CHAPTER 1

CONSTRUCTIVISM

A Brief Introduction

What are the laws or principles of change? How and why do *we* change? What can we do to anticipate and direct change? Such questions are fundamental to all teaching, and they are central to the practice of psychotherapy. They are also at the heart of this book. I have sought to understand human change processes all of my life. I am, of course, still seeking and learning, but I also appreciate the significance of recent developments in our ways of thinking about human experience and adaptation. Relative to what was known only 10 or 20 years ago, our scientific understanding of human development has made substantial leaps. Some of these advances have been humbling and others are truly inspiring.

HUMAN CHANGE PROCESSES

Three questions are fundamental to the profession of psychotherapy: Can humans change? Can people help one another change? Are some forms of helping better than others? The questions seem simple. Their answers are more complicated than one might expect, and good answers lead to further questions.

Can we change? Yes, but it is rarely easy, simple, or pleasant. We are, in fact, capable of more change than most scientists and therapists had imagined. We are an incredibly resilient and creative life form, and we are capable of surviving and adapting to circumstances that stretch the imagination. But human change is more complex and difficult than many spe-

cialists had once thought. We do not change our lives as easily as we change our clothes. We cannot simply choose a new personality or a new sense of ourselves and implement such a change in a few weeks of casual practice. Changing our habitual patterns of being is a formidable challenge, and it is now clear that there are good reasons for this. This does not mean that we are incapable of such changes. Nor does it rule out sudden leaps in our ways of being. It does mean, however, that we are wise to appreciate the self-protective conservatism of change processes. We resist change even more passionately than we seek it. We are sometimes desperate in our quests for different ways of being, yet we gravitate toward old and familiar patterns. Change is a risky and sometimes lonely adventure.

Can we help one another change? Most definitely. In fact, most change takes place in contexts of human relatedness. We are fundamentally relational beings. Our relationships with one another are crucial to our survival and adaptation. We live in and from the bonds of belonging. A child's development is influenced by his or her parents. Parents are also changed by their children. We are changed, for better and for worse, by our families and friends, our teachers and students. We are changed by the drunk driver and the good Samaritan. We affect one another, and we create intricate webs of influence that merit our reflection and respect. Some relationships entrap us in patterns that prevent or complicate our change. And some relationships provide us with precious opportunities to develop.

Are some forms of helping more effective than others? Yes, and we now know some of their characteristics. Our understanding of human change processes has harvested valuable lessons from clinical practice, careful scientific research, and studies of the wisdom embedded in multicultural spiritual traditions. More effective forms of helping tend to be more sensitive to our personal needs, our developmental history, our styles of learning, our cycles of experiencing, the changing circumstances of our lives, and our relationships, communities, and cultures. Effective forms of helping are also more creative, more affirming, and more likely to respect our capacities for development. They reflect a perspective that has gained increasing visibility. That perspective is called "constructivism." Constructivism offers considerable promise in guiding our efforts to serve the lives and development of other human beings professionally. This book is an attempt to convey that promise in as clear and practical a manner as possible.

My goal in this book is to translate a multidisciplinary understanding of human development into guidelines for the practice of psychotherapy. Although I offer resources and suggestions for further reading, I do not survey or summarize the existing literature. Indeed, I have struggled to resist temptations to be encyclopedic. The "big picture" is a seductive one for me, but it also exacts a price that few readers are willing to pay. Fortunately, there are valuable research reviews and extensive literature surveys available.[1] My focus here is on weaving a coherent fabric of conceptualization

for practice. An inherent theme in my work as a weaver is one of integration. The major conceptual traditions in psychotherapy—behavioral, biological, cognitive, existential–humanistic, psychodynamic, systems, and transpersonal—have each contributed valuable insights and exercises to what is called "constructive" psychotherapy. Constructivism also embraces contributions from anthropology, biological science, cognitive neuroscience, philosophy, sociology, and a range of spiritual wisdom traditions. It is an approach that bridges and balances many calcified contrasts, particularly those between mind and body, head and heart, self and society, and science and spirituality. Constructivism offers a positive and promising way of conceptualizing human experience as a complex, lifelong experiment. We are neither prisoners of our pasts nor free to choose any future. We are, however, vigilant protectors of what we hold close to our hearts—our view of reality, our sense of ourselves, our values, and our sense of control. When we are asked to change these, as we often are in our development, the challenge to change may feel overwhelming. I believe that constructivism offers a promising choice in ways of thinking about and dealing with human change processes. It is, in my opinion, the best conceptual system we now have that integrates multidisciplinary knowledge about human development.

