Complexity, Conflict Resolution, and How the Mind Works

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Western thought has changed considerably over the centuries. As assumptions about knowledge shifts, fields of practice are affected. This article reviews critical epistemological developments and the implications for the field of ADR.

The next two decades will present challenges to Western thought unseen in almost four hundred years. Not since the seventeenth century, when such monumental figures as Newton and Descartes laid the foundations for the next four centuries of modern thinking, has a period of exploration and scientific discovery afforded more insight into what it is to be human and what it means to communicate and be in conflict. This new work, from such diverse fields as neuroscience, microbiology, physics, cognitive psychology, and linguistics, will challenge the central tenets of mediation and conflict resolution—among them impartiality, neutrality, and fairness—as well as the underlying models of mediation that we use for training and that we have built into our statutes and court rules.

In this short article, we hope to introduce you to a rushing torrent of exploration and begin a process where you may question your beliefs about the nature of reality in ways you have never questioned before. To do so, we begin by surfacing the conventional assumptions that govern most, if not all, of our thinking about reality and, on the most fundamental level, how things work. From there, we venture into a brief discussion about the workings of the human mind and the emerging theory of complex adaptive systems, both of which, we believe, will seriously challenge and, eventually, revolutionize these very assumptions. We conclude by delineating the raw and beginning theoretical implications for our field of conflict resolution.

The Sweep of History

If we look back through the lens of four centuries of post-Enlightenment progress, we conclude that medieval thinking seems strange. For instance, the earth was a flat, motionless platform at the center of the universe. The health of the human body was governed by the relative balance of the four cardinal humors of sanguine (blood), phlegm, melancholy, and choler. When a ball was thrown, no matter how hard, it would eventually come to a stop. All of this folk wisdom came from direct human observation and lived experience, which made perfect sense for hundreds of generations.

Those beliefs, and many others, were to be overthrown during the Enlightenment. For instance, in the late fifteenth century, Copernicus, and about one hundred years later Galileo, turned all of celestial mechanics upside down with their theory that the sun was the stationary sphere, with the Earth and other planets in orbit around it. Analysis of the human body led to the knowledge that the heart is a pump, that the stomach and intestines are a chemical processing system for delivering nutrients to the rest of the body, and that the nervous system connects the brain to the rest of the body. Finally, Newton theorized that a body placed in motion would stay in motion unless acted on by other forces.

Within the space of a few generations, Western thinking was revolutionized. From where we stand today, it is difficult to understand the source of great resistance to these new perspectives. How could they have believed differently? Conversely, it was these new ideas that seemed foolish and unbelievable when compared to the common sense of lived experience.

In retrospect, the seventeenth and eighteenth centuries were an amazing time. Newton, Descartes, Bacon, Leibniz, Kant, and others created what became the major disciplines of study that still control most thinking into the twenty-first century. Most of the vast bounty of discoveries arising in the industrial and scientific revolutions that we now take for granted had their seeds planted in the sixteenth century, notably the principles of objectivism, reductionism, determinism, and linearity.

The principle of objectivism arises from the mind-body dualism espoused by Descartes, which allows the assumption that we can observe, measure, and reason about ourselves and the world around us in a way that is completely separate and outside of what we measure and observe. This leads naturally to the belief that we are capable of coming to objective, observer-independent conclusions.

Reductionism is the concept that analysis of the parts elicits truth about the whole. Breaking things down into their parts is the way to learn

about systems, and the more complicated systems become the further they must be broken into constituent pieces to be understood. Conversely, complicated things can be built from simpler parts. Knowledge of the system resides within the knowledge of its parts.

The idea of determinism is that every effect has a cause. Combined with objectivism and reductionism, it should always be possible to determine the cause of every phenomenon by tearing it apart and analyzing those pieces in an objective and observer-independent manner. Once the causes have been determined, it becomes possible to reverse the process and engineer for intended results. If you do *x*, you will always get *y*. If you do *a*, *b*, and *c*, you will always get *d*. Finally, there is a direct and linear relationship between inputs and outputs. Small inputs produce small outputs and large inputs produce large outputs. If linearity is not present, we assume that the system is not elemental but a complicated combination of elemental systems instead.

These assumptions are the core of what has become known as the scientific method, and we should never underappreciate their potency (Kuhn, 1996). These beliefs, however, go far beyond scientific investigation. They are now so deeply embedded in our cultural and communal psyche that we rarely, if ever, think of them.

