JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2005, **38,** 279–287 NUMBER 2 (SUMMER 2005)

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Montrose Madison Wolf, who discovered the reinforcing power of adult attention for children and based on that discovery invented and named the nonviolent parenting procedure time-out; who discovered that absent speech and social development could be artificially created with operant conditioning techniques; who first engineered a token economy into a useful motivational system; who invented the good behavior game; who orchestrated the massive research program that developed and refined the Teaching-Family Model as a residential treatment solution for delinquent development; who reinvented field observation, repeated measurement, and single-subject research methods; who introduced and named the concept of social validity; and who led the founding of the discipline of problem-solving real-world research called applied behavior analysis, died of Huntington's disease on March 19, 2004, at his home in Lawrence, Kansas.

BEFORE APPLIED BEHAVIOR ANALYSIS

Mont Wolf was born in Houston, Texas, on May 29, 1935. He received a BS in psychology from the University of Houston in 1959. At Houston he was introduced to the "problem-solving science" and the "experimenting society" notions of Francis Bacon, Claude Bernard, and B. F. Skinner by Jack Michael, and was enthused by the groundbreaking real-world field research in a mental hospital of his graduate student friend Ted Ayllon (e.g., Ayllon & Michael, 1959). At Houston he met and married fellow psychology student Sandra Spiller, who was his lifelong colleague and companion.

Mont and Sandra followed Jack Michael to Arizona State University where Mont received an MA in psychology in 1961 and a PhD in psychology in 1963. (Because his was among the first PhD degrees awarded at Arizona State, representatives from other departments carefully monitored his dissertation defense. Mont recalled that an English professor's minority opinion was that the PhD signified that one was a "cultured gentleman," and that on that ground Mont did not qualify for the degree!) At Arizona State, Wolf was mentored by Jack Michael, and both his thesis and dissertation research studies were laboratory experiments with animals. But from Lee Meyerson he learned the clinician's ethical principle to personally know the individual people one is studying and serving, and to be responsible for tracking and improving their well-being—an ethic on which he later built the observation, measurement, and single-subject experimental design conventions of applied behavior analysis. He also served as a research assistant to both Israel Goldiamond and Arthur Staats, gaining experience in hands-on work with people and in programmatic research. With Staats and others (Staats, Minke, Finley, Wolf, & Brooks, 1964; Staats, Staats, Schultz, & Wolf, 1961), Wolf was a coauthor of the first two limited experimental demonstrations of an artificial reinforcement system—one that he soon developed into practical token economies and point systems of the type now adopted by many parents, teachers, and community service providers.

THE ORIGINS OF APPLIED BEHAVIOR ANALYSIS

In the early summer of 1962, Wolf joined Sidney Bijou at the Institute of Child

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doi: 10.1901/jaba.2005.165-04

Development at the University of Washington as a research assistant professor. Bijou, a major figure in experimental child psychology, directed the Institute with its preschools, child clinic, and experimental child laboratories, and he also coordinated the child clinical and developmental psychology areas of the Department of Psychology at the University of Washington. Bijou had recruited Donald Baer and Jay Birnbrauer as new assistant professors of developmental psychology and Robert Wahler as the postdoc director of the child clinic. Bijou had established a grant-funded human learning laboratory at a rural mental retardation institution near Seattle and hired Wolf to run it. In retrospect, Wolf never did the job he was hired to do—generate useful knowledge from a human operant laboratory—but with the excitement and productivity of everything else he instigated, no one seemed to notice. (Wolf came to consider laboratory research on human behavior to be an unproductive misdirection of effort, and 5 years later when he created the editorial policy of the new *Journal of Applied Behavior Analysis*, he explicitly excluded purported laboratory analogues in favor of the in-context observation and investigation of real-world phenomena.)

