JOURNAL OF ORGANIZATIONAL BEHAVIOR MANAGEMENT
2022, VOL. 42, NO. 1, 3–35
https://doi.org/10.1080/01608061.2021.1924340

Routledge
Taylor & Francis Group

A History of Organizational Behavior Management

Dale M. Brethower[a], Alyce M. Dickinson[a], Douglas A. Johnson[a], and C. Merle Johnson[b]

[a]Western Michigan University, Department of Psychology, Kalamazoo, Michigan, USA; [b]Central Michigan University, Department of Psychology, Mount Pleasant, Michigan, USA

ABSTRACT

Organizational behavior management (OBM) arose as early behavior analysts decided to use data in earnest to make the world a better place, first through education, then workplace training, and eventually through business and industry as a whole. The historical roots of the field are traced through the lessons learned by these pioneers and how their formative experiences created the tools and techniques that are common within the discipline today. This history also created a worldview and conceptual system that continues to distinguish OBM from alternative approaches and is reflected in recent publication trends seen today. As the levels of analysis, specializations, implementations, and problems faced continue to vary and expand within organizational behavior management, the mantra of performance-based empiricism has remained as a steady and consistent guide throughout the decades.

KEYWORDS

Organizational behavior management; history of OBM; programmed instruction; behavioral systems analysis

In order to better understand how the field of organizational behavior management (OBM) came to operate as it does today, it may be instructive to trace our historical roots to see how the legacy of several pioneers left us with certain tools, assumptions, and a general modus operandi. This cumulative history created the framework that guides our current pioneers as they seek to apply our particular brand of science to improve behavioral relations within business. It can also serve as a point of demarcation to highlight how our field evolved differently than other fields with similar interests, which could prove useful as we look to our growth going forward. OBM-like work gradually emerged during the 1950s and 1960s as individuals began to see the relevance of the experimental work being done by behavioral psychologists to the behavior of management and employees (Aldis, 1961). The OBM label was formalized when the *Journal of Organizational Behavior Management* (JOBM) was established in 1977. The publisher, Behavioral Systems Incorporated

CONTACT Douglas A. Johnson behavioranalyst@gmail.com Western Michigan University, Department of Psychology, P.O. Box 20415, Kalamazoo, MI 49019

The authors were participants at various stages during much of the history that is described. When we say "we" in the manuscript, it will mean one of the authors unless otherwise specified. As will be the case with any historical review of a mature discipline, a single manuscript will inevitably leave out some important contributors to the development of the field. In no case was this intentional and we apologize for any accidental oversights or omissions due to space limitations.

(BSI), was a for-profit firm started in 1971 by Aubrey Daniels and Fran Tarkenton. Daniels is recognized as one of the pioneers of OBM, receiving the OBM Network's first Lifetime Achievement Award in 1988 (see Dickinson, 2000). Tarkenton is best known as a National Football League Hall of Fame quarterback for the Minnesota Vikings.

The potential for behavioral principles and derived procedures to reshape business and industry had already begun to be demonstrated in the decades that preceded the formation of OBM. For example, James Lincoln (1961) developed a system of incentives to produce lasting and economically important effects in industry. Lincoln Electric in Cleveland operated by paying production employees for only what they produced rather than paying a salary. This was different than hourly pay; the approach most American factories utilized at the time and had earned Lincoln Electric a worldwide reputation for its management practices (Handlin, 1991). The Lincoln philosophy that had guided such practices was not an inherently behavioral philosophy. The company founder believed that the key to employee motivation was to develop the workforce's sense of pride and mutual respect, which was best achieved by ensuring recognition was scaled to contribution (Lincoln, 1951). Although the philosophical core was different than the basis that guides OBM, many of the resulting practices and procedures were similar. As a businessman Lincoln believed that the fruits of business should be shared among workers, owners, and customers. He further believed that profit sharing alone was insufficient, rather there needed to be a recognition of the individual's performance (as Lincoln once put it, "an organization is composed of individuals – not charts"). There would be individual accountability for both quality and output with employees only being paid for good products and correcting any defects on their own time. Although monetary incentives were a standard part of the Lincoln approach, the company also emphasized that money is not the only form of reward. Under incentive management, wages went up and prices went down. At one point, Lincoln Electric won a lawsuit against the Internal Revenue Service; the IRS accused the company of paying workers a lot to drive up costs and thereby "hide" profits. Why else, the IRS argued, would Lincoln Electric pay workers three times as much as the industry average? The winning defense was that piecework pay yielded about three times the average compensation and three times the productivity. Also, there were special incentives for working cooperatively. The first author toured the plant in the 1970s and asked about safety. Workers got a lot done and avoided accidents, else they did not earn any money when hurt or sick.

What events drove people to look for OBM-like applications?

"Let the data be the guide!" was a rallying cry of a handful of behaviorally-oriented graduate students at Harvard, Columbia, the University of Michigan,

and a few other universities during the 1960s. Rallying around the data is essential to success in the field and discovering variables that must be managed to improve performance. What excited us most was, "How can we revolutionize education?" The answer to both finding and managing the variables, we believed, was through "programmed learning," which primarily involved the careful application of fading, prompting, priming, branching, and response requests to instructional material, along with extensive testing and revisions (D. M. Brethower, 1963; Markle, 1969). Several publications inspired our emphasis on this great educational revolution, particularly those by the first author's mentor, B. F. Skinner, and his thoughts on how automated and individualized instruction might transform how students learn (Skinner, 1954, 1958). Skinner had noted how effective education requires a careful analysis and sequencing of instructional content, continual engagement by the learner, and frequent consequences closely following performance. Such an extensive management of behavioral contingencies would require behavioral science to adapt to serve large numbers of students at once, a problem of scale that would prove relevant again later on as behaviorists began trying to shape the behavior of entire workforces. Skinner's approach to educational contingencies is well-represented in a collection of his articles titled *The Technology of Teaching* (Skinner, 1968).

The preface to an updated edition of *The Technology of Teaching* was written by James G. Holland, in which he recounted how he attempted to apply Skinner's notion of teaching machines and a behavioral approach with education to Natural Science 114, an undergraduate course at Harvard University that taught about the experimental analysis of behavior. These efforts involved extensive testing and refinement of instructional material in which student responding guided every decision throughout several development cycles. Eventually the program within the teaching machine was converted into textbook form with the publication of *The Analysis of Behavior* (Holland & Skinner, 1961), which would become the most influential and well-known of the programmed learning books, of which there were many publications over the years (with the number of 'm's in programed/programmed varying across authors). Beside Holland, other key figures in the Harvard Teaching Project included Susan Meyer Markle, author of *Designs for Instructional Designers* (Markle, 1990), and Tom Gilbert, author of *Human Competence* (Gilbert, 1996). Gilbert sometimes referred to himself as "Skinner's right-hand man" as a way of acknowledging Skinner's impact on his work. The field of programmed learning developed out of enthusiasm for improving public education. The most significant early development occurred in the early 1960s when Professor Skinner went into the shop at the Psychological Laboratories in Harvard's Memorial Hall and built a teaching machine out of an old phonograph turntable. Deficiencies in public education had caught his

attention when he visited his daughter's elementary school (Skinner, 1983). He set out to do something about it, wrote a paper (Skinner, 1954), got some funding, and, with the help of the members of the Harvard Teaching Machine Project, the field of programmed learning was off and running.

There was a flurry of entrepreneurship in the programmed learning business during the 1960s. Most of these businesses failed or transformed themselves into vendors in the training and human resources marketplace. Robert Mager (1997) was one who succeeded and made significant contributions to the field. When enthusiasm and hard work were not enough to support a great educational revolution, many of us began to apply behavioral principles in a variety of settings such as government agencies, institutions, private businesses, and educational organizations.

Behavioral psychologists, aware of Skinner's (1938) three-term contingency connecting relationships among antecedents, behavior, and consequences, researched reinforcement, extinction, discrimination, and other fundamental processes. Beyond that, the foundation for OBM was like loosely laid paving stones; there were solid items and many gaps. The paving stones are important in hindsight because organizational behavior management was influenced historically by a variety of sources including human learning, education research, economics, systems analysis, management, and both the experimental analysis of behavior and applied behavior analysis. For example, there was solid evidence that:

- simply practicing intellectual tasks does not have much effect on other tasks; transfer of training does not happen automatically (Woodworth & Thorndike, 1901).
- basic principles of learning can be applied to:
  - learning of emotions (Watson & Rayner, 1920)
  - treatment of emotional disorders (Ayllon & Michael, 1959; Lazarus, 1959)
  - learning by disabled humans (Fuller, 1949)
  - learning of social skills (Azrin & Lindsley, 1956)
  - learning of language skills (Skinner, 1957)
- simple tests can teach (Pressey, 1926)
- numerous variables influence how reinforcement works (Ferster & Skinner, 1957; Keller, 1954; Premack, 1959; Skinner, 1953)
- how humans process information is important; there are limitations on how much people can keep in memory at one time (G. A. Miller, 1956)
- there are serious concerns about the applications of behavioral principles to human behavior (Rogers & Skinner, 1956)
- the "systems approach" is both relevant and important (Boulding, 1956; Drucker, 1946; Skinner, 1938; Weiner, 1950)

- there are complex and important social implications related to applying the concepts and methods of science to practical human affairs (Drucker, 1973; Mayo, 1933, 1945; Roethlisberger & Dickson, 1939; Skinner, 1948)
- there exist well-developed methodologies (Flagle et al., 1960; Sidman, 1960).

The most powerful methods, described by Sidman (1960), were well-known to a few hundred people familiar with the work of B. F. Skinner at Harvard and Fred Keller at Columbia. Economists called these time-series designs. These methods were not and are not well known to psychologists, educators, social scientists, or managers outside OBM. Part of the excitement of graduate students of this period was the gaps we could fill. We did not know all the answers, but we knew how to find them. Manipulate variables related to the three-term contingency and collect data on the effects (see Sidman, 1960). From the beginning our willingness to be guided by the data was one of the most important biases of people working in OBM; science is more valuable than ideology. The data bias is one of the reasons that establishing professional journals and graduate programs is an important part of OBM history.

What lessons from Nobel Prize scientists proved important to the assumptions of OBM?

From Percy Bridgman (Nobel Prize in Physics), we can learn that one of the necessary tasks in doing an OBM project is enabling the client to see the world as we see it (Bridgman, 1959, 1961). We must integrate our knowledge into the world of the client, at least the part of the world that is within the scope of the project. One way, maybe the best way, to achieve that integration is to partner or work with the client.

Bridgman gave a presentation, *The World as I See It*, in Cambridge, MA in the early 1960s. The first author attended and saw his point was clear: the world as I see it is the world as I see it. He said he did not know if the point was trivial or profound. It was years later before the first author saw that while the point might sound trivial, nonetheless it is still profound. Getting clients and OBM professionals to see the world the same way is necessary for success; both the success of the project and success in getting repeat business and referrals (see Standard 4 of the International Society for Performance Improvement (ISPI) certification standards; ISPI, n.d.).