Recent Developments

Discoveries over the last two or three decades in physics, microbiology, the neurosciences, cognitive psychology, and linguistics have profound implications for our understanding of how we, as humans, create reality from our sensory experiences and, from that, our view of human interaction and conflict. These discoveries bring into question the linear, reductionist, objectivist, and deterministic manner in which we examine much of the world around us. To understand these incredible changes, we briefly explore the work in the neurosciences, cognitive psychology, and linguistics and what it brings to our understanding about how the mind functions. We then move on to the nascent field of complex adaptive systems.

The Workings of the Human Mind

In this section, we introduce four ideas about how the human mind works. Lakoff and Johnson (1999), in their work on cognitive psychology and linguistics, advance three main principles: first, the human mind is inherently embodied, and no separate and objective reasoning facility exists; second, thought is primarily unconscious; and third, abstract concepts are

communicated primarily through metaphor. Damasio (1999), in his work in the neurosciences and psychiatry, asserts that humans are feeling beings with thoughts, not thinking beings with feelings.

The Mind Is Inherently Embodied. The human mind/brain is the most complex system in the world. The huge, incredibly intricate network of neurons and the electrical and chemical activity across this network is dynamic and distributed, not fixed and localized. For instance, with color recognition there are no specific neurons that respond to red and others to green. There is no identifiable place in the brain that switches on when presented with one color or another. Further, thinking consists of more than electrical and chemical signals across this neural network. As we perceive, respond, and adapt to the world around us, our mind is constantly making and remaking neural connections. Sensorimotor experiences generate and stimulate neural structures that interact and respond in complex ways with the whole human system (and all its subsystems). In turn, neural connections that are used and reused are strengthened, and connections that aren't used atrophy and dissolve.

This leads to the only possible conclusion: the mind does not function in a representational fashion, nor does thought occur like software running on a standard hardware platform. The metaphor of the mind as computer does not apply. Further, the entire nervous system is the embodiment of all of the lived experiences. The whole sensorimotor experience (motion, touch, seeing, hearing, smelling) co-forms the neural response. The neural response then co-forms the sensorimotor experience. There is no disembodied logic that I can exercise separate from the embedded neural activity of my brain. Universal reason isn't discernible or testable by the embodied human mind.

Thought Is Mostly Unconscious. The vast majority of our thought takes place in our cognitive unconscious and is unavailable to us. We have no direct access to much of our thought processes. For instance, there is signal processing on the retina, at the junction with the optic nerve, as well as the visual centers of the brain. At each step, the number of inputs is reduced. In fact, we know that the optical information arriving in the brain constitutes only a coarse image compared with the output of the retina. Even so, humans consciously experience a seamless, high-resolution image of the visual world around them. To none of this do we have conscious access. All of this signal processing and subsequent construction of the image we perceive takes place without our conscious intervention.

By far, most of our thinking activity goes on outside our awareness or control. Unconscious activity influences the dynamic plasticity of the neural network just as potently as our conscious thinking does. All of this unconscious activity co-forms our reality in uniquely human and individual ways.

Communication About Abstract Concepts Is Largely Metaphorical. Most of us were taught that poets, playwrights, and novelists use metaphors. Metaphors are clever gimmicks and tools, but not implements of substantive discussion or exchange. Serious scientists, conversely, avoid metaphors (we were taught) and are required to describe abstract concepts directly and objectively. Lakoff and Johnson (1999) thoroughly demonstrate that it is virtually impossible to communicate about abstract concepts, whether for a scientist or layperson, without turning to deeply embedded and camouflaged metaphors.

Think about describing time. Using clocks and watches is not sufficient. Although they use moving hands or counting numbers, they only "tell" time; they aren't time itself. In the dominant culture, time is perceived and communicated using two primary metaphors: time as dimension or time as resource Consider three saying that demonstrate the metaphor of time as a dimension: "My, how time flies"; "We are looking toward the future"; "The past is behind us now." In this metaphor, time is either stationary and we move along it, or we are stationary and time is moving by us. Our motion on that dimension works like any other motion: time can go fast or slow. Newton built a calculus for his laws of motion that treats time as a dimension in exactly the same way that those laws handle the three dimensions of physical space. This is clearly a potent and useful metaphor, but it is nonetheless a metaphor.

For the second metaphor, we experience time as a resource or commodity. "I don't have enough time"; "I waste too much time"; "Can you spare a minute?" We often have too little time. Or someone that seems to be constantly doing mundane or unimportant things has too much time on her hands. We use these two metaphors interchangeably, and even simultaneously. We do not experience any dissonance or stress from the fact that these two metaphors for time are incompatible. We hold them both at once and move seamlessly between them depending on the circumstance.

