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Attracted to Conflict: Dynamic Foundations of Destructive Social Relations

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Robin R. Vallacher • Peter T. Coleman
Andrzej Nowak • Lan Bui-Wrzosinska • Larry
Liebovitch • Katharina G. Kugler • Andrea Bartoli

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 Springer

Robin R. Vallacher
Department of Psychology
Florida Atlantic University
Boca Raton, Florida
USA

Peter T. Coleman
International Center for Cooperation and
Conflict Resolution
Teachers College
Columbia University
New York
USA

Andrzej Nowak
Department of Psychology
University of Warsaw
Warsaw, Poland

Lan Bui-Wrzosinska
International Center for Complexity and
Conflict
Warsaw School of Social Sciences and
Humanities
Warsaw, Poland

Larry Liebovitch
Division of Mathematics and
Natural Sciences
City University of New York
Queens College
New York
USA

Katharina G. Kugler
Economic and Organisational Psychology
Ludwig-Maximilians-Universitaet Muenchen
Munich, Germany

Andrea Bartoli
School for Conflict Analysis and Resolution
George Mason University
Arlington, Virginia
USA

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Preface

Conflict is ubiquitous in social life, leaving no realm of human interaction untouched. The potential for conflict in social relations has not gone unnoticed in psychology and the social sciences, as evident in the many insightful perspectives that have been advanced regarding this central feature of human nature. Despite this long-standing preoccupation, however, conflict in all its manifestations has yet to be integrated with respect to a unified set of principles. The lack of an agreed-upon theoretical synthesis is hardly surprising. Conflict can characterize social relations as distinct as marriage, parliamentary democracy, and international negotiations. Conflict can be a one-off experience, lasting minutes or even seconds, or it can become a persistent state that unfolds over months, years, or even decades. Conflict can be a constructive experience, promoting innovation and a shared reality, or it can engage the most destructive aspects of human nature, promoting extreme forms of violence, disrupting social progress, and magnifying differences in people's beliefs and values. And conflict can set in motion mechanisms that provide for its resolution or it can represent a self-sustaining process that makes resolution virtually impossible.

The perspective developed in this book was motivated in part by the inability of traditional models of social relations to impose coherence on the multifaceted nature of conflict in human affairs. We approached this task from what may seem like an ironic assumption: that the diversity of conflict can be integrated with respect to a perspective on science that encompasses the far greater diversity of phenomena in the natural world. This perspective—*nonlinear dynamical systems theory*—has proven successful since the 1970s in establishing the invariant processes that underlie seemingly distinct topics in fields such as physics, chemistry, cosmology, and biology. In recent years, the metaphors, principles, and methods of nonlinear dynamical systems have been successfully adapted to the subject matter of human experience, from cognitive and social psychology to economics and political science. This book describes how the dynamical perspective in psychology has been extended to understanding human conflict at different levels of social

reality, from dyadic tensions to interstate warfare, with special emphasis on conflicts that are destructive and seemingly impervious to resolution. Such *intractable conflicts* are relatively rare, but their toll in loss of life, property damage, resource depletion, and draining of social capital qualifies them as among the most consequential of all social problems. And they have proven to be the most difficult to understand, let alone anticipate or resolve.

Considerable progress has been made over the past decade in framing the key features of intractable conflict in terms of formal models informed by nonlinear dynamical systems. These models have been instantiated in computer simulations and tested against archival and empirical data. But this book is intended to be heuristic as well as synthetic, establishing a road map for future research agendas. So in addition to framing conflict in dynamical terms and presenting supportive research, we point to areas in which more scholarly work is needed and we outline the strategies by which these theoretical and empirical goals can be accomplished.

Because the potential for destructive and intractable conflict cuts across all levels of human experience, comprehensive yet nuanced understanding is best served by enlisting the involvement of theorists, researchers, and practitioners with correspondingly diverse areas of expertise. The authors of this book reflect this multidisciplinary approach. Our team includes an experimental social psychologist (Vallacher), a social psychologist with expertise in computer simulation of social processes (Nowak), three social-organizational psychologists specializing in conflict management and resolution (Coleman, Bui-Wrzosinska, and Kugler), a cultural anthropologist with firsthand experience in intrastate conflict resolution and peace processes (Bartoli), and a physicist with expertise in complexity and nonlinear dynamical systems (Liebovitch). This collaborative effort, initiated in 2006, has tackled a wide range of topics, including dyadic (e.g., marital) conflicts, intra-organizational disputes, school violence, civil war, interstate warfare, negotiation, peace building, and sustainability.

