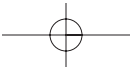


Memory and Mind

A Festschrift for Gordon H. Bower





Gordon H. Bower Festschrift. May, 2005. Jordan Hall, Stanford University.

FIFTH ROW: John Gabrieli, Irv Biederman, Richard Shiffrin, Brian Ross, Steve Sloman, Larry Barsalou

FOURTH ROW: Claude Steele, Anders Ericsson, Herman Buschke, Perry Thorndike, Arnie Glass, Herb Clark, Gary Olson, Eric Eich, Trey Hedden, Keith Holyoak, Stephen Kosslyn, Anthony Wagner, Anthony Wright

THIRD ROW: John Black, David Spiegel, John Anderson, Michael Conant, Mike Rink, Eni Becker, Judy Olson, Art Graesser, John Clapper, Bob Bjork, Teal Eich, Dan Morrow, George Wolford.

SECOND ROW: David Shanks, Beth Loftus, Barbara Tversky, Chizuko Izawa, Mark Gluck, Ian Gotlib, Roger Shepard, Elizabeth Marsh, Elizabeth Bjork, Laura Carstensen, Bob Zajonc

FRONT ROW: Sharon Bower, Bill Estes, Gordon Bower, Karl Pribram, Lera Boroditsky

Memory and Mind

A Festschrift for Gordon H. Bower

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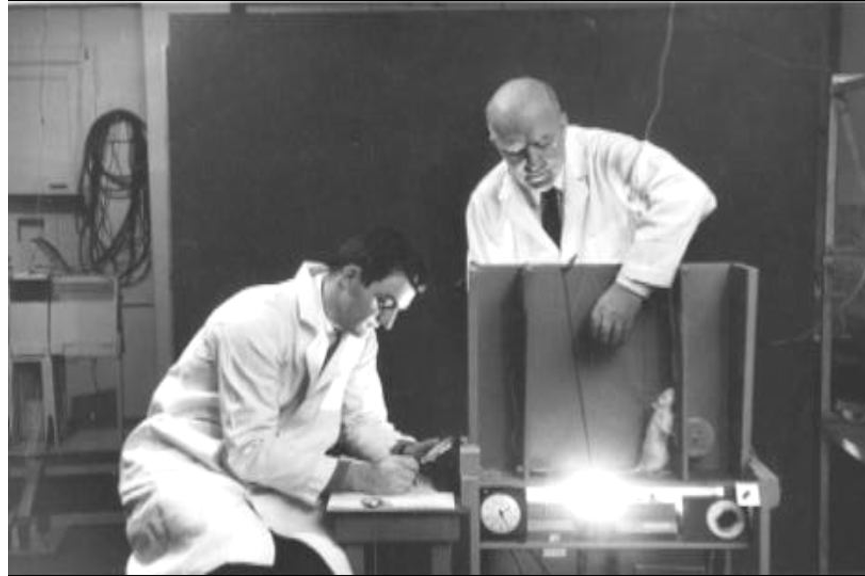
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Gordon with his graduate mentor, Neal Miller, testing a rat with a dual reward-punishment electrode: these animals would press a lever (see the left side of the cage) to turn on the brain stimulation, then as it continued, rotate a wheel (right side) to turn it off. They would perform this on-then-off cycle until all concerned (except the rats) wearied of it. Photo taken circa 1956; these experiments were the basis for Gordon's first talk at the APA and his first co-authored publication with Miller: Bower, G. H., & Miller, N. (1958). Rewarding and punishing effects from stimulating the same place in the rat's brain. *Journal of Comparative and Physiological Psychology*, 51, 669–674.

