



Dialogue

Concerning the Two Chief Approaches to a Science of Life

Word Pictures and Correlations versus Working Models

*William T. Powers
and Philip J. Runkel*

*Edited by
Dag Forssell*

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Comments on this volume

Many people have reviewed this volume. They have diverse backgrounds and a variety of professions, and are at various stages in life. Their comments below touch on the science, the letters, the remarkable men who wrote them, as well as their own experience of PCT and the particular relevance it has had for them.

—The editor

This is a marvelous and extremely important volume. It is extremely important because it records two towering intellects in an extended correspondence concerning a true scientific revolution in psychology. Powers and Runkel theorize, experiment, model, discuss, criticize and advance our understanding of Perceptual Control Theory (PCT) which was given its first extended formulation in Powers' *Behavior, the Control of Perception* (1973). The correspondence is exceptionally well-written, occasionally wandering, sometimes technical (but no more than advanced algebra) often insightful, and always illuminating. It provides an outstanding case study of how science develops when real scientists are involved. There are suggestions, descriptions of experiments, computer modeling, explorations of consequences, criticisms, false starts, new breakthroughs, and throughout it all the sense that this is real science in the making.

The volume is marvelous because the humanity of these two men of science is also abundantly present. They express their pride in their successes, their frustrations at being misunderstood, their growing respect for each other as scientists and their maturing friendship for each other as persons.

It is a must read for anyone who is interested in bringing psychology out of the dark ages and in observing how two outstanding scientists make science really work.

Hugh Petrie, Ph.D. (Philosophy)
Professor Emeritus and former Dean,
Graduate School of Education
State University of New York at Buffalo

Bill Powers is one of the clearest and most original thinkers in the history of psychology. For decades he has explored with persistence and ingenuity the profound implications of the simple idea that biological organisms are control systems. His background in engineering allowed him to avoid many of the traps that have victimized even the best psychologists of the past. I believe his contributions will stand the test of time.

Henry Yin, Ph.D. (Cognitive Neuroscience)
Professor of Psychology & Neuroscience
Duke University, NC

Bill Powers' work in the 20th century will prove to be as important for the life sciences as Charles Darwin's work in the 19th century. By the time this notion has become common knowledge, historians of science will be very happy with this correspondence between two giants.

Frans X. Plooiij, Ph.D. (Behavioral Biology)
Director, International Research-institute on
Infant Studies (IRIS), Arnhem, The Netherlands

I am a former Navy Fire Control Technician, charged with operating, maintaining and repairing the systems that control a warship's gunnery and missile systems. I like to think I know a little bit about control. When I first read *Behavior: The Control of Perception* in 1975, PCT immediately struck a chord with me. Most important, it provided a schematic for analyzing, understanding and improving human performance in the modern workplace.

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What Peter Drucker called “the shift to knowledge work” was actually a shift from prefigured or ‘canned’ work routines to configured or ‘crafted’ responses. Crafted responses entail figuring out what to do so as to achieve and maintain valued results. That requires employees to exercise a considerable degree of discretion and to vary their behavior in ways that get the job done. The old stimulus-response view of human behavior doesn’t offer any help with this kind of performance, and neither does the cognitive view.

The bottom line is that employees must be viewed as agents acting in their employer’s best interests instead of compliant instruments of managerial will. The only theory of human behavior (and performance) that fits the bill is William Powers’ Perceptual Control Theory (PCT). His view of human beings as “living control systems” is precisely what management needs if it is ever again to have any meaningful impact on workplace performance and productivity. Finally, I find PCT very useful as a way of reflecting upon, understanding and managing my own behavior.

Fred Nickols, www.nickols.us
 Managing Partner, Distance Consulting LLC
 Exec. Dir. Educational Testing Service (1990–2001)

This book provides a wonderful compilation of the historical underpinnings of Perceptual Control Theory (PCT), and includes many communications between Philip Runkel and William Powers during the time period that PCT was being further developed and refined. As part of the book, other authors’ contributions are given, including excellently written comments by the editor, Dag Forssell. PCT first became known to my wife and me in 2004, when we attended a class for retired people at the University of Cincinnati. We had two outstanding teachers, Len Lansky (a retired psychology professor) and Robert Summer (a psychotherapist in private practice). Besides learning about the basic simplicity of PCT and about the huge improvement that PCT has over other concepts of psychology in describing the actions of living things, the class members learned how to effectively use PCT to think about and resolve disagreements between two people. Overall, this new book is extremely valuable in understanding PCT.

