in the CASE program was by studying for an hourly wage or getting 90 percent or better on a test. Points earned could then be cashed in for a variety of reinforcers.

Once points were earned, the “Student Educational Researchers” as they were christened, could choose to spend them in a variety of ways. Popular purchases included soft drinks, milk, potato chips, Polaroid snapshots, entrance to and time in the lounge or library, smoke breaks, rental of a private room, rental of books and magazines, purchase of private tutoring, and purchase of goods from a mail order catalogue. Integral to the

implementation of the program was the layout of Jefferson Hall itself. In their 1971 monograph, Cohen and his colleague James Filipczak described the design of each floor and explained how each space was designed to function in a specific way. Access to certain parts of the building, such as the aforementioned lounge, was built into the token economy. Other parts of the building, such as the educational floor on the second level, were designated areas where only certain behaviors were expected and/or allowed to take place. All students were constantly monitored and clocked in and out of certain areas designated by function. As a result, detailed data on the length of time each student spent in each area of the building were available to the researchers: "The individual student was clocked in and out of each area.... This procedure provided an exact record for each individual over hundreds of calendar days, in terms of activities in functional locations and time measured in hundredths of an hour" (Cohen & Filipczak, 1971, p. 109).

It was clear that one of the keys to the functioning of the program was being able to use physical space to influence and monitor the behavior of the program participants. The Skinner box had expanded to encompass multiple rooms and several floors without sacrificing control or precision of measurement.

So how well did the program work? The main goal of CASE was to boost educational and academic achievement. Overall, according to its developers, it met this goal remarkably well. Participants' grade levels at the beginning of the program were measured across five subject areas – Reading, English, Science, Mathematics, and Social Studies. According to their entrance placement tests, none of the participants had reached either the junior or senior levels (encompassing Grades 8-12) in any of these areas except Reading, where thirty-seven percent of participants were reading at the junior level

(Grades 8-10). By the time this group had completed the program, 26% had achieved senior level status in Reading, 33% had achieved senior level status in English, 18% were seniors in Science, 25% were seniors in Math, and 39% were seniors in Social Studies.

This was good news indeed. If provided with appropriate incentives within an educationally enriched and individualized learning environment, it was clear that even society's write-offs could make impressive academic gains. But for prison officials and government agencies, the acid test was in the follow-up data. Would the Student Educational Researchers maintain their motivation and academic performance when returned to mainstream society – when released from the Skinner box? Furthermore, would they stay out of the penal system for good?

In 1969, Cohen and Filipczak received more federal money to make an evaluation of recidivism in CASE project participants. With this grant, they were able to gather information on 31 of the 41 students in the project. Twenty-six of these 31 participants were interviewed and tested to measure whether their academic gains had been maintained. Overall, they concluded that spelling, math, and reading scores were satisfactorily maintained by most students even though they had been out of school for over two years. In terms of measuring recidivism, they decided that students who were in the program less than 90 days, and/or those who were released from CASE back into other programs or institutions before final release (rather than directly into society), should not be included in the analysis, thus reducing the sample to only 11 of the original 41 participants. Four of these 11 participants, or 36.4%, recidivated within three years of their release. The group of CASE participants who served time in other penal programs before being released recidivated at the rate of 68.8%. The researchers reported that

according to NTS data, 76% percent of similar juvenile delinquents receiving no rehabilitation recidivate during the first year. Overall, they concluded that although numbers were small, it appeared that the CASE program delayed the delinquent's return to incarceration, but his behavior would require additional maintenance "in the real world" for the CASE experience to remain effective. The case was made for the transfer of Skinnerian principles from the laboratory to life.

The termination of the CASE program coincided with the closure of the National Training School for Boys in 1967. In a letter to Cohen about a year after the program had ended, Skinner wrote that he considered the CASE project to be "one of the most important experiments in the history of penology."⁴ Meanwhile, with the CASE programs as a model, other behavior analysts were trying their hands at behavior modification in the prison system. With grant money readily available, an arsenal of scientifically-derived techniques at their disposal, and a desire to be socially relevant, they moved into cellblocks nationwide to tackle the thorny problem of how to move prisons and prisoners from incarceration to rehabilitation. I have told the story of their successes and failures elsewhere (see Rutherford, 2006). Suffice it to say that converting prisons to Skinner boxes was a tricky endeavour indeed, and provided many interesting lessons in the perils of using science and technology in the service of social control.