THE ESSENCE OF CONSTRUCTIVISM

Constructivism is expressed in a range of perspectives on human experiencing. The range is so wide and their legacy so deep that describing them could easily require many volumes. Here, I only touch on major themes and influences. More elaborate technical information on the history and contemporary voice of constructivism is presented in Appendix A. For information on journals, conferences, and training, the Society for Constructivism in the Human Sciences is a valuable resource.[2]

Constructivism is neither new nor narrow. In Asian philosophy, it was anticipated in the teachings of Lao Tzu (6th century BC) and Buddha (560–477 BC). The Tao (literally, the "path" or "way") outlines an ancient wisdom tradition that recognizes the fluidity of life and its essential embrace of seemingly opposite elements (the "yin" and "yang"). Buddhism also acknowledges the changing (impermanent) nature of our lives, particularly our inner lives. Prince Siddhartha (more commonly called "the" Buddha) realized that we play a large role in the construction of our worlds by means of our thoughts, fantasies, and all manner of imaginings. Constructivism earned its name from its emphasis on acts of construction. The verb "to construct" means to organize or create order. As we shall see, order is essential to perception and fundamental to meaning. But in English, the word "structure" tends to have connotations of a static thing, such as a

building, that does not change. The sense of permanence here is contrasted with the dynamic emphasis of ongoing reorganization emphasized by constructivism.

In Western Culture core aspects of constructivism were expressed by the presocratic philosopher Heraclitus (540–475 BC). He argued that everything that is must also be becoming. Centuries later, this would be called process philosophy. It was Heraclitus who immortalized the statement that one cannot step into the same river twice. It is not just the water that is moving or the river that is changing. The person is also changed by the experience. We are neither spectators nor pawns in our lives. As Cris Williamson has put it in musical verse, we are both the changer and the changed.[3] This is a valuable insight with practical clinical implications. No matter how small our voice may seem, it is part of the cosmic choir. Every life and every act within a life makes a difference.

The three writers most often credited as the formal originators of constructivism are Vico, Kant, and Vaihinger. Recent studies suggest that Schopenhauer may also deserve some of that credit. Giambattista Vico (1668–1744) of Naples wrote poetically on philosophy, history, and the human construction of human experience. Vico's contributions have become the focus of entire fields of scholarship.[4] Immanuel Kant (1724–1804) portrayed the mind as an active organ of self-organization. Kant argued that rather than being a passive recipient of experience, we construct our knowledge by means of categories. We perceive and feel and think in channels, and there may be much that exists beyond the channels to which we are attuned. Arthur Schopenhauer (1788–1860) respected these insights of Kant, and he went on to elaborate a theory of will and representation that is still being studied by modern scholars.[5] Hans Vaihinger (1852–1933) was also inspired by Kant's work, particularly the part that emphasized our human tendency to carry on our activities "as if" some things were the case. Vaihinger's *Philosophy of As If* explored the functional values of mental fictions.[6] His work would influence later constructivists such as Alfred Adler and George Kelly.

Major 20th-century constructivists included Alfred Adler, Albert Bandura, Gregory Bateson, Jerome Bruner, James Bugental, Mary Whiton Caulkins, Viktor Frankl, Kenneth Gergen, Vittorio Guidano, Hermann Haken, Sandra Harding, Friedrich Hayek, William James, Evelinn Fox Keller, George Kelly, Karin Knorr-Cetina, Humberto Maturana, Jean Piaget, Joseph Rychlak, Esther Thelen, Francisco Varela, and Paul Watzlawick. Fortunately, some of these pioneers are still constructing. Across the diversity of their interests and emphases, however, there are shared themes. I believe these themes capture the organic essence of constructivism.

The five basic themes of constructivism are (1) active agency, (2) order, (3) self, (4) social–symbolic relatedness, and (5) lifespan development. Let me state them succinctly and then briefly elaborate. Constructivism maintains the following:

1. Human experiencing involves continuous *active agency.*
2. Much human activity is devoted to *ordering processes*—the organizational patterning of experience; these ordering processes are fundamentally emotional, tacit, and categorical (they depend on contrasts), and they are the essence of meaning making.
3. The organization of personal activity is fundamentally self-referent or recursive, making the body a fulcrum of experiencing and encouraging a deep phenomenological sense of *selfhood* or *personal identity.*
4. Self-organizing capacities and creations of meaning are strongly influenced by *social–symbolic processes*; persons exist in living webs of relationships, many of which are mediated by language and symbol systems.
5. Each human life reflects principles of *dynamic dialectical development*; complex flows among essential tensions (contrasts) are reflected in patterns and cycles of experiencing that can lead to episodes of disorder (disorganization) and, under some circumstances, the reorganization (transformation) of core patterns of activity, including meaning making and both self- and social relationships.