Raymond E. Sund, Ph.D. (Nuclear Physics)
 Former Director of R&D at Toledo Edison Co.

Bill Powers provides a way of understanding living beings that on the surface might appear simple. And yet, once you look from this perspective, everything you thought you knew is brought into question and a process of re-examination and rediscovery begins. I have found this to be the most valuable learning experience I have ever had and the most significant influence on my work as a clinician and researcher. The collection of letters and papers in this book provides a fascinating opportunity to embark upon the journey of discovery and re-examination shared by Bill Powers and Phil Runkel. It provides an experiential process of learning more about PCT in a way that brings everything to life.

Sara Tai, Ph.D. (Clinical Psychology)
 Senior Lecturer, Chartered Clinical Psychologist,
 Accredited Cognitive Behavioural Therapist
 University of Manchester, UK

It is hard to overstate the importance of this work yet its significance will probably not be fully realized for many years to come. The contribution of Powers’ insights to the life sciences are so profound and far-reaching that virtually none of our current knowledge will remain intact in the new paradigm where the phenomena of control and circular causality are the foci of attention. Some current concepts will require only a slight tweaking while others will need a major revision. Still others will become entirely irrelevant.

Being able to follow along while a highly respected scholar such as Runkel spring cleans all that he knows in order to understand PCT accurately is a rare privilege. While Runkel learns more about PCT, the reader cannot help but to benefit from Runkel’s searching queries and astute insights.

This book will become an important resource for any serious student of PCT which, in time, will be anyone who seeks to rigorously understand the fundamental elements of the process of living.

Tim Carey, Ph.D. (Clinical Psychology)
 Associate Professor in Mental Health, Centre for
 Remote Health, a joint Centre of Flinders
 University and Charles Darwin University and
 Central Australian Mental Health Service,
 Alice Springs, Northern Territory, Australia

While Director of Systems Manufacturing at a division of Intel, I had the opportunity to innovate specific management processes and communications strategies based on my understanding of PCT. The experience spanned about 14 months. The result was a level of plant performance that had never been attained before. The plant won numerous accolades for on time delivery, line linearity, and quality. Also, teamwork between departments, which in the past had been less than ideal, improved significantly.

As a consultant, I created programs applying PCT to problems that managers encounter often.

At Apple, I taught managers how they might deal with problem performers in a more effective manner. At Hughes Bipolar Semiconductor, I applied PCT to building teamwork in a production area where performance was so poor that the material cycle time in the area was over 24 weeks. When I completed my work, the line had already reduced cycle time to less than 8 weeks. Morale was the best managers had seen in memory.

I worked with Intel's PC Enhancement Division on Constructive Confrontation communications skills and taught managers how they could aggressively confront problems with others, but in such a way that they did not have to get into angry, stressful arguments. The managers told me that I had given them a new set of tools for dealing effectively with others, even when a problem might get emotional.

Upon reflection, it is not surprising that applying PCT in a number of practical and skillful ways would produce results. PCT is the most comprehensive and accurate model of the human operating system I have ever encountered. I am satisfied that in the future organizations will realize more repeatable results, more efficient and effective problem resolution, a far greater sense of teamwork and esprit de corps, all with managers experiencing far less stress.

Jim Soldani

Intel: Director, Systems Manufacturing,
Memory Systems, Phoenix, AZ. 1978–81
Director, Corporate Training 1981–83
Director, Systems Group WW Materials 1991–94
Author: *Effective Personnel Management:
An Application of Control Theory*

I never “bought” the linear determinism of the stimulus-response psychologies because it was inconsistent with my experience, and because promoters of these views seemed always tacitly to exempt themselves from being subject to them. That's probably why learning perceptual control theory was for me in the early 1990s not a tumultuous overthrow of old ideas, such as Dr. Runkel reports in the earliest of the letters here, so much as it was an exploration of the ramifications.