When he arrived at the Institute, Wolf was assigned to teach the teachers of the four preschools a course in learning principles. The four class projects designed by Wolf and carried out by the teachers constituted the original experimental documentations—the discovery—of the reinforcing power of adults' social attention for children. We had never seen nor imagined such power! The speed and magnitude of the effects on children's behavior in the real world of simple adjustments of something so ubiquitous as adult attention were astounding. Those four studies were subsequently published (Allen, Hart, Buell, Harris, & Wolf, 1964; Harris, Johnston, Kelly, & Wolf, 1964; Hart, Allen, Buell, Harris, & Wolf, 1964; Johnston, Kelly, Harris, & Wolf, 1966), and one of them, titled "Effects of Social Reinforcement on Isolate Behavior of a Preschool Child," became Wolf's first citation classic (i.e., identified as one of the most frequently cited publications by *Current Contents: Social & Behavioral Sciences*). Forty years later, social reinforcement (positive attention, praise, "catching them being good") has become the core of most American advice and training for parents and teachers—making this arguably the most influential discovery of modern psychology.

The research methods that Wolf pioneered in these studies were also groundbreaking: direct observation with interval recording and interobserver reliability, systematic alteration of the natural environment, reversal and multiple baseline single-subject experimental designs. These occurred at a time when, with the exception of Ayllon's work, the only real-time data of human behavior were from laboratory settings, and the few real-world efforts were being documented only with field notes. Precedents for the structured observations were found in several early child psychology studies, and precedents for field interventions were common to all teaching and helping professions, but the research designs were new to psychology. These designs did not come from conventional experimental design logic, which required experimental and control groups to show causality. Nor did they come from the conventions of the experimental analysis of behavior, which relied on multiply revisited steady states of behavior associated with different conditions to show causality. The reversal or ABAB design that Wolf reinvented from Claude Bernard's early examples in experimental medicine entailed establishing a baseline of repeated quantified observations sufficient to see a trend and forecast that trend into the near future (A); to then alter conditions and see if the repeated observations become different than they were forecast to be (B); to then change back and see if the repeated observations return to confirm the original forecast

(A); and, finally, to reintroduce the altered conditions and see if the repeated observations again become different than forecast (B). (The unprecedented multiple baseline design that Wolf first demonstrated at this time, and later elaborated on with other colleagues, similarly entailed concurrently establishing baselines of repeated observations of either more than one behavior, more than one condition, or more than one person sufficient to see trends in each baseline and forecast those trends into the near future; to then alter conditions for one baseline and see if the repeated observations of that baseline become different than they were forecast to be, and that the other baselines remain as forecast; to then similarly alter conditions for a second baseline and see if it too becomes different than forecast while the remaining baselines confirm their original forecasts; and so on.) Wolf reinvented these methods to fit the problems being studied: how to show that *this* beneficial intervention with *this* child *caused* a quantifiable change in *that* behavior. In these four preschool studies, Wolf first assembled field observation, field intervention, and single-subject design into a field research methodology. That methodology came to define applied behavior analysis.

Among Wolf's other duties at the Institute of Child Development was the task of building, at a rural institution, an experimental classroom for children with developmental disabilities. He had brought from Arizona State the first seed of an extrinsic reinforcer methodology that he now cultivated into a powerful motivational system—now called a token economy or point system—that could spread out the powerful reinforcing properties of "big things" into many small physical tokens or recorded points that could be accumulated to buy them. And just as important, Wolf had noted that the process also artificially reordered the social attention of those who dispensed the tokens or points by necessarily increasing their attention to the positive behaviors they were rewarding. He designed a token system for the classroom, and revised it until it was easy to run and successfully sustained high rates of academic behavior (and the children made steady progress through the reading, writing, and arithmetic programmed instruction curricula that Birnbrauer, Bijou, Wolf and others were developing) (Birnbrauer, Bijou, Wolf, & Kidder, 1965; Birnbrauer, Wolf, Kidder, & Tague, 1965). With teachers in another classroom in that institution, Wolf also provided the first example of a functional analysis of a severe problem behavior with a field experiment demonstrating that the frequent vomiting by a student was, surprisingly, operant behavior maintained by its function of returning her to her dormitory (Wolf, Birnbrauer, Lawler, & Williams, 1970; Wolf, Birnbrauer, Williams, & Lawler, 1965). Wolf's values, and his intervention strategies, were always about energizing people with positive reinforcement and building their skills and capabilities, and about paying increased attention to the positive things that people do. After he had pioneered the point system or token economy invention into a reliable social technology in the classroom, he relied on it as a part of his subsequent problem-solving research and development because it could sustain such high effort and enthusiasm for learning and practice.

