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EDITORIAL

Human Competence Revisited: 40 Years of Impact

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In May 2018 the Association for Behavior Analysis International hosted an invited symposium titled "Human Competence Revisited: 40 Years of Impact." This special selection of presentations, highlighted the foundational influence of Thomas Gilbert's book titled *Human Competence: Engineering Worthy Performance* on recent technological advancements in performance improvement, instructional design, and behavioral systems applications. Gilbert worked in both laboratory and applied settings. His work is notable for its breadth and provides a coherent and practical perspective on human behavior in organizations. Gilbert's scholarly impact in form of citations is widely seen today (see Table 1). We celebrate these contributions and briefly highlight the domains below.

About the Gilberts: Thomas F. Gilbert (1927–1995) received his BA and MA degrees at the University of South Carolina and his PhD in psychology from the University of Tennessee. He is best known known for his seminal contributions in the field of human performance technology. Gilbert's book *Human Competence: Engineering Worthy Performance (1978, tribute issue in 2007)* is a highly influential text in which Gilbert describes his behavioral engineering model applied to work organizations and educational settings. This text offers a coherent approach towards improving organizations' performance by focusing on critical accomplishments and changing the behaviors that produce them. Gilbert started out as an educational psychologist focused on assessment, and later on conducted verbal learning experiments. Gilbert completed post-doctoral training with B. F. Skinner at Harvard University and worked with Ogden R. Lindsley at Metropolitan State Hospital in Waltham, Massachusetts. The influence of these two pioneers is evident in Gilbert's meticulous focus on factors in the environment as critical in understanding behavior and finding opportunities to greatly enhance performance by employees and students. Gilbert identified himself as a behavioral scientist/performance engineer focusing on developing applications with demonstrable utility––in other words, he was among the cadre of pioneers who translated basic science to applications to improve the human condition. In Gilbert's case

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Table 1. Number of Citations Is Per Google Scholar

Publication Title	*JOBM* Citations	Other BA Journal Citations*	Other Citations**
Making competencies pay off	0	0	26
Experiments in morale	0	0	2
The dependency of cyclical feeding behavior on internal and external cues	0	0	21
Overlearning and the retention of meaningful prose	0	1 (*TBA*)	39
Fundamental dimensional properties of the operant	0	22 (*JEAB*) 4 (*PR*)	92
The effect of a food-associated stimulus on operant-level locomotor behavior	0	0	2
Praxeonomy: A systematic approach to identifying training needs	0	0	58
The high cost of knowledge	0	0	8
Human competence: Engineering worth performance	51	9 (*JABA*) 1 (*BSI*) 11 (*TBA*)	1,485
Thinking metric	1	0	3
Measuring the potential for performance improvement	0	0	25
The science of winning	1	0	16
What Skinner gave us	0	0	14
Potential contributions of performance science to education	0	1 (*JABA*)	18
Saying what a subject matter is	0	1 (*JABA*)	13
Mastering metrics	0	0	0
The autobiography of an educational revolutionist	0	0	5
Superstitious behavior: Lesson one	0	0	0

*"Other BA Journal Citations" include articles from: *JABA* (*Journal of Applied Behavior Analysis*), *JEAB* (*Journal of the Experimental Analysis of Behavior*), *BSI* (*Behavior Analysis International*), *Psych Record* (*PR*), and *The Behavior Analyst* (TBA).

**"Other Citations" include articles/chapters from any source not already covered (*Journal of Organizational Behavior Management* [*JOBM*], *JABA, JEAB, PR*, and *TBA*).

he worked in many diverse organizational settings to engineer worthy performance with an elegant, coherent and replicable technology.

Gilbert emphasized observation of behavior in context causally related to accomplishments, supplemented by interviews and verbal reports, to discover variables in the environment that enable or impede exemplary performance to then focus on changing these to improve accomplishments. These factors, not the individuals' lack of knowledge or skill, were regarded as the barriers to worthy performance. Gilbert classified important and manageable factors affecting performance in a 2 × 3 matrix that he called his Behavior Engineering Model (BEM). BEM identifies six variables necessary to improve human performance: information, resources, incentives, knowledge, capacity, and motives.

Performance Improvement: Tom Gilbert replaced what he called "the cult of behavior" with a focus on valuable accomplishments produced by behavior, a major contribution that launched a seismic shift for those who followed. This shift has been challenging, not only for applied behaviorists, but also for ordinary people. Many are more accustomed to observing and discussing behavior, whether precisely or not, than identifying the valuable

accomplishments produced by that behavior, especially when the accomplishments are less tangible than deliverables or widgets, for example, decisions, relationships, or recommendations. Another of Gilbert's major contributions, BEM, extended the variables influencing behavior by incorporating physical and social elements of the work environment, entering repertoires needed to be effective, variations in reinforcement values, and other factors into the analysis of contingencies of reinforcement. These variables are seldom relevant in research with food-deprived laboratory animals in simplified experimental chambers.