These ramifications, as he also attests, are challenge enough. PCT is unprecedented in its breadth and reach. Its grounding in physics and physiology sets it far above the speculations that prevail in the psychological and social sciences. Its requirement for explicit working models that conform closely to recorded behavior sets standards of excellence that are without parallel in these fields. This, together with the restoration of purpose to the center of the sciences of living things, separates what is essential from what is incidental. The perceptual variables controlled by an individual are the essential matters to be identified and measured. The countless other variables that an investigator might perceive and statistically correlate are revealed as disturbances to or incidental side effects of control, obscured by the aggregation of data from many trials and many individuals.

These characteristics of PCT—its scope, its rejection of IV–DV hand-waving and ‘models’ that don't work, its demand for hard-science specificity and for correlations near 100%—can make it a hard sell. Those who wish to curry favor among today's makers and breakers of reputation might well steer clear. The essay *Three “Dangerous” Words* in Part II will tell you why. But those who want to do something of lasting value should pay close attention. Our colleague Phil Runkel has gone this way before us under the guidance of our mentor Bill Powers, and their 22 years of wise, articulate, witty correspondence lays out bright lights and signposts for our benefit.

Bruce Nevin, Ph.D. (Linguistics)

Editor, *The Legacy of Zellig Harris:
Language and information into the 21st century*
Program Manager & Information Architect,
Cisco Systems Inc.

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Dialogue Concerning the Two Chief Approaches to a Science of Life lays out a fascinating, behind-the-scenes and historical look at why a highly regarded academic psychologist, Phil Runkel, came to abandon mainstream psychology principles and adopt Perceptual Control Theory originated by Bill Powers.

PCT will assuredly have a huge impact on the social sciences due to the fundamental insight that people do not respond to stimuli, they act to oppose disturbances to their controlled variables.

I know PCT has significantly improved my thinking about human behavior in general, and about research in psychology and economics in particular. I am currently using PCT principles to investigate my investment process for buying and selling stocks. Gaining a deeper understanding of the higher level reference perceptions underlying my formation of an “investment thesis” for a stock and my interpretation of new information, such as company news announcements, is a lot more complex and difficult than I thought.

Bartley J. Madden, BSME, MBA
Former Managing Director, Credit Suisse,
Author of
*Wealth Creation: A Systems Mindset for Building
and Investing in Businesses for the Long Term*

As a psychologist, Runkel approaches ideas about how human behavior functions that originate from Powers’ technical world of engineering. Although Runkel could consider himself to be an expert on human behavior, he puts himself into the position of a student who open-mindedly learns a promising new theory about the nature of psychological processes. As a psychologist, for me it is very exciting to witness the written dialogue between Runkel and Powers, and to put myself into the position of a student as well. Perceptual Control Theory (PCT) has a lot to tell about human behavior, a perspective that contrasts with mainstream psychological reasoning. *Dialogue* is not merely a discussion between two scientists, not just a discourse on PCT—it is a challenge to the fundamental concepts of modern psychology.

Michael Cramer, Dipl.-Psych. (Psychology)
Head of Addictions Department,
Clinic for Forensic Psychiatry and Psychotherapy,
Kaufbeuren, Germany

I was pleasantly surprised by the importance of the contents. Often, correspondence like this gets lost in the shuffle, yet is also often some of the most enlightening material on the sources of the correspondents’ thinking—particularly when the correspondents’ thinking is as cutting edge as Bill’s and Phil’s.

The period of time during which I participated in CSG meetings and had conversations with Bill and others was among the most significant of my life. My interests have been and continue to be at the societal level rather than the psychological; of course, as a member of the social systems in which I have interest, it has been important that I develop some form of understanding of myself, my desires and my thinking and how those play into collective processes of social design and transformation, which must include consideration of the desires and thinking of others.

I am an engineer by training, as is Bill, and it was always refreshing to have someone with whom to talk who was first and foremost interested in what is useful, i.e., that which might be employed to alleviate the misery that pervades much of the current human condition. Bill showed tremendous patience with my interests and found ways to discuss control systems theory that continues to inform my search for social design theory and method when I am a part of the very systems I design.

These letters remind me of the richness of those conversations.