III. Deconstructing the Box: Skinnerian Principles in Self-help

As Skinner's system expanded into a full-fledged technology of behavior and behavior modifiers used their expertise in institutional settings, they also explored the potential of their techniques in everyday life. If timeout could be used on the psychiatric

⁴ Letter from B. F. Skinner to H. L. Cohen, January 10, 1968. HUG FP 60.20, Box 6, Folder: IBR 1961-72. Skinner Papers, Harvard University Archives.

ward, why not in the home? Why not use stimulus control in a personal weight-loss program? How about a self-designed and implemented token economy? Could people be taught to be their own behavior analysts?

As many writers, both scholarly and popular, have pointed out, the practice and principles of behavior modification have existed throughout time and place:

“Commonsense notions of the ways in which reward and punishment can change behavior have existed since time immemorial” (Stolz, Wienckowski, & Brown, 1975, p. 1027). The power of positive reinforcement has been experienced by anyone who has ever become hooked on lottery tickets after a small win, or rewarded themselves with a vacation after completing a difficult assignment. Given that “The principles used by behavior therapists in their work are available to and in fact are universally used by virtually all people at all times” (Stuart & Davis, 1972, p. 75), how did applied behavior analysts both lay claim to a body of specialized knowledge and a set of specialized techniques, and give them away?

In part, behavior analysts accomplished this sleight of hand by using the cultural authority and practical tools of science. Systematic observation, measurement, control, and precise monitoring of behavior took the behavior analytic system beyond common sense. As behavior analysts themselves wrote: “The principles of behavior modification *codify* and *organize* common sense, showing under what conditions and in what circumstances each aspect of ‘common sense’ should be applied” (Stolz, et al., 1975, p. 1029, italics added). The techniques of behavior modification, although in many cases topographically similar to everyday practices, were scientifically derived and tested - based on findings from the experimental analysis of behavior, which itself was conducted

in what sociologist Thomas Gieryn would call a “truth spot” – the scientist’s laboratory.⁵ The application of these principles to dieting, parenting, and assertiveness training thus benefited from their place of provenance. The fact that the principles were systematically tested in the laboratory of the psychological scientist afforded them significant cultural currency as they moved from the laboratory to everyday life.

Behavior analysts also distinguished their techniques from common sense by formulating a specific language that set their advice apart and marked it as scientific, or at least technical. This was the language of positive and negative reinforcement, stimulus generalization, stimulus control, aversive consequences, functional relationships, and self-control. The use of the term self-control signified not only a change in language, but a change in approach. Willpower, insight, and actualization were out, behavioral self-control was in. Shedding a few pounds or giving up cigarettes was no longer a matter of exercising willpower, gaining insight into unconscious motivations, or working towards self-actualization. Behavior analysts highlighted the limitations of these inner-focused approaches: “Many of the humanistically oriented techniques...fail to provide self-controlling skills. Too often the focus is excessively insightful rather than ‘outsightful.’ That is, the person focuses on historical understandings and current interpretations rather than on the functional relationships between his own behavior and the immediate environment” (Thoresen & Mahoney, 1974, p. 140). Building self-control became a matter of analyzing and arranging your environment in specific ways to maximize the probability of the desired behavior change. Your life was your laboratory.

⁵ Thomas Gieryn describes a scientific truth-spot as a physical place that in its very generality and reproducibility actually transcends place and achieves universal acceptance as a spot from which truth is generated. The scientist’s laboratory, he argues, has become such a truth-spot (see Gieryn, 2002).

