Chapter 2
Origins: The Promise of Dynamical Systems Theory

"Theory is an arbitrary structure that we impose on chaos to make it meaningful and predictable"

John Whiting

The dynamical systems approach to conflict is relatively new, but it has deep roots in other orientations and research agendas. Particularly noteworthy are three very distinct areas of inquiry with equally distinct historical pedigrees: peace and conflict studies, social psychology, and complexity science. As the John Whiting quote implies, each of these traditions is valuable yet limited, focusing attention on particular aspects of the phenomenon, often at the expense of others. Considered together, however, these three lenses impose structure on the "chaos" of conflict, enabling the emergence of a unique and coherent perspective on the development, maintenance, and resolution of conflict in interpersonal, intergroup, and international relations.

Of course, a comprehensive rendering of the impact these three perspectives have had on the study of social conflict would require a volume in its own right. Our aim here is to highlight those ideas and findings from each that have most informed our thinking. We first discuss the direct focus on conflict that has been provided by the peace and conflict perspective. Decades of theory, research, and practice have revealed paradoxical features of conflict and established the diverse forms that conflict can take at different levels of social reality. Within this tradition, five paradigms have been advanced to provide insight into the principles by which conflicts develop and unfold. In the next section, we discuss how conflict fits into general theories of social psychological functioning. We briefly outline six classic social psychological perspectives on conflict and then discuss basic issues of conflict in light of themes and questions that are ascendant in contemporary social psychology. In the last section, we turn our attention to recent developments in complexity science and dynamical systems, and the potential value these developments have for the study of conflict.

Lessons from Peace and Conflict Studies

The eclectic field of *peace and conflict studies* has provided a wide variety of metaphors through which we can envision and study the phenomenon of conflict. In different quarters, scholars and practitioners have framed conflict in terms of *games*, *problems*, *diseases*, *force fields*, *machines*, *wars*, and *quagmires*. Each metaphor has value, but we prefer the metaphor offered by the eminent peace psychologist, Morton Deutsch, who is fond of saying "conflict is like sex". Like sex, conflict is everywhere. It is a natural state of affairs in the human condition, basic to life, learning, and love. It can be invigorating and deeply satisfying or hurtful and humiliating. It can be fleeting and insignificant or intense and life altering. Its lure can subside and remain latent for long periods of time, and then suddenly re-emerge and become the main focus of life. It can take place when we are alone, with other people, or with groups of people. The pathologies of conflict are similar to those of sex: people can become extremely conflict-avoidant or conflict-obsessed, suffer from position-rigidity or premature conflict resolution, and engage in it with extreme passion and emotionality or in an overly intellectualized and game-like manner. But ideally, conflict, like sex, results in satisfying experiences for all parties involved and enhances, not impairs, relationships.

This, then, begs the question that has organized over 70 years of systematic research on conflict: *What determines whether conflict—a pervasive and naturally occurring event—moves in a constructive or destructive direction*? (see Deutsch, 1973, 2006). In other words, what are the conditions and processes that determine whether conflicts provide a uniquely human opportunity to learn about ourselves and others, to motivate necessary changes in the status quo, to challenge obsolete ways of thinking, relating, working, and to innovate—or result in experiences of loss, frustration or misery. *Constructive conflicts* are defined as those which result in mutually satisfactory experiences of the processes, relationships and outcomes associated with the conflict for all involved parties (Deutsch, 1973). *Destructive conflicts* are the opposite, in them at least one of the parties involved experiences dissatisfaction with the conflict. Many if not most of the conflicts that we face have the potential for satisfying, constructive outcomes for all. However, this potential is rarely realized because of our tendency to see most conflicts as win-lose. Engaging in conflict tends to generate anxiety in many people who associate it with negative or violent outcomes, which leads to fight or flight responses. Good cooperative relations however facilitate the constructive management of conflict and the ability to handle constructively the inevitable conflicts that occur during cooperation, which facilitates the survival and deepening of cooperative relations.

The Paradoxes of Social Conflict

The view of conflict emanating from peace and conflict studies research is one of good news and bad news. The good news is that most conflicts are either fleeting and insignificant or are resolved constructively—or at least well enough. In fact, the historical trends are very promising. Violent conflict in Western society shows a clear downward trend throughout recorded history (Gurr & Scarritt, 1989; Pinker, 2011). For instance, the international community has recently experienced a dramatic increase in the number of wars ending through negotiation rather than through unilateral military victory. These numbers have flipped since the end of the Cold War, with today double the percentage of wars ending through negotiations than had previously through military victory (Mason, Crenshaw, McClintock, & Walter, 2007). Incredibly, more wars ended through negotiations from 1988 to 2003 than during the previous two centuries ((United Nations, 2004). After peaking in 1991, the number of civil wars dropped roughly 40 % by 2003 (United Nations, 2004). This suggests that local, regional, and international peacemakers are having an increasingly positive impact on constructive resolution.

But some conflicts are different—they are at odds with these positive trends. They act strangely and do not conform to normal expectations or respond to standard interventions. They resist change, grinding on and on for months, years, decades, even generations. Although these types of conflicts are relatively uncommon, they can cause disproportionate amounts of misery and instability, wreaking havoc on families, communities, nations, and at times entire regions of the globe (Coleman, 2003, 2011; Diehl & Goertz, 2001; Kreisberg, 2005). These conflicts have come to be labeled *intractable*.

Intractable conflicts evidence certain peculiarities. For example, they defy what we know about motivation and conflict. Research on *ripeness theory* has found that when people engaged in long-term conflicts experience high levels of pain and suffering from the conflict and then see some opportunity to escape it, they will tend to agree to negotiations and settlement (Druckman, 2007; Mooradian & Druckman, 1999; Zartman, 2000). However, sometimes the opposite occurs. Zartman (2000) has found that when conflicts involve "true believers" and "true believer cultures," extreme suffering can have the reverse effect. He writes, "Parties thinking as true believers are unlikely to be led to compromise by increased pain; instead, pain is likely to justify renewed struggle" (p. 239).

Intractable conflicts also display unique patterns of escalation and de-escalation. They may simmer at low levels of intensity for long periods of time, but then escalate into violence and bloodshed overnight, seemingly out of nowhere, showing spikes of enmity and hostilities previously unseen. These high-levels of intensity may persist much longer than anticipated, outliving any rational utility. But then one day, they may decline precipitously in violence—again, seemingly out of nowhere and for no obvious reason.

These types of conflicts tend to respond to direct attempts at intervention such as conciliatory gestures, mediation, or even threats of violence in odd and unpredictable ways. Specifically, they may (1) completely ignore the intervention, continuing their trajectory of escalation; (2) show an exaggerated response to a seemingly insignificant intervention, though in the desired direction; (3) evolve in a completely unpredictable direction independent of the intervention; or (4) respond in a manner proportional to the actions and plans undertaken by the intervener. Furthermore, intractable conflicts often respond to initiatives in ways that are disproportionate to the magnitude of intervention. In these situations, major attempts at resolution by superpowers, the UN, the international community, and other high-impact actors seem to have little or no observable effects on the conflict (Diehl & Goertz, 2001).