Larry Richards, Ph.D. (Operations Research)
President, American Society for Cybernetics, 1986-88.
Executive Vice Chancellor for Academic Affairs
and Professor of Management & Informatics
Indiana University East

Learning about PCT during my undergraduate studies certainly forced me to think again. Now that I have, a world where organisms execute responses to stimuli just does not add up anymore. Grasping Bill Powers’ revolutionary idea is not necessarily easy, but that is because it challenges you to review your very fundamental assumptions about how we function as humans. I am glad that I had the chance to do so early on in my career, because it certainly does not get easier later on.

Oliver Schauman, BSc (Hons) Psychology,
University of Manchester

I read this book with great interest and enjoyment. Phil Runkel and Bill Powers are two of the most intelligent people I've ever met, and reading this collection of letters felt like listening in as two great minds engage in intense and highly productive discussions. As in all really good discussions, the parties to this exchange confront conflicts and differences of perception head-on, and both come away with new insights. It was particularly fascinating to watch Phil Runkel reorganize his perceptions of what PCT is all about, and I found it equally intriguing to watch Bill Powers enlarge his view of how the social sciences can work.

Because this exchange pushed both men to the limits of their understanding of the newly developing science of control of perception, readers of the book can also draw fresh insights from their discussions. I expect that every serious student of PCT will want to read this book. Although both Powers and Runkel are superbly clear writers, some of their letters do require close reading, particularly the opening exchange that dissects the 1978 Powers article on *Quantitative analysis of purposive systems*. To figure out what they were talking about, I had to go back and reread that article, but the article was well worth rereading, and the commentary in the letters illuminated points that I had missed the first time around. Again and again through the rest of the book, I came across ideas that suggested answers to questions I've had as I apply PCT in my own sociological work.

Finally, I found it particularly poignant to observe the way that friendship and affection grew between these two men over the course of their correspondence. The two show themselves in these letters not only as great scientists but also as men of compassion, warmth, and humanity. When someday historians of science are writing biographies of Bill Powers, this book will be an invaluable resource.

Kent McClelland, Ph.D. (Sociology)
Professor of Sociology, Grinnell College, IA

B.F. Skinner famously posited that our behavior is caused by what we perceive. William Powers caught my attention when he turned that proposition on its head: What we perceive is caused by our behavior. That is, in fact, what human behavior is—action that creates a change that we perceive; if the perception conforms to what we intended, the action was a suc-

cess. In a stroke, Powers put purpose at the heart of the human condition. As someone trying to understand the law and its insistence that humans are responsible for their actions, seeing humans as the authors of their behavior made sense of the legal assignment of responsibility, where Skinner's proposition would rob the law of its moral force, making it simply another form, albeit sloppy, of behavior control.

Better than that, Powers went on to illuminate the process by which humans exert their control over perception: the negative feedback process. As it has become articulated in the work that followed *Behavior: The Control of Perception*, Powers's theory grew capable of revealing the inner dynamic of all fields of human behavior, from law to ergonomic design to learning, emotions, and the behavior of crowds. The current volume puts you in the heart of this conversation about human nature, in the hands of two lucid thinkers.

Hugh Gibbons, J.D. (Legal Theory)
Professor of Law Emeritus
New Hampshire School of Law,
University of New Hampshire

As a researcher and practitioner of cognitive behavioural therapy (CBT), I have seen its powerful effects in aiding people's recovery, yet I have been aware of the limitations of, and contradictions between, the cognitive and behavioural theories that inform CBT. When I discovered PCT in the late 1990s, I saw immediately a theory that could bridge the gaps between cognition, behaviour, and motivation by considering them as integral components of a single unit—the negative feedback loop. When I read Powers (1973) further, I realised that these units could be configured in such a way as to model learning, memory, planning and mental imagery. I was 'sold', and since this time I have endeavoured to test and apply PCT within my research and clinical work. It is often difficult for therapists to grasp the notion that there can be a precise, empirical and quantitative model of purposive, humanistic psychology—but here it is.