At the same time, Wolf accepted the challenge of getting Dicky, a post-cataract-surgery 3-year-old boy with autism who displayed temper tantrums and self-injury and who resided in a psychiatric hospital 50 miles distant, to wear glasses. Thus began a year of weekly drives that culminated in the premier study of behavior modification. Wolf had to develop techniques to deal with Dicky's tantrums and sleeping and eating problems, and to establish wearing glasses, basic socialization, and functional speech. After having just discovered the power of adult attention for young children, and realizing that the staff could not simply ignore temper tantrums,

especially violent ones with mild self-abuse, Wolf decided to prescribe a response to tantrums that would minimize any social reinforcing effect of the necessary attention and counterbalance that reinforcement with a period of social isolation. The prescription for tantrums was to place Dicky, calmly and without comment, in his room until the tantrum ceased and at least 10 min had passed. When tantrums were under control and after wearing glasses had been hand shaped, Dicky began to throw his glasses occasionally. When the social isolation prescription was applied, glasses throwing decreased from about twice per day to zero. But the hospital staff doubted that it was due to the procedure because Dicky didn't seem to mind being taken to his room; he just rocked in his rocking chair and hummed to himself. Because throwing glasses was both less serious and more reliably measured than tantrums, Wolf agreed to discontinue the procedure—and glasses throwing soon increased to the previous level. The social isolation procedure was reinstated, and glasses throwing decreased again to zero. When writing the paper about the study, Wolf wanted to emphasize the applicability of operant conditioning "microteaching" techniques to children with severe disabilities. The social isolation procedure had no precise analogue in operant conditioning, but the practice of briefly turning out the lights after errors in match-to-sample research with pigeons (to avoid reinforcing error–error–correct sequences) had been called *time-out*. So, in the paper, Wolf decided to attach that label to contingent social isolation for children's acts that could not be ignored. Thus, this nonviolent alternative to physical punishment—based on his discovery of the power of adult attention for children—was labeled *time-out* in the paper that first introduced the procedure and documented its effectiveness. Forty years later, it is now recommended by the American Academy of Pediatrics (1998), and most of the parents (and teachers) in America—at the moments when *their* parents would have spanked or slapped—use social isolation instead, and call it *time-out*. Time-out is now a part of our general culture in everyday talk and popular cartoons, and is arguably the most widely adopted social invention of modern psychology.

That study with Dicky and three follow-up studies are also noteworthy for discovering how operant conditioning techniques could be applied to shape verbal imitation and meaningful speech in children with severe disabilities in the now familiar discrete-trials approach (Risley & Wolf, 1964, 1967; Wolf, Risley, Johnston, Harris, & Allen, 1967; Wolf, Risley, & Mees, 1964). These studies, which also included shaping social skills and toilet training together with Wolf's functional assessment of vomiting, started a movement in behavioral psychology to apply operant conditioning microanalysis and microteaching techniques to behavior problems of people with severe disabilities, culminating in a new profession: the board-certified behavior analyst. In this and subsequent work, Wolf's emphasis on the entirety of a person's daily life—analyzing consequences, building skills, motivating effort and enthusiasm—and on social validity also led to a related movement in education called positive behavior support and to the requirements for functional assessments in current federal law. The initial article reporting the work with Dicky, titled "Application of Operant Conditioning Procedures to the Behaviour Problems of an Autistic Child," became Wolf's second citation classic.