The scholarly output of our team to date would have been impossible without the valuable cooperation of colleagues and the organizational and financial assistance provided by several institutes and foundations. Much of the initial work in developing the dynamical framework, generating formal models, and collecting empirical data was funded by a grant from the James S. McDonnell Foundation. Generous funding for conferences and workshops has been provided by the *International Center for Cooperation and Conflict Resolution (ICCCR)* and the *Advanced Consortium on Cooperation, Conflict, and Complexity (AC4)* at Columbia University; the *Institute for Conflict Analysis and Resolution (ICAR)* at George Mason University; the *Community Foundation of Boulder*; the *Peace Studies Program* at Florida Atlantic University; and the *Berghof Foundation*. Finally, we wish to acknowledge several colleagues, postdoctoral students, and graduate students for their invaluable scholarly contributions to our research program: Pawal Haltof, Wojciech Borkowski, Naira Musallam, Christine Chung, Jay Michaels, Susan Sullivan, and Vincent Naudot. The success of our efforts to date, as represented in this book, is attributable in large measure to the

collaborative spirit—and constructive conflict—inspired in our team by the
aforementioned individuals and organizational entities.

Boca Raton, FL
New York, NY
Warsaw, Poland
Flushing, NY
Munich, Germany
Arlington, VI

Robin R. Vallacher
Peter T. Coleman
Andrzej Nowak
Lan Bui-Wrzosinska
Larry Liebovitch
Katharina G. Kugler
Andrea Bartoli

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Chapter 1

Overview: Conflict in Human Experience

This is a book about conflict. But it is also a book about essential features of human nature that are expressed in every type of human interaction. In an even broader sense, this is a book about the basic processes that link conflict to a vast array of phenomena in the physical world. These seem like incompatible agendas. Conflict is not the only way humans interact, after all, and the conflicts that define human interactions would seem to have little in common with things like weather patterns, landslides, or bacterial growth. But as we shall see, science in recent years has exposed a set of basic operating rules that connect processes of all kinds in physical and social reality. This synthetic view is more than an abstraction; to the contrary, breakthroughs in mathematics, empirical methodology, and computer simulations have enabled scientists to identify the ways in which common processes and properties are manifest in very different phenomena. Our aim is to describe this new perspective and shine its concepts, methods, and tools on the recurrent and all-important issue of conflict in interpersonal, intergroup, and international relations.

Framing conflict in terms of generic processes would make little sense if conflict was viewed solely as dysfunctional, an anomaly of human interaction signaling a breakdown in the way people normally connect to one another. To be sure, conflict can showcase the very worst in people's thoughts, feelings, and actions with respect to one another. But conflict is far more than a problematic and unwanted feature of human experience. Quite the contrary, conflict is not only a frequent feature of social life, it is essential to our survival and progress as a species. Conflict, whether between individuals, groups, or cultures, is necessary for the construction of shared realities, technological and intellectual innovation, and adaptation to novel events and uncertain circumstances. Conflict is inherent in virtually every aspect of human encounter, from sport to parliamentary democracy, from fashion in the arts to paradigmatic challenges in the sciences, and from economic activity to intimate relationships.

Conflict in any of these realms, however, can become problematic, relinquishing its adaptive functions in favor of decidedly maladaptive consequences. Sports rivalries can precipitate violence; opposing political parties can become gridlocked, eliminating the possibility of compromise in framing public policy; clashes in art

and science can stifle rather than inspire the exchange of ideas and information; economic competition can degenerate into sabotage within a society or into war between societies; and conflicting perspectives in an intimate relationship can spiral into distrust, antagonism, and physical abuse.