Warren Mansell, Ph.D. (Clinical Psychology)
Senior Lecturer, Chartered Clinical Psychologist,
Accredited Cognitive Behavioural Therapist
University of Manchester, UK

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William Powers' great contribution has been to explain exactly what it means, in scientific terms, to say that people have purposes, and to follow through the logic of this basic idea to build a testable theory of human behaviour. This book shows him explaining these ideas to a colleague in a correspondence over many years, infused throughout with his characteristic warmth, clarity, and vigour. I have found Powers' approach to control systems fruitful in my own work in robotics and in computer-generated human animation.

He is also one of the wisest people it has ever been my good fortune to know.

Richard Kennaway, Ph.D. (Mathematics)
Senior Research Associate
School of Computing Sciences
University of East Anglia, Norwich, UK

Can you imagine that in an hour and a half the course of your life would change?

That's what happened to me in the fall of 1957 when I wandered into a free seminar at the University of Chicago Counseling Center training program, where I was an intern. It changed my life forever.

The topic was: *A General Feedback theory of human behavior*. It left me quivering with excitement. This is it, I felt. Here was a description of how behavior really works—something I had been yearning to find all the way through my graduate courses.

Since that day, I have been striving to draw useful applications from Bill Powers writings and teachings. I have an earnest desire to see the world come to a realistic understanding of human behavior, and a conviction that such knowledge will affect the course of human life for good.

Richard Robertson, Ph.D. (Psychology)
Professor emeritus of Psychology,
Northeastern Illinois University
Co-author and editor,
Introduction to Modern Psychology;
The Control-Theory View

In his 1933 magnum opus, *Science and Sanity*, Alfred Korzybski presented his system of applied epistemology (labeled “general semantics”) as his contribution to the foundations of a “science of man.” As early as his first 1921 book *Manhood of Humanity*, he had expressed the importance of non-linear, circular (“spiral”) causation for understanding human behavior. But his rough working intuition of circular mechanisms didn't

line up with the psychology of his day, which mainly operated within the stimulus-response paradigm. So although he regretted the lack of what he considered a “scientific psychology” (an exact theory of the circular mechanisms of behavior didn't exist) he was forced when formulating his own work to make use of the best, though inadequate, studies of his day.

Almost as soon as he became aware of the notion of feedback, which began to rise into public awareness after World War II under Norbert Wiener's rubric “cybernetics,” Korzybski leaped on it as “a turning leaf in the history of human evolution and socio-cultural adjustment.” But it took a long time after Korzybski's death in 1950 before William T. Powers' 1973 book *Behavior: The Control of Perception* actually showed how negative feedback control, long touted by cyberneticists, might function as the core for an exact and overarching scientific theory for psychology.

Powers is not just a theorist—as an engineer he had intimate contact with the ‘guts’ of actual mechanical servomechanisms. He's had lots of experience with human servomechanisms too. He and his colleagues have elaborated a detailed research program for psychology, called Perceptual Control Theory (PCT), which emphasizes human autonomy, a phenomenological perspective, and the rigorous modeling of behavior. Their program has already begun to get carried out, although acceptance by the larger social/behavioral science community has been slow going indeed, since much of modern (2010) behavioral/social ‘science’ still operates under the burden of the outdated but still pervasive stimulus-response, linear cause and effect, paradigm. I am convinced that PCT is at the forefront of a major and needed paradigm shift in the human sciences, part of the non-aristotelian socio-cultural-scientific revision that Korzybski long hoped to foment.

This book of correspondence between Powers and his close colleague, the late Philip J. Runkel, will give the interested reader an irreplaceable inside view (and a very human one) of the developing work-in-progress in PCT over the last several decades and into the new millennium. It seems well nigh certain that Korzybski would have felt delighted to see the substantial standing and growing structure that Powers and Runkel, two early and serious students of his work (see the Name Index), have produced on such korzybskian foundations.

Bruce I. Kodish, Ph.D. (Applied Epistemology)
Author of *Korzybski: A Biography*

For readers possessing prior knowledge of Perceptual Control Theory (PCT), *Dialogue Concerning the Two Chief Approaches to a Science of Life* will provide a fascinating and intimate back story and commentary to PCT as developed by Bill Powers and encountered and understood by Phil Runkel.

Those with little or no knowledge of PCT will find the book to be an enticing, if sometimes challenging, introduction to this revolutionary way of making sense of behavior. Editor Dag Forssell's preface, the correspondence between Powers and Runkel, and a collection of other writings by PCT pioneers provide a rich and often colloquial context in which to encounter and reflect on a perspective that turns behavioral science upside down and inside out.