Different people see the world differently. Even when working with colleagues or clients who see the world in much the way we do there will be differences of opinion. What should we do first on this performance improvement/OBM project? Should we try what worked last time, even though conditions changed? There is usually no umpire to decide. Even if there is an authoritarian leader who decides, maybe collecting more data will

change the Big Boss' mind. Not only are numbers important for changing minds – the data often reflect matters necessary for success. Do funding agencies consider our results good enough? Are lost time accidents decreasing? Do we have enough potential customers in the pipeline to generate enough sales to continue the business? Is the cost of production decreasing for our products? Bankers, investors, and senior executives live in a world where data rule.

OBM practitioners work in an environment in which we are not all powerful; we must work with others to achieve results. Rarely are we the ones who have the final word. "Do this because I'm the expert on behavior" rarely works. This is one reason the ISPI adopted "Partner with Clients" as #4 of the 10 Standards of Excellence. The mnemonic is RSVP: Results, System, Value-added, Partner. "Results" are decided by measures such as increases in revenues, widgets produced, profit margins, or returns on investments. A "System" is a department, company, or a division in which anything that happens can affect something else. All performance occurs in a system of some sort. "Value-added" is making things better. Getting agreement on what adds value by collecting data to discover which results might add value.

From Georg von Békésy (Nobel Prize in Physiology) we learn that what we must do is "first, make the analysis; second, make the synthesis; the synthesis tells you if your analysis is correct." The analysis identifies key variables that must be managed to get the result we seek. The synthesis includes building a system that manages the variables and gets results. von Békésy (1961) gave his talk, probably in Memorial Hall at Harvard, also in the early 1960s. The analysis/synthesis/evaluation-confirmation quote was from the beginning of the presentation. He ended by repeating it and saying, "You do the work; they give you the prize." The middle concerned how he made a model of the basilar membrane and used it to replicate many phenomena in hearing; thus, providing evidence that his analysis was correct. The first author left the talk glad he attended, but unaware he had just received a summary of how to make OBM projects successful. First do the analysis, then do the synthesis by building a system to manage variables from the analysis to yield the result. Variants of von Békésy's procedure appear under several names: the experimental analysis of behavior, applied behavior analysis, behavioral systems analysis, organizational behavior management, human performance technology, behavior engineering, and the scientific method. Whatever we name it, we are doing what von Békésy said: "First you make the analysis … " The contemporary set of standards for certifying excellence show these remarks by two Nobel Prize recipients prophetic: ISPI 10 standards (ISPI, n.d.).

What are some of the other basic lessons learned during the history of OBM?

Analysis is always part of our work, but what is it? Analysis is nothing more nor less than finding answers to questions. An economist might analyze by asking, "How did supply and demand vary to change prices of seed corn in Iowa during the 1930s?" A performance analyst might ask, "What are the salient differences between what our best machine operators do and what our typical operators do?" "What results are we not getting that we should be getting?" Each discipline has its own tailored analysis questions. It was years into doing "subject matter analysis" for programmed learning and doing "behavior analysis" that we began to figure out differences between variables that bring about excellent performance and variables that bring about average performance. Finally, we figured out two insights that felt startling: First, analysis is always about asking questions, and second, different disciplines have tailored analysis questions. All of them. The key to performance analysis is asking the right questions. Different gurus all ask good questions. In addition, all successful gurus are good at value sharing. They have a subtext: "You and I have some of the same values; we can work together." The subtext is *not*: "I'm an expert and will show you peasants what to do."

Second, do the synthesis. Teach the average performer to do what the best performer does. For example, find out what happens when you introduce the production techniques used in the best performing manufacturing plant into an average performing plant. Crawley et al. (1982) demonstrated this approach when they recorded the top 65 sales performers' behaviors for four months (1000 hours). Then they trained these techniques to 450 sales agents across the country. This improved performance for average sales agents and the company. Gilbert's (1996) "PIP" (potential for improving performance) model of computing the ratio of top performers' accomplishments, compared to average performers, demonstrates the utility of this OBM technique. Large PIP ratios indicate opportunities to improve overall performance; small ratios suggest spending time and resources elsewhere.

Third, test the synthesis. Collect performance data, then revise and fine tune until it works. Does it always work? No. Get suggestions from performers and others, make changes, and measure the results. Call this "re-engineering," "trial-and-error," or "persistence." Discover that when the people involved get involved (the ISPI Standard 4 on Partnering) this improves overall organizational performance (ISPI, n.d.). We are biased toward science and engineering and practical matters. We tend to rely on data, often data obtained by counting such as students graduated, products sold, exam questions answered correctly, number of responses, etc.

What were the early jobs as the field tried to find opportunities?

There were and are three main markets for our sources of income: academics, consultants, and salaried personnel such as trainers, safety experts, and in more recent years, organizational development specialists and quality improvement specialists. We had to market our skills and perform useful work as best we could. We all had a common set of principles, an entrepreneurial tendency, and a reliance on data to guide our work.

Academics typically work in a publish-or-perish environment in which we earn our base pay by teaching courses, providing service to universities and organizations, and conducting research. We earn advancements and avoid perishing by publishing articles and books. Securing grants and contracts is important for major research universities. We sometimes moonlight as consultants and, occasionally, leave academia to start or work in consulting businesses. Consultants are free lancers or small business owners and employees thereof. Some are profiled in Dickinson (2000) and have informative websites. Earning a living as a trainer – now called Human Resource Developer – became the most common because of our early roots in programmed learning. The National Society for Programmed Instruction was started in 1962 and became ISPI. Several of the founding members, such as Tom Gilbert, had connections to Skinner's Harvard Teaching Machine project. The Programmed Learning Workshop at the University of Michigan contributed to the development of the field by helping businesses that sent people to the workshop develop effective self-instructional programs.

How was the OBM infrastructure built through journals and training programs?

The *Journal of the Experimental Analysis of Behavior* was established in 1958; an applied outgrowth periodical, *Journal of Applied Behavior Analysis*, was established a decade later in 1968. *Performance Improvement Journal*, started in the 60s as the Programmed Learning journal, evolved into *Performance Improvement Quarterly*. As mentioned earlier, the *Journal of Organizational Behavior Management* was established in 1977. Academic programs specializing in analysis of behavior were simply non-existent in the early 60s. Students learned by falling within the orbit of individual faculty members. That changed gradually as faculty were able to recruit colleagues. That is how all our applied behavior analysis and OBM graduate programs started. Early on, several people collected in various parts of universities such as the University of Michigan, University of Kansas, University of Nevada-Reno, West Virginia University, North Texas State University, and Western Michigan University. Some started masters and doctoral programs (Dickinson, 2000).

How did OBM move from programmed learning to workplace and organizational performance?

Influences from the Harvard Teaching Machine Project showed up at the University of Michigan in the early 1960s. Harlan Lane, a newly minted Harvard Ph.D. and author of critically acclaimed *The Wild Boy of Aveyron* (Lane, 1976), later received a MacArthur Foundation Genius Grant. He teamed with F. Rand Morton on a U.S. Office of Education project. The purpose? Build programmed learning for 5 languages. The first author went to Michigan to help. Part of the reason for joining the project was that pundits were saying the complex material could not be taught with programmed learning. Teaching languages by programmed learning was part of the proof that the pundits were wrong. Morton wrote the Spanish program. Faculty members from other universities wrote programs in French, German, and Chinese. The first author, with a couple of Thai graduate students, wrote the program in Thai. Geary Rummler, working for the University of Michigan Office of Research Administration, was assigned to monitor the project.

Lane and Morton also started the Institute for Behavioral Research and Programmed Instruction (IBRPI) with funding from a private company. IBRPI had a lofty motto, written on a medallion. Read one way the medallion said: "To Change Man to Change the World." Read another way it said: "To Change the World to Change Man." What it meant is: "to improve the performance of individuals and change the world for the better" (A very similar motto is seen throughout the works of Dick Malott, who helped pioneer the early dissemination and adoption of OBM/behavioral systems analysis and introduced these topics to generations of behavior analysts). The IBRPI mottos refer to small goals that might have a huge impact. IBRPI worked toward a small goal and initiated a workshop to train people from the private sector to write self-instructional programs. IBRPI failed as a business, but the workshop was a success. The workshop was the beginning in a series of important developments in the history of OBM. These small but impactful developments are described in detail below.

George Odiorne (primarily known for advocating "management by objectives"), Rummler's mentor in the College of Business, brought the IBRPI workshop into the University of Michigan. Odiorne opined that the new programmed learning workshop should distinguish itself from the competition by training people better, faster, and cheaper. To do that it should use programmed instruction and have workshop participants actually write programs to prove in the marketplace that the faster and cheaper (one week rather than 2 to 6 weeks) was also better. Participants in competing workshops learned a lot about programmed learning but practiced little actual writing during workshops. There was much to learn that was not put into practice. Participants went through a self-instructional program and Rummler

managed them. The first author wrote the instructional material and then hid so participants would not know how very young he was. Rummler sent out a brochure advertising the workshop which would now be offered by the "Center for Programmed Learning for Business" of the College of Business at the University of Michigan. There was one problem; there was no such center. Odiorne received a phone call from the Business College Dean who chastised Odiorne and explained that such a center must go through a review process that could last years. Odiorne was properly contrite and asked "OK, but what should I do with all the checks?" "What checks?" "People have already enrolled and I have checks here from . . . " Odiorne then listed several of the largest corporations in Michigan, including Ford, General Motors, and Michigan Bell. The Center for Programmed Learning for Business became the only Center at Michigan ever established by press release. Rummler learned another lesson in entrepreneurship from his mentor; it truly is easier to get forgiveness than permission.

The program used in the workshop was later published by the first author (D. M. Brethower, 1963; there was a Japanese translation in 1965), which covers the core techniques and uses of programmed instruction. The program taught enough so that workshop participants could describe what they were trying to do; doing it was difficult because the program did not provide enough examples of material similar to what they were trying to program. The workshop staff corrected that by collecting examples from participant programs and publishing another programmed book of what we called the lean programming process and expanded the scope of the previous publication by examining how to first analyze various subject matters, then break the content down to manageable sizes, and then conduct empirical testing and revision (D. M. Brethower et al., 1965). The Center for Programmed Learning for Business workshop ran once per month for twenty years or so, long after Rummler and Brethower had earned their Ph.D.s and left the University of Michigan. Each workshop included an exercise in "subject matter analysis" in which we tried to analyze what every participant's program would teach. Not just general "business math," but "computation of the production costs of new products." The program required specific outcomes so that we knew what computations learners would master by the end of the program. We could work backwards from the computations to determine what was to be taught. Seeing 20 or so examples each month we noticed patterns in subject matter analysis. The analysis questions were quite similar regardless of the subject matter we were analyzing (e.g., "What will they do with what they learned? Examples, please!").