However, much smaller, seemingly insignificant actions—the involvement of a low-power group of clergy, women, or an NGO, or even a small gesture of genuine kindness by one of the parties—can have a major impact. This is what was witnessed in the protracted conflicts in both Liberia and Mozambique (Bartoli, Bui-Wrzosinska, & Nowak, 2010; Disney & Gbowee, 2012). Actions that seem small and insignificant often act as catalysts, facilitating processes of change when the critical ingredients for change are already in place. The critical ingredients for positive change center on social capital, collective identity, and a sense of hope. The critical ingredients for negative change, meanwhile, center on despair or a sense of hopelessness. Further, constituent groups at different levels of societies might respond to interventions in disparate ways. The experience of intractable conflict might for example lead the political elite to favor a negotiated settlement, but the population, having suffered so much pain, displacement, and grievance, might advocate continued struggle. Also, intractable societal conflicts can appear resolved through peace agreements, but the deep rooted cleavages in perceptions, grievances, etc. of ordinary people may not be addressed by elite level negotiations. Because of the difference in perception between societal layers, conflict can simmer on and re-erupt later.

Most strikingly, intractable conflicts seem to take on a life of their own. They can persist despite the weariness of the parties and an increasing genuine desire to end hostilities. And even when major changes occur in the political landscape—assassinations, coups, ousted leaders, policy changes, you name it—they can still persist. In this way they seem to defy logic and reason.

In sum, most conflicts have both positive and negative potential. They can propel people and societies forward toward new solutions, innovations, more just social arrangements and enhanced relationships—or they can stop these constructive developments dead in their tracks. The good news is that most conflicts are resolved effectively and we seem to be getting better at this. The bad news is when they go bad, they can get stuck and do an inordinate amount of damage.

But why? What is it about this particularly intractable species of conflict that makes them so odd, unpredictable, and paradoxical?

The Diversity of Conflict

Conflict is easy to recognize but hard to understand. It is often obvious and pervasive in human relations, yet it is like a Rorschach test for theorists, eliciting our own biases, fears, preferences and yearnings. As stated in Chap. 1, we define conflict as *a relational process that is influenced by the perception of incompatible activities*. These perceptions can occur within and between people and groups of people, can be expressed or left unexpressed, and can be experienced by the parties to the conflict or by observers external to the conflict (Boardman & Horowitz, 1994; Deutsch, 1973). These experiences can also differ by level of importance (from superficial to existential concerns), centrality (impacting one's identity, esteem, and sense of reality), pervasiveness (number of interconnections with other conflicts and experiences), and duration. Conflicts also contain important differences in the objective structures of the various issues involved. They may be purely distributive in nature (zero-sum, but divisible), integrative (with satisfactory alternatives available for all), inefficient (complex and difficult with elusive but nevertheless real integrative or distributive potential), or non-negotiable (with indivisible qualities). However, it is principally the *subjective experience* of conflict, which may or may not be congruent with the objective nature of the issues (see Deutsch, 1973), that drives reactions and behavior (Rubin, Pruitt, & Kim, 1994), particularly under conditions of intense escalation (Fisher & Keashly, 1990).

One set of challenges inherent to understanding intractable conflict concerns the complex and idiosyncratic nature of these conflicts, and the difficulty of generalizing knowledge across levels of analysis. Conflicts may be or may become intractable for a wide variety of reasons. In our research, we have identified over 50 aspects of such conflicts that scholars have recognized as accounting for intractability (Coleman, 2003, 2011; see Table 2.1). These includes various aspects of the contexts in which conflict occurs, the issues involved, the relationships that shape these issues, the processes that unfold, and the outcomes they generate. Every seemingly intractable conflict—Kashmir, Israel-Palestine, Northern Ireland, Colombia, etc.—is quite different, involving and emphasizing a unique subset of these factors. Indeed, the challenge of achieving theoretical clarity does not reflect a lack of identifiable factors, but rather an over-abundance. An intractable conflict is often one that has become entrenched in a wide variety of cognitive, affective, and social-structural mechanisms, a transformation that effectively distances the conflict from the perceived incompatibilities that launched it initially. Hence, the task for theory construction is integrating these diverse factors into an account that provides a coherent perspective, yet allows for prediction and a basis for conflict resolution in specific settings.

Further complicating theoretical comprehension of these protracted disputes is the fact that they occur at all levels of social relations, from marriages and families to civil wars and interstate warfare. Therefore, it may not always be useful or valid to compare, say, moral interpersonal conflicts with intractable conflicts over territory or water rights, or conflicts between a husband and wife in the U.S. with those

Table 2.1 Fifty-seven elements of intractable conflict

Context		Element	Description
Historical dominance and injustice		Domination	Severe imbalance of power between people or groups
		Inequity	History of colonialism, racism, sexism, ethnocentrism, or human rights abuses
		Gendered problems	Situations where men, who are responsible for the vast majority of violence, are in charge.
		Divide and conquer	High-power groups (HPGs) manipulate low-power groups' (LPGs') ethnic differences
		Cracks in the façade	Conditions where HPGs control of historical and cultural meaning through history textbooks, media, official accounts etc. becomes compromised.
		Delegitimization of hierarchy-legitimating myths	Challenges to ideologies, narratives and policies that validate hierarchical power arrangements.
		Structural victimization of LPGs	Denial of identity, security, and voice
		Structural violence toward LPGs	Unequal access to housing, health care, nutrition, education, etc.
		Lack of awareness	An insulated and inattentive HPG
		Accumulation of indignities	Pervasive patterns of "civilized oppression" by HPGs against LPGs
Instability and anarchy		Seismic shifts	Periods of rapid social change and instability
		Tainted infrastructure	Compromised institutions, laws, and social norms for conflict regulation
		Looking up	Changes in LPGs' aspirations
		Power shifts	Changes in the balance of power between HPGs and LPGs
		Ambiguity of power	Unclear relative status of groups in conflict leading to more volatility
		Anarchy	The complete collapse of social order.
Issues	Nature of core issues	Dialogic poles	Underlying issues rife with apparent trade-offs
		Paradoxical dilemmas	Issues that when resolved create new problems
		Intricate interconnections of issues	Complex connections between distinct issues
		High centrality	Issues that have high personal or group-based importance
	Meaning	Truth	Issues that revolve around important, basic beliefs
		Hub issues	Grievances embedded within broad beliefs, ideologies, and basic assumptions

Relationships	Nature of relationships	Exclusive structures	Structures that keep groups isolated and out of contact with each other
		Inescapable relationships	Relationships from which it is virtually impossible to exit
		Collapsed relationships	Relationships damaged beyond repair by conflict
		Intense mixed motives	High-stakes conflicts with a mix of cooperative and competitive goals
		Intractable core	Fundamentally unsolvable issues
	Identity	Polarized collective identities	Group identities based on the negation and destruction of the "other"
		Conflict identities	Group identities organized around an ongoing conflict
		Monolithic and exclusive identities	All different aspects of ingroups and outgroups collapse into single entities
		Frozen identities	Personal and group identities become rigid and unresponsive to change
	Internal dynamics	Unconscious needs and defenses	Motives that are operative but difficult to identify and address
		Intragroup divisions and factions	When internal group divisions drive intergroup conflict
		Hidden agendas	Covert or criminal objectives that drive the overt conflict
Processes	Emotions	Emotional contagion	The pervasive spread of toxic emotions such as humiliation, deprivation, loss, rage
		Memorialized conflict	Conflict driven by a sense of duty and loyalty to those lost in war
		Socially-constructed volatility	Ingroup processes which create rules and norms that sanction destructive emotions
		Impaired cognitive functioning	Information processing impairment resulting from protracted, high-intensity situations.
	Social processes	Malignant social processes	Self-perpetuating, inescapable emotional dynamics
		Escalatory spirals	Basic tit-for-tat escalatory dynamics that run amok
		Structural changes	Changes in social and institutional structures due to escalation which perpetuate conflict
		Moral exclusion	Conditions where groups see out-groups as deserving of immoral treatment
		Violent exchanges and atrocities	A tipping point when violence justifies and begets more violence
	Pervasiveness and complexity	Pervasiveness	Conflict spreads into functional aspects of life (education, cultural systems, etc.) and transforms them into tools of conflict
		High complexity	When conflicts become too complex to comprehend
		Multilevel	When negative aspects of conflicts link from people to groups to institutions to cultures