After accomplishing all this in 28 months at Bijou's institute, in 1964 Wolf took a regular academic position at the University of Arizona, where among other things he completed the first systematic demonstration of the use of operant techniques to toilet train people with severe developmental disabilities (Giles & Wolf, 1966). In 1965 Wolf was recruited to the University of Kansas where he spent the rest of

his professional life. Mont Wolf came to Kansas because of the opportunity to create solutions for problems of segregation and poverty on a community-sized scale at the Juniper Gardens Children's Project. He came because of the research administration vision and funding genius of Richard Schiefelbusch, who could temporarily support him and his students and colleagues (and who could teach us all how to fund our problem-solving research). He came because Baer had convinced Frances Horowitz to allow us to create, in the new Department of Human Development that she headed, a PhD program that emphasized immersion in research, demonstrated mastery of professional competence, but few required courses. Many former students and former colleagues also came to Kansas as soon as we could, to continue the excitement of collaborating with Wolf and sharing his vision of a new field of problem-solving research.

Wolf's first focus at Kansas was the Juniper Gardens Children's Project that he cofounded and codirected in an African-American poverty neighborhood in Kansas City, Kansas. The project, one of Schiefelbusch's many societal creations, was a joint venture of the University of Kansas and neighborhood civil rights activists with participation by local churches and public housing authorities. A pediatrician and a social worker conducted well-child clinics and follow-up home visits, some behavioral scientists worked on classroom problems with local schoolteachers, some established preschools, and Wolf set up an afterschool remedial classroom in a church basement. Through laughter and kindness, fun field trips, and opportunities to earn good stuff, elementary children were enticed to come voluntarily to Wolf's basement classroom every day after school and work on academic materials. As the incentive system was developed, the children began to come regularly and work hard—and to make large gains in academic progress in their regular classrooms and on standardized tests (Clark, Lachowicz, & Wolf, 1968; Wolf, Giles, & Hall, 1968). Then Wolf also began to work on remedial reading instructional techniques (Barnard, Christophersen, & Wolf, 1974; Strang & Wolf, 1971) and on adapting variations of the incentive system for homes (Christophersen, Barnard, Ford, & Wolf, 1976) and regular classrooms (Barrish, Saunders, & Wolf, 1969). One of these adaptations, the good behavior game, is still used by desperate teachers today. The article by Barrish et al., titled "Good Behavior Game: Effects of Individual Contingencies for Group Consequences on Disruptive Behavior in a Classroom," became Wolf's third citation classic.

THE *JOURNAL OF APPLIED BEHAVIOR ANALYSIS*

By 1966, the combination of field research methods and problem-solving strategies that Wolf had pioneered in 1962 had now evolved in sophistication and application and had proliferated across the country (except, peculiarly, in those places where operant laboratory research was strongest). By this time, books of readings were no longer adequate vehicles to assemble the work being done to enable cross-fertilization across topics areas. And Wolf was dissatisfied with the narrow focus of each specialty therapy, child, and education journal he had been using for his work, and he was disturbed by the lack of differentiation between laboratory analogue and real-world research in the experimental journals. So he began building support for a new journal. Several commercial publishers were willing, but the society that published the *Journal of the Experimental Analysis of Behavior* was persuaded to subsidize an applied companion journal. Nathan Azrin was the obvious choice as founding editor, but he declined and nominated Wolf as the person with the youth, dedication, and vision needed for the job; thus, Wolf was chosen to shape the new journal. He designed its name, the *Journal*

of Applied Behavior Analysis (*JABA*), to emphasize natural rather than laboratory or clinic settings and significant rather than inconsequential behavior (''applied''), observable relationships rather than intervening variables or hypothetical constructs or explanatory fictions (''behavior''), and quantified observations and experimental research rather than narrative descriptions (''analysis'').