Our questions focused on *results*; the results added measured *value* to the organization (system) as a whole. The results required *partnering*, that is, other people in the company also must perform well. Many years later an ISPI Task Force codified essentially the same pattern as the first 4 of 10 Standards for

Excellence in performance improvement projects: Results, Systemic, Value Adding, and Partnering (see D. M. Brethower, 2008).

The programmed learning workshop spawned others at the Center: one on advanced programmed learning, a management of behavior change, and a training systems workshop. The story of how this occurred further illustrates the entrepreneurial spirit of the time and adherence to the rallying cry "Let the data guide!" We believed that workshop graduates would be successful only if they practiced applying the developmental testing process. But there was a serious problem; participants did the developmental testing on Friday. To accomplish that we used available technology; typewriters operated by paid typists who stayed up late Thursday night so that programs would be ready to test Friday. Participants had Thursday nights off, having worked until 9 or 10 PM Sunday through Wednesday. They complained and we explained that they had to work in our workshop. Participants took advantage of their free time to experience Ann Arbor's night life; some came in bleary eyed Friday morning and not ready to learn developmental testing. Rummler successfully solved the problem by scheduling a session for Thursday evening. Under the title Applied Learning Theory, the first author lectured about behavioral theory and told them stories to hold their attention. These included folklore from students at Harvard, Columbia, and Michigan in which students had changed professor behaviors. For example, Harvard students reported shaping a chemistry professor to lecture holding onto both faucets on a sink at the front of the lecture hall. Whenever the professor approached the sink they "looked alert" and took notes; when he lectured from anywhere else they sat back looking like other bored students. Within the first hour the professor touched the faucets with one hand, then both, and lectured from there. The first author told workshop participants that such antics were unethical unless students obtained the professor's permission in advance. Part of the workshop fee included follow-up telephone conversations with workshop graduates. These calls turned out to be extremely important because we learned from their successes and failures and improved the workshop. Years later a colleague published a book describing very similar techniques (Brinkerhoff, 2003).

Some graduates reported their own behavior change examples, some work related and some personal. The first author was delighted since it showed his lectures did not bore people too much; Rummler was delighted since it suggested an entrepreneurial opportunity. He sent brochures offering a 3-day workshop in "Applied Learning Theory." Participants said they had trouble convincing their bosses that 3 days of theory was worth the money. We let the data be our guide and changed to "Management of Behavior Change" so that participants could justify "management" over "theory." We ran the workshop quarterly for several years. The effort Rummler made to stay in touch with workshop graduates paid off in another offering: The Training Systems Workshop. Programmed Learning and Behavior Change graduates reported

a variety of organizational problems on the job from their programs including managers with other priorities or other workers who scoffed and performed in a different way. Such problems were no surprise to us; we discovered them while doing subject matter analyses in the programmed learning workshop. We tried to show participants how to deal with such problems, but participants told us we were not successful. People wiser than we were said organizational problems were easy to discover but quite difficult to solve or even ameliorate. We offered advice, "If you can't maintain it, don't train it!" (K. S. Brethower, 1967). We set out to design a workshop to practice what we were preaching. Two tools helped participants analyze behavior change problems and create (synthesize) solutions.

The first tool guided what we called a balance of consequences analysis. The workshop experiences forced us to place a greater emphasis on the maintenance of performance after training via programmed instruction (K. S. Brethower, 1967). As we move around on the chessboard of life, every move we take has more than one consequence–some environmental outcomes will strengthen the reoccurrence of trained behavior and some outcomes will weaken the reoccurrence of trained behavior. The net effect of these daily consequences will determine whether the performers will persist in emitting that behavior beyond training. If the problem is with maintenance via consequences, then training will not be successful as an intervention, at least for the subordinate (although training for supervisors in how to provide support may be warranted). Some consequences are immediate, some are delayed. Immediate consequences, perhaps small, have more power than delayed consequences, even if the delayed consequences are larger. This had been demonstrated many times in the behavioral research literature and, for several years later on, was a mainstay of Dick Malott's teaching and public lectures at Western Michigan University. Multiple authors began to present this notion graphically as a pharmacist's set of scales balancing reinforcing and punishing consequences (see Figure 1 as an example) for desired and undesired behavior and began to classify the consequences by category (Connellan, 1978; Petrock, 1978). Consequences were classified according to their frequency-altering effect (reinforcing or punishing), magnitude (large or small), impact (personal or organizational & other), timeliness (immediate or delayed), and probability (certain or uncertain). Unhealthy organizations will typically have powerful reinforcers and weak punishers for undesired behavior and/or weak reinforcers and powerful punishers for desired behavior. The balance of consequences can be thrown off in other ways, such as with "dangerous" organizations in which both desired and undesired behaviors are excessively punished or "silly" organizations where all behaviors are met with noncontingent reinforcement (Brown, 1982). Eventually, the balance of consequences analysis was adapted into tools such as the PIC/NIC model or ABC Analysis, which focused on consequence characteristics of frequency-altering effect

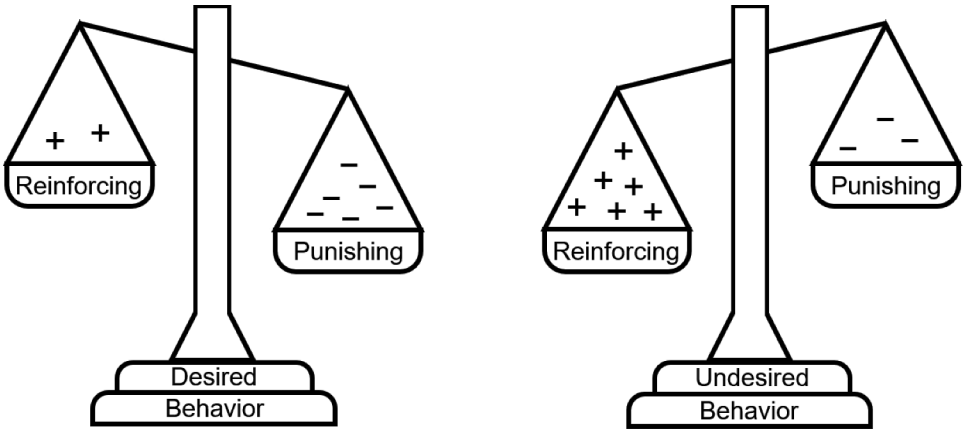

Figure 1. Balance of consequences representing an unhealthy organization.

(now labeled as positive or negative), timeliness, and probability (Braksick, 2007; Daniels & Bailey, 2014). Unfortunately, the important considerations of magnitude and whether the consequence impacts the individual, the organization, or both were lost along the way. Eventually, more prescriptive assessment tools at the performer level began to emerge over time (see Gravina et al., 2021).

One of the other products that emerged from the Training Systems Workshop was a second tool called the Total Performance System (TPS) diagram (see Figure 2). It captured the functioning of the organization at a level broader than the individual performer. General Systems Theory and Information Theory were hot topics for a few years so Center staff looked for

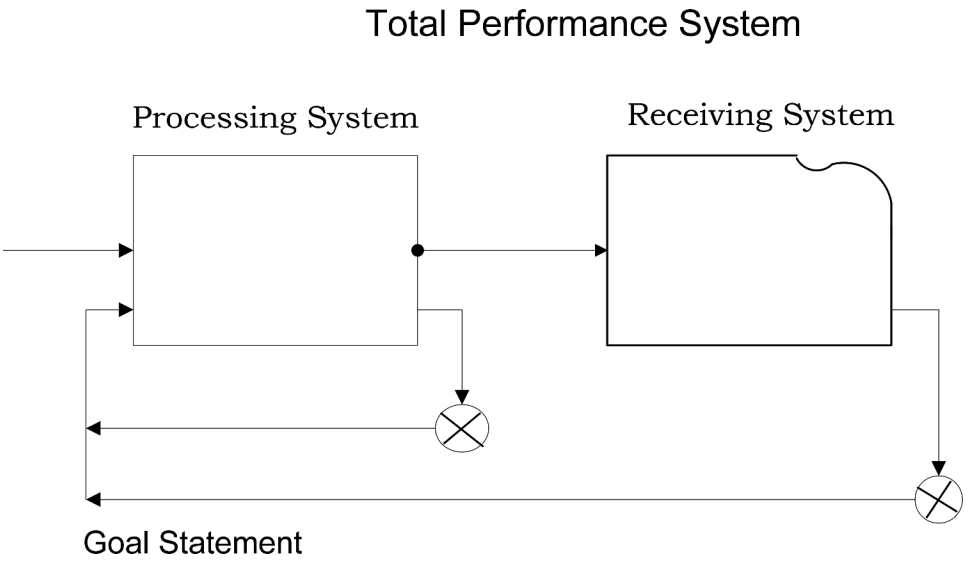

Figure 2. Total performance system map.

guidance as we designed the workshop. General Systems Theory could be applied by people with common sense, such as a Ph.D. in economics, and a penchant for thinking out of the box. The material crossed discipline lines and organizational boundaries. Our training systems workshop was designed for a broader chunk of the marketplace, so we applied programmed learning logic and tactics to the design. We had participants devise many diagrams during workshop exercises. Two turned out to be quite important: flow charts and total performance system diagrams. The idea behind flow charting is to discover how work flows better, faster, and cheaper. This became process mapping; Hammer and Champy (1993) helped that effort (see McGee & Crowley-Koch, 2021, for a discussion of various systems tools). The reason we called it the Total Performance System diagram was because clever people could use it to capture all of the most essential variables participants in the Training Systems Workshop would have to capture to manage critical business issues in their organizations. Later, Geary Rummler earned a living with process mapping and the TPS diagram expanded into the core of his Anatomy of Performance (AOP) diagram. Similarly, Maria Malott (2003) showed the world how the TPS could be applied to multiple levels of organizations. Some participants learned in the training systems workshop that Rummler should be hired as a consultant to work on strategically as well as tactically significant problems. During this time Tom Gilbert made several trips to Ann Arbor, appearing in workshops and talking with staff. Tom, Geary, and a third partner formed the Praxis Corporation headquartered in Manhattan. Geary completed his Ph.D. in adult learning and moved to New Jersey. The decade of the history of OBM in the 1960s was ending.

What are the lessons we can learn from the work at the University of Michigan?

One lesson is that innovators sometimes fail but keep on trying. Life is full of intermittent reinforcement. Jonas Salk, who discovered the polio vaccine, stated, "There is no such thing as failure, there's just giving up too soon." The IBRPI founders and staff had not found a market for programmed language learning. IBRPI failed, but Rummler and Odiorne kept programmed learning workshops. Innovators in OBM learn from both successes and failures.

Marketplace forces are more powerful than the innovators' intentions. To market a new product or service, offer it, sell it, and use the revenue to fund additional products/services. Geary knew that in advance; the first author did not. The analysis, synthesis, and test process applied to all the work at the Center for Programmed Learning for Business. We did subject matter analysis in the programmed learning workshop, followed by synthesis (writing programs) and testing (by the Friday developmental testing work). We did

balance of consequence analysis in the Behavior Change Workshop and had participants devise (synthesize) practical management systems to create balances that supported improved performance. Testing occurred when they returned to their workplaces and implemented the designs. Did the designs work? It was not hard to find out; some did not work fully and needed revision. The Total Performance System diagram helps people capture complex interactions of variables in complex organizations. Some call the diagram a "model." We do not, instead preferring to call it a tool. The first author's dissertation validated the tool (D. M. Brethower, 1970).