Conflict *per se*, then, is neither an exception nor a problem. Conflict becomes a problem—potentially the most serious social problem humans face—when it loses its constructive features and becomes defined in terms of its destructive potential, particularly when the conflict becomes protracted over time with no obvious means of resolution. Fortunately, enduring destructive conflicts—termed *intractable conflicts* (cf. Coleman, 2003)—are relatively rare, constituting about 5–7 % of all conflicts between individuals, groups, and countries (Coleman, 2011). But even here, conflict does not represent an anomaly, but rather a particular confluence of the same basic mechanisms that shape other types of human interaction. Indeed, the distinction between constructive and intractable conflict has parallels to distinctions between phenomena in the physical sciences. A hurricane, for example, is a rare event with destructive consequences, but it represents an expression of the same elements (air molecules, water) and forces (barometric pressure, wind currents, temperature) that promote sunny skies.

Chapter Overview

A central aim of this book is to couch intractable conflict—the form that poses serious challenges for social life—in terms of basic principles that find expression everywhere in the social and physical sciences. This chapter is intended to set the stage for this endeavor by presenting three seemingly different ways of understanding and investigating the potential for destructive conflict. The first perspective is the most straightforward: social science theory and research on interpersonal and intergroup conflict (cf. Deutsch, Coleman, & Marcus, 2006). By focusing directly on the experience of conflict in real-world settings, this approach has documented a plethora of local conditions and precipitating factors associated with the eruption and maintenance of antagonistic social relations. We then broaden our perspective by discussing the relevance of social psychology—the study of human thought and behavior in a social context. This approach assumes that conflict, even in its most destructive forms, is an expression of basic principles that can be observed in any social relationship.

After framing the potential for understanding intractable conflict in terms of generic social processes, we introduce the idea that the principles at work in social conflict are not limited to those in the social sciences or psychology, but rather reflect those that are common to the physical sciences as well (e.g., Coleman, Bui-Wrzosinska, Vallacher, & Nowak, 2006; Vallacher, Coleman, Nowak, & Bui-Wrosinska, 2010). This broadened perspective on conflict is possible because of recent advances in the understanding and investigation of *nonlinear dynamical systems* in mathematics and the physical sciences (cf. Holland, 1995a, 1995b;

Strogatz, 2003). It is this perspective that provides the theme for this book. We wish to emphasize at the outset, though, that this way of framing the issue of intractable conflict does not dismiss the insights and findings generated within the social science and social psychological perspectives. Rather, the perspective of nonlinear dynamical systems and complexity science provides a platform within which the propositions and data of conflict theory, peace research, and social psychology can be synthesized to create a unified account of one of the most pressing problems facing humanity today.

We conclude the chapter by providing succinct overviews of the succeeding chapters. The sequence of chapters is intended to be cumulative, with each chapter building on the ideas and research findings presented in the preceding chapters. Taken together, the chapters should provide a progressively integrated view of conflict, one that does justice both to the diversity of conflict in the real world and to the common principles that unite them all in theory.

The Problem of Intractable Conflict

Conflict is traditionally defined as *the perception of incompatible activities* (goals, claims, beliefs, values, wishes, actions, feelings, etc.). An incompatible activity “prevents, obstructs, interferes, injures” or in some way makes less likely or less effective another activity (Deutsch, 1973, p. 10). When a conflict is perceived, we actively interpret its meaning through pre-existing cognitive structures (beliefs, attitudes, stereotypes, etc.), through a consideration of the context of the conflict (occurring in the context of a long friendship or between enemies), and by way of certain mediums or processes (such as direct perceptions vs. second-hand reports or rumors; see Brunswick, 1956; Deutsch, 1973). At any point in this process of perception and interpretation, conflicts can begin to be seen as more or less important, threatening, and intractable. For example, the printing of political cartoons depicting the prophet Mohammed in newspapers in Europe is seen as a provocative gesture to some, and as a flagrant attack on Islam to others. The interpretation of these activities, regardless of the editors’ real or stated intentions, is significantly affected by the perceiver’s psychological schema for the conflict, social interactions with peers, the medium through which they learn of the events (*The New York Times* or *Al Jazeera*), and by the contextualization of the event within their own or their group’s normative understanding of Muslim–Non-Muslim relations worldwide.

Our definition of social conflict builds on the thinking of Follet (1925/1973), Lewin (1936) and Deutsch (1973), but incorporates contemporary calls to view conflict not as a moment-in-time, but rather as a process unfolding in relationships across time (De Dreu, 2010; De Dreu & Gelfand, 2008; Pondy, 1967). Accordingly, we define conflict as *a relational process that is influenced by the perception of incompatible activities-difference*. These processes typically occur in a relational context that provides a sense of history and a normative trajectory. In other words,

the perception of incompatible activities can function to redefine the manner in which the parties to a relationship think about and act toward one another.