Together, then, these themes suggest that a constructive view of human experience is one that emphasizes *meaningful action by a developing self in relationship*. The five themes are expressed very tersely here, of course. They are reviewed again in Chapter 2, in which the focus is on clinical practice. For the moment, I elaborate only briefly.

Activity

Like existential philosophy, constructivism says that we humans are active participants in our own lives. We choose, and our choices make important differences in our lives and in the lives of all with whom we are connected. We are often reactive, to be sure. Constructivism does not deny our capacity for unreflective reflex and conditioning. But our efforts to survive are also fundamentally proactive. We anticipate. We lean into life. We fall forward into our being. And just like the skydiver in free fall or the wind surfer, sailor, or skier, our posture in that process influences its form and direction. We are moving in the midst of forces far greater than ourselves, yet we have voice and choice within those forces. We may not be able to command the stars or the winds, but we can learn to read them better and to set our sails and our actions in ways that serve our movement. And, lest all of this sound a bit ambitious or audacious, we can also learn the sacred arts of stillness and acceptance in the never-ending dance of effort and surrender.

The central point of this first theme is that humans are not passive pawns in the game of life. We are agents that act on and in the world: hence, the emphasis on self-efficacy (Bandura) and acts of knowing

(Bruner). Freud and Skinner, who were both determinists, argued that humans are no more than machines being driven by internal (psychic) or external (environmental) forces. In constructivism, the individual is an active agent in the process of experiencing. Paying attention is an act of agency (James). Like the processes of "natural selection" that contributed to our biological evolution, we are each engaged in acts of selection at every moment (Bateson).

Order

The second principle of constructivism acknowledges that we need order. We organize our worlds and we respond to the order within them (Hayek). We develop patterns and create meanings (Haken, Frankl), and we do most of this without being aware of what we are doing. We are creatures of habit, to be sure, and well might we wonder whether it is we who possess our habits or our habits that possess us. Almost as quickly as we learn a new skill, we become mindless of it. It goes underground, so to speak, and enters into the root structure of our life patterning. And this applies not only to our physical actions but also to our patterns of thinking and feeling. This explains a large part of the difficulty in our change projects. We long to change, yet there is a powerful momentum to the ways we have come to be. This is why the most important changes in our lives may require ruptures and repairs to the very fabric of our lives.

Our emotions develop as powerful biological forces in our self-organization (Guidano). Emotions serve critical roles in directing our attention, shaping our perceptions, organizing our memory, and motivating our active engagement with the learning that life relentlessly requires of us. We feel our way. Constructivism views emotions as central to human experiencing. Feeling is not bad or dangerous or unhealthy. On the contrary, not feeling or fighting against what we are feeling is a more formidable threat to our health and well-being. Our relationships with our feelings are often at least as important as the feelings themselves. This point has important implications for our understanding of what it means to be human, and what we can do in constructive psychotherapy (Bugental).

Self

We organize our worlds by first organizing ourselves (Piaget). Biological self-regulation emerges from bodily experiences. Early in life we struggle to separate ourselves from our caregivers—to individuate into a coherent and differentiated identity. The body and its boundaries become an axis for the organization of experience (Bateson). Like our relationships with our emotions, our relationships with our bodies may become complicated and painful. So, too, at more abstract levels of self-relationship. All psychotherapy

is, in a sense, a psychotherapy of the self (Guidano)—an act of assistance in self-organization.

The uniqueness of each self-organizing life is emphasized in constructivism. Terms emphasize individual being (Adler), recursive self-construction (Maturana, Varela), and the personal nature of the order created (Kelly). The unique perspective of the experiencing agent is honored. Moreover, what people experience is integrally related to how they have learned to create an orderly reference point—a metaphorical center. The "who" that is experiencing is one of the more elusive phenomena in consciousness. The self is a process, not an entity (Caulkins, James). And the self is not separated or isolated. Another way to say this might be that the self is a fluid coherence of perspective from which we experience. But the sense of self emerges and changes primarily in relationship to others.