It is exceedingly difficult to construct our own reality and communicate with others without using metaphors. They are extremely powerful tools (to use a metaphor). They are constructed out of our physical experience and our lived reality. It is the things we do and perceive, the physical matter

we manipulate that give us the fuel for creating metaphors. For example, examine the metaphors used in this paragraph: construct, tools, and fuel. Each metaphor arises from physical objects or actions and our relationships to them.

Humans Are Feeling Beings with Thoughts. As the most highly developed creatures on earth, our evolution is an extension of (not separate from) the rest of the animal kingdom. Although we have more advanced reasoning skills and have attained a higher level of consciousness, these abilities were not created out of whole cloth. Each new evolutionary development represents incremental change and new growth built upon more ancient systems. As each of us perceives the world around us, these inputs are processed through numerous, complex, and—most important—older subsystems before reaching the higher brain functions. These subsystems are responsible, for the most part, for creation of emotional responses and monitoring of bodily feelings. Further, this emotional processing takes place in the cognitive unconscious beyond our direct access. As a result, we have no thought without emotion. It is impossible to balance our checkbooks, drive to the store, or deal with our co-workers without an emotional component. We cannot move through our world or conjure up thoughts of past events absent accompanying emotions.

Because we have no thought without emotion, we have no decisions without emotion. The converse seems also to be true: without access to our emotions, we seem to be incapable of making decisions. Numerous case studies demonstrate that individuals who have lost cognitive access to their emotions, whether through disease or injury, are incapable of making even the most minor decisions. Contrary to the Western rationalist model, we cannot make decisions in an emotionless environment.

Human Systems Are Complex Adaptive Systems

Developments over the last twenty-five years have demonstrated a novel way to look at how things work, which differentiates between things that are "complicated" and things that are "complex." We have already discussed the importance of the scientific method, with its reductive, deterministic, objectivist, and linear methods of analysis for the knowledge developed over the past four hundred years. This has led to an understanding of complicated systems: a desktop computer, the Internet, or a 747 jetliner. However, a class of systems called complex adaptive systems have proven

quite resistant to analysis, description, and prediction using these centuries-old tools. Complex adaptive systems—among them the human mind, an ecosystem, or a community of individuals—represent a wholly different set of systems from those that are merely complicated and cannot be understood with traditional analysis.

First, these systems function as an integrated whole that cannot be reduced to subsystems. All the agents participate in subtle ways in the system's response, which is distributed across the system. Second, when complex systems are studied, linear causality can be deduced retrospectively, but it cannot be predicted prospectively. Small inputs do not necessarily mean small outputs, and likewise for large inputs. Third, these systems are not determinative; cause and effect are not uniquely coupled. Finally, and most important, complex adaptive systems can produce truly novel, unexpected responses. Whether in studying the neural network of the brain or in studying the behavior of communities in conflict, we are only at the embryonic beginnings of our understanding of how these systems create new possibilities and outcomes (Cowan, Pines, and Meltzer, 1994).

Impact on Conflict Resolution

How can we be so certain that we are entering a new era of change as great as the Age of Enlightenment? Haven't schools of thought come and gone without lasting impact? Faculty at most universities in seventeenth-century Europe must have felt that way about Francis Bacon and others who argued for the supremacy of empiricism and the scientific method over all other sources of knowledge and wisdom. During the Age of Enlightenment, it was experimental evidence that confirmed the speculation of some philosophers and theorists that profoundly changed the debate and anchored a true revolution in thought. It was no longer simply schools of philosophical thought debating the nature of reality; it became a matter of which hypotheses were confirmed by observation and measurement.

As powerful as linear reductionist analysis has proven to be, it cannot unlock the mystery of complex adaptive systems. We can send men to the moon and return them using these tools. We can lift massive metal machines like the Boeing 747 into the air and fly it for thousands of miles. We can create the Internet with them (but we cannot predict how it will organize itself). Nevertheless, we now know that we can't understand how individuals or communities think, learn, and create reality with these tools alone; nor can we understand how they conflict.

In the sixteenth and seventeenth centuries, observations were made by early physicists, chemists, and astronomers that insisted many old ideas be abandoned. Today the research results of biologists, physicists, neuroscientists, linguists, and others cannot be ignored either. All of this leads to a new universe of questions for conflict resolution.

To see how this may apply in an immediate sense to conflict resolution, let us examine questions that might arise from the "loss" of objectivity. Since objectivity in the sense of most Western thought does not exist, what is the impact on our concept of neutrality and impartiality and all of our efforts to legislate it into our mediation statutes and rules? Contrary to the beliefs of Socrates, there is no essence of chair, the color blue, or beauty. There is also no separately definable and objective standard of fairness, impartiality, or neutrality. Each exists separately within us as we form them in our own reality while we go about life.