Intractable Conflict in the Contemporary World

The news about global conflict is mixed. The International Crisis Group is currently monitoring 70 conflicts worldwide (as of today: 5 crisis, 9 deteriorating, 55 status quo, 1 improved). The good news is that the world has seen a sharp decrease in international conflicts since the end of the Cold War. Although there was a sharp increase in intra-national (civil) conflicts following the collapse of the Soviet empire, this trajectory peaked in 1991, with a 40 % decrease in the number of civil wars by 2003. We have also seen dramatic increases in wars ending through negotiation. Indeed, today twice as many conflicts end through negotiation than through military victory—a proportion that has flipped since the Cold War). To illustrate, from 1980–2003, more wars ended through negotiation than had ended in this fashion in the previous two centuries.

The bad news is that 25 % of wars ended through negotiation relapse into violence within 5 years. In some cases (such as Rwanda and Angola), more people were killed in-country after peace agreements failed than were killed during the war itself. States with civil wars, moreover, are far more likely to experience new violence. In fact, the longer a civil war lasts, the greater the likelihood of a recurrence of violence. In addition, civilian casualty rates have skyrocketed (today 80–90 %), and hospitals, schools, and children are directly targeted.

Highly destructive conflicts are often difficult to resolve. Of the 70 ongoing ICG-monitored conflicts noted above, over half (43) have persisted for 20 years or more (12 have persisted between 11 and 20 years, 15 have persisted between 1 and 10 years). History attests to the difficulty of resolving destructive conflicts. At the onset of WWI, none of the major powers expected a prolonged conflict. Four years later, 70 million troops had been mobilized and nine million combatants lay dead. Between 1945 and 1995, 18 cases of intractable interstate relationships have been documented, producing 75 militarized and violent conflicts that resisted hundreds of attempts at resolution, despite the threats they posed to regional or international security (Bercovitch, 2005). Indeed, enduring conflicts have been linked to 50 % of the interstate wars since 1816, with 10 out of 12 of the most severe international wars emerging from protracted destructive relations (Bennett, 1996). The apparent immunity to resolution has led many scholars to label such conflicts *intractable* (cf. Coleman, 2003). In view of the ubiquity and seeming intractability of destructive conflict in the world today, a clear vision of how such conflicts can be transformed and hopefully resolved constitutes what is arguably the major challenge of contemporary social science.

What We Know About Intractable Conflict

What makes a conflict intractable? A survey of the extant literature on intractable conflict presents a complex picture of the sources of intractability. In his meta-framework on intractable conflict, Coleman (2003) identified over 50 variables associated with the persistence of destructive conflicts. These include a variety of independent dimensions concerning the contexts, issues, relationships, processes, and outcomes of such conflicts. Coleman concluded that intractability is the result of complex interactions among multiple factors across different levels of these conflicts over long periods of time.

The centuries-old conflict in Northern Ireland is a good example of this multi-level complexity. The Irish “troubles,” long understood as a religious conflict between Catholics and Protestants in Ireland, at its base is a conflict between those who wish to see Northern Ireland remain part of the United Kingdom, and those who wish to see the unification of the island of Ireland (Cairns & Darby, 1998). Religion, of course, plays a role in this conflict, as do global affairs, a history of international dominance, economic and other types of inequality (access to education, healthcare, housing, jobs, etc.), issues of social identity, the existence of multiple factions within each community, and serious concerns over human rights abuses and the use of terrorist tactics. These structural and group-level factors have a considerable impact on interpersonal relations (between friends and enemies) and personal functioning (mental and physical health, decision-making, voting behavior, etc.). Thus, long-term patterns of inter-ethnic violence in Northern Ireland are multiply determined.