Preface

Gordon H. Bower was born in 1932 in Scio, Ohio, a small Midwestern town of less than 1,000 residents struggling at that time to survive the Great Depression. Inspired by the movie, *The Lou Gehrig Story*, Gordon resolved at the age of 8 to become a professional baseball player. By 11, he was good enough (and big enough) to play on local semiprofessional baseball teams. Although tempted by an offer to enter professional baseball with the Cleveland Indians' farm system, Gordon instead decided to attend Western Reserve University (now Case-Western Reserve) where he played on their varsity baseball team. Considering a possible career in psychiatry, he took a job at the Cleveland State Mental Hospital in the summer of 1951 where he encountered the primitive state of psychiatric medicine, an experience that dissuaded him from pursuing that career. However, his interest in understanding mental disorders was undiminished, and at the end of that summer's experience Gordon returned to college with a new desire to pursue basic psychological research.

Graduating in 1954, Gordon had two career choices: professional baseball or graduate school in psychology. Although tempted by the former, Gordon figured that he had a better chance of long-term success in psychology than in baseball. After a year spent learning mathematics and statistics at the University of Minnesota, Gordon entered the Ph.D. program at Yale in the fall of 1955. There he became caught up in the heady excitement of the early days of mathematical psychology. He was especially captivated by Estes's work on statistical learning theory as well as a recent book by two other leading mathematical psychologists, Robert Bush and Frederick Mosteller, entitled *Stochastic Models for Learning* (1955). While working with his Ph.D. adviser, Neal Miller, on electrical brain

stimulation studies in rats, Gordon also studied mathematical psychology with Frank Logan who was, at that time, working on variations and extensions to Clark Hull's mathematical theories of learning.

In the summer of 1957, Gordon won an award to attend a workshop on mathematics in the social sciences at Stanford University. There he met W. K. (Bill) Estes. In the years to follow, Gordon would have a powerful influence on Bill's research (and vice versa). Bill offers a personal memoir of Gordon's research career and its context during the period 1957 to 2006 in chapter 1, "Gordon H. Bower: His Life and Times."

Gordon attended the then-famous summer school in mathematical psychology at Stanford University, where he met most of the luminaries in the field. So impressive was Gordon that he was offered a job at Stanford before even finishing his Ph.D. thesis at Yale, and, in 1959, Gordon moved to the Stanford Psychology Department—never having had to go through a formal interview! He was joined soon thereafter by Bill Estes and other mathematical psychologists. Trained as a behaviorist, Gordon established an extensive animal-conditioning laboratory, including Skinner boxes that he built with elaborate circuits cannibalized from discarded pinball machines acquired from the local junkyard. By the mid 1960s, however, Gordon's animal research was crowded out by his growing interest in mathematical models of human learning.

In 1963, Doug Hintzman was a 1st-year graduate student in the Stanford Psychology Department whose 1st-year project, developed in another lab, was not going well: His adviser unexpectedly decided to take a leave of absence, and a lab assistant plugged his DC circuitry into an AC outlet—thereby destroying the apparatus. Desperate for new start, Doug made an appointment to see Gordon and explained his situation. Gordon glowered at Doug, said he was too busy to hold the hand of a student who didn't know what he was interested in. However, to Doug's relief, Gordon's gruff exterior turned out to mask a sympathetic soul. They worked out a project to study the short-term recall of strings of digits and letters. As Doug's Ph.D. adviser, Gordon continued to provide Doug with a morale-boosting combination of independence, respect, and support. In chapter 2, "Memory From the Outside, Memory From the Inside," Doug speculates that Gordon's research success can be attributed largely to his ability to view cognition from two quite different but complementary perspectives: the reverse-engineering perspective of the formal modeler, and the first-person perspective of a self-aware cognitive system.

In September of 1964, Gordon traveled down the coast of California for a meeting of the *American Psychological Association* in Los Angeles. There, he heard Endel Tulving present the results of two experiments showing that repetition of material can lead to decrements in recall. At the end of the talk, a tall young man whom Endel had never seen before, sitting close to the front in the crowded lecture hall, stood up and in a booming voice announced to the audience that the talk they had just heard was balderdash and the results horsefeathers (or

words to that effect). He backed up these assertions with astute observations and carefully considered arguments. After the session ended, the troublemaker trundled to the front of the hall and addressed himself: "I'm Gordon Bower." Endel knew the name, of course. "Everybody knew the name of the boy wonder of experimental psychology at that time," he recalls.