When we enter a conflict as mediators, we do not arrive as neutrals; nor can we remain impartial during the mediation. As the conflict moves through the mediation process, we co-form the joint reality with the parties. We do so as feeling beings whose thought processes are largely inaccessible to us and whose reality is largely communicated through metaphors. We exist in a system that is unpredictable, nonlinear, and not subject to the types of analysis with which most of us are familiar.

Even to say that impartiality and objectivity is a standard to which we should each aspire is to invoke a method of thinking and a view of reality that does not exist. There is no there there when it comes to this assertion. To use this thinking is to assume that which is not. To believe that we should seek impartiality and objectivity is to assume that such concepts exist outside of each of us, and that we can seek to examine, understand, and emulate these concepts. It just *ain't* so.

What, then, should we do? First, we must recognize the invalidity of the concepts of neutrality and impartiality and, in their place, recognize that mediators are coparticipants in the conflict who bring their own unspoken and often unrecognized biases to the conflict. Each statement we make, each innocuous question we ask betrays our impartiality. Consider, "Does this proposal fit your budgetary needs?" or "Have you included the real estate taxes in your budget?" These questions and thousands like them would not raise the eyebrow of any competent mediator, but each may promote thinking by a disputant that he or she might not do outside the mediation setting. Each time the mediator speaks, it moves the parties about on the conflict playing field, as the parties and the mediator co-form and co-reform their conflict reality. As mediators, we must also embrace

our own existence in the mediation as feeling beings with thoughts and share that realization with the disputants. Only then can we begin to constructively engage conflict and individuals in conflict, and thus begin the incredible search for new understandings about conflict.

As an extension of this, should we abandon the idea (sometimes asserted) that mediators have a duty or obligation to balance the power between the parties or to level the playing field? Since there is no objective idea of fairness, to what purpose can mediators be acting when they move to help one side achieve a "fair" or "fairer" result? If we mediators are, in fact, instituting our own version of fairness, perhaps we should abandon the effort altogether as a hopeless and hapless cause, or perhaps even destructive effort. On the other hand, maybe we should fully embrace the effort to level the playing field, recognize mediator's biases and human fallibility involved, and do so in a way that is transparent for the disputants. Each of these steps may well involve the disputants in the conflict resolution process in a way that is much different from anything we have seen so far. These are just a few micro-level questions that first arise from examination of the discoveries in the workings of the human mind and complex adaptive systems.

This work, however, poses much broader questions that we must begin to address. For instance, how is the experience of conflict expressed in the network response of the human brain? Can the neurosciences aid us in further understanding how the human mind works during conflict, and, relatedly, how might this further understanding aid us in our approach to human conflict? If we are feeling beings with thoughts, how should we approach our work with people in conflict? How does this affect the models we use for our training?

How would conflict be characterized among disputants using concepts of complex adaptive systems? If we cannot fully understand the conflict by reducing it to its smallest pieces or by applying objectivist, reductionist, and linear thinking, what understandings can we bring to bear on resolving conflict? How do we understand the experience of conflict given that the reality of the conflict is being dynamically co-formed by the disputants both internally and interactively? How does the formula change when a mediator is introduced and the parties and the mediator are jointly co-forming the conflict reality?

What does neutrality mean? What does resolution mean? Can there be a claim to objective truth or fairness in mediation?

How can we train mediators given that representational assumptions about learning have been shown to be wrong? If the idea of teaching

neophyte mediators the "tools" of the trade is now an outdated metaphor, what new metaphors do we put in place?

These questions are intended to stimulate all of us in the field of conflict resolution to step back and rethink many of our closely held assumptions about human reality, human community, and conflict. The modern era worshiped answers. In moving into a new era, we must rediscover a more timeless point of view: true wisdom is in the question, not the answer.

We understand that we set no small agenda at the beginning of this article. To the extent that we have failed in fulfilling this mission, the fault lies with us and our meager abilities to describe what we see unfolding from this work. Although these developments in the study of the human mind and of complex adapting systems date back only about twenty years and the application to the field of management is less than a decade old, there are only now meager efforts to apply this work to social systems in conflict. This article represents the beginning work that will involve us for the next decade, at least. New learning has turned conventional wisdom on its head at times in the past. It is unsettling to find ourselves currently in that same condition, but it is not unprecedented. Individual and collective choices are in order. A revolution in thinking has begun. We have chosen to be explorers of the new world, not defenders of the conventional wisdom.

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