Behavior analysts advocated the use of self-control techniques for a wide range of personal problems in the 1970s. These included overeating, lack of assertiveness, fears and phobias, poor study habits, marital and sexual problems, smoking, and parenting. But the impulse to train people to be their own behavior analysts had started earlier. As Israel Goldiamond wrote to Skinner in 1962: “If operant procedures are to be used [outside the laboratory], then they should be used frankly, and in on-going analysis, to shape self-control. So, I have been counseling a) obese students, b) students who are flunking out of school, and c) marital problems”⁶

Goldiamond was not alone in his conviction that behavior analysts could help others help themselves. By 1976, there were so many self-help programs based on behavior mod that one behavior therapist suggested that professional regulations be developed to help monitor the quality and effectiveness of self-administered “nonprescription” behavior therapies. In 1976, psychologist Gerald Rosen noted the proliferation of the “self-help” behavior modification literature, and called for increased quality control, worrying that the spirit of empirical rigor so central to the field was being diluted as behavior modifiers jostled for their piece of the self-help pie (Rosen, 1976). Although his recommendations for monitoring this literature were not adopted, his article and the rejoinder to it written by Israel Goldiamond, highlighted the genre’s rise to prominence. As behavior modifiers began to see the success of their efforts in closed environments such as psychiatric wards and classrooms, a desire to promote the use of their principles in everyday life quickly ensued.

⁶ Israel Goldiamond to B. F. Skinner, December 13, 1962. HUG FP 60.10, Box 6, Folder: #1 of 2 Misc. 1962, Skinner Papers, Harvard University Archives.

In the published literature, one of the earliest problems to be tackled and reconceptualized in a behavior analytic framework was overeating. In 1965, an excited testimonial arrived on Charles Ferster's desk at the Institute for Behavioral Research in Silver Spring, Maryland:

*Dear Dr. Ferster,
I am a psychiatric nurse in charge of Unit 9 at Patton State Hospital.... Since November of 1964 we have made practical use of operant conditioning procedures in an open unit.... In this experiment in operant conditioning, we of nursing service attempt to shape and control the behavior of chronic schizophrenic patients. When I was in the program a little over two months, I decided that if I expected the patients to change old habits, I had better start on myself.... I weighed 263 pounds and was sorely in need of changing my eating habits. It occurred to me that operational [sic] procedures could apply in my case. I developed self-control in eating much the same as you have recorded in your paper The Control of Eating. I have demonstrated that this method does work!*⁷

How well did the method work? Nurse Norma Fullgrabe lost 95 pounds using Ferster's method. Was *The Control of Eating* a miracle diet? Had a behavior analyst discovered the cure for obesity?

In 1962, Ferster, fresh from collaborating with Skinner on their book *Schedules of Reinforcement*, published an article in which he provided an analysis of eating behavior and outlined behavioral strategies to control this behavior (Ferster, Nurnberger, & Levitt, 1962/1977). The report was actually based on an experimental diet control program that Ferster had carried out with a number of 'human eaters' – 12 nurses at the Medical Center, ranging in age from 24 to 65 years, who had self-identified as wanting help with dieting and weight loss.⁸

⁷ Norma Fullgrabe to C. B. Ferster, December 29, 1965. Box: Ferster Depot, Folder: Diet control. Ferster Papers, Archives of the History of American Psychology.

⁸ C. B. Ferster, "The control of eating," Unpublished manuscript. Box: Ferster Depot, Folder: Diet control. Ferster Papers, Archives of the History of American Psychology.

So what did the nurses do to lose weight? Ferster outlined a four-step plan: 1) Determining what variables influence eating; 2) Determining how these variables can be manipulated; 3) Identifying the unwanted effects – or ultimate aversive consequences (UACs) of overeating; and 4) Arranging a method of developing required self-control – perhaps the most challenging task, at times requiring so “drastic a change in behavior” that reinforcing by successive approximations became necessary (Ferster, Nurnberger, & Levitt, 1962/1977, 310). Of note was Ferster’s insistence that the program was not about developing willpower or some other internal property. Developing self control, like any other behavioral problem, was a matter of arranging the environment and manipulating conditions to make some behaviors unlikely (eating) and others more likely (not eating).

Despite Ferster’s interest in the project and its apparent success (at least in the case of Norma Fullgrabe), this early treatise on the control of eating was relegated to an obscure publication outlet, the *Journal of Mathetics*, and Ferster left the project behind when he moved from Indiana to Maryland. The idea of applying behavioral strategies to the problem of overeating, however, soon caught on. One of the most widely referenced and well-known weight-control manuals of the 1970s was Richard Stuart and Barbara Davis’ *Slim Chance in a Fat World: Behavioral Control of Obesity* (1972). Stuart, a behavioral psychologist in the School of Social Work at the University of Michigan, influenced by Ferster’s 1962 article, designed his own behavioral treatment program involving eight patients and reported the results in a 1967 publication (Stuart, 1967). In this article he wrote, “The behavioral processes involved in a person’s control of himself are the same as those one would use in controlling the behavior of others” (p. 357). A self-administered behavioral program to treat overeating was clearly possible.