Sometime in the future, mainstream behavioral scientists will understand behavior as the control of perception. For them, this book will document this paradigm shift's initial diffusion to and further development by a small group of early adopters. It will also serve as a reminder of how difficult and slow such a process can be, even when the availability of personal computers made it possible to simulate in detail the hierarchical perceptual control systems that are at the heart of this new understanding of behavior.

PCT has provided a foundation that has offered me new insights into my interests in evolution, human nature, learning, and education. This book documents the building of this foundation that has broad application to all other disciplines and sub-disciplines in the life sciences.

Gary A. Cziko, PhD. (Psychology)
Professor Emeritus of Educational Psychology
University of Illinois at Urbana-Champaign
Author of *Without Miracles* and *The Things We Do*

At first glance I could not see a reason for this book, but after reading it I realized that it is a brilliant way to guide the reader into an understanding of what Perceptual Control Theory is, and why it is necessary and useful. Next to having one's own prolonged exchange with Powers, one can hardly find a better way to learn PCT and its ramifications than to see how Runkel's understanding develops through thoughtful questioning and equally thoughtful answers. This book should be on the reading list of every student of PCT.

Martin Taylor, Ph.D., P.Eng. (Engineering Physics
and Experimental Psychology perception)
Scientist Emeritus, Defence Research
and Development Canada – Toronto

Dialogue resonates with us. We have benefited so much from the study and application of PCT.

One benefit, most significant to us at a very personal level, flows from the basic PCT realization that behavior is the control of perception. Action is only a part of that process, and a rather automatic one at that. More significant is intent, and PCT makes it clear that you cannot tell what a person is doing (intent) by watching what the person is doing (action).

Over time, as we studied and internalized PCT, we understood that actions, what we sense and observe, are *not* the whole story. As each of us interprets and attaches meaning to the actions of the other, that meaning originates in each of us and does not necessarily yield a valid understanding of the other person's intent. So we have learned to ask what the other intended, was trying to achieve—not to criticize action. This has made us slow to blame or to anger. Of course, we may start by sharing how we felt about or experienced the actions of the other, but then we shift the conversation to a dialogue about intent. That habit has led us to a better understanding and acceptance of each other. Our marriage was good before we discovered PCT. It is even better now!

We also learned from PCT what we can't do. We can't make another person do what we want. In fact, if we try, if we coerce, people resist more often than not. So we proceed invitationally, asking each other and others if they would like to do such and such, participate in this or another project. We are not offended if our invitations are not accepted. Live and let live!

We treasure this dialogue of letters because it reminds us of Bill's and Phil's lively and informative conversations at the annual Control System Group meetings. It has been a singular privilege to know two such exceptional gentlemen.

Lloyd Klinedinst, Ph.D. (Middle English)
Barbara Bollmann, M.A. (Counseling)

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As an engineer, I have always considered psychology to be an unreliable fuzzy science. PCT is different. It is a well structured approach that's easy to understand and just makes sense.

I work with very large computer systems. Users come to me with their problems and wish lists. With a very basic understanding of PCT, I learned not to focus on "What are you trying to do?" and get caught up in the user's proposal for changes to the system, but instead get to "What are you trying to achieve?", which meant encouraging the user to spell out the desired end result. That has worked for me as it made it easier for me to suggest alternative, much easier solutions to my users' problems.

Björn Leffler, M.Sc. (Computer Science)
Senior Software Developer
Animal Logic Studios, Australia

In this volume, Bill Powers shows Phil Runkel the way from experimental psychology towards a psychology where perceptions are controlled through negative feedback. I found it most interesting to read Phil Runkel's questions and comments along with Bill Powers' convincing answers. I imagine that Phil Runkel experienced Bill Powers' explanations in much the same way as I have experienced Bill Powers' many books and essays. Phil Runkel's *People as Living Things—The Psychology of Perceptual Control* is further evidence of the way Bill Powers explains things and events.

Bill Powers has meant more to me than any other person as I have developed my understanding of people and human behavior.

Bjørn Simonsen
Former Professor of Chemistry
Bergen University College, Norway