OBM developed from practical issues in the world. The practical issues always involved improving performance in various organizations: schools, workplace, or the home. The development of the field is well chronicled (Dickinson, 2000). Participants in our workshops always focused on practical problems and these were great sources of learning for us. The performance might be reducing accidents, improving time on-task, reducing inventory shrinkage, reducing time to market for new products, or increasing prosocial behavior/reducing anti-social behavior among prison inmates. Every real-world issue had professionals eager to improve performance.

How did OBM the field start to mature as it moved from the 1960s to 1970s?

It seems the way the Center for Programmed Learning for Business grew and developed continued into the current era as new markets were discovered, new clients found, and new technology developed. For example, process mapping evolved from small flow-charting exercises to major tools in the business press. Once the idea of process mapping – drawing flow charts of the revenue producing processes – became a hot item in business there was an upsurge in demand for these services (Hammer & Champy, 1993; Rummler & Brache, 2013). Programmed learning faded as a movement over the years, but artifacts remained as "job aids." Costly training could be avoided by crafting tools such as a procedural checklist, labeled diagram, or computer-aided artificial intelligence program that show workers how to do specific tasks. The familiar "To-Do" list can be part of documentation for work completed. Some job aids are just part of the job; the airline pilot's pre-flight checklist is one example (Gawande, 2009; Rantz et al., 2009). The analysis tools – diagrams like the Total Performance System, the Behavioral Engineering Model, Rummler's Anatomy of Performance, Langdon's Language of Work, and Binder's Six Boxes are job aids for very complex tasks (Binder, 1998; D. M. Brethower, 1972; Gilbert, 1996; Langdon, 2000; Rummler, 2007). By the time the 1970s arrived, the number of business-minded individuals inspired by Skinner's general approach dramatically increased as they saw the potential for using behavioral technology to solve the concerns of business and industry. Joe

Harless (1970) textbook explicitly suggested that behavioral concepts and procedures should be applied to the management of others so that one could become a better parent, teacher, or supervisor. Corporations such as General Motors published management textbooks that were essentially behavior analysis textbooks (General Motors Institute, 1971). The relevance of operant techniques for a better understanding of classic organizational psychology events such as the Hawthorne studies began to emerge (Parsons, 1974), although myths about those studies still persist decades later in traditional textbooks as a form of academic folklore (Olson, Hogan, & Santos, 2006). Lawrence Miller published multiple books (L. M. Miller, 1974, 1978) that introduced readers to how behavioral concepts could apply to topics such as performance management, systems analysis, training, and self-management, making extensive use of case studies to illustrate his points. One of the better-publicized case studies, involving Edward J. Feeney's efforts to use feedback and reinforcement to improve sales training and save millions of dollars at Emery Air Freight, was featured in multiple textbooks, such as *Organizational Behavior Modification* (Luthans & Kreitner, 1975) and *Behavior Modification in Business, Industry, and Government* (Brown & Presbie, 1976). Before the 1970s ended, the *Journal of Organizational Behavior Management* would see its first publication.

What was happening in the field during the 1980s and 1990s?

Dickinson (2000) asserted that OBM fully matured as a field by the 1980s; there were undergraduate and graduate programs, OBM jobs in academia and in consulting firms, and jobs in both profit and nonprofit organizations. Multiple handbooks dedicated to OBM had been published in the early 1980s (Frederiksen, 1982; O'Brien et al., 1982). As in former decades, there were many publications in journals beyond the OBM-centric periodicals. ISPI grew – by the time the first author was elected President for 1999–2000 there were a dozen or so thriving chapters and about 10,000 members. The Association for Behavior Analysis International (ABAI) also prospered; Executive Director Maria Malott assured that OBM technology was applied to manage the annual conference and the entire operation. The *Journal of Organizational Behavior Management* celebrated 20 years of success by publishing a special edition of invited articles. Major books published OBM work, or Human Performance Technology as it was often called by ISPI members. One example was the edited book by Kaufman et al. (1997), *The Guidebook for Performance Improvement: Working with Individuals and Organizations*. The title indicates that the focus grew to include both individuals and organizations. One development in the 1990s foreshadowed major events that occurred at the beginning of the 21st Century. Rummler and Brache (2013; original work published 1990) released a book full of tools they used in their work,

Improving Performance: How to Manage the White Space on the Organization Chart. Rummler's fans recognized his humor; the white spaces in the org chart are the cracks that problems fall through rather than being solved.

What is the status of OBM looking backwards from the 21st Century and how do we compare to similar approaches?

The field has clearly grown; less obvious and perhaps as important is that history has performed an experiment about the folly of drifting away from evidence-based practice. ISPI has drifted and lost vitality; ABAI, including the OBM Network, remained close to the data. This can be demonstrated in a number of ways. For example, one could look at the peer-reviewed flagship journals for the two organizations: *Performance Improvement Quarterly* (PIQ) for the ISPI and *Journal of Organizational Behavior Management* (JOBM) for the OBM Network. If one excludes editorials and book reviews, the two journals published a comparable number of articles (183 for PIQ and 192 for JOBM) during the most recent decade (2011–2020; volumes 24–33 for PIQ and volumes 31–40 for JOBM). The overlap between topics covered during this decade was also comparable. For example, PIQ covered topics such as employee engagement, organizational culture, coaching, gamification, instructional design, feedback, employee incentives, performance appraisals, transfer of training, and team performance over the past decade (Ellis & Brown, 2020; Ghosh et al., 2019; Goksoy & Alayoglu, 2013; Gray et al., 2015; C. L. Miller et al., 2018; Norberg, 2016; Pousa & Mathieu, 2014; Song, 2011; Yelon et al., 2013; Zingoni, 2017). JOBM covered topics such as employee engagement, organizational culture, coaching, goal setting, rapport-building, feedback, employee incentives, performance appraisals, transfer of training, and safety over the past decade (Arnold & Van Houten, 2020; Curry et al., 2019; Gil & Carter, 2016; Gravina & Siers, 2011; Hagge et al., 2017; D. A. Johnson, 2013; Krapfl & Kruja, 2015; Ludwig & Frazier, 2012; M. V. Miller et al., 2014; Tilka & Johnson, 2018). However, the philosophical assumptions and standards for empiricism are very divergent in these two publication outlets. To illustrate this, we classified every article according to one of three categories: 1) collected data based on survey, interview, or other form of self-report (without any accompanying performance data), 2) collected data based on original performance data (summarizations of data previously published elsewhere did not qualify as original), or 3) other types of data or no data collected (e.g., literature reviews, qualitative case studies, theoretical arguments, meta-analyses, etc.). Original performance data could include actual changes in behavior or the results of behavior (e.g., sales made, units completed, etc.), including the data from customers, employees, supervisors, and/or laboratory participants. If survey data were collected in addition to performance data, this

was classified as "performance data" only (i.e., no multiple category classifications).

In regard to PIQ, 56.3% of the articles were based on self-report data, 9.8% of the articles were based on performance data, and 33.8% of the articles did not fall into either prior category. The theoretical orientations, models, and framework employed are quite varied within this journal, including conceptualization such as psychological ownership (Chai et al., 2020), self-efficacy (Howard, 2019), equity theory (Kang et al., 2012), social exchange theory (De Guzman & Teng-Calleja, 2018), organizational knowledge creation theory (Kang et al., 2012), motivation-hygiene theory (Chyung & Vachon, 2013), mental models (Toker & Moseley, 2013), group-efficacy (Eatough et al., 2015), emotional intelligence (Nafukho et al., 2016), implicit mind-set (Zingoni, 2017), and cognitive load theory (Darabi & Kalyuga, 2012). In regard to JOBM, 3.6% of the articles were based on self-report data, 66.1% of the articles were based on performance data, and 30.2% of the articles did not fall into either prior category. Figure 3 shows the comparisons between the journals. The theoretical orientation, model, and framework employed within JOBM were consistently based on behavior analysis, sometimes in combination with general systems theory, economics theory, or another hybrid approach.

It is clear that PIQ (and by extension ISPI) has long since drifted from its behavioral roots. One survey (Roy & Pershing, 2012) of ISPI members found only 20% of members identified "behavior analysis" as an area that is part of

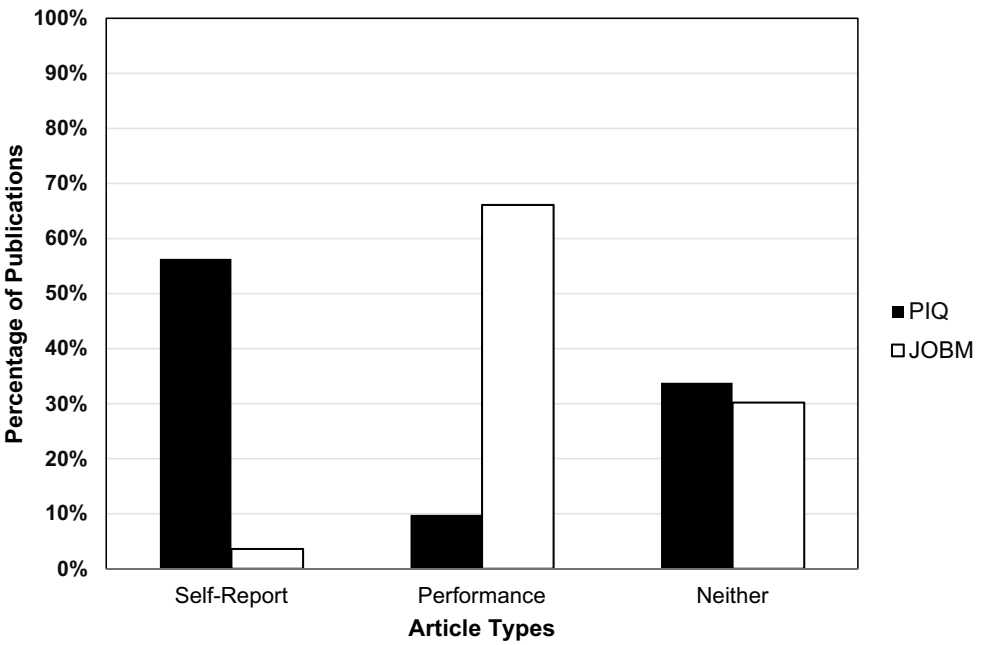

Figure 3. Comparison of PIQ and JOBM publication types.

their research or practice (note: respondents were free to identify multiple areas), outpaced by areas such as cognitive science, educational research, learning theory, and systems theory. Furthermore, respondents categorized behavior analysis as a low-tier application. This drift away from an emphasis on behavior-environmental relations may help explain why verbal reports are used as a substitute for actual performance data, such as when Frino and Desiderio (2012) asked salespeople about their performance but never measured that performance directly. One interesting observation from a reading of recent PIQ articles is how often the publications acknowledge the importance of looking at performance data and the pitfalls of relying on self-report. For example, Farrington (2011) warned that self-report data are often flawed. Duan (2011) lamented that little application of performance measurement existed, instead being eclipsed by stories, anecdotes, and single cases. Several publications (Howard, 2019; Marshall & Rossett, 2014; Williams & Nafukho, 2015) bemoan the fact that studies of training rarely go beyond Kirkpatrick's first level of evaluation (i.e., reactions of trainees) and neglect higher levels of evaluation (i.e., actual learning, changes in work performance, changes in results). While there is value in self-report research (e.g., employee burnout, customer perception of service, etc.), it should not be forgotten that what people say (derived from techniques such as questionnaires, interviews, focus groups, etc.) and what people actually do (derived from observations or demonstrations of performance) are not equivalent.