Several lines of research are devoted to conflict intractability. Labels such as deeply-rooted conflict (Burton, 1987), protracted social conflict (Azar, 1986, 1990), moral conflict (Pearce & Littlejohn, 1997), and enduring rivalries (Goertz & Diehl, 1993) have been used to depict conflicts of this nature. Kriesberg (2005) stresses three dimensions that distinguish intractable from tractable conflicts: their persistence, destructiveness, and resistance to resolution. Most conflicts don't begin as intractable, but become so as escalation, negative sentiment, and hostile cognitions and interactions change the quality of the conflict. They can be triggered by a wide variety of factors and events, but often involve such issues as moral and identity differences, high-stakes resources, and/or struggles for power and self-determination (Coleman, 2003, 2006; Kriesberg, 1999). Not surprisingly, these circumstances often lead to incalculable human suffering, including destruction of vital infrastructure, division of families and communities, extreme violence, dislocation, and trauma (Cairns & Darby, 1998; Coleman, 2000a, 2000b).

What We Don't Know About Intractable Conflict

Despite the widespread and destructive nature of intractable conflict, this phenomenon has yet to be conceptualized in an agreed-upon and coherent fashion. The failure to achieve consensus regarding the fundamental processes underlying intractable conflict, and the corresponding failure to generate effective strategies for transforming such conflict, does not represent a lack of effort on the part of the scientific and practitioner communities. To the contrary, numerous theories, research initiatives, and intervention strategies have been proposed over the years (cf. beyondintractability.org; Azar, 1990; Burton, 1987; Cairns & Darby, 1998; Coleman, 2003, 2004, 2006; Crocker & Hampson, 2004; Crocker, Hampson, & Aall, 2005; Diehl & Goertz, 2001; Fiol, Pratt, & O'Connor, 2009; Goertz & Diehl, 1993; Kelman, 1999; Kriesberg, 1999, 2005; Kriesberg, Northrup, & Thorson, 1989; Lederach, 1997; Pearce & Littlejohn, 1997; Pruitt & Olczak, 1995). To some extent, the problem in framing a coherent theory reflects the inevitable idiosyncrasies of each conflict. Common factors and processes have been identified, but they represent an embarrassment of riches for theory construction. The challenge for theory construction is how to integrate these diverse factors into an account that is coherent, yet allows for prediction and a basis for conflict resolution in specific conflict settings.

A defining feature of intractable conflicts is that they display remarkable resistance to intervention even in the face of rational considerations that would seemingly defuse the animosities promoting the conflict (cf. Azar, 1990; Bar-Tal, 2007; Bennett, 1996; Bercovitch, 2005; Burton, 1987; Coleman, 2003; Goertz & Diehl, 1993; Kriesberg, 2005; Marshall & Gurr, 2005; Pearce & Littlejohn, 1997). In fact, there is some evidence that mediation has no impact at all in these situations or in fact makes these conflicts worse (Diehl & Goertz, 2001). This suggests that the problem of intractability says more about psychology than it does about objective reality. Numerous psychological mechanisms relevant to conflict intractability have in fact been identified (cf. Deutsch et al., 2006). Again, the challenge of achieving theoretical clarity does not reflect a lack of identifiable factors, but rather an overabundance. An intractable conflict is one that has become embedded in a host of cognitive, affective, and social-structural mechanisms, a transformation that effectively distances the conflict from the perceived incompatibilities that launched it.

How might we advance our understanding of such states of intractability? Can we better specify and model the underlying structure and dynamics of these phenomena? And can such a model accommodate the multitude of variables and processes identified as contributing to intractability, while remaining sufficiently parsimonious and predictive? We suggest that the perspective provided by nonlinear dynamical systems and complexity science offers a fruitful platform for the development of such a framework. Before introducing this perspective, however, it is useful to frame intractable conflict in terms of basic social processes that have been shown to characterize human experience generally.

The Relevance of Social Psychology

No area of social relations is untouched by the potential for conflict. Warmth, trust, humor, and empathy are very important dimensions of human interaction, but none of these come close to conflict in their ubiquity across all forms of social encounter. Conflict is manifest at all levels of social reality, from dyadic interactions to international relations. It takes place on an enormous range of time scales, from a minor dust-up at a social gathering to civil wars that persist for decades. It occurs in relationships with very different degrees of depth, from complete strangers to the most intimate lovers. And conflicts run the gamut from those that are constructive, such as parliamentary debate and group therapy, to those that are destructive and detrimental to all concerned, such as war and genocide.