From those inauspicious beginnings, Endel and Gordon's relationship was all uphill. Before his sabbatical at Berkeley in 1964/1965 ended, Endel and his wife Ruth had visited Gordon and Sharon in Palo Alto, broken bread together, and formed the foundation for a friendship that has lasted to this day. As his friend, Tulving learned that behind Gordon's rough exterior and highly honed skill of intimidation lay "a soul as sweet as Mother Theresa's, a soul that he did not wish to reveal to many, for reasons that probably only Sharon and his analyst can fathom." Tulving's chapter 3, "On the Law of Primacy," does not have much to do with Gordon's past work, nor with Tulving's own. Rather, it contains a germ of an idea, whose appearance in this book Tulving hopes may not only honor Gordon but perhaps please him, as well.

A few years later, 1966, Elizabeth (Beth) Fishbein (soon to be Loftus) arrived at Stanford as a new graduate student in psychology. Beth didn't work with Gordon directly, but became closer to him later as their lives converged through professional organizations, and Gordon became a *de facto* mentor to her. In chapter 4, "Gordon and Me," Beth writes about how Gordon's career and hers have been intertwined, with examples of the times and places their paths crossed. Again and again, whenever she was at a difficult spot in her life, Gordon was there to back her up and encourage her. Today, Beth counts Gordon as among the most important influences on her career. The lesson here, she notes, is that a mentor doesn't have to be someone who chaired your thesis committee; others can, and do, play a significant role, as well.

As a new graduate student in 1967, Alan Lesgold first met Gordon following a luncheon for a departing departmental colleague. Walking back from lunch, Gordon spotted Alan, and introduced himself, asking, "Who the hell are you?" Alan soon became Gordon's graduate student, drawn in part by what he recalls as Gordon's "fundamental disposition to dig deeper into phenomena that seem of social importance." In chapter 5, "Toward Valued Human Expertise," Alan describes the forms of cognition that he hopes will distinguish people from machines in the future.

How does one best prepare to be a successful graduate in psychology? In the fall of 1968, Gordon's advice to one entering Stanford student, John Anderson, was straightforward: Take a speed-reading course. While a graduate student with Gordon, the two wrote a book, *Human Associative Memory* (HAM), that served as the intellectual thrust that determined the course of John's scientific life. The ACT theories that John has worked on for 30 years have their foundation in his early work on HAM at Stanford. Gordon, John recalls, was "always concerned with how to bring the rigor of science to applications of importance to society."

John's contribution to this volume, chapter 6, "The Algebraic Brain," describes how one cognitive science method (in particular, neuroimaging) contributes to our understanding of learning algebra.

Stephen Kosslyn will never forget the day he met Gordon Bower. All of the cognitive students and faculty met every Friday afternoon, and a graduate student presented his or her work. "I first saw Gordon at such a Friday seminar," remembers Steve. And continuing:

Gordon had been overseas my first quarter of graduate school, and this was the first seminar he attended after I had become a student. I was sitting next to the speaker, who seemed unusually nervous. I noticed a line of sweat on his forehead, and he was clearly agitated. I couldn't understand why. Then I noticed that in spite of the fact that people were standing by the walls and sitting on the floor, the seat at the other end of the long table was empty; moreover, we were running late, but everyone was waiting. At that point a very large man, who looked remarkably like John Wayne, entered. He ambled to the empty chair, sat down, and said, "OK, we can begin." I wondered who he was. Within minutes he began asking extraordinarily insightful and blunt questions. He was very quick on the uptake, very confident, and unusually assertive. At one point he interrupted the speaker, and pounded his fist (the size of a ham, in my memory) on the table, creating a sine wave that propagated down to my end. Roberta (then known as Bobby) Klazky came to the rescue, with a trenchant rejoinder to Gordon's broadside. In fact, before Gordon was completely finished, Bobby (who then looked about 17) cut him off, and explained that there was another finding he was ignoring. Gordon listened carefully, head cocked to one side, nodded, and grumbled to a halt. I was in a state of semishock. Not only did I feel totally inadequate, having no idea what either of them were talking about, but I also was impressed by Gordon's ability to extrapolate and search for implications of empirical findings. But more than that, I was amazed that he did not mind being interrupted and corrected. Gordon clearly wanted to "get it right."