Wolf then put in 3 years of heroic effort on top of his research projects and student mentoring to create a field out of a journal. To appreciate the abysmal state of the articles submitted, one needs to go back to the edited books of readings in behavior modification or therapy in the late 1960s (e.g., Bijou & Baer, 1967; Ullmann & Krasner, 1965; Ulrich, Stachnik, & Mabry, 1966) before *JABA* began to serve its function of providing models and reinforcement for field research with reliable measurement and valid design. Wolf was an unnamed coauthor of half the articles in the first two volumes as he helped authors reanalyze and rewrite their reports to salvage any parts of any work in which measurement and design allowed even tentative conclusions. He also ''educated by review'': Everyone who submitted an article was assigned someone else's article to review. He gave extensive feedback to everyone—authors and reviewers—and circulated reviews to everyone who needed a better example, and edited offensive statements out of the comments of inexperienced reviewers. His expressed goal was that everyone who submitted a paper, whether it was accepted or rejected for publication, would submit another paper, and that paper would be a better one. Wolf was successful. Within 2 years, submissions of good research increased as people began to do field experiments with adequate measures and single-subject designs because the outlet for such research existed, because early articles had provided them with good examples of it, and because they received encouragement and instruction more than criticism with each submission. An overview instructional article that Wolf and others wrote for *JABA*'s first issue also helped (Baer, Wolf, & Risley, 1968). That article, titled ''Some Current Dimensions of Applied Behavior Analysis,'' became Wolf's fourth citation classic. In fact, for several years it was the most frequently cited article in the social sciences, partly because it contained the first discussion of Wolf's single-subject research designs.

After his 3-year term as founding editor ended in 1970, Wolf watched the journal continue to serve its function of prompting, instructing, and reinforcing problem-solving field research as it passed through the hands of successive editors. But he was concerned by the growing presence of articles that seemed to show small concern for the well-being of the participants: The behaviors measured seemed trivial, or the methods seemed harsh or expensive, or the effects seemed too small or too brief to please the participants or significant others. Because Wolf's vision of an experimenting society requires a fair trade between an intruding scientist and a benefiting participant, this trend in the key publication outlet concerned him. As usual his response was to instruct rather than criticize. He wrote an article introducing the notion of social validity that spread throughout psychology (Wolf, 1978). Social validity is the radical concept that clients (including the parents and guardians of dependent people, and even those whose taxes support social programs) must understand and admire the goals, outcomes, and methods of an intervention. Wolf's article, titled ''Social Validity: The Case for Subjective Measurement or How Applied Behavior Analysis Is Finding Its Heart,'' became his fifth citation classic.

APPLIED BEHAVIOR ANALYSIS AND BEYOND

Concurrent with founding and defining a new field, Wolf went beyond it and began

to consider how one might conduct a research program to create a complete solution to a societal problem. He embarked on a program of mission-oriented research that culminated as the Teaching-Family Model for facilitating the development of troubled youth. At Achievement Place, a halfway house for delinquent boys, he began with a point system (Phillips, Phillips, Fixsen, & Wolf, 1971), developed the teaching interaction that added emotional and cognitive features to make social and point reinforcement more instructive, then added preteaching before problem times and delayed but predictable reviews and reinforcement of successes, and finally added family conferences and guided self-government. With effective methodology for a ''hothouse'' teaching environment, more complex developmental goals were added: academics, self-control, accepting feedback, negotiating with authority figures, conversation, effective interactions with dysfunctional parents, resisting drugs and alcohol, anger management. He then began to deliberately expand, and began to document, the processes for recruiting, training, supporting, certifying, and recertifying the teaching parent couples who lived with the youth, and the processes for maintaining effective community boards that sponsored and oversaw each new home. Because a solution has a multitude of interrelated features, Wolf saw that experimental demonstrations in mission-oriented research must be limited to only the most important or expensive or unpopular or counterintuitive features, and so the published experimental articles target only some parts of the complete solution, but the teaching-family operations manuals are thoroughly field tested and contain everything.