Because conflict is so central to social life, the scientific study of social relations—social psychology—is ideally situated to identify the basic principles underlying the myriad manifestations of conflict. According to the field's first historian, F.B. Karpf, the devastation wrought by the U.S. Civil War motivated the early development of social psychology (Morawski, 2000). And indeed, conflict has been a recurring theme in social psychology since the field's beginnings in the early twentieth century. Kurt Lewin (1936), arguably the founding father of social psychology, devoted a great deal of attention to the study of conflict, analyzing it in terms of a field of psychological forces. Lewin's students, most notably Morton Deutsch, picked up on his lead and developed coherent and heuristic theories of conflict. Deutsch (1973), for example, framed conflict in terms of basic dimensions of social relations, such as cooperation versus competition, and distinguished between constructive and destructive conflicts.

The Advantages of Social Psychology

Social psychology came of age in the aftermath of World War II. Entire countries had lined up against one another and engaged in military campaigns that eventually led to the death of over ten million people, many of them victims of genocide in service of ethnic cleansing. This clearly was not the first time that nations had engaged in warfare; human history is littered with violent conflicts that erupt with disturbing regularity. Social psychology, however, had recently emerged as a scientific discipline with the methods—primarily those involving experimentation—to identify the factors that give rise to such events. Laboratories devoted to the study of conflict were established at several institutions in the United States, including Columbia University, University of California at Berkeley, Massachusetts Institute of Technology, and University of Michigan, and at various institutions in other countries as well. In its aspiration to become a respected science, social psychology turned increasingly to the experimental method, fashioned along the lines of methods employed in the physical sciences to identify

causal mechanisms. This approach has served social psychology well. In the context of a well-designed experiment, one can isolate potential causes while controlling for others, and examine the effects of these “independent variables” on the phenomenon of interest, which is defined in terms of agreed-upon measurement procedures that reduce its ambiguity. The real world is complex and messy, with variables linked together by unclear causal relations, so bringing selected features of the world into the lab and systematically exploring their causal underpinnings brings a great deal of added value to the study of conflict. In identifying cause and effect, experiments have a crucial advantage over approaches that identify patterns of correlation among variables without being able to determine the mechanisms responsible for their association.

The Limitations of Social Psychology

The control and precision afforded by experimental methods, however, come at a cost. For one thing, experiments by their very nature are artificial and thus lack *mundane realism*—similarity to settings in real life. There is also the risk that they come up short on *psychological realism*—the ability to trigger the psychological processes that the experiment is designed to create. Social psychologists are keenly aware of these limitations of experimentation, of course, and have become very adept at creating realistic settings in laboratory settings, often by employing clever cover stories that deceive participants into believing things about their experience that are not true. Still, it is difficult to recreate the intensity and personal involvement inherent in real-world conflict in a psychology laboratory on a nice tree-lined college campus.

Experiments are also limited because certain topics of intense interest are taken off the table. All the informed consent and debriefing in the world would not justify testing the conditions under which people experience personal humiliation or engage in armed conflict with people from different social groups. Yet such issues are often front and center in real-world conflicts. Excluding them from consideration limits what can be learned from experimental research, and thus may provide an incomplete picture of how certain forms of conflict develop and become maintained.

Ironically, the focus on causality poses another limitation on the value of experimental research. In the prototypical experiment, one or more independent variables are manipulated at Time 1 and their main and interactive effects are assessed at Time 2. A psychological process, however, does not necessarily stop after a cause has produced an effect. Indeed, the immediate effect can itself function as a cause, changing the course of subsequent behavior, perhaps even magnifying or diminishing the very causal factor that produced the effect in the first place. Experimental research has established that exposure to televised violence promotes aggressive behavior in young children, for example, but this conclusion creates the impression that the relationship is a one-way street. The real world is awash in

reciprocal causality, however, with the initial effect of a causal factor functioning as a cause as the process unfolds. Watching a violent TV show may indeed lower a child's threshold for aggression, but once the child behaves violently, he or she may be inclined to absorb even more violent TV shows.

The potential for reciprocal causality and other temporal patterns is especially acute in conflict scenarios that unfold over extended periods of time. The first response to an instigating factor may be important, but stopping the investigation at this point may provide a misleading portrait of the scenario. Over time, the initial response may become amplified in intensity, diminished in intensity, or follow a more complex time course such as periodic oscillation or chaos. Investigating conflict as a one-step process clearly does not do justice to the dynamics involved.