Months later, Steve got to experience the Bower Effect firsthand when he gave his own first Friday Seminar, describing his early work on mental imagery. A few days later, Gordon stopped Steve in the fourth-floor lounge of the psychology building, and they talked for over an hour. "I discovered that he wasn't simply critical," recalls Steve, "but very constructive, supportive and helpful." Gordon began showing up at Steve's office from time to time, giving him reprints and chatting. Steve soon realized that Gordon was someone he could count on to be on his side in the deepest sense. Soon thereafter, Steve switched advisors and began working with Gordon, a move he describes as "one of the best decisions I have ever made."

Kosslyn's extensive body of research on mental imagery, some of which is summarized in chapter 7, "Remembering Images," can all be traced back to a single sentence of a paper that Gordon wrote—a sentence that appeared in a preprint manuscript, but, for some unknown reason, was deleted in the published version. As Kosslyn recalls, the sentence said something like, "If visual mental images are like pictures, and can be scanned and so on, then . . ." It was the bit on scanning that stuck in Steve's mind, and led to his first experiments on mental imagery.

In 1970, Barbara Tversky arrived at Stanford to do a 1-year postdoctoral fellowship with Gordon. He greeted her warmly, and promptly took off for London

for the quarter. Having worked largely on her own during graduate school, Barbara assumed this was the norm for a postdoc–mentor relationship and dug into her own projects while Gordon was away. She returned to Stanford in 1977 as a visiting scholar and stayed on in various faculty roles during which time the two became colleagues, attended each other’s lab meetings, shared a few students, co-taught a graduate course in cognition, and served on many dissertation committees together. Barbara says:

I learned an enormous amount from him, not just psychology, but how to do psychology, how to interact with students and colleagues, how to contribute outside the university. Not that I always emulated him, he had his own style, but thinking about what he was accomplishing and how helped me set mine.

Barbara’s chapter 8, “Sharing Landmarks and Paths,” describes Gordon’s and her comings and goings at Stanford, and ways in which their interests intersected on scientific topics, memory (especially recognition memory and imagery), spatial mental models, and events.

Arriving in 1971 as a new graduate student with Gordon, Arnie Glass soon came to view Gordon as more than just an adviser. When he got married 2 years later, and neither his nor his wife’s family could make it to California for the nuptials, it was Gordon and Sharon who gave the young couple a wedding. Arnie remembers Gordon discussing his all-or-none learning model, including the objections that caused him to abandon it. “It seemed to me then that the model wasn’t untestable in principle, as others assumed,” notes Arnie, “but that no one had yet come up with a good way to test it.” Arnie thought about this problem for about 25 years until he came up with a suitable experimental paradigm described here in chapter 9, “Evidence of All-or-None Learning From a Repetition Detection Task.”

In 1972, the year after Glass arrived, Keith Holyoak entered the graduate program in psychology at Stanford. In his first quarter, Gordon assigned Keith a project on recognition memory for naturalistic sounds, which resulted in a quick publication in the *Journal of Experimental Psychology*. Keith recalls that Gordon did all the writing, and that the article was accepted on its first submission, without revision—an event never replicated in Keith’s subsequent publishing career. While being mentored by Gordon, Keith worked with Arnie Glass to explore the field of semantic memory; his chapter 10, “Relations in Semantic Memory: Still Puzzling After All These Years,” takes a retrospective look at what has been learned since the 1970s.