Table 2.1 (continued)

		Multiparty	Increasing numbers of stakeholders contribute to its perpetuation
		Chaotic and mercurial	Constantly changing dynamics which perpetuate conflict
Outcomes	Trauma	Individual and community trauma	Families and communities lose the capacity to trust one another and therefore function
		Betrayal of trust	A rupture of the basic understanding of a predictable world
		Beyond posttraumatic stress disorder	When atrocities lead to extraordinary levels of trauma that impair basic functioning
	Duration	Trauma unaddressed	When past trauma is left untreated to fester
		Historical rivalries	Robust, long-term animosities among people and groups
		Enduring cycles of low to high intensity	Cycles of conflict that alternate between high and low intensity, which can lead to temporary states of complacency.
		Destructive norms	Hostility and violence become the accepted norm
		Intergenerational perpetuation	Children and newcomers are socialized into the conflict
		Lasting commitments	A conflict's long duration justifies its perpetuation

between a powerful majority group and members of a low-power minority group in East Asia. Such disputes may differ in terms of the number of parties and issues involved, the relative ease of separation of the parties and enforceability of agreements, and the degree of involvement of outside representatives, institutions and bureaucracies (see Rubin & Levinger, 1995, for an excellent discussion of cross-levels comparisons).

However, might the diverse, paradoxical nature of intractable conflict actually belie something more fundamental that could allow for integrative understanding? Is conflict, at base, paradoxical or can it be conceptualized in a way that is consistent with general models of human behavior? Can theoretical coherence be achieved for a fixture of human relations that spans levels of social reality, from dyads to international relations? These are the questions that peace and conflict scholars have wrestled with for almost a century.

Five Paradigms of Conflict Studies

Over the past several decades, the literature on peace and conflict has generated a large array of approaches for the study of protracted social conflict (see Coleman, 2004). These perspectives have emerged from a variety of disciplines such as political science, social psychology, developmental psychology, law, education, communications, anthropology, linguistics, public health, and economics. Below, we outline five major paradigms currently employed in framing research and practice in this area: *realism*, *human relations*, *pathology*, *post-modernism*, and *systems*. These paradigms are, in effect, clusters of approaches that vary internally across a myriad of important dimensions, and overlap to some degree with approaches from other paradigms. The five paradigms are presented in order from most to least influential in the field today.

The Realist Paradigm

Historically, this perspective has been the dominant paradigm for the study of war and peace in history, politics, and international affairs. Essentially a political metaphor, it views protracted conflicts as dangerous, high-stakes games that are won through strategies of domination, control, and counter-control (see Schelling, 1960). Although they vary, approaches of this nature tend to assume that resources and power are always scarce, that human beings are always capable of producing evil and have a will to dominate, and that one's opponents in conflict at any point may become aggressive. Consequently, they present an inherently conflictual world with uncertainties regarding the present and future intentions of one's adversary leading to risk-aversive decision-making. Thus, intractable conflicts are thought to result from rational, strategic choices made under the conditions of the "real

politics" of hatred, manipulation, dominance, and violence in the world. These conflicts are seen as "real conflicts" of interest and power that exist objectively due to scarcities in the world, and are only exacerbated by such psychological phenomenon as fear, mistrust, and misperception. In this context, power is seen as both paramount and corrupting, and real change is believed to be brought about primarily through power-coercive, command and control strategies. Neorealism, a less ardent version that emphasizes the constraints imposed by international structures, operates with many of the same assumptions (Waltz, 1979).

At the same time, though, this orientation to conflict is based on assumptions of rational choice that are "economic" in nature (i.e., reasoning through efficient cost/benefit analyses), which, although valid under certain conditions, fail to account for many other types of human reasoning and action (such as social, legal, moral, and political forms of reasoning), which function differently and have a large impact on decisions and outcomes in conflict settings (see Diesing, 1962, for an extensive discussion). In addition, its "preventative orientation" to managing conflict (see Higgins, 1997) leads to a focus on short-term security needs, worse-case scenarios, and an over-reliance on strategies of threat and coercion (see Levy, 1996). Furthermore, its core competitive assumptions (regarding the nature of power and security, the availability of resources, and the inevitability of the other's aggression) can limit a party's response options and typically results in competitive and escalatory dynamics and self-fulfilling prophesies which foster further entrenchment in the conflict (see Deutsch, 1973, 2000).

The Human Relations Paradigm

An alternative to the realist paradigm emerged primarily through the social-psychological study of conflict (discussed below), and stresses the vital role that human social interactions play in triggering, perpetuating, and resolving conflict. Based on a social metaphor, its most basic image of intractable conflict is of destructive relationships in which parties are locked in an increasingly hostile and vicious escalatory spiral, and from which there appears to be no escape. With some variation, these approaches view human nature as mixed, with people having essentially equal capacities for good and evil, and stress the importance of different external conditions for eliciting either altruism and cooperation or aggression and violence. This orientation also identifies fear, distrust, misunderstanding, and hostile interactions between disputants and between their respective communities as primary obstacles to constructive engagement. Thus, subjective psychological processes shape disputants' perceptions, expectations, and behavioral responses, thereby playing a large role in determining the course of conflict (see Deutsch, 1973). From this perspective, change is thought to be brought about most effectively through the planful targeting of people, communities, and social conditions, and is best mobilized through normative-reeducative processes of influence (Fisher, 1994).

Nevertheless, relationally-focused strategies of intervention, when not complemented by other methods, often fall well short of their objectives in hazardous situations of protracted conflict. Although overstated, they have been criticized by some realists as "...at best well-intentioned, at worst soft and driven by sentimentalism, and for the most part irrelevant" (Lederach, 1997). They typically work best in situations where there is an a priori acceptance of the values of reciprocity, human equality, shared community, fallibility, and non-violence (Deutsch, 2000). Contexts that are void of these norms, and of the laws and institutions that regulate them, present substantial challenges to the constructive use of relational strategies. For example, in societies where male-superiority goes unquestioned, the use of cooperative strategies to address protracted gender conflicts may in fact only perpetuate the oppressive quality of gender relations in that context. Finally, most human relations approaches are based on the values and assumptions of scientific humanism and planned social change (Fisher, 1994). These values and assumptions define the boundaries of these approaches and limit their applicability in situations where such values are not shared.