In contrast to this acknowledgment, one could not be faulted if they mistakenly thought ISPI stood for "Interviews and Surveys about Performance Improvement" given the overreliance on asking people about performance rather than measuring performance. Despite assertions that improving performance is the primary concern of the field (Kang & Molenda, 2018), the publications suggest that perceptions, constructs, and model-building may be the actual primary concern. If we only relied on self-reported perceptions in other sciences, we would still believe that the Earth is flat and that the rest of the universe moves around our stationary world. However, the empirical data told us that our perceptions were wrong, that we actually live on a rotating round planet that is flying through the universe. Data must rule, whether in deciding questions of the cosmos or how to best manage a business. It is difficult to "let the data be the guide" when there are no data available.

Although the current JOBM publications reflect a stronger interest in measuring performance rather than inferring it, the possibly of a discipline losing focus on foundations in favor of fads should serve as a cautionary tale for the OBM community. Although the creation of models and tools is a fine endeavor and can be a useful guide in practice, they are not intended to replace data. OBM successes typically have data guided analysis, data guided synthesis, and continuous data guided management of value adding performance. In

addition, OBM practitioners typically maintain allegiance to science through education, networking, and research, especially the B. F. Skinner style science of human behavior. In 2000, ISPI had roughly 10,000 members. Two decades later that number dwindled by more than 80%. Several Past-Presidents, and Honorary Members for Life attribute much of the decline to ISPI's failure to remain close to evidence-based practice (D. M. Brethower, 2012; Wallace, 2012). Despite such decline, there still remains good work by many ISPI members. For example, Guy Wallace has collected dozens of interviews and publications by ISPI thought leaders (see https://hpttreasures.wordpress.com/). ABAI, including the OBM Network, has grown in membership and visibility in the world during this same period. OBM still emphasizes the performance of individuals but has expanded its reach to include product lines and total organizations.

OBM is very similar to what can be found in conventional business or management textbooks. The OBM contribution is to apply a science and engineering mind-set to real problems and opportunities in real settings. Our work helps put into practice what is easy to say in textbooks. We know why it is difficult to put good ideas into practice. Different folks have different ideas about what should be done. Getting to agreement on actions to improve performance is difficult for potential clients/customers (some say it is harder than herding cats). OBM methods can be used to gain agreement and get worthy results. However, we should remember that our clients/customers have been quite successful serving their clients and customers. They have expertise in areas we may not exhibit; we offer expertise in analyzing the behaviors to get them where they want to go. They may be the cats we are trying to herd, but we must never forget that it is their habitat we wandered into.

OBM practitioners focus sharply on performance, especially in what we measure and what variables we manage. Our focus is on what many called the ABCs of performance: Antecedents (what happens before) Behaviors (what performers do to get results) and Consequences (what good and bad things happen as a consequence of the behavior). Knowing the ABCs we can focus on training and maintenance: how can performers learn to perform? And what must the organization provide to maintain high levels of performance? For example, safety experts know that "unsafe conditions" yield accidents so part of managing antecedents (A), is reducing "unsafe conditions" as much as we can. Safety experts know that many lost time accidents result from behavior (B), especially lifting by bending the back rather than lifting with a straight back and bended knees. Safety experts and "safe lifters" also know that lifting light loads with bended back can lead to the set of consequences (C) of faster and easier lifting. That tells OBM practitioners that some serious effort will be required to maintain safe lifting.

We don't have any magic but OBM practitioners know that unless we get the ABCs right for the immediate situation (lifting this box) and the rest of the time (lifting all the boxes by the entire shift today and every day), there will be instances of improper lifting. And we know that the ABCs apply, over longer time spans, to the organization as a whole (e.g., to at least a few key managers who can keep the "safe lifting" system in place). Before, during, and after are the 3 salient time periods – that is common sense that has been fully verified in practice. We are biased toward science, engineering, and practical matters. We tend to rely on data, often data obtained by counting things such as students graduated, products sold, exam questions answered correctly, etc. There are many examples throughout OBM history (D. M. Brethower, 2016).

What major books were published in the 21st century and what "tools of the trade" from them are likely to be important in the future?

Many noteworthy and influential books focused on performance improvement have been published during the 21st century. These books contain numerous job aids that capture essential variables that enable client organizations to agree about what key players must do to achieve and maintain high levels of performance. Aubrey Daniels continued his pioneering OBM efforts into the 21st century, publishing books aimed at leaders (Daniels & Daniels, 2007), students (Daniels & Bailey, 2014), and people in general interested in understanding the business of behavior (Daniels, 2001, 2009, 2016). His books represent a continual quest to push supervisors away from an emphasis on aversive control and the latest management fads to instead find reinforcement-based approaches built upon decades of scientific understanding. Diagnostic tools such as the PIC/NIC analysis (the descendent of the earlier balance of consequences model) are used to identify why employees are only putting in the minimal effort and how to bring out discretionary effort. He is quick to operationalize commonly thrown around words like trust, vision, loyalty, and engagement so that readers are left with a blueprint of actions to take (as opposed to vague and vacuous truisms you might get from other management books that left readers inspired but directionless). As always, he uses a friendly and approachable voice that still makes readers well aware of the wealth of business consulting experiences and management stories that Aubrey has collected over the years.

Bill Abernathy published his final book, *The Liberated Workplace* (Abernathy, 2014) which was one part homage to the utopia of *Walden Two* (Skinner, 1948) and one part distillation of his years of consulting efforts to dissect typical compensation practices. Like his classic *Sin of Wages* book (Abernathy, 1996), he highlights how typical wage-and-salary system reinforce the wrong behaviors and disconnects the performer contingencies from the organization contingencies. Instead, he proposes performance scorecards and

associated profits systems to motivate performers to work toward the health of the business. Of course, if a reader wants an in-depth guide to building measurement and compensation systems, he also published books to guide such endeavors (Abernathy, 2011, 2012).

Leslie Wilk Braksick published an update of her popular book *Unlock Behavior, Unleash Profits* (Braksick, 2007). This is another book exploring how antecedents and consequences drive employee performance and she walks the reader through the process of measurement, pinpointing, environmental redesign, and the maintenance of behavior change. A stronger emphasis on executive decision making and coaching than most, using the diagnostic tool of E-TIP (her particular descendant of the balance of consequences model) to guide behavior change. Roger Kaufman's work is also devoted to strategic planning; he illuminates the path toward engineering the connections. Two useful books provide tools and notions that help close the gap between "our world now" and "the way we'd like our world to be." (Kaufman, 2006; Kaufman et al., 2003). These are important examples of Kaufman's leadership in closing the gap.

Dick Grote released books on discipline systems and performance appraisal. Although not full of technical terms, both books embody the Skinnerian spirit of building a better organizational culture, especially one that tries to minimize aversive control. In his *Discipline without Punishment* book (Grote, 2006), he presents an alternative to the typical progressive discipline system to focus on how to salvage chronic problem employees through collaboration and problem-solving. Despite writing at length about disciplinary efforts, at the core of his approach is how to use analysis and recognition to build the desired performance. This theme is seen in his performance appraisal book as well (Grote, 2002), which focuses on the importance of clear expectations and feedback during the supervision process, loaded with many tips for dealing with the specific issues that may arise during implementation.

Danny Langdon published *Aligning Performance* (Langdon, 2000) to continue advancing his "language of work" model, also described in his earlier book *The New Language of Work* (Langdon, 1995). Langdon's key point across these publications is powerful and simple: organizations are created to do work. That is what any organization does. Langdon's other key point is that to be managed well, work must be described well. He offers an unabridged language of work dictionary that describes all work in an organization. The dictionary has 6 entries, which are fundamentally the same as the labels on the *Total Performance System* diagram (D. M. Brethower, 1972). Langdon considers that the simplicity and consistency of language is essential if we are to understand the complexity of organizations. Langdon and Langdon (2018) wrote three short books (*The Business Model, The Managing Model*, & *The Working Model*) that show how the new language of work model matches the roles that three levels of an organization should perform in managing work.

Rummler (2007) published a book about consulting, because he wanted to be clear that he could not speak for all consultants. The book is a fictional case study that faithfully follows actual case studies in Rummler's files. The book is intellectually honest. It shows how the work in classics such as Gilbert's (1996) *Human Competence* and Rummler and Brache (2013) *Improving Performance* (currently in its 3rd edition) books was done. Rummler's entire career was devoted to tackling worthwhile practical problems the way a good scientist/engineer/thought leader does. He learned and shared. Fortunately, in another book published posthumously, *White Space Revisited: Creating Value through Process* (Rummler et al., 2010), he shared a chockfull of diagrams and charts that are tools used to add value to clients, helping them create value for customers, employees, and investors. The tools in *Revisited* are off-putting to some who do not like technology. It may help folks by pointing out that Rummler's tools are like children's art. Anyone can make them with a little practice, yet no one knows what they mean until they talk with the artist. Geary described his art making process this way: "I'll sit down and talk with several people about the matters you've said are issues. I'll take notes and then go away and noodle a while. When I get my notes organized, I'll come back and show them to you, and you can tell me where I've gotten it wrong. We'll work together a bit and get it right." (First, make the analysis, then the synthesis, then test it.) When talking and noodling and talking again is finished there are complex-looking diagrams that transform the confused into the manageable. One other point: Geary and his colleagues at Performance Design Lab divided projects into phases so the client did not have to clarify everything in the first round. Or pay a huge fee for something they did not know would help their organization. There is a shorter book for executives without the detail (Rummler et al., 2011).