Experiments have another limitation that can prove even trickier to resolve in an unequivocal fashion. If the situation created in a laboratory setting is truly realistic for participants, it has the potential to alter the state of mind that participants had before coming to the experimental session. Some experiments are designed to make participants feel uncomfortable or to behave in ways they might not otherwise consider. Particularly in research relevant to social conflict, the need for psychological realism often necessitates placing participants in personally distressing situations. The famous experiments by Stanley Milgram (1974) on obedience to authority illustrate this concern. Psychologists were shocked by Milgram's results, which showed that a majority of participants followed the orders of the experimenter to deliver up to 450 V of electricity to a middle-aged man with a heart condition when he provided incorrect answers to a series of questions.

No doubt this experience was uncomfortable for participants, who may have realized for the first time that they are capable of inhumane behavior toward someone who did not warrant such treatment. Participants were debriefed upon completion of the session, of course, but telling them the true intent of the experiment may have made matters even worse. Imagine how you would feel if you delivered what you knew were painful shocks to someone else, only to learn afterward that your behavior had nothing to do with learning, but everything to do with blind obedience to authority.

Putting Social Psychology in Context

Social psychology experiments play a crucial role in understanding conflict because they identify causal factors and reveal how a small set of them interact to influence thoughts, feelings, and actions in conflict-relevant settings. By themselves, however, experiments cannot accommodate the enormous complexity of real-world conflicts, each of which is nested in an idiosyncratic ensemble of historical, geographical, economic, and social factors. An experiment is ideally suited for isolating specific causes, but is not well suited for probing the interactions among dozens of factors.

The benefits of social psychology are best realized in the context of multi-disciplinary research. The perspectives and methods of political scientists, anthropologists, economists, and historians provide insight into the complex patterns of intertwined factors at work in the emergence, maintenance, and resolution of conflicts between social entities (e.g., groups, cultures, nations). The role of social psychology in this collaborative strategy is to focus on the causal connections among subsets of the factors identified by their social science colleagues. The cross fertilization of theories and methods between social psychology and the other human sciences can promote a synthesis that captures both the mechanisms of conflict and the larger context in which these mechanisms operate. If performed competently, this multi-disciplinary approach can avoid the trade-off between precision and qualitative understanding associated with employing one approach and ignoring the others.

The value of multi-disciplinary research concerning conflict can, in effect, be *too* successful. Because conflicts represent the complex interactions among myriad factors at different levels of psychological and social reality, models that capture this complexity can be correspondingly complex and thus fail to provide coherent and parsimonious understanding of the nature of conflict.

This is where the paradigm of complexity science and dynamical systems enters the picture. This paradigm has revolutionized the physical sciences (cf. Holland, 1995a, 1995b; Strogatz, 2003; Waldrop, 1992), and in recent years it has been applied to important psychological and social processes as well (cf. Guastello, Koopmans, & Pincus, 2009; Nowak & Vallacher, 1998; Vallacher & Nowak, 1994a, 2007). As detailed below, the dynamical approach is designed to uncover the underlying forces that give rise to the complexity and richness of social relations. This approach, moreover, can track the operation of these forces as they interact with one another on different time scales. Once these forces and temporal trajectories are identified, experimental methods can be employed to isolate specific causal mechanisms and to test hypotheses concerning mechanisms that have yet to be identified. This approach to science thus has the potential to develop comprehensive models that recognize the multi-faceted nature of conflicts in the real world, but to do so with respect to basic principles that are both parsimonious and generalizable across manifestly different conflict scenarios.

The Relevance of Complexity Science

Everyone would agree that the world, in both its physical and social manifestations, is very complex, with a wide variety of forces and mechanisms responsible for the surface structure of reality. Any phenomenon—whether the formation of a galaxy, an internal combustion engine, brain function, or stock market patterns—can be conceptualized as a complex system composed of many parts that give rise to the behavior of interest. From its inception over 400 years ago, science has tried to understand complicated systems by reducing them into their simple parts. This

eminently reasonable strategy has had its share of successes, but ultimately it falls short in providing insight into how the system as a whole manages to function. For many topics of interest to scientists and lay people, knowing the list of parts that make up a system and how these parts work in isolation simply does not provide insight into the strange and exciting things that happen when all those parts work together. Knowing all the carbon, nitrogen, oxygen, sodium, and chloride atoms in a teenager, for example, does not explain, let alone predict that crazy thing that he or she did last week.