The Medical Paradigm

This paradigm pictures intractable social conflicts as pathological diseases—infections or cancers of the body politic—that can spread and afflict the system and that need to be correctly diagnosed, treated, and contained. In this view, the conflict system (the patient) is a complicated system made up of various interrelated parts that can be analyzed and understood directly and treated accordingly. Conflicts are thought to be treated most effectively by outside experts who have the knowledge, training, and distance from the patient necessary to accurately diagnose and address the problem. This perspective views humans and social systems as basically health-oriented entities that, due to certain predispositions, neglect, or exposure to toxins in the environment, can develop pathological illnesses or tendencies that are destructive. Treatment of these pathologies, particularly when severe, is seen as both an art and a science, with many courses of treatment bringing their own negative consequences to the system. Although not as common as the realist and human relations paradigms, the medical model is particularly popular with agencies, community-based organizations, and non-governmental organizations working in settings of protracted conflict.

However, once again, this worldview is limited in its capacity to manage protracted conflict unaided. The practice of medicine often seeks to address symptoms of illness (coughs, fever, rashes, etc.) rather than underlying causes, just as we often seek to address the expression of a pathology with Band-Aid solutions (e.g. armed violence treated by ceasefires) rather than addressing the systemic problem that gave rise to the emergent symptom. Although hostilities between people may be temporarily controlled by the acceptance of a cease-fire or peacekeeping troops, the conflict may move no closer to resolution and may in fact

become more intractable as a result of the disengagement of the parties (Fisher, 1997). In addition, the approach of identifying and exposing covert or unconscious motives and interests rests on the assumption that doing so is good. Thus, it assumes that it is both possible and constructive to unearth such motives, that people have the capacity and support to tolerate such information when it is forthcoming (about themselves, their government, their businesses, and so on), and that people, corporations, and governments will then have the motivation and the capacity to reform. These assumptions, although hopeful, are often inaccurate. Finally, this orientation is based on a deficit model, with a focus on that which is wrong or pathological in a conflict system. Although important, this orientation often neglects focusing on positive responses such as resiliency or altruistic and ethical behavior under difficult circumstances, and can foster a negativity bias in our understanding of and responses to the phenomena.

The Post-Modern Paradigm

Also known as constructivism, this perspective portrays intractable conflicts as rooted in the ways we make sense of the world. A linguistic and communications metaphor, its most basic image is of conflict as a story: a narrative or myth that provides a context for interpretation of actions and events, both past and present, that shapes our experience of ongoing conflicts. Thus, conflict springs from the way parties subjectively define a situation and interact with one another to construct a sense of meaning, responsibility, and value in that setting. Intractable conflicts, then, are less the result of scarce resources, incendiary actions of parties, or struggles for limited positions of power, than they are a sense of reality, created and maintained through a long-term process of meaning-making through social interaction (Lederach, 1997; Pearce & Littlejohn, 1997).

This worldview highlights a form of power as meaning-control: an insidious, although primary form of power that is often quietly embedded in the assumptions and beliefs that disputing parties take for granted. It suggests that it is primarily through assumptions about what is unquestionably "right" in a given context that different groups develop and maintain incommensurate worldviews and conflicts persist. Thus, change is believed to be brought about by dragging these assumptions into the light of day through critical reflection, dialogue, and direct confrontation, consequently increasing disputants' awareness of the complexity of reality, of our almost arbitrary understanding of it, and of the need for change.

Although rich and intuitively appealing, post-modern constructivism has been criticized for its abstract intellectualism (Alvesson & Willmott, 1992a, 1992b) and its tendency to denigrate and alienate the elite (Voronov & Coleman, 2003). Critics find its central ideas and jargon vague and difficult to operationalize in any useful manner. It seems to find meaning-making processes and dominance everywhere, but makes it difficult to pinpoint them anywhere. It has also been chided for its over-emphasis on the subjective and concomitant denial of the importance of objective

circumstances. Although intriguing, this level of consciousness can be quite demanding and difficult to sustain, even under non-threatening conditions (Kegan, 1994). Therefore, the possibilities of applying such methods in situations of intense, protracted conflict are especially challenging.

The Systems Paradigm

In essence, the system's perspective is based on an image of a simple living cell developing and surviving within its natural environment. A biological metaphor, it views conflicts as living entities made up of a variety of interdependent and interactive elements, nested within other, increasingly complex entities. Thus, a marital conflict is nested within a family, a community, a region, a culture, etc. The elements of systems are not related to one another in a linear manner, but interact according to a non-linear, recursive process so that each element influences the others. In other words, a change in any one element in a system does not necessarily constitute a proportional change in others; such changes cannot be separated from the values of the various other elements which constitute the system. Thus, intractable conflicts are viewed as destructive patterns of social systems, which are the result of a multitude of different hostile elements interacting at different levels over time, culminating in an ongoing state of intractability (see Coleman, Vallacher, Nowak, & Bui-Wrzosinska, 2006; Pruitt & Olczak, 1995). Power and influence in these systems are multiply determined, and substantial change is thought to occur only through transformative shifts in the deep structure or pattern of organization of the system.

Important insights for working with intractable conflict follow from three basic assumptions of general systems theory: the non-linear nature of the relations between elements in a system; systemic openness and the importance of the internal and external environment; and the structure of nested systems within systems. These ideas shift our thinking away from simple, essentialized, static, or dyadic views of conflict. In its place, we can begin to understand the complex, multi-level, dynamic, and cyclical nature of these phenomena. However, general systems theory has been criticized for its lack of specificity, for its imprecise definition, and for contributing relatively little to the generation of testable hypotheses in the social sciences (Kozlowski & Klein, 2000). Work from this perspective will need to move beyond its use as a general heuristic in order for it to realize its full potential to addressing complex social conflicts. This has been a primary goal of the development of dynamical systems' principles and methods for applications to conflict and peace dynamics.

The five paradigms outlined in this section provide us with an extensive menu of perspectives and options for viewing intractable social conflicts. Each approach is supported to some degree by empirical research, and each offers a unique system of questioning that governs the way we think about intervention in conflicts. Ideally, however, we must develop a capacity to conceptualize and address intractable

conflicts that is mindful of the many factors and complex relationships inherent in such phenomena, and of the complementarities of these diverse approaches.

The Social Psychology of Conflict

Social psychology was born in the cradle of war (Morawski, 2000) and has been compelled by world events to study conflict throughout its history. Ablion Small, a sociologist, suggests that social psychology arose from a time when Americans "whose thought-world had been stirred to its depths by the war found themselves in 1895, star-gazing in social heavens that had never looked so confused nor so mysterious" (quoted in Karpf, 1932, p. 213). Others have identified World War I and II as two of the major forces behind the early development of social psychology (Allport, 1954; Cartwright, 1979; Jones, 1985). Scholars have even gone as far as crediting Adolph Hitler and the Nazi Party in Germany with igniting social psychology, as the fear and oppression imposed by the Nazi's forced pioneers of the field like Kurt Lewin to flee Europe and to come to the U.S. to study problems such as conflict, prejudice, and authoritarianism (Cartwright, 1979; Jones, 1985). These beginnings have carried the field far in its understanding of conflict, violence, and war, largely through the work of prominent psychologists such as Lewin, Jerome Frank, Charles Osgood, Morton Deutsch, Harold Kelley, Herbert Kelman, Dean Pruitt, Dan Druckman, and David Johnson and many others.