Social–Symbolic Relatedness

Much of the order that we seek and the meaning that we create emerges out of what we feel with one another. We are born in relationship, and it is in relationship that we most extensively live and learn (Bandura). Our languages lack words to convey adequately our social and symbolic embeddedness. Throughout psychology and philosophy, there are creative gestures at capturing the elusive ever-presence of "alterity," "intersubjectivity," and "interbeing."[7] A simplifying analogy would be a fish trying to describe water. Plato was making much the same point in his allegory of the cave. The forms that make up our personal experience are themselves shaped by forces we can hardly claim to imagine, let alone know. The words that you are now reading are more than symbols on a page. What they invoke in your experience depends on a vast network of relationships (Gergen, Rychlak, Watzlawick). Some words and concepts will be more familiar than others. The less familiar ones may give you occasional pause, and you may unconsciously interpret them in terms of what is more familiar. What is familiar and comfortable depends of your personal history, the vocabulary and concepts closest to you, and so on. These are, in turn, reflections of your vast connections with people and ideas (past and present).

The active organization of a self takes place not only "in" a body but also simultaneously "with" and "through" social bonds and systems of symbols (Harding, Keller, Knorr-Cetina). We humans are fundamentally social creatures, and there is no meaningful way of separating our sociality from our symbolic capacities. We may talk about living "in" our heads because we spend so much time thinking, but the form and structure of our thinking is itself relational. One of our favorite ways of organizing our own experience and relating to one another is through stories (Bruner). In other words, a large part of our meaning making is experienced and expressed as narrative (story): our stories, our selves. Stories may teach and sooth. They

can also challenge and inspire. Much of what I share in this book is in story form.

Lifespan Development

In its emphasis on the lifelong dynamics of our development, constructivism speaks to the cycles and spirals of experiencing. Like Sisyphus in Greek mythology, we live our lives seeking to achieve a balance that can never quite be perfectly mastered. Some of us get nearer to that balance more often than others, but everyone falls occasionally and eventually. Small falls teach us important lessons about paying attention, learning what is risky, holding on, and recovering control. Big falls overwhelm us. If we are lucky, we hit something soft and are caught in the loving embrace of family and friends. But even in the best of circumstances some falls may feel endless and fatal—what existentialists and mystics have called "the void" and "the dark night of the soul." Whatever the precipitating event, in these there is a felt loss of everything—of meaning, of life order, of control, of identity, and of hope. This kind of hard fall may feel like an agonizing death—a loss not only of all balance but also of wholeness and health. It is, in fact, a metaphorical form of death and a disintegration (a literal loss of integration) of the active life order that preceded it. Often experienced as a living hell, it is something that career psychotherapists witness more often than they might wish.

Constructivism emphasizes developmental processes (Piaget, Thelen). Sometimes we develop via "baby steps" of gradual change. Other times, life demands a large leap. Changes outside of us and inside us may suddenly emerge. When these changes are large, we may undergo a personal revolution. In the face of overwhelming challenges, it is common to do two seemingly opposite things: rigidify and disorganize. We resist the challenge to change. At the same time, however, if the challenge persists or increases, we show signs of variability. Our usual patterns of order begin to disintegrate. This is particularly evident in cycles of energy, moods, sleep, attention, appetite, and digestion. Our formerly "normal" life begins to deviate from its own norms. Such variability and disorganization—literal "disorder"—are natural expressions of a life that is trying to reorganize itself. The shift from an old order to a new one is seldom easy or painless. But it can be "naturalized" and facilitated by a therapist who appreciates the developmental dynamics of self-organizing systems.

A constructive approach to psychotherapy does not deny the struggles of life or the pain of losing meaning or balance. It does not promise quick and easy solutions to tragedies and lifelong struggles. What constructive therapy does offer is compassion and hope borne of an understanding and trust in the powerful wisdom of life processes reorganizing themselves. It offers practical suggestions for coping and incorporates techniques that

have been extensively evaluated. More importantly, however, constructive therapy offers an authentic human relationship in which clients are encouraged to experience in their own way, to explore what has happened and is happening in their lives, and to experiment with possibilities for living more fully. Beyond the safety, nurturance, and wisdom offered in the helping relationship, constructivism offers a widely embracing conceptualization of life and development. Patterns of distress and dysfunction are not viewed as diseases. They may be excruciatingly painful and persistent, of course, but they are not seen as something that is biologically or morally "wrong" with the person. There are, of course, biological structures and processes that shape any individual's experiencing. Neuroscientists pursuing the constructivist tradition are among those at the leading edge of our rapidly expanding knowledge of how bodies and brains organize and reorganize themselves.[8] Their findings emphasize the five themes—that is, that biochemically and neurologically, humans are ever-active organizers whose biological patternings develop and change in ways that reflect an extensive network of dynamic relationships. When the many factors influencing any given life moment are taken into account (genetic constraints and activations, cultural and developmental history, current health, skills development, and life circumstances), each human being can be seen as doing and feeling what is "natural" for him or her. They are still responsible for their actions, and an important part of that responsibility is engagement in future development.