Also arriving in 1972 as a new graduate student seeking to work with Gordon was Robert (Bob) Sternberg. Bob remembers that “Gordon was a wonderful adviser because he left his students alone to pursue their own dreams, helping them when they wanted, but never interfering.” In chapter 11, “Using Cognitive Theory to Reconceptualize College Admissions Testing,” Bob describes his work on culture and abilities, an extension and broadening of his dissertation studies with Gordon on the nature of intelligence.

David Rosenbaum began his graduate studies with Gordon in 1973. From his 2nd year of graduate school onward, David chose to focus on the planning and control of physical movements, a topic far removed from Gordon's own interests. Nevertheless, Gordon supported David's foray into a different research domain. In later years, Gordon, the faithful and loyal advisor, always came to David's talks at Psychonomics as well as the talks of all his other former students, no matter how removed from his own interests those talks were. In chapter 12, "Moving Cognition," David summarizes his research on the planning and control of movements, especially hand and arm movements. Gordon's willingness to apply what he knew about cognition to Rosenbaum's nascent ideas about the control of physical action helped Rosenbaum see that cognitive psychological principles could be profitably applied to the problem of translating cognition into overt performance.

As an Army officer, John Black was stationed in 1972 at the now-closed Sacramento Army Depot, a few hours' drive from Stanford University. Having read papers by Gordon and Richard Atkinson (also at Stanford) while an undergraduate, John hoped to leave the Army and study mathematical psychology. As John recalls:

I thought I wanted to work with Gordon, so I called him on the phone only to have him tell me that he wasn't there—this was my first contact with Gordon. He went on to say he was spending the year at the Center for Advanced Study writing a book with a former student (this turned out to be *Human Associative Memory* with John Anderson), and that I should talk to Dick Atkinson instead. I did talk to Dick and arranged to visit Stanford on a Friday, where I had my next contact with Gordon watching him rip to shreds a presentation by a Post-doc in the Friday Seminar. Perhaps perversely I found this appealing because I wanted to prove I could stand up to such criticism.

John soon became interested in story understanding, which was a hot topic at the time, but Atkinson discouraged his interests in story understanding and encouraged him to do memory-scanning experiments with word lists instead. A few days later, John ran into Gordon in the men's restroom, where Gordon said that he had heard John was interested in story understanding. Gordon was too, he told John, and so the two began a collaboration that produced many studies of story understanding during John's 4 years at Stanford. The research he did with Gordon on story understanding has provided the foundation on which John built his subsequent research on imaginary worlds and its application to technology and learning, work described in his chapter 13, "Imaginary Worlds."

Arriving in June of 1977, eager to get an early start on graduate school, Larry Barsalou asked Gordon for advice on how to be a successful graduate student. "It's 20% ability and 80% motivation," replied Gordon. Barsalou's chapter 14, "Continuing Themes in the Study of Human Knowledge: Associations, Imagery, Propositions, and Situations," demonstrates what Larry describes as a resonance that Gordon and he share, a tolerance and appreciation for multiple conflicting perspectives—as well as evidence of a lot of motivation!

A year later, in 1978, Brian Ross arrived at Stanford to work with Gordon. “Gordon’s broad approach to cognition has been an encouragement in my trying to integrate category learning with the many areas of Psychology,” notes Brian. In his chapter 15, “Category Learning: Learning to Access and Use Relevant Knowledge,” Brian shows why categories are important by considering various types of goal-oriented category learning.

While at a conference in 1979, Eric Eich and a friend were chatting as they made their way across a crowded hotel lobby. Eric brushed by a very tall gentleman, who was speaking to someone else. Not recognizing him, Eric kept on walking and talking with his friend. He got about two or three steps when, behind him, he heard a booming voice say: “Well, so you’re Eich? I know what you do. Get over here.”

Eric doesn’t remember much of what Gordon said: There was a dull ringing in his ears brought on by the realization that the speaker was none other than Gordon H. Bower and that he did indeed know something about Eric (a grad student with Endel Tulving at the University of Toronto at the time) and his work (on drugs and memory). But Eric does recall Gordon’s discussing his recent studies of mood and memory, and speculating on how drug and mood effects might be related. These are, in fact, the central issues in Eric’s chapter 16, “Revisiting the Idea of Mood Mediation in Drug-Dependent and Place-Dependent Memory.”