Classic Perspectives

Several classic lines of theory and research inform the social-psychological study of conflict today. Early theories of conflict presented it in the context of competitive struggles and employed a deterministic mode of explaining conflict, war, and hostility. This included Darwin's (1859, 1871) evolutionary perspective of the struggle for survival of the fittest in species, Freud's (1936, 1960) psychodynamic perspective of internal psychic struggles between the Id, Ego and Superego or between the conflicting internal drives of Eros (life, love, creativity, etc.) and Thanatos (death, aggression, destruction, and so on), and Marx's (1844/1997) socio-political-economic perspective of class struggle. Although these early works provide evidence for the claim that systemic and dynamic perspectives are at the very roots of the social-psychological approach to conflict studies, the lack and paucity of systematic empirical support for these perspectives rendered them more doctrines and ideologies than scientific theories. This was also largely true of many of the early "armchair-speculation" social-psychological theories of pleasure-pain, egoism, sympathy, gregariousness, imitation, and suggestion (Allport, 1969).

However, the subsequent transition of social-psychological research into a phase of more sophisticated, rigorous empirical science came largely at the cost of systemic, dynamic thinking. What the development of reductionist, systematic, and particularly laboratory methodologies delivered in terms of precision and predictive power of research, they lost in terms of the more complex, holistic, temporal conceptualization of conflict dynamics. Ultimately, this led to both the specialization and the fragmentation of the field at its early stages of conflict theory development, where the socio-political, economic, psychological, and evolutionary perspectives became largely disconnected.

This basic disconnect is still visible today in the lack of a common scientific platform for uniting the main areas of conflict studies, such as political and economic science, psychology and social psychology, law, evolutionary biology and primatology, anthropology, and epidemiology. Typically, psychological models privilege cognitive factors as central mechanisms in social, economic, and political conflict processes, while socio-economic models emphasize structural, social and economic factors in determining human functioning in conflict. This results in an understanding of the effects of economic, social, and political structures that is disconnected from our sense of human factors and dynamics.

Two basic challenges to the coherence of the social-psychological approach to conflict come from the considerable pressure in empirical research to identify (linear) causal mechanisms, and the dearth of multi-level models and methodologies for conducting research. However, the genesis of social-psychological thinking was built on the assumption that social-structural and psychological conditions and processes are intimately linked. Aristotle and Plato, arguably two of the earliest social-psychological thinkers, spent considerable time contemplating and debating the interactive relationship between the individual and society (Allport, 1969).

Later, Kurt Lewin offered his elegant formula for conceptualizing the interaction between individuals (P) and the environment (E) in determining human behavior (B): $B = f (P \times E)$. This framework encouraged unity in a young discipline that was increasingly divided between the social and personality schools, and offered a whole new vocabulary for the conceptualization and scientific study of conflict processes (discussed in greater detail in Chap. 3). This included such constructs as force fields, tension systems, vectors, temporal trajectories, goal gradients, systemic and reciprocal causation, as well as the importance of understanding the complexity of human motivation and the value of mathematization of psychological constructs. These and other contributions of Lewin (e.g., action research, field theory) highlighted the circular causation between the individual and the environment (see Deutsch, 1969), a tradition that finds a continuation in the dynamical systems approach to conflict today.

Social-Psychological Models of Social Conflict

Six theoretical models of social conflict build on elements of the Lewinian approach have been particularly influential in the development of the field: *game theory*, *social interdependence theory*, *social motivation theory*, *dual-concern theory*, *power dependence theory* and *social identity theory* (see Coleman et al., 2012). Each of these models has focused generally on *understanding the conditions and processes that lead to constructive versus destructive conflict dynamics and outcomes* (see De Dreu & Gelfand, 2008; Deutsch, 1973, 2002; Deutsch, Coleman, & Marcus, 2006). They are summarized below.

Game Theory

The Cold War era (1950–1980s) led to a stronger emphasis in social psychology on conflict structure (realpolitik) and the dominance of the game theoretical perspective in conflict conceptualization, methodology, and policy-making (Schelling, 1960; Von Neumann & Morgenstern, 1944). In 1944, Von Neumann and Morgenstern published their now famous *Theory of Games and Economic Behavior*, which formulated conflicts of interest in mathematical terms. Like Lewin's (1947, 1948) work in psychology, this approach emphasized the interdependent nature of disputants' interests, behavior, and fates. However, it focuses on rational decision-making in conflict, positing that there is always a "rational" choice that is the best counter-choice to that of one's opponents.

This approach has been most effective in predicting behaviors and outcomes in "zero-sum" situations, where the maximization of one party's outcomes means the minimization of the other party's outcomes. Scholars contend that the game theoretical approach is most predictive in competitive situations because of the underlying assumptions inherent in the theory of what constitutes "rational" choice (e.g., efficiency, maximization of goals, transitivity of preferences, etc.; Deutsch, 1985; Diesing, 1962). These assumptions limit the applicability of the model to more distributive, economic types of conflicts.

Conflict research from a game theoretical perspective has focused largely on the rules and strategies for *winning* conflict games,[1] but it also investigates the structure and process of interdependence between parties, with a focus on identifying the conditions for achieving a state of equilibrium or stability between them. Particularly important is the recognition that many if not most conflict situations are of a mixed-motive (cooperative and competitive) nature (Schelling, 1960). An important finding from this research is that players pursuing only their self-interest in

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[1] Central to this was the development of the "mini-max" strategy, where negotiators strive to develop strategies that limit the alternatives available to their adversaries so that when their adversaries choose to minimize their maximum loss, they will inevitably choose an alternative that is good for their side.

these games tend to end up worse-off over time than players who consider the other's concerns when making choices. The prisoner's dilemma (e.g. Axelrod, 1984), for example, has been used to investigate the strategies individuals employ under incentive structures that pit self-interest against cooperation and collective interest. This approach has shown that although competition is clearly not the best strategy, neither is consistent cooperation because it sets up the individual for exploitation. The best strategy for maximizing individuals' outcomes is responsiveness to one another's behavior in a "tit-for-tat" manner, with a readiness to move to cooperation in line with a "forgiveness" mindset.

Methodologically, game theory has had a huge impact on conflict research as it introduced game matrices, which are abstract representations of social conflicts that are precise and efficient and allow for the investigation of dynamics *over time*. In 1977, Pruitt and Kimmel documented that over 1,000 studies had been published employing experimental games. However, as Deutsch writes, "Much of this research…was mindless—being done because a convenient experimental format was readily available" (Deutsch, 2002, p. 313). In other words, although the research shed light on more rational, competitive conflict dynamics, no grand theory to better inform our understanding of conflict dynamics more generally emerged from game theory (Pruitt, 1998). Nevertheless, conflict scholars continue to work with these ideas and methods today, and it can be said that the mathematical approach of dynamical systems to conflict has been partially in response to the values and limitations of past game theoretical approaches.

Social Interdependence Theory

Based on Lewin's insight that interdependence was the essence of group dynamics (Lewin, 1936, 1948), this theory specified the basic conditions and processes involved in constructive versus destructive conflict (Deutsch, 1973). Deutsch's earlier research (Deutsch, 1949a, 1949b) showed how different *types of goal interdependence* between parties—*positive* or cooperatively linked goals versus *negative* or competitively linked goals—affect constructive versus destructive processes and outcomes in groups, respectively. When applied to conflict, the research found that constructive processes of conflict resolution are similar to cooperative problem-solving processes where the conflict is seen as a mutual problem by the parties and addressed jointly; and that destructive conflict processes are similar to competitive processes where the conflict is framed and approached as a win-lose struggle (Deutsch, 1973).