Another important book is Maria Malott's (2003), *Paradox of Organizational Change: Engineering Organizations with Behavioral Systems Analysis*. Organizations are full of complexities, contradictions, and inconsistencies. Paradoxically, organizations are formed out of simpler, coherent, consistencies. She describes the simpler parts in coherent language that demonstrates the consistencies among the parts. Find the consistencies and we can build effective and manageable organizations. "If you don't see how crazy this place is, you don't understand it." True. "If you view this place as a system you can engineer the craziness out and the productivity in." True. Mostly. We would be remiss if we did not highlight her contributions to advancing not just the knowledge of our field, but the professional organization that supports the field of behavior analysis as a whole. Maria Malott doesn't just give lip service to "practicing what we preach," she makes sure that ABAI does it. In her role as the long-serving Executive Director, she applies OBM principles, practices, and technology to the operation of ABAI. She keeps the cost of the annual conference low and affordable by academics,

including students. She sponsors interns who do OBM-type projects that develop job aids for running a high-quality conference and an efficient society. Board meetings feature performance data Maria provides. ABAI is managed through evidence-based practices, guided by data, and guided by the science of behavior. She proves that the science isn't just an intellectual exercise for the books, but a better way of doing business.

Finally, the 21st century saw the publication of handbooks such as the first *Handbook of Organizational Performance* (edited by C. M. Johnson et al., 2001) and *Organizational Behavior Management: The Essentials* (edited by Wine & Pritchard, 2018). Also, the *Journal of Organizational Behavior Management* continues to publish volumes of articles every year full of performance-based empiricism and guidance for best practices. Of course, there are many other books not mentioned, especially if one starts to expand the list to sub-specializations within OBM such as safety, consumer behavior, etc. It does not matter whether readers begin with books by Daniels, Rummler, Malott, etc.; they all say fundamentally the same things – just from different perspectives. That is not obvious to most readers.

What gaps in our knowledge are important to fill in the future?

When the Michigan group began using the Total Performance System diagram in the 1960s, we always drew the Receiving System box with a missing corner. It is a visual reminder that the Receiving System is not completely known. Rummler's Anatomy of Performance diagram requires us to specify more detail, to make more of it known. The version of the AOP diagram in Figure 4 shows where the inputs to the Processing System begin (Capital Markets and Customer Markets), where the outputs go, and where the external feedbacks derive. It calls attention to the competitive environment organizations face and to the importance of both "close" and "distant" external influences. "My Enterprise," the processing system, must navigate through all those important, often unknown, and always changing influences if an enterprise is to continue and prosper. The AOP diagram visually demands strategic planning and far-sighted management. It helps managers, executives, and small business owners develop the plans and tools they need to navigate successfully. Please notice that the arrows at the top pointing down to the enterprise box from the "close" and "distant" influences boxes do not quite touch. The gap exists because Rummler never engineered the connections. The arrows signal "be aware of" and "consider as much as you can," not "Here is how to devise goals, policies, and procedures to engineer these important connections."

Two points illustrate both the scope and success of this work should become increasingly known and influential in the future. First is the work at the Technological Institute of Sonora to establish a program to "get your company a Ph.D." The faculty included Mariano Bernardez, Roger Kaufman, Ingrid

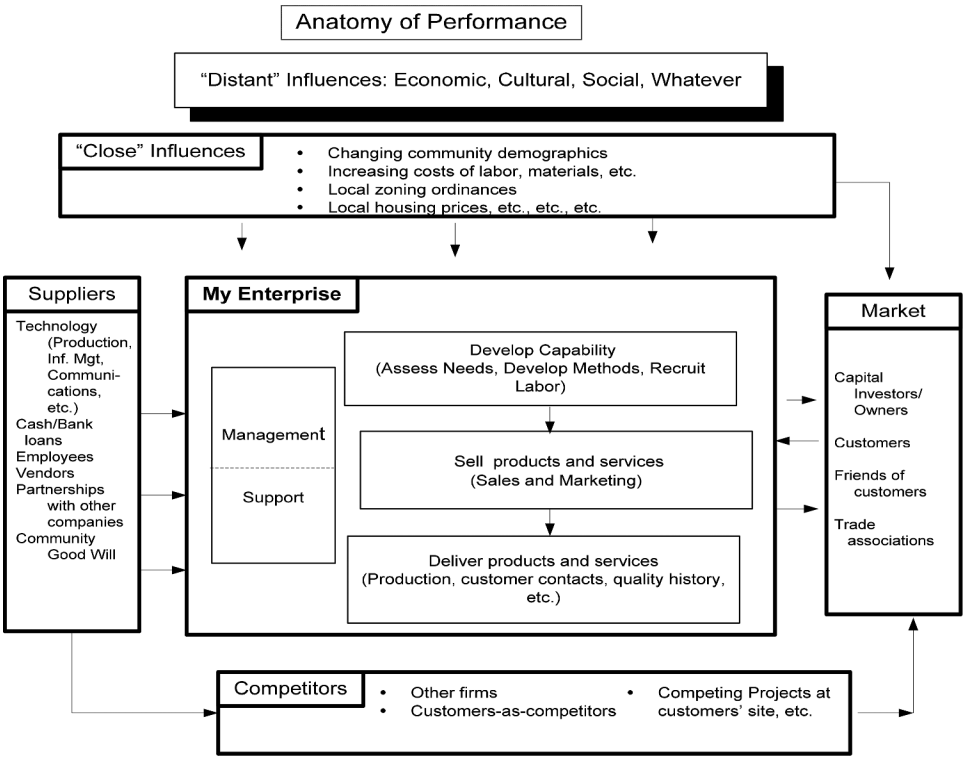

Figure 4. Anatomy of performance.

Guerra-Lopez, Geary Rummler, Dale Brethower, and a few others. The idea was that students would learn and do by starting a new business or a new product line. They did that for several years before the program foundered due to opposition from traditional academics during an economic downturn in Mexico (Guerra & Rodriguez, 2005).

Second is work primarily organized by Mariano Bernardez in the Spanish speaking world. Most of the material can be found online in both Spanish and English (http://www.piionline.org/or http://www.ispiglobal.org/) There are also links to some of this work on Kaufman's web site (https://megaplanning.com/). This work is important to OBM Network people who want to see what is being done in the Spanish speaking part of the globe and/or those who wish to know more about the increasing scope of our work. Kaufman's notion is that the people running an enterprise should start by agreeing on their ideal vision for the world they are helping create (think meaningful vision statements focused on the AOP world of distant influences). This is Mega Thinking. The Kaufman vision idea that may work best is, "We are creating a better world for tomorrow's child." Are we creating a worse world? Ignoring the plight of children? How can we operate our enterprise to create a better world for our own children? For our customers and other stakeholders'

children? It is not hard to imagine that discussion, one-on-one, in every organization with which we work. It is easy to imagine Roger Kaufman, Maria Malott, or any one of a dozen or so OBM people known to us leading that discussion with a group of managers or executives. To those that know her, it is easy to imagine Maria flipping open her computer and saying, "OK, if that's our goal, what's our plan?" and hammering out a draft on the spot, using some of the OBM tools.

There is certainly a need to disseminate OBM even more broadly, including beyond its American roots, to be a more inclusive discipline. Much important work has been done by OBM researchers and practitioners working in places such as Brazil, Iceland, Ireland, Israel, Italy, Norway, South Korea, and the United Kingdom (Aljadeff-Abergel et al., 2017; Chae et al., 2020; Fagerstrøm et al. 2015; Lebbon & Sigurdsson, 2017; O'Hora & Maglieri, 2006; Porto & Foxall, 2019; Tosolin et al., 2005), but many opportunities still remain elsewhere (and more extensively in the places we have already been). Our job, after all, is to make the world a better place. Of course, there always more topics and research lines to pursue. Basically, if something matters to the world of work and the vision of tomorrow, it should matter to us as well. The topics in our books and journals will probably never exhaust the range of important ideas because the workplace is always evolving and sometimes rediscovering old lessons.

Is that your last word about the history of OBM?

Almost. One way to assess the status of OBM in the 21st century is to think about the publications within this series. The evidence-based material could not have been written 50 years ago. Another way to assess the status is to search the internet and to look into the behaviorally oriented set of academic programs in the world. In the United States, they can be found at Western Michigan University (said with a bit of bias from the authors who spent much of their careers at WMU), Florida Institute of Technology, University of Florida, University of Kansas, University of Nevada-Reno, Appalachian State University, California State University (Fresno, Northridge, and Sacramento campuses), Portland State University, and more (the OBM Network maintains a list of training programs that interested students should consult). The list of schools and programs is often in flux as faculty retire, are hired, or transition to practice or other schools and programs. But the work continues because the work is needed and will continue to be needed in the world of tomorrow. OBM grew through the work of many people who were willing to work hard to make the world a better place. They started by working in their own sandbox, then continued to work in almost every imaginable organization. They encountered a great variety of real human/organizational performance problems and attempted to improve

the performance using what they already knew, a body of knowledge and common sense. If they did not already know how to do the job, they analyzed, synthesized, and tested until they got the job done. They developed tools to help. They used these tools to improve performance wherever they were. They wrote about the work, shared technology, and shared stories of successes and failures. Undoubtedly these stories will grow as OBM turns from yesterday and continues on its journey into tomorrow.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Douglas A. Johnson http://orcid.org/0000-0002-7802-3566

References

Abernathy, W. B. (1996). *The sin of wages: Where the conventional pay system has led us and how*. Performance Management Publications.

Abernathy, W. B. (2011). *Pay for profits: Designing an organization-wide performance-based compensation system*. Performance Management Publications.

Abernathy, W. B. (2012). *Human performance diagnostics: A multidisciplinary approach for analysis & improvement in organizations*. Performance Management Publications.

Abernathy, W. B. (2014). *The liberated workplace: Transitioning to Walden Three*. Performance Management Publications.

Aldis, O. (1961). Of pigeons and men. *Harvard Business Review*, *39*(4), 59–63.

Aljadeff-Abergel, E., Peterson, S. M., Wiskirchen, R. R., Hagen, K. K., & Cole, M. L. (2017). Evaluating the temporal location of feedback: Providing feedback following performance vs. prior to performance. *Journal of Organizational Behavior Management*, *37*(2), 171–195. doi:10.1080/01608061.2017.1309332

Arnold, M. L., & Van Houten, R. (2020). Increasing following headway in a driving simulator and transfer to real world driving. *Journal of Organizational Behavior Management*, *40*(1–2), 63–81. doi:10.1080/01608061.2020.1746475

Ayllon, T., & Michael, J. (1959). The psychiatric nurse as a behavioral engineer. *Journal of the Experimental Analysis of Behavior*, *2*(4), 323–334. doi:10.1901%2Fjeab.1959.2-323

Azrin, N. H., & Lindsley, O. R. (1956). The reinforcement of cooperation between children. *Journal of Abnormal and Social Psychology*, *52*(1), 100–102. doi:10.1037/h0042490

Binder, C. (1998). The Six Boxes: A descendent of Gilbert's behavior engineering model. *Performance Improvement*, *37*(6), 48–52. doi:10.1002/pfi.4140370612

Boulding, K. (1956). General systems theory: The skeleton of science. *Management Science*, *2* (3), 197–286. doi:10.1287/mnsc.2.3.197

Braksick, L. W. (2007). *Unlock behavior, unleash profits: Developing leadership behavior that drives profitability in your organization* (2nd ed.). McGraw-Hill.

Brethower, D. M. (1963). *Programed instruction: A manual of programing techniques*. Educational Methods, Inc.