This is also true for the conflicts between people, cultures, and nations. Knowing the parts of these systems does not necessarily inform us how they interact to generate heated conflicts, nor does such knowledge point to the interventions that may be needed to transform antagonistic relationships into relationships characterized by tolerance and good will.

The Essence of Complexity Science

Complexity science is a new scientific field that can give us some understanding of how the properties of whole systems arise from the interactions of their parts. The ideas that underlie this new science are based on the behavior of some example systems that are described by detailed mathematics. These examples are called “dynamical systems” because the variables that describe the state of the system are dynamic—they evolve over time. Mathematical, physical, and social complex dynamical systems share some important broad characteristics that are useful for us in understanding the social psychology of conflicts. The following characteristics are especially relevant to our depiction of conflicts that become intractable—protracted over time and seemingly impervious to resolution:

- Self-Organization. Local interactions can create large-scale patterns. The movement of tiny patches of moist hot air forms a hurricane extending over hundreds of miles. Actions of individual investors create economic bubbles and then burst them. The decisions by a few local Liberian mothers and grandmothers to employ non-violent forms of anti-war civil-disobedience result in the downfall of the strongman Charles Taylor and the emergence of peace in Liberia.
- Emergence. The properties of the whole system are often quite different from the properties of its parts. This is widely recognized in the physical sciences. For example, hydrogen and oxygen together are an explosive mixture of gasses, but water—which represents the interaction of hydrogen and oxygen—is stable and wet. Examples of emergence abound as well in the social sciences. For example, individually peaceful people can assemble into a dangerous, violent mob.
- Unintended Consequences. Small tinkering with, or changing the pieces of a system can lead to surprising and completely unanticipated results. A tree falls on an electrical transmission wire in a forest in the U. S. Midwest and cascading electrical failures put out the lights of tens of million of people in the Northeast.

The Internet, originally designed to transfer data files between military computers, leads to on-line social networks that mobilize average citizens into toppling a dictatorship.

Complexity Science and Social Conflict

This new science of complexity can be used in two different ways to help us understand social systems and conflict. In one approach, we can encode social mechanisms into equations, solve those equations (analytically or numerically) by rigorous mathematical methods, and thereby learn the logically necessary consequences of those social mechanisms. This approach, which is the one typically used in the physical sciences, is now being used in the social sciences to gain new insight into social phenomena. Examples of this approach later in this book include models of conflicts between two people and the rapid spread of conflict from an isolated region to an entire society.

We can also use our knowledge gained from these mathematical examples in an entirely different way. It is hard to think of entirely new things. Can you picture a color that you have never seen before? In science, we often use an idea from something that is familiar to us and apply it to something new. That approach can give us a new perspective and therefore new insights. In this way, we can use what we know about mathematical systems to give us new metaphors to understand social systems. Networks, sand hills, self-organization—these new metaphors help us see conflicts in a new way. They yield new interpretations of the data, they drive us to ask new questions, and they suggest new social psychology experiments for us to perform. Examples of this approach later in this book include understanding the intractability of conflicts, analysis of emotionally charged difficult conversations between people, and the sudden transformation from conflict to peace in societies ravaged for years by civil war.

Throughout this book we will use both mathematics and metaphors derived from mathematics based on several different types of complex dynamical systems. Here, we mention only one particular metaphor because we will use it extensively throughout this book. The metaphor, based on ordinary differential equations, consists of an artificial landscape of hills and valleys. The location in that landscape represents some characteristic of the conflict, for example, the emotional states of the participants. An artificial gravity relentlessly pulls those participants downhill into a valley. This valley is called an “attractor” because it represents the stable endpoint that results from the mutual behavior of the participants. Small changes may lead the participants uphill a little, but they are likely to soon fall back into their previous patterns of behavior represented by the bottom of the valley. Escape out of the valley, and therefore out of the conflict, is possible only if additional forces or a change in behavior get the participants past the top ridge that forms the valley, or a deeper more favorable valley opens up within their reach.