Joe Forgas spent his first-ever sabbatical leave in 1980 at Stanford with Gordon. As a newcomer to the field, Gordon’s theoretical approach guided their research, whereas Joe’s interest in perceptual processes influenced what they actually ended up doing together. Joe returned several more times to Stanford on sabbatical visits, and Gordon and Sharon visited Joe in Australia several times as well, allowing Joe and Gordon to continue a collaboration for many years, resulting in several journal papers and review chapters together. Their joint work on the influence of mood on social judgments and behavior combined Gordon’s interest in affect, from the point of view of a cognitive psychologist, with Joe’s interest in social judgments and person perception, from the point of view of a social psychologist. This work is reviewed in Joe’s chapter 17, “Affect, Cognition and Social Behavior: The Effects of Mood on Memory, Social Judgments and Social Interaction.”

In 1982, Gordon turned 50 and to mark this occasion, John Anderson and Stephen Kosslyn organized Gordon’s students to write chapters for a first Festschrift volume, which appeared as *Tutorials in Learning and Memory: Essays in Honor of Gordon Bower* (Anderson & Kosslyn, 1984). They gave Gordon early copies of the chapters, and soon thereafter, each of contributors received a long handwritten note from Gordon telling them how important it was for each of them to support each other and to attend to the human and social side of life even while they worked hard on their research. Of course, they also all received their drafts back, marked up with the detail and care that had characterized their earlier student relationships with Gordon. As Alan Lesgold recalls, “This combination of being supportive and caring combined with not being afraid to be helpful in both professional and personal ways was characteristic of Gordon.”

In the fall of 1982, Mark Gluck arrived at Stanford as a 1st-year graduate student. As an undergraduate at Harvard, Mark had worked with two members of the extended Bower circle: Gordon's former graduate student Steve Kosslyn and his former Stanford colleague, Bill Estes. Not surprisingly, both Kosslyn and Estes encouraged Mark to apply to Stanford to do a Ph.D. with Gordon. Mark and Gordon's first phone conversation got off to a bad start when Mark admitted to Gordon that not only had he never been to a baseball game, but he had no interest in the sport at all.

Gordon was away on sabbatical when Mark arrived at Stanford in the fall of 1982, and Mark began working with Amos Tversky and Roger Shepard. During this year, Mark was frequently regaled by students and faculty with "Gordon Stories" until, in Mark's expectation, Gordon must surely be 10 feet tall, broad as a linebacker, and tough as an ironworker. A year later, Gordon returned from sabbatical and the two met for the first time. "Young man," said Gordon as they passed in the hallway of Jordan Hall, "you're flying at half-mast," as Gordon pointed to Mark's semiopen pant zipper.

With an interest in mathematical models of category learning that had developed during his work with Kosslyn and Estes, Mark continued to pursue this topic at Stanford as well. Most of the ideas that Mark enthusiastically brought to Gordon elicited a withering critique of their flaws, shortcomings, and ill-conceived sloppy vagueness. For the few ideas that Gordon acknowledged had some merit, he provide pointers to the literature where Mark could read how other psychologists had published these ideas years ago. Discouraged, and feeling he was getting nowhere, Mark contemplated transferring to the Business School or going off on his own to start some entrepreneurial business venture. A chance encounter with another professor in the Psychology Department, Richard Thompson, introduced Mark to neuroscience. Through this side project with Thompson, Mark developed an appreciation and admiration for the elegance, simplicity, and power of Rescorla and Wagner's (1972) mathematical model of animal conditioning. Why doesn't cognitive psychology have models like this?, Mark wondered. Taking advantage of the new paradigm of connectionist neural-network models that Mark had learned about while working with Estes at Harvard (who had published many of the early network models as editor of *Psychological Review*), Mark proposed to Gordon that they use connectionist network models as a framework for applying the Rescorla–Wagner model to human category learning. This work with Gordon, and its influence on Mark's later work in cognitive neuroscience, is described in his chapter 18, "Behavioral and Neural Correlates of Error-Correction in Classical Conditioning and Human Category Learning."