Constructive therapy affirms and encourages a hopeful engagement with the mysteries and complexities of each developing life and the connectedness of all lives. It addresses the painful limitations of some personal beliefs, the gain and loss of meanings as life unfolds, and the chaos that often accompanies major life changes. What happens when the order of a life is challenged? What happens when a personal paradigm no longer holds the world together? What are the structures and processes of personal revolutions? On the practical level, what can both client and therapist do to facilitate the kinds of changes that best serve quality of life and wise paths of development? My responses to these questions form the heart of this book.

PRINCIPLES AND PERSONAL REVOLUTIONS

Before turning to the practical aspects of constructive psychotherapy, the complexity of human change processes merits appreciation. Human development rarely follows a simple, linear path. It is more often a zigzag course, with frequent sticking points, repetitive circles, occasional regressions, and a few startling leaps and falls. The particulars may seem dizzying in their diversity, yet there are patterns. Patterns suggest principles. Understanding the principles of human development is essential to the task of

psychotherapy. The quest for such principles has been an intense one. Theories of personality and psychopathology have proliferated. Such theories have tried to describe the order and disorder in human lives. With few exceptions, the common assumption has been that order is healthy, normal, and desirable. Disorder has been used as a synonym for disease and dysfunction. The implicit goal of psychotherapy has been to help the disordered individual return to order. But our conceptions of order and disorder are now in the midst of a revolution. Chaos theory, dynamic systems theory, and the sciences of complexity have encouraged new ways of thinking about life and its challenges.[9] Without belaboring the technicalities, I amplify and illustrate that encouragement in this book.

What happens when old ways of being fail to satisfy the demands of new challenges in life? In the harshest of scenarios, that being dies. Fortunately, most human failures do not result in death. We are a flexible life form. We find ways to continue. We try something different, explore alternatives, turn the challenges into opportunities. When circumstances permit, our determination and flexibility allow us to find a better way of being. Our success is more than a matter of our cleverness, however. Our viability reflects the fundamental processes that have characterized the development of life on this planet. Biological evolution has been demonstrating this clever persistence and flexibility for a long time.[10] Change and exchange are the essence of life as we know it. This is one of the central emphases of constructivism. Order is not the opposite of disorder. They are complementary processes. Relative stabilities can be described, but we should be careful not to think of stability or structure as the opposite of process. Consider the apparently stable structure of our bodies. The human body recomposes itself every 7 years. The organic materials that make up our bodies are regularly recycled (at different rates for different tissues). Because the new material (protein, mineral, etc.) is introduced slowly and takes up the positions and functions of the old material, we experience a continuity of structure despite the high rate of exchange via processes.

This same kind of continuity and change applies to our psychological lives. There are processes that are crucial to our psychological existence. Structured continuities are often described in terms of traits, "true" or "real" selves, personality, and character types. Psychology is full of typologies. Constructivism is full of challenges that are not simply protests against typologies.

Constructivism suggests that it is typical for humans to typify. As Kant put it, we are categorical creatures. Schopenhauer wryly noted that there are two kinds of people in the world: those who believe that there are two kinds of people in the world, and those who do not. This observation deserves more than casual reflection. Our penchant for dichotomy and simplification continues to plague our conceptualizations of human development.[11] Problems arise most often when our categories are inadequate to

our experiencing. This is when we most need a revolution in our thinking and being. Indeed, as I demonstrate, periods of disorganization and fluctuations in our experiencing are a natural and necessary part of development. Such episodes may not be pleasant, but they often reflect promise and possibility in our processes of being.

I can speak to the phenomena and phenomenology of personal revolutions at several levels. I have been privileged to participate in quite a few revolutions. Some have been with my clients. Others have been with scientific researchers. And still others have been with psychotherapists themselves. Revolutions are often revelations to those involved. I have experienced several myself, personally and professionally. In my quest to understand and help people who are changing, I have changed myself. I am not the same person I was when I began practicing psychotherapy more than 30 years ago. I have been deeply touched by the many lives in which I have participated. I have wept and laughed and yelled—sometimes with clients, often in my private reflections on their lives.