As the number of homes grew and additional training sites were established and the model was adapted to serve other kinds of children and youth, Wolf designed a new professional organization, The Teaching-Family Association, as a durable, decentralized vehicle for supporting high-quality delivery of the Teaching-Family Model. An estimated 10,000 teaching parents, treatment foster parents, home-based therapists, independent living counselors, and others—who have served over 85,000 children, youth, and dependent adults—have been trained and certified since the association was established. In 1975,Wolf also took the Teaching-Family Model, by then roughly complete, to Father Flanagan's Boys Town. Their on-campus program was converted from dormitories to family homes with live-in teaching parents. The model then became the foundation for Girls and Boys Town's far-reaching residential and foster family programs that have served 40,847 troubled or at-risk girls and boys since 1975. In 1996, Wolf received the Father Flanagan Award for Service to Youth in recognition of his 30 years of mission-oriented research, the comprehensiveness of the resulting solution, and the astounding number of identifiable people measurably benefited by the Teaching-Family Model. Wolf's illness prevented him from mounting his planned teaching campaign to behavioral psychology about what he had learned about mission-oriented research and building complete solutions to societal problems. But in the middle of his decline, a group of his collaborators in the development of the Teaching-Family Model helped him to write a brief retrospective account of the model's development (Wolf, Kirigin, Fixsen, Blasé, & Braukmann, 1995). That account references the research demonstrations of dozens of pieces of the Teaching-Family Model and the model's outcomes in many of its applications.

Montrose Wolf led by example, by enthusiasm, by patient instruction, not by exhortation. He did not have to be in charge to accomplish his ends—collaboration was his method, and he was its master. And we collaborators always got more than we gave. Several different people were heavily involved in each of his many contributions described above (only his social validity paper was an isolated act). In retrospect,

in our work with him we collaborators were actually mostly eager followers—we either did something that he recognized as useful, tried something he suggested, or wrote the draft he outlined—but his recognitions, suggestions, and outlines always occurred in exciting brainstorming discussions that made each of his collaborators a full partner of that part of Wolf's larger vision. Although he was a truly humble person, Wolf accepted second or last authorship on most of the published products of his vision and ingenuity as a practical way to motivate his collaborators. His goal was to make a dent in our society's problem-solving ineptness, not to make a splash for recognition. Wolf insisted that meaningful discoveries, inventions, and solutions in human affairs can only be developed by teams of people working together on ambitious projects over long periods of time. He was certain that collaboration was a habit that could be taught through practice, and he organized all his classes and research meetings accordingly. Ninety-six different people coauthored one or more publications with him. For most collaborators, working with Wolf was the most productive season of their careers. For all collaborators, working with Wolf was the most exciting time of our lives.

Because of Huntington's disease, Wolf was unable to assume the expected later career role of a senior statesman in behavioral psychology. After about 1985, he conserved his steadily diminishing energy and brilliance to try to complete the Teaching-Family example of mission-oriented research. He never ran for elective office in professional organizations. His few offices and committee memberships were mostly honorific. He avoided further editorial or professional review responsibilities. Because of this, psychology was denied the mid- and late-career leadership of one of its most influential figures.

Montrose Wolf's vision of an experimenting society was influenced by Francis Bacon and B. F. Skinner, and later by Donald Campbell and Richard Schiefelbusch. His research methods were influenced by his belief in active problem solving, and he therefore followed Claude Bernard's dictum of experimental medicine: When you have to try to help, the experimental question then becomes "What would have happened had you done nothing?" If we consider Wolf's professional contributions in that light, the productivity of the hundreds of his collaborators and students, the functioning of thousands of participants in his several projects, the knowledge bases of those project areas, the practices of behavioral psychology, the field of applied behavior analysis, the discipline of psychology, and the problem-solving abilities of our society would have been notably less without him.

Although Montrose Wolf was an inventor of time-out, his career was devoted to solving societal problems by filling people's daily lives with fun and learning. On his tombstone in the family cemetery in Texas are inscribed the words "Time In."

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Received November 29, 2004
Final acceptance January 18, 2005
Action Editor, Patrick Friman