Brethower, D. M. (1970). *The classroom as a self-modifying system* (Unpublished doctoral dissertation). The University of Michigan.

Brethower, D. M. (1972). *Behavior analysis in business and industry: A total performance system*. Behaviordelia, Inc.

Brethower, D. M. (2008). Historical background for HPT certification standard 2, take a systems view, part 2. *Performance Improvement*, *47*(4), 15–24. doi:10.1002/pfi.198

Brethower, D. M. (2012). The future of HPT depends on whether practitioners focus on foundations or fads. *Performance Improvement Quarterly*, *25*(1), 47–58. doi:10.1002/piq.20139

Brethower, D. M. (2016, April 10-12). *Keeping score with scorecards* [Invited address]. ISPI Annual Conference, Philadelphia, PA.

Brethower, D. M., Markle, D. G., Rummler, G. A., Schrader, A. W., & Smith, D. E. (1965). *Programmed learning: A practicum*. Ann Arbor Publishers.

Brethower, K. S. (1967). Maintenance: The neglected half of behavior change. In G. A. Rummler, J. P. Yaney, & A. W. Schrader (Eds.), *Managing the instructional programming effort*. Bureau of Industrial Relations.

Bridgman, P. W. (1959). *The way things are*. Harvard University Press.

Bridgman, P. W. (1961). *The world as I see it. [colloquium session]*. Harvard University Department of Psychology.

Brinkerhoff, R. O. (2003). *The success case method: Find out quickly what's working and what's not*. Berrett-Koehler Publishers.

Brown, P. L. (1982). *Managing behavior on the job*. John Wiley & Sons, Inc.

Brown, P. L., & Presbie, R. J. (1976). *Behavior modification in business, industry, and government*. Behavior Improvement Associates.

Chae, S., Eagle, L. M., Johnson, D. A., Moon, K., Choi, E., & Oah, S. (2020). The impact of authority relations and feedback delivery method on performance. *Journal of Organizational Behavior Management*, *40*(1–2), 140–150. doi:10.1080/01608061.2020.1746476

Chai, D. S., Song, J. H., & You, Y. M. (2020). Psychological ownership and openness to change: The mediating effects of work engagement, and knowledge creation. *Performance Improvement Quarterly*, *33*(3), 305–326. doi:10.1002/piq.21326

Chyung, S. Y., & Vachon, M. (2013). An investigation of the profiles of satisfying and dissatisfying factors in e-learning. *Performance Improvement Quarterly*, *26*(2), 117–140. doi:10.1002/piq.21147

Connellan, T. K. (1978). *How to improve human performance: Behaviorism in business and industry*. Harper & Row.

Crawley, W. J., Adler, B. S., O'Brien, R. M., & Duffy, E. M. (1982). Making salesmen: Behavioral assessment and intervention. In R. M. O'Brien, A. M. Dickinson, & M. P. Rosow (Eds.), *Industrial behavior modification: A management handbook* (pp. 184–199). Pergamon Press.

Curry, S. M., Gravina, N. E., Sleiman, A. A., & Richard, E. (2019). The effects of engaging in rapport-building behaviors on productivity and discretionary effort. *Journal of Organizational Behavior Management*, *39*(3–4), 213–226. doi:10.1080/01608061.2019.1667940

Daniels, A. C. (2001). *Other people's habits: How to use positive reinforcement to bring out the best in people around you*. McGraw-Hill.

Daniels, A. C. (2009). *Oops! 13 management practices that waste time and money (and what to do instead)*. Performance Management Publications.

Daniels, A. C. (2016). *Bringing out the best in people: How to apply the astonishing power of positive reinforcement*. McGraw-Hill Education.

Daniels, A. C., & Bailey, J. S. (2014). *Performance management: Changing behavior that drives organizational effectiveness* (5th ed.). Performance Management Publications.

Daniels, A. C., & Daniels, J. E. (2007). *Measure of a leader: The legendary leadership formula for producing exceptional performers and outstanding results*. McGraw-Hill.

Darabi, A., & Kalyuga, S. (2012). Improvement of organizational performance and instructional design: An analogy based on general principles of natural information processing systems. *Performance Improvement Quarterly*, *25*(3), 23–35. doi:10.1002/piq.21122

De Guzman, I. L. M., & Teng-Calleja, M. (2018). Development of a model for a great place to work and its perceived outcomes: An example from the Philippines. *Performance Improvement Quarterly*, *31*(1), 5–34. doi:10.1002/piq.21252

Dickinson, A. M. (2000). The historical roots of organizational behavior management in the private sector: The 1950s-1980s. *Journal of Organizational Behavior Management*, *20*(3–4), 9–58. doi:10.1300/J075v20n03_02

Drucker, P. F. (1946). *The concept of the corporation*. John Day.

Drucker, P. F. (1973). *Management: Tasks, responsibilities, practices*. Harper & Row.

Duan, M. (2011). Application of data collection techniques by human performance technology practitioners. *Performance Improvement Quarterly*, *24*(3), 77–100. doi:10.1002/piq.20118

Eatough, E., Chang, C., & Hall, N. (2015). Getting roped in: Group cohesion, trust, and efficacy following a ropes course intervention. *Performance Improvement Quarterly*, *28*(2), 65–89. doi:10.1002/piq.21183

Ellis, S., & Brown, H. Q. (2020). Can values be trained? Applying affective engagement to change organizational culture. *Performance Improvement Quarterly*, *33*(3), 327–347. doi:10.1002/piq.21327

Fagerstrøm, A., Stratton, J. P., & Foxall, G. R. (2015). The impact of corporate social responsibility activities on the consumer purchasing situation. *Journal of Organizational Behavior Management*, *35*(3–4), 184–205. doi:10.1080/01608061.2015.1093053

Farrington, J. (2011). Training transfer: Not the 10% solution. *Performance Improvement Quarterly*, *24*(1), 117–121. doi:10.1002/piq.20105

Ferster, C. B., & Skinner, B. F. (1957). *Schedules of reinforcement*. Appleton-Century-Crofts.

Flagle, C. D., Huggins, W. H., & Roy, R. H. (1960). *Operations research and systems engineering*. The John Hopkins Press.

Frederiksen, L. W. (1982). *Handbook of organizational behavior management*. John Wiley & Sons.

Frino, M. G., & Desiderio, K. P. (2012). The role of demographics as predictors of successful performance of sales professionals in business-to-business sales organizations. *Performance Improvement Quarterly*, *25*(4), 7–21. doi:10.1002/piq.21128

Fuller, P. (1949). Operant conditioning of a vegetative human organism. *American Journal of Psychology*, *62*(4), 587–590. doi:10.2307/1418565

Gawande, A. (2009). *The checklist manifesto: How to get things right*. Metropolitan Books.

General Motors Institute. (1971). *Behavior . . . and what you can do about it*. General Motors Education and Training.

Ghosh, R., Shuck, B., Cumberland, D., & D'Mello, J. (2019). Building psychological capital and employee engagement: Is formal mentoring a useful strategic human resource development intervention? *Performance Improvement Quarterly*, *32*(1), 37–54. doi:10.1002/piq.21285

Gil, P. J., & Carter, S. L. (2016). Graphic feedback, performance feedback, and goal setting increased staff compliance with a data collection task at a large residential facility. *Journal of Organizational Behavior Management*, *36*(1), 56–70. doi:10.1080/01608061.2016.1152207

Gilbert, T. F. (1996). *Human competence: Engineering worthy performance*. International Society for Performance Improvement.

Goksoy, A., & Alayoglu, N. (2013). The impact of perception of performance appraisal and distributive justice fairness on employees' ethical decision making in paternalist organizational culture. *Performance Improvement Quarterly*, *26*(1), 57–79. doi:10.1002/piq.21137

Gravina, N., Nastasi, J., & Austin, J. (2021). Assessment of employee performance. *Journal of Organizational Behavior Management*, 1–26. Advance online publication. doi:10.1080/01608061.2020.1869136

Gravina, N. E., & Siers, B. P. (2011). Square pegs and round holes: Ruminations on the relationship between performance appraisal and performance management. *Journal of Organizational Behavior Management*, *31*(4), 277–287. doi:10.1080/01608061.2011.619418

Gray, C. M., Dagli, C., Demiral-Uzan, M., Ergulec, F., Tan, V., Altuwaijri, A. A., . . . Boling, E. (2015). Judgment and instructional design: How ID practitioners work in practice. *Performance Improvement Quarterly*, *28*(3), 25–49. doi:10.1002/piq.21198

Grote, D. (2002). *The performance appraisal question and answer book: A survival guide for managers*. American Management Association.

Grote, D. (2006). *Discipline without punishment: The proven strategy that turns problem employees into superior performers*. American Management Association.

Guerra, I. J., & Rodriguez, G. (2005). Educational planning and social responsibility: Eleven years of mega planning at the Sonora Institute of Technology (ITSON). *Performance Improvement Quarterly*, *18*(3), 56–64. doi:10.1111/j.1937-8327.2005.tb00341.x

Hagge, M., McGee, H., Matthews, G., & Aberle, S. (2017). Behavior-based safety in a coal mine: The relationship between observations, participation, and injuries over a 14-year period. *Journal of Organizational Behavior Management*, *37*(1), 107–118. doi:10.1080/01608061.2016.1236058

Hammer, M., & Champy, J. (1993). *Reengineering the corporation: A manifesto for business revolution*. Harper-Collins.

Handlin, H. C. (1991). The company built upon the golden rule: Lincoln Electric. *Journal of Organizational Behavior Management*, *12*(1), 151–163. doi:10.1300/J075v12n01_07

Harless, J. H. (1970). *Behavior analysis and management: A self-instructional lesson*. Stipes Publishing Company.

Holland, J. G., & Skinner, B. F. (1961). *The analysis of behavior: A program for self-instruction*. McGraw-Hill.

Howard, M. C. (2019). The effect of training self-efficacy on computer-based training outcomes: Empirical analysis of the construct and creation of two scales. *Performance Improvement Quarterly*, *32*(4), 331–368. doi:10.1002/piq.21301

ISPI. (n.d.). *CPT performance standards*. Retrieved from https://ispi.org/page/CPTStandards

Johnson, C. M., Redmon, W. K., & Mawhinney, T. C. (Eds.). (2001). *Handbook of Organizational Performance: Behavior analysis and management*. Haworth.

Johnson, D. A. (2013). A component analysis of the impact of evaluative and objective feedback on performance. *Journal of Organizational Behavior Management*, *33*(2), 89–103. doi:10.1080/01608061.2013.785879

Kang, I., Song, J. H., & Kim, W. (2012). The mediating effect of team-level knowledge creation on organizational procedural justice and team performance improvement. *Performance Improvement Quarterly*, *25*(2), 43–64. doi:10.1002/piq.21117

Kang, S., & Molenda, M. H. (2018). How shall we define human performance technology? *Performance Improvement Quarterly*, *31*(2), 189–212. doi:10.1002/piq.21276

Kaufman, R. (2006). *Change, choices, and consequences: A guide to mega thinking and planning*. HRD Press & International Society for Performance Improvement.