This basic idea cascaded into a variety of propositions (outlined in Deutsch, 1973) that provide a general intellectual framework for understanding conflict and how to intervene constructively. Deutsch's theory of conflict resolution is widely recognized as one of the most important advances of the twentieth century in the study of conflict (Jones, 1998). It has been validated by a large canon of empirical studies (see Deutsch, 1973; Johnson & Johnson, 1989, 2005), and has led to a wide

array of practical methodologies and training strategies for the constructive resolution of conflict (see Coleman & Deutsch, 2001; Coleman & Lim, 2001; Deutsch et al., 2006; Johnson & Johnson, 2005; Lewicki, Saunders, Barry, & Minton, 2004; Tjosvold, 1991; Tjosvold & Johnson, 1983).

However, Deutsch's theory has its limitations (see Deutsch, in press; Johnson & Johnson, 2005). Two of the most consequential are its assumptions regarding social power and interdependence. The original formulation of the theory assumed both *equal power* and *high degrees of interdependence* between the parties in conflict (Johnson & Johnson, 2005). Thus, the processes and outcomes observed in most of the empirical studies supporting the original theory occurred under these conditions.

Social Motivation Theory

Another influential model of social conflict, informed by the work of Kelley and Thibaut (Kelley & Thibaut, 1978; Thibaut & Kelley, 1959) on interdependence and McClintock (1976) on social motives, describes how both individual and situational differences in interdependence affect people's *social orientations* and thus their values and behaviors when negotiating disputes (see De Dreu, Beersma, Steinel, & Van Kleef, 2007; Van Lange, De Cremer, Van Dijk, & Van Vugt, 2007). Although a variety of different social motives have been identified (e.g., altruistic, competitive, and individualistic), most of the research on negotiation and conflict has focused primarily on the effects of *pro-self* versus *pro-social* motives. Pro-self motivation combines both individualistic and competitive goals into one motivational orientation, whereas pro-social motivation combines both cooperative and altruistic goals.

Research has shown that negotiators with a pro-self motive seek to maximize their own outcomes and have little or no regard for the other party's outcomes, tend to see negotiation as a competitive game where wielding power and winning are key, and selectively search and process information that is consistent with this competitive view (De Dreu et al., 2007). In contrast, negotiators with a pro-social motive seek fair outcomes that maximize both one's own and the other party's goals, tend to view negotiations in more cooperative terms where harmony, solidarity and fairness are important, and seek information that validates this view. This research has found that while social motives have a strong dispositional component (De Dreu & Van Lange, 1995), the tendency to adopt a pro-self or pro-social orientation can also be triggered by reward structures (e.g., Weingart, Bennet, & Brett, 1993) and social cues (e.g. Burnham, McCabe, & Smith, 2000).

The research on social motives has highlighted the importance of motivational orientations in affecting short-term responses to conflict, and sheds light on some of the social-cognitive processes associated with pro-self and pro-social motives. But it has two significant limitations. First, by collapsing together distinct motives such

as competition and individualism in conflict, it often *conflates* what may in fact be important conflicting tendencies in some social situations (maximizing one's own outcomes versus accepting less in order to defeat the other party). Second, research on social motives has tended to investigate the comparative effects of distinct motivational orientations (cooperation, egalitarianism, altruism, etc.) in conflict, but has yet to fully address how these basic aspects of social relations can be *integrated* into an account of how social motives function together in conflict (see Van Lange et al., 2007).

Dual-Concern Theory

This approach was originally conceived as a model of individual differences in conflict resolution styles (Blake, Mouton, Barnes, & Greiner, 1964; Filley, 1975; Rahim, 1983, 1986; Thomas, 1976), but has subsequently been developed into a more predictive theory of choice and strategy under different motivational conditions in conflict (Pruitt & Kim, 2004; Pruitt & Rubin, 1986). It proposes that differences in two basic concerns of disputants—concerns for their own outcomes and concerns for the other parties' outcomes (ranging from weak to strong)—combine to affect the strategies people choose in conflict, including *yielding*, *avoiding*, *contending*, *problem-solving*, and *compromising*. With this model, Thomas (1976) extended Deutsch's one dimensional model (competitive or cooperative) to include a second dimension, as he saw self-concern and other-concern as orthogonal interests, which can function independently. These two concerns can differ according to social conditions (reward structures, social and cultural norms, etc.) and individual differences in style preferences.

Dual-concern theory has received some empirical support (e.g., Sternberg & Dobson, 1987; Van de Vliert & Kabanoff, 1990) and has begun to address how motivational differences (concerning both self and other) can operate orthogonally and vary by *degrees of importance*. Subsequent research on this model has primarily focused on the conditions that foster self and other concerns in conflict, but has also indentified how strategic choice is moderated by peoples' resistance to yielding (Druckman, 1994; Pruitt, 1998) and the perceived feasibility of employing different strategies in particular contexts (Kelley, 1967; Pruitt, 1981; Pruitt & Kim, 2004). However, the model has yet to address how differences in the *power* distribution of parties affect people's strategies and choices in conflict situations. This shortcoming limits the generality and predictive power of the model.

Power Dependence Theory

Many studies of power differences in negotiations are based on the theory of power dependence (e.g., Gerhart & Rynes, 1991; Kim & Fragale, 2005; Mannix, Thompson, & Bazerman, 1989; Ng, 1980). Situated within the broader framework of interdependence theory (Kelley & Thibaut, 1978; Thibaut & Kelley, 1959),

power dependence theory states that "the power of A over B is equal to and based upon the dependence of B on A" (Emerson, 1962, pp. 32–33). Dependence is based on two dimensions of the negotiation situation (1) it is directly proportional to the value attributed by a party to the outcome at stake, and (2) it is inversely proportional to the availability of this outcome through alternative sources. Laboratory research on negotiations has generally supported this model, finding that negotiators who hold more attractive BATNAs (Best Alternatives to a Negotiated Agreement—or the possibility of achieving desired outcomes through alternative means) or who are able to increase the other party's dependence, are less dependent on their negotiation partners and thus possess greater power relative to them and obtain better outcomes in negotiations (Kim, 1997; Kim & Fragale, 2005; Mannix, 1993; Pinkley, Neale, & Bennett, 1994).

Power dependence theory has been particularly predictive in the realm of distributive or competitive negotiations, but also has its limitations (see Kim & Fragale, 2005). Most notably, by defining and operationalizing power *solely* as "asymmetries of dependence", the model overlooks the many other types of power and influence operating in social relations to shape conflict dynamics. Beyond that, it does not incorporate the potential for *change* in the differential dependencies among parties to a conflict over time (Kim et al., 2005).

Social Identity Theory

Some conflicts become deeply anchored in the way people define themselves and their own groups, which contributes greatly to their intractability. Social Identity Theory (SIT; Tajfel & Turner, 1979) has advanced the understanding of the individual psychological processes at the root of ethnocentrism and intergroup conflict by emphasizing the link between group identification and intergroup relations. SIT was developed in the context of research on realistic conflict theory (Campbell, 1965; Sherif, Harvey, White, Hood, & Sherif, 1961), where intergroup hostility is viewed as the result of competition over real or perceived scarce resources. Researchers set out to identify the minimum baseline for resource scarcity that would trigger intergroup conflict, and were surprised to find that simply categorizing people into arbitrary groups seemed to elicit ethnocentric ingroup bias (Tajfel, 1970). These findings seemed to indicate that scarcity of resources was not a necessary precondition for intergroup conflict, since the introduction of even minimal group distinctions was sufficient for initiating competitive intergroup relations.