In 1983, Gordon was on sabbatical at Carnegie-Mellon University (CMU) in Pittsburgh where he met John Clapper, a visiting prospective graduate applicant who had already been accepted to both CMU and Stanford. Meeting Gordon convinced John that he wanted to go to Stanford and work with Gordon. John

was Gordon's Ph.D. student from 1983 to 1988, and then continued working with Gordon as a research associate (with Air Force funding) until 1993. John then left academia for several years to work in the nonprofit sector but never lost his interest in cognitive psychology. He began to teach on a part-time basis at Humboldt State University in 1997, and soon had a small research program back up and running. He found himself reinfected with the cognitive psychology "bug" and—with Gordon's support and encouragement—decided to return to academia on a full-time basis. John's chapter 19, "Category Learning as Schema Induction," is a summary of some of the early work he carried out with Gordon and a description of the directions he has taken since reentering the field.

Evan Heit arrived at Stanford in 1986 to work with Gordon as a graduate student. His chapter 20, "Categorization, Recognition, and Unsupervised Learning," offers a window into what was happening in Gordon's lab in the late 1980s and early 1990s, as well as how these ideas transmogrified 10 years later and 5,000 miles away in Evan's lab in England.

"So what do you know about connectionism?" asked Gordon (in lieu of any standard form of greeting) when Steven Sloman poked his head into Gordon office for the first time in 1986. Connectionism was then an up-and-coming approach to cognitive theorizing, and Gordon always made sure that he and his students were abreast of the latest movements in the field. Steven's chapter 21, "Updating Beliefs With Causal Models: Violations of Screening Off," investigates the viability of a Markov model of human reasoning, a type of mathematical model that Gordon helped bring to psychology over 40 years ago.

In spite of the fact that Gordon was deeply involved with this students' research (and typically, their lives), he found time to travel widely. While giving a talk at Marburg University, Germany, in 1987, Gordon met Mike Rinck, who later came to work with Gordon as a postdoctoral fellow in 1991. This led to a 10-year collaboration that continued long after Mike had returned to Germany. In the final chapter of this volume, chapter 22, "Spatial Situation Models and Narrative Comprehension," Mike describes one of Gordon's later research interests—mental models and text comprehension.

As the preceding narrative makes clear, Gordon—throughout his career—would identify a critical unsolved problem, make seminal contributions that established a new area of research, attract many other people to this new fertile domain, and then move on to do it all over again in some completely different area of learning and memory research. As noted earlier (and described in more detail in the chapters to follow), some of the vexing problems that Gordon addressed include: How do people reorganize memory during learning? How do mnemonic devices work? How does hypnosis affect memory? What role does mental imagery play in memory? How do we understand and remember simple narratives? How does our mood influence what we learn and remember? How do principles of animal conditioning apply to human category learning?

xviii PREFACE

Gordon's considerable influence on the field of memory research stems not only from his own research but also from his role as a prolific educator and mentor to young psychologists—including the authors of the chapters that follow—many of whom went on after their training with Gordon to play major roles in the growing field of cognitive psychology. The breadth of Gordon's reach can also be seen in the diverse (and almost contradictory) spectrum of journals on whose editorial boards he served, including the leading journals of both Skinnerian behaviorism and the opposing cognitive psychology movement, and ranging from the most applied areas of clinical psychology to the most abstract realms of theory.

Gordon never fulfilled his early dream of pitching a no-hitter at Yankee Stadium; he spent his entire professional career at Stanford University where he retired in 2005. However, in his chosen career of psychology, where he went up to bat time after time against a broad and diverse lineup of the most challenging problems in learning and memory, Gordon hit a string of home runs worthy of his childhood idol, Lou Gehrig.