The demands of being a therapist are formidable. Psychotherapy is a difficult profession. We practice a privilege, and we often pay a high personal price. One does not serve such an intimate and responsible role without being changed in the process. One does not bear close witness to the human heart without getting bloody. Broken hearts and lost souls fill our appointment books. If we let them (and I believe we should), they do get to us. They touch the core of our being. Sometimes it is too much to bear. Dozens of lives simultaneously circle around our counsel, each placing its own demands on our wisdom and strength. Even the wise and the strong have their needs and their follies. Therapists need therapy, too. I did not appreciate that fact when I was a beginning therapist. I now emphasize it to my students and colleagues. Clients are not the only ones who change. We therapists are changed by what we do. We also teach in large part by learning. We teach our clients to risk aliveness by taking such risks with them. We teach them to change by being open to change ourselves.

I have learned valuable lessons from my clients. I have also learned from being a client myself. I have been comforted, counseled, and encouraged by colleagues. And I have served as a therapist for many therapists. It has been an honor to serve those who are serving others. My clients, therapists and otherwise, continue to teach me what we all need to learn—that life can be brutally hard and simply beautiful, that we are stronger than we know (or might wish), and that the human heart shines most brilliantly when it is engaged and shared.

In these pages, I share much of who I am and how I try to be in my role as a therapist. I relate intimate stories. Some tell of people struggling to endure and develop in the face of life's relentless challenges. Other stories illustrate the inevitable surprises of therapeutic work. I describe some of my mistakes and discoveries—these two being often related. My life has been

enriched by the privilege of practicing and teaching psychotherapy. Its demands are formidable. It is likely to be even more demanding—and more important—in the future. Life is complex, and it is becoming more complex all the time. Being a psychotherapist is an exponentially complex life path. It is a principled attempt to serve the development of lives in process. Drawing upon wisdom and knowledge that embrace a diversity of disciplines and traditions, constructivism offers an integrative approach to professional helping. Let us now turn to what that means for psychotherapy.

NOTES

1. Anderson (1990, 1995, 1997, 2003); Brower and Nurius (1993); Carlsen (1988); Caro (1993, 1994, 1997); Franklin and Nurius (1998); Gergen (1994, 1999); Goldberger, Tarule, Clinchy, and Belenky (1996); Hoffman (1998); Hoyt (1998); Mahoney (1991, 1995a, 1995b, 2000a); Martin (1994); Neimeyer (1995b); Neimeyer and Mahoney (1995); Neimeyer and Raskin (2000); Polkinghorne (1988); Raskin and Bridges (2002); Ronen (1997, 1999, 2001); Rosen and Kuehlwein (1996); Sexton and Griffin (1997); Walker, Costigan, Viney, and Warren (1996).
2. Constructivism, Box 311280, Denton, TX 76203; *www.constructivism123.com*.
3. Williamson (1975).
4. Berlin (1976); Mancuso (2001); Mazzotta (1999); Pompa (1975); Verene (1981).
5. Magee (1983, 1997); Schopenhauer (1932).
6. Vaihinger (1911/1924).
7. Anderson (1997); Arciero (1999); Bretherton (1995); Caputi (1988); Caputo (1987); Cushman (1995); Foucault (1965, 1970); Gergen (1991, 1994); Hargens (2001); Hoffman (1998); Palmer (1969); Sampson (1993); Stern (1985); Thompson (2001); Varela and Shear (1999); Velmans (2000).
8. Cytowic (1998); Damasio (1995, 1999); Freeman (1995); Gallese (1995); Núñez and Freeman (1999).
9. Arciero, Gaetano, Maselli, and Gentili (2003); Beck and Cowan (1996); Chamberlain and Bütz (1998); Combs (1996); Gleick (1987); Haken (1996); Hayek (1964); Kauffman (1993, 1995); Kelso (1995); Krippner (1994); Mahoney (1991); Mahoney and Marquis (2002); Mahoney and Moes (1997); Masterpasqua and Perna (1997); Pagels (1988); Palombo (2000); Pattee (1973); Prigogine (1980); Prigogine and Stengers (1984); Robertson and Combs (1995); Schiepek, Eckert, and Weihrauch (2003); Weimer (1982, 1987); Wilber (1999).
10. Capra (1996); Margulis (1998); Margulis and Sagan (1995); Thompson (1996).
11. Bateson and Martin (2000); Goldberger et al. (1996); Keller (1983, 1985); Koestler (1978); Lowen (1982); Oyama (2000); Smith (1988); Wilber (1998).

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