Kaufman, R., Oakley-Browne, H., Watkins, R., & Leigh, D. (2003). *Strategic planning for success: Aligning people, performance, and payoffs*. Jossey-Bass/Pfeiffer.

Kaufman, R., Thiagarajan, S., & MacGillis, P. (Eds.). (1997). *The guidebook for performance improvement: Working with individuals and organizations*. Jossey-Bass/Pfeiffer.

Keller, F. S. (1954). *Learning: Reinforcement theory*. Random House.

Krapfl, J. E., & Kruja, B. (2015). Leadership and culture. *Journal of Organizational Behavior Management*, *35*(1–2), 28–43. doi:10.1080/01608061.2015.1031431

Lane, H. (1976). *The wild boy of Aveyron*. Harvard University Press.

Langdon, D. (1995). *The new language of work*. HRD Press.

Langdon, D. (2000). *Aligning performance: Improving people, systems, and organizations*. Jossey-Bass/Pfeiffer.

Langdon, D., & Langdon, K. S. (2018). *The language of work trilogy*. Performance International.

Lazarus, A. A. (1959). The elimination of children's phobias by deconditioning. *Medical Proceedings (South Africa)*, *5*, 261–265.

Lebbon, A. R., & Sigurdsson, S. O. (2017). Behavioral perspectives on variability in human behavior as part of process safety. *Journal of Organizational Behavior Management*, *37*(3–4), 261–282. doi:10.1080/01608061.2017.1340922

Lincoln, J. F. (1951). *Incentive management*. The Lincoln Electric Company.

Lincoln, J. F. (1961). *A new approach to industrial economics*. Devin-Adair.

Ludwig, T. D., & Frazier, C. B. (2012). Employee engagement and organizational behavior management. *Journal of Organizational Behavior Management*, *32*(1), 75–82. doi:10.1080/01608061.2011.619439

Luthans, F., & Kreitner, R. (1975). *Organizational behavior modification*. Scott, Foresman and Company.

Mager, R. F. (1997). *Preparing instructional objectives: A critical tool in the development of effective instruction (*3rd*ed.)*. Center for Effective Performance.

Malott, M. E. (2003). *Paradox of organizational change: Engineering organizations with behavioral systems analysis*. Context Press.

Markle, S. M. (1969). *Good frames and bad: A grammar of frame writing*. John Wiley & Sons, Inc.

Markle, S. M. (1990). *Designs for instructional designers*. Stipes Publishing Company.

Marshall, J., & Rossett, A. (2014). Perceptions of barriers to the evaluation of workplace learning programs. *Performance Improvement Quarterly*, *27*(3), 7–26. doi:10.1002/piq.21173

Mayo, E. (1933). *The human problems of industrial civilization*. Harvard University Press.

Mayo, E. (1945). *The social problems of an industrial civilization*. Harvard Business School.

McGee, H. M., & Crowley-Koch, B. J. (2021). Performance assessment of organizations. Journal of Organizational Behavior Management. Advance online publication. https://doi.org/10.1080/01608061.2021

Miller, C. L., Grooms, J. C., & King, H. (2018). To infinity and beyond—Gamifying IT service-desk training: A case study. *Performance Improvement Quarterly*, *31*(3), 249–268. doi:10.1002/piq.21263

Miller, G. A. (1956). The magical number seven plus or minus two: Some limits on our capacity for processing information. *Psychological Review*, *63*(2), 81–97. doi:10.1037/h0043158

Miller, L. M. (1974). *Behavior management: New skills for business and industry*. Human Behavior Institute, Inc.

Miller, L. M. (1978). *Behavior management: The new science of managing people at work*. John Wiley & Sons, Inc.

Miller, M. V., Carlson, J., & Sigurdsson, S. O. (2014). Improving treatment integrity in a human service setting using lottery-based incentives. *Journal of Organizational Behavior Management*, *34*(1), 29–38. doi:10.1080/01608061.2013.873381

Nafukho, F. M., Muyia, M. H., Farnia, F., Kacirek, K., & Lynham, S. A. (2016). Developing emotional intelligence skills among practicing leaders: Reality or myth? *Performance Improvement Quarterly*, *29*(1), 71–87. doi:10.1002/piq.21215

Norberg, P. A. (2016). Employee incentive programs: Recipient behaviors in points, cash, and gift card programs. *Performance Improvement Quarterly*, *29*(4), 375–388. doi:10.1002/piq.21233

O'Brien, R. M., Dickinson, A. M., & Rosow, M. P. (1982). *Industrial behavior modification: A management handbook*. Pergamon Press, Inc.

O'Hora, D., & Maglieri, K. A. (2006). Goal statements and goal-directed behavior. *Journal of Organizational Behavior Management*, *26*(1–2), 131–170. doi:10.1300/J075v26n01_06

Olson, R., Hogan, L., & Santos, L. (2006). Illuminating the history of psychology: Tips for teaching students about the Hawthorne studies. *Psychology Learning & Teaching*, *5*(2), 110–118. doi:10.2304/plat.2005.5.2.110

Parsons, H. M. (1974). What happened at Hawthorne? *Science*, *183*(4128), 922–932. doi:10.1126/science.183.4128.922

Petrock, F. (1978). Analyzing the balance of consequences for performance improvement. *Journal of Organizational Behavior Management*, *1*(3), 197–205. doi:10.1300/J075v01n03_04

Porto, R. B., & Foxall, G. R. (2019). The marketing firm as a metacontingency: Revealing the mutual relationships between marking and finance. *Journal of Organizational Behavior Management*, *39*(3–4), 115–114. doi:10.1080/01608061.2019.1666774

Pousa, C., & Mathieu, A. (2014). The influence of coaching on employee performance: Results from two international quantitative studies. *Performance Improvement Quarterly*, *27*(3), 75–92. doi:10.1002/piq.21175

Premack, D. (1959). Toward empirical behavior laws: I. Positive reinforcement. *Psychological Review*, *66*(4), 219–233. doi:10.1037/h0040891

Pressey, S. L. (1926). A simple apparatus which gives tests and scores–and teaches. *School and Society*, *23*(586), 373–376.

Rantz, W. G., Dickinson, A. M., Sinclair, G. A., & Van Houten, R. (2009). The effect of feedback on the accuracy of checklist completion during instrument flight training. *Journal of Applied Behavior Analysis*, *42*(3), 497–509. doi:10.1901/jaba.2009.42-497

Roethlisberger, F. J., & Dickson, W. J. (1939). *Management and the worker*. Harvard University Press.

Rogers, C. R., & Skinner, B. F. (1956). Some issues concerning the control of human behavior: A symposium. *Science*, *124*(3231), 1057–1066. doi:10.1126/science.124.3231.1057

Roy, R., & Pershing, J. A. (2012). Examining the boundaries of HPT through the lens of communities of practice. *Performance Improvement Quarterly*, *25*(2), 79–105. doi:10.1002/piq.21120

Rummler, G. A. (2007). *Serious performance consulting: According to Rummler*. The International Society of Performance Improvement.

Rummler, G. A., & Brache, A. P. (2013). *Improving performance: How to manage the white space on the organization chart* (3rd ed.). Jossey-Bass.

Rummler, G. A., Ramias, A. J., & Rummler, R. A. (2010). *White space revisited: Creating value through process*. Jossey-Bass.

Rummler, G. A., Ramias, A. J., & Wilkins, C. L. (2011). *Rediscovering value: Leading the 3-D enterprise to sustainable success*. Jossey-Bass.

Sidman, M. (1960). *Tactics of scientific research: Evaluating experimental data in psychology*. Basic Books.

Skinner, B. F. (1938). *The behavior of organisms: An experimental analysis*. Appleton-Century-Crofts.

Skinner, B. F. (1948). *Walden Two*. MacMillan.

Skinner, B. F. (1953). *Science and Human Behavior*. Appleton-Century-Crofts.

Skinner, B. F. (1954). The science of learning and the art of teaching. *Harvard Educational Review*, *24*, 86–97.

Skinner, B. F. (1957). *Verbal behavior*. Appleton-Century-Crofts.
Skinner, B. F. (1958). Teaching machines. *Science*, *128*(3330), 969–977. doi:10.1126/science.128.3330.969
Skinner, B. F. (1968). *The technology of teaching*. Appleton-Century-Crofts.
Skinner, B. F. (1983). *A matter of consequences*. University Press.
Song, J. H. (2011). Team performance improvement: Mediating roles of employee job autonomy and quality of team leader-member relations in supportive organizations in the Korean business context. *Performance Improvement Quarterly*, *24*(3), 55–76. doi:10.1002/piq.20115
Tilka, R., & Johnson, D. A. (2018). Coaching as a packaged intervention for telemarketing personnel. *Journal of Organizational Behavior Management*, *38*(1), 49–72. doi:10.1080/01608061.2017.1325821
Toker, S., & Moseley, J. L. (2013). The mental model comparison of expert and novice performance improvement practitioners. *Performance Improvement Quarterly*, *26*(3), 7–32. doi:10.1002/piq.21152
Tosolin, F., Truzoli, R., Vigano, I., Algarotti, E., & Gatti, M. (2005). Current practice of Precision Teaching in the workplace. In G. Chiazzese, M. Allegra, A. Chifari, & S. Ottaviano (Eds.), *Methods and technologies for learning* (pp. 159–166). WIT Press.
von Békésy, G. (1961). *Untitled presentation* [colloquium session]. Harvard University Department of Psychology.
Wallace, G. W. (2012). Not every ISPI'er needs to be a researcher, but every ISPI'er needs to know how research findings apply to what they do. *Performance Improvement Quarterly*, *24*(2), 7–9. doi:10.1002/piq.20127
Watson, J. B., & Rayner, R. (1920). Conditioned emotional reactions. *Journal of Experimental Psychology*, *3*(1), 1–14. doi:10.1037/h0069608
Weiner, N. (1950). *The human use of human beings*. Houghton Mifflin.
Williams, R. C., & Nafukho, F. M. (2015). Technical training evaluation revisited: An exploratory mixed-methods study. *Performance Improvement Quarterly*, *28*(1), 69–92. doi:10.1002/piq.21187
Wine, B., & Pritchard, J. K. (Eds.). (2018). *Organizational behavior management: The essentials*. Hedgehog Publishers.
Woodworth, R. S., & Thorndike, E. L. (1901). The influence of improvement in one mental function upon the efficiency of other functions. *Psychological Review*, *8*(3), 247–261. doi:10.1037/h0074898
Yelon, S. L., Ford, J. K., & Golden, S. (2013). Transfer over time: Stories about transfer years after training. *Performance Improvement Quarterly*, *25*(4), 43–66. doi:10.1002/piq.21131
Zingoni, M. (2017). Motives in response to negative feedback: A policy-capturing study. *Performance Improvement Quarterly*, *30*(3), 179–197. doi:10.1002/piq.21249