In their 1972 manual, Stuart and Davis made their self-help philosophy clear from the outset: “the environment rather than the man is the agent of control of human behavior” (Stuart & Davis, 1972, p. 62). They explained that their approach was based on the principles of behavior modification, and described in detail four classes of antecedent conditions and four classes of consequences that would affect the probability of overeating. Thus, the reader learned of discriminative, facilitative, instructional, and potentiating stimuli, as well as positive and negative reinforcers, punishment, and extinction. The reader was then taken through a rather elaborate series of steps employing these principles in the behavioral control of overeating.

The reader first learned to “narrow the span of situational cues which are associated with eating.” That is, readers were told to arrange to eat only in one place in one room and not to engage in any other activities while eating, such as reading, or watching television. The second step was “constructing an environment free of stimuli that might cause overeating” (p. 79), or, more simply stated, putting temptation out of reach. If possible, the dieter should remove tempting food from the house and “increase the response cost of eating” by making it difficult to eat high-calorie foods that may have been intended for other family members.

Another important component of the *Slim Chance* program was the use of self-administered positive reinforcement following the completion of eating and exercise requirements or weight loss. In fact, the authors recommended a self-administered token economy approach. Dieters were encouraged to set up a token reinforcement menu in which behavioral goals such as following their diet for one meal would earn tokens which could then be exchanged for tangible (presumably non-consumable) rewards. For

example, they suggested an award of 3 tokens for following one's diet for one meal, or 100 tokens for following one's diet for seven consecutive days. The successful dieter could then exchange 500 tokens for a new dress. Twenty-five tokens might buy an extra baby sitter for three hours during the day (Stuart & Davis, p. 94). The power of social reinforcement was also highlighted: the weight-reducer was advised to enlist the help of others and to discuss her efforts only with those sympathetic to her goals. Friends and family were welcomed within the life-sized Skinner box, but only if they gave out the right kind of reinforcement.

Conclusion

By the 1970s, the potential power of the technology of behavior seemed limitless. Skinnerian psychologists had convinced the American public that in making and remaking their environments, they could essentially remake themselves. Despite Skinner's polemic in *Beyond Freedom and Dignity*, which collided with one set of American values, his technology of behavior aligned itself both with the American technological imperative and with the progressivist values of self-improvement and perfectibility central to American national identity. Further, Skinner offered the unique potential for control, not over nature, but over *human* nature. It is plausible that Skinner's system could neither have arisen nor taken hold in any other cultural milieu. After all, Skinner was himself a product of this distinctly American context.

Metaphorically, in moving from the laboratory to life, Skinner's system also moved from the basic to the applied, from the local to the universal, from the specific to the general, from the private to the public, and from the academic to the popular. The

evolution of the technology of behavior involved all of these processes. In making these moves, the technology of behavior came to inform not only cultural practices, but the very ways Americans experienced themselves. In his popular 1974 book *Behavior Mod*, journalist Philip Hiltz wrote: “The mod squadders keep graphs on themselves, their children, their friends...The world is a different place, with a different set of boundaries, structures, and meanings for the mod squadders... For a society obsessed with efficient tools, with getting results, the neat systems of the behaviorists will be hard to resist” (Hiltz, 1974, p. 17).

Although the technology of behavior has not created a different world for most of us, it has been remarkably successful in many important areas of human concern. It has directly informed treatments for many developmental disorders, including autism and attention deficit disorder. Weight control programs, assertiveness programs, parenting programs, and animal training programs often use operant psychology as the bedrock of their approach. Teachers and parents use behavior modification in the home and in the classroom on a daily basis. In short, American society continues to be driven by the desire to achieve ever greater control over nature *and* human nature. Skinner’s most enduring achievement was to treat human behavior change like any other technological problem. To the extent that we continue to engineer behavior, Skinner’s cultural legacy lives on.

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