Building on the results from the minimal group paradigm, Tajfel and Turner (1979) developed a model proposing a link between group categorization and tendencies toward ingroup bias and out-group discrimination. Essentially, social identity theory suggests that people are motivated to achieve and maintain positive self-esteem, and one avenue for achieving this is through positive ingroup

associations when compared to outgroups. In this perspective, out-group derogation provides a means of boosting one's self-esteem as a member of the ingroup. In extreme cases, the mere presence of an out-group may be seen as a threat to a positive social identity or even to a group's existence (Kelman, 1999), and thus fuel conflict intractability due to a zero-sum perception of the opposing groups identities. Research on social identity theory has focused recently on identity content (Hewstone & Cairns, 2001; Lalonde, 2002; Turner, 1999; Turner, Oakes, Haslam, & McGarty, 1994) and categorization processes (Perdue, Dovidio, Gurtman, & Tyler, 1990), and has been applied to cases of intractable conflict such as Northern Ireland (Cairns & Darby, 1998; Livingstone & Haslam, 2008). It should be noted, though, that the link between self-esteem and out-group derogation is controversial. Research on collective self-esteem (e.g., Crocker & Luhtanen, 1990; Luhtanen & Crocker, 1992) and collective narcissism (Golec De Zavala, Cichocka, Eidelson, & Jayawickreme, 2009) has established an intricate link between self-esteem and intergroup conflict at the individual and group level.

Although social identity theory has contributed to better understanding of collective behavior including ingroup bias, responses of subordinate groups to their positions of unequal status, and intragroup homogeneity and stereotyping, the relationship between group identification and ingroup bias is still unclear. In addition, the generalizability of the self-esteem hypothesis across different cultures, as well as its relevance for asymmetric conflicts and low-status groups, has been questioned (Brown, 2000), and it has also been criticized for its lack of predictive power (Hogg & Williams, 2000; Turner & Reynolds, 2001). In one meta-analysis, Hinkle and Brown (1990) found that across 14 studies, the overall association between identification and intergroup bias was negligible. Although social identity theory may explain some key mechanisms at play in intergroup conflict, the multitude of other factors contributing to conflict and intractable conflict in particular (see Coleman, 2003) may limit the role of identity in fully explaining the dynamics of intractable conflict.

The six models outlined in this section have made considerable inroads into our understanding of constructive versus destructive conflict in social relations. However, because these inroads have often proceeded in somewhat different directions, we today find ourselves with a rather fractured understanding of conflict dynamics. We currently have a series of mid-level or micro-level models of conflict antecedents, processes, and outcomes that have yet to become convergent with a more general theory of social relations. Clearly, the time is ripe for a more comprehensive approach to social conflict.

Contemporary Social Psychological Themes

A concern with the nature of social conflict is also represented in several contemporary approaches to conflict. These approaches span different levels of analysis, incorporate different aspects of conflict processes, and consider different

characteristics of conflict and of the conflicting parties. Below we provide a brief
overview of these orientations by focusing on the particular themes they address.

Can Conflicts Have Positive Consequences?

During the last 15 years, there has been an interest in exploring the potentially
positive consequences of conflict. The basic idea is that dissent based on differences
in knowledge, opinions, and expertise can be beneficial when such views are
integrated constructively (De Dreu & Weingart, 2003). In this context, task
conflict—which refers to conflicts about the distribution of resources, procedures
and policies, judgments and interpretations—has been found to enhance under-
standing of the matter at hand and thus lead to better performance as well as
increased creativity and innovation (Schulz-Hardt, Mojzisch, & Vogelgesang, 2008).
Even though meta-analyses (De Dreu & Weingart, 2003; De Wit, Greer, & Jehn,
2012) do not support the positive consequences of task conflict per se, it is to date
assumed that under specific circumstances positive consequences of conflict can
be found. For example, the motivated information processing perspective assumes
that cooperative outcome interdependence might set the stage for constructive
and task-relevant exchanges of information, but only when individuals engage in
systematic information processing, in order to combine and integrate the informa-
tion held by individuals (e.g., Bechtoldt, De Dreu, Nijstad, & Choi, 2010;
Brodbeck, Kugler, Fischer, Heinze, Fischer, 2011; De Dreu, Beersma, Stroebe, &
Euwema, 2006). In contrast, relationship conflict—which refers to conflicts about
personal taste, political preferences, values, and interpersonal style—appears to
lack the potential for positive consequences.

Which Motives Drive Individuals' Behaviors in Conflict Situations?

In most conflicts, goal interdependence is neither purely cooperative nor purely
competitive but rather reflects mixed motives (Katz & Kahn, 1978). Accordingly,
contemporary research has focused on how bundles of motives drive individuals in
such situations. Mixed-motive situations offer incentives to invest in the collective
goal as well as in personal benefit. Depending on personal factors as well as
situational influences, mixed-motive conflict scenarios promote either pro-social
motives or pro-self motives. Whereas pro-social motives drive individuals to focus
on a common benefits and goals, pro-self motives are linked to goals and concerns
with personal benefit (De Dreu, Weingart, & Kwon, 2000).

What Factors Activate Biases and Stereotypes Regarding Out-groups in Conflict Scenarios?

It is not surprising that extremists openly favor their own in-group *vis a vis* out-groups, and that they harbor prejudice and stereotypical views regarding out-groups as well (Fiske, 2002). These features of in-group—out-group relations, however, also characterize people who are moderate in their views and not in direct conflict with an out-group. These biases are mostly automatic and unconscious (Dovidio & Gaertner, 1986; Fiske, 1998, 2000), but nevertheless can influence everyday behavior. For example, people tend to behave and speak in a less friendly manner and to withhold positive behaviors that suggest liking and respect toward out-group members. Interestingly, there is evidence that out-group cues heighten activity in the amygdala, the center in the brain of fear and anxiety (Fiske, 2002). This is true for moderates as well for those with explicitly antagonistic views of out-group members. There is debate, however, whether these biases are unconditionally versus conditionally automatic (i.e., unlearned vs. learned), since factors such as education, economic opportunity, and constructive contact among groups have been found to decrease the biases and their consequences.

What Promotes and Maintains Oppression Between Groups?

Social dominance theory (Sidanius, Pratto, van Laar, & Levin, 2004) focuses on individual and structural factors that contribute to various forms of oppression (e.g., discrimination, racism, ethnocentrism, classism, sexism) among social groups. Oppression itself is seen as a specific form of a more general human tendency to form and maintain group-based hierarchies. Sidanius, Levin, Federico, and Pratto (2001), for example, argue that humans have a desire for unequal relations among social groups, regardless of whether this means in-group domination or in-group subordination. In these unequal relations, oppression is driven by systematic institutional and individual forms of discrimination, evident in the disproportional allocation of desired goods (e.g., prestige, wealth, power, food, health care) to the privileged groups and the greater allocation of undesirable things (e.g., dangerous work, disdain, imprisonment, premature death) to members of less privileged groups. The research on social dominance theory studies the determinants of group-based oppression at multiple levels of analysis, ranging from the individual within a group to the entire system in which groups are embedded.

Why Do Conflicts Endure?

System justification theory explores majority and minority group investment in the status quo by focusing on the "process by which existing social arrangements are legitimized, even at the expense of personal and group interest" (Jost & Banaji,

1994, p. 2). The theory suggests that individuals are inclined to legitimize, justify, and maintain the status quo (Jost & Banaji, 1994), and it distinguishes three different motives or justification tendencies: *ego justification* (the need to develop and maintain a favorable self-image); *group justification* (the desire to develop and maintain favorable images of one's own group), and *system justification* (social and psychological needs to legitimize the status quo of the entire system). Members of advantaged groups—having a favorable self-image, group-image, and the need to maintain the status quo—do not have a desire to change a system. Members of the disadvantaged groups are only likely to engage in social change when ego justification and/or group justification motives are stronger than system justification needs and tendencies (Jost, Banaji, & Nosek, 2004).

What Factors Foster Escalation and De-escalation in Conflicts?

Researchers have analyzed past conflicts to identify the factors that inhibit versus escalate conflict escalation. The factors identified thus far include the expansion of issues, the polarization of relations, the involvement of other biased parties, dehumanization of the adversaries, and a homogenous in-group (Kriesberg, 2003). On the other hand, factors such as sympathy and empathy, new interests, shared norms, modeling de-escalating conflict strategies, a loss of faith in the justice or legitimacy of the goals as well as growing interdependence between the parties have been identified as mitigating escalatory trends (Kriesberg, 2003).

When Is the Optimal Moment for Attempts at Conflict Intervention or Resolution?

Research on ripeness theory (Zartman, 1989, 2000) has identified basic factors that determine when a conflict is ripe for an attempt at resolution. Zartman (2000) writes: "The concept of a ripe moment centers on the parties' perception of a mutually hurting stalemate, optimally associated with an impending, past, or recently avoided catastrophe. ... The other element necessary for a ripe moment is ... the perception of a way out, ... a sense that a negotiated solution is possible for the searching and that the other party shares that sense and the willingness to search too" (p. 228). However, ripeness theory has been criticized on many grounds including being too passive, static, and simplistic a model (Pruitt, 1997; Rubin, 1991), but has recently been reconceptualized in dynamical-systems' terms (Coleman, Hacking, Stover, Fisher-Yoshida, & Nowak, 2008).

The Promise of Dynamical Systems

Although classic and contemporary research on conflict has made great strides toward understanding the conditions and processes that determine whether conflict will take a constructive or destructive course, none of these ideas fully explain the paradoxical and diverse nature of intractable conflict. The ideas are especially wanting when it comes to the small proportion of conflicts that progress to intractability. This is where the core assumptions and insights of dynamical systems enter the picture. These assumptions and insights have transformed the way scientists conceptualize and investigate phenomena in the physical sciences and there is reason to believe that they will do the same for the social sciences in general, and for the study of social conflict in particular.

What new perspectives can dynamical systems give us in understanding the causes of conflicts and how to resolve them? Some of the important issues in conflicts are to understand (1) whether latent conflicts are triggered into active conflicts only when some variables exceed certain threshold values; (2) how the patterns of behavior in groups develop from the many and diverse interactions between individual people; (3) whether almost identical conditions do, or do not, result in similar conflicts; (4) whether seemingly random events are really due to undeterminable influences; and (5) how we can assess, and perhaps even predict, the statistical properties of the variables that describe a conflict.

Perhaps surprisingly, quite similar questions have been asked about the properties of physical and biological systems. The success of dynamical systems in answering such questions in those fields gives us the hope that these methods may also shed new light on social systems such as conflicts. We will now describe how dynamical systems have addressed similar questions in three different physical or biology systems: the motion of air in the atmosphere, the spread of infectious diseases, and the movement of sand in a sand pile. Our understanding of the use of dynamical systems in these physical and biological systems can then be our springboard in using dynamical systems to develop a new perspective in social psychology on conflicts.

Saltzman (1962) and Lorenz (1963) used dynamical systems to understand a highly simplified model of the motion of air rising and falling in the atmosphere over the earth. The air is heated by the surface of the earth and cooled by the top of the atmosphere. The solution of the mathematical equations that they formulated to represent the air shed light on issues similar to those listed above. First, when the temperature difference between the earth and the top of the atmosphere is small, heat flows from one patch of air to the next and all the air remains motionless. But, if the temperature difference is larger than a critical value, the air starts to move. This happens because the heat from the earth is enough to expand each patch of air reducing its density, making it float up in the atmosphere. How high it floats depends on how much it has expanded, how fast it moves, and the temperature in the atmosphere around it. Thus, when a certain variable (the temperature

difference) exceeds a threshold, the entire nature of the system changes (issue #1). Second, the motion of individual patches of air organize into an overall global pattern (issue #2). The air circulates up on one side and then down on the other side of large long cylinders. This is an example of "self-organization" and "emergence" where the local interactions between the tiny parts of a complex system, here the small patches of air, produce a globally organized pattern.

Third, and perhaps the most unexpected, surprising, and deeply important result of the dynamical system analysis by Lorenz was that if the initial motion of the air was started at only very slightly different speeds, then the motions later could be remarkably different (issue #3). That is, almost identical initial conditions would lead to patches of air that were moving upward on one part of the earth in one case but downward at that same part of the earth in another case. This result became known as "sensitivity to initial conditions" or more commonly called the "Butterfly Effect", meaning that the small effect on the air of a butterfly beating its wings in Kuala Lumpur, Malaysia could determine whether or not, a week later, there is a violent thunderstorm over New York City.

This important finding on initial conditions led to a new way to interpret experimental data and to think about physical (or social) systems (Liebovitch & Scheurle, 2000). Because there will always be the tiniest difference in the initial conditions each time we run the same experiment no matter how closely we try to match them, the Butterfly Effect means that the time series of measurements can be different, even very different, when we repeat the same experiment. We expect though that there is something that should indeed be the same every time we run a similar experiment. In fact, Lorenz found that certain combinations of the variables that describe the motion of the air traced out a pattern that was the same each time. This pattern is called an *attractor* (issue #4). Even though the time series of the variables can be different every time, the attractor remains the same. This is because the combination of the variables of each time series traces out a slightly different part of the attractor, but it is still the same attractor. It is called an attractor because every time an experiment is run on the same system, the values of this combination of variables are always drawn to those found only on the attractor. The importance of attractors is that the variables of some dynamical systems, no matter their initial values, always evolve in time to only these certain values. We will see throughout this book the central role that attractors play in understanding social systems in general and intractable conflicts in particular.

Dynamical systems have also been used to shed light on the spread of infectious diseases such as chickenpox, measles, and mumps. Over the last 100 years (Anderson & May, 1991) SEIR mathematical models have been used to describe the time course of how the number of susceptible individuals (S) become exposed to disease (E), develop the infection (I), and then recover (R). These equations are deterministic, meaning that the number of people in each S, E, I, and R group at any one moment can be directly computed from the number at the previous moment. Even though that is the case, the number of people infected each winter can vary in

a seemingly random way (Schwartz, 1992) (issue #5). That such deterministic systems can produce behavior that seems to be due to chance became known as "chaos". Contrary to its usual meaning, here chaos means that a deterministic system, which is completely uninfluenced by chance, can generate effects so complex and unpredictable that they appear to be due to chance. That seeming random social behaviors can be produced by deterministic social mechanisms is another useful lesson for social psychology from the study of dynamical