Instructional Design: Although only addressed in one chapter in *Human Competence*, Tom Gilbert wrote extensively about his method for teaching learners new concepts, principles, facts and skills, which he called mathetics. Mathetics included a generic instructional delivery procedure with three phases: (a) demonstrating skills, concepts, and principles to learners; (b) guiding learners as they practice; and (c) testing students to see if they have achieved mastery. Mathetics also incorporated procedures for designing instructional materials, such as how to identify and organize stimuli and responses from instructional goals, and how to incorporate behavioral procedures such as shaping and back chaining during instruction (Gilbert, 1962a, 1962b).

Behavioral Systems Applications: Gilbert's BEM and vantage points provide a strong foundation for behavioral systems engineering to establish and maintain adherence to work routines within complex organizations. Two challenges can face managers in complex behavioral systems. First, teams of employee need to follow well established procedures to achieve milestones. Second, employees encounter anomalies not addressed in instructions. During these crises, teams must stop following standard procedures, assess changing conditions and adapt their behavior to the unexpected events in order to avert catastrophe. Behavioral systems engineering increasingly integrates human behavior with automated systems to adapt complex processes to changing contexts. Thus management of human behavior is one factor in a highly engineered system that can be designed to respond to both challenges (maintain routines, adjust to crises). Gilbert's focus on information, instrumentation and instruction as key elements of effective behavior management systems preceded the technological developments of recent decades and seems prescient of the important role automation has assumed in behavior control.

As we see it, the above-mentioned areas of behavior analytic applications seen today would not have achieved their recurring impact without the direct influence of Gilbert's *Human Competence*. The BEM introduced in this book has guided behavior analytic research and applications with an emphasis on parsimony, elegance and usefulness of associated methodologies.

Throughout the years, the powerful partnership between Tom and Marilyn Gilbert resulting in the publication of *Human Competence*, and many revolutionary training modules and consulting reports, has not received the well-deserved acknowledgment it is due. By drawing upon her pioneering work with Tom Gilbert, Marilyn Gilbert accepted our invitation to celebrate the 40 years of *Human Competence* and author the unpublished updated account of *Human Competence* that was written during the latter part of Tom Gilbert's life.

While Organizational Behavior Management (OBM) practitioners and researchers have long cited Gilbert's work in various contexts, the International Society for Performance Improvement (ISPI; formerly the National Society for Programmed Instruction) is the professional community where his influence has been most widespread and continuous. ISPI republished *Human Competence* twice, and for decades countless ISPI publications and conference presentations have referred to, applied, and expanded upon his work. Gilbert's focus on accomplishments was perhaps his most important contribution. It represented a paradigm shift that has informed entire careers, such as that of Joe Harless, Gilbert's student who became a performance improvement thought leader in his own rite. Harless refined and packaged the accomplishment based approach to performance improvement, and built his Accomplishment Based Curriculum Development methodology firmly on the shoulders of Gilbert's contributions. The BEM has perhaps been mentioned more often than any of his other contributions, in part because it summarizes the factors that influence behavior in a very practical, parsimonious way. There have been many derivative models, based on the BEM, that slightly change the language or application of Gilbert's original framework, in efforts to make it easier for some audiences to communicate or apply.

Marilyn Gilbert edited Ferster's & Skinner's *Schedules of Reinforcement*, was the first editor of the *Journal of the Experimental Analysis of Behavior* (*JEAB*), edited *Human Competence*, and provides instruction on technical writing to countless students through her course offered by the University of North Texas. She graciously shared with us the unfinished manuscript that would be the revision to *Human Competence*. These type-written sections were stored in her home since Tom's passing. With her permission, we assembled their work for publication in this special issue of the *Journal of Organizational Behavior Management* (*JOBM*). Some papers were nearly finished and publication ready; some were drafts requiring more work. We selected those most relevant to *JOBM* readers and edited only for clarity and continuity. While their writing is now twenty-three plus years old, their analyses, extensions and updates to the 1978 text offers much to those currently working in OBM. We trust readers will appreciate the brilliant scholarly work of the Gilberts as they updated their text. For more on

Thomas's career and contributions, see Lindsley (1996) memoriam to Gilbert in ABAI's *The Behavior Analyst*.

The following pages were cowritten by Tom and Marilyn and comprise a remarkable but unfinished revision to the 1978 text. We scanned the type written pages, preserved the tables and figures, including Tom's sketches, and organized the sections for publication in *JOBM*. Readers will see that their decades of work in a variety of settings validated and strengthened the ideas presented in the 1978 text. Many examples convey their approach to rigorous observation and data analysis of worthy performance and design of interventions that combine information, instruction, and incentives to improve results. The revised book is more than a technical account of behavioral engineering; the examples and anecdotes reveal their keen eye for human interactions including the verbal exchanges occurring during implementation of interventions. The examples are from the 1980s and 1990s and are flavored by the issues and concerns of those decades. Readers will see their account of emerging trends in business, technology, and education and appreciate that their work provides a powerful approach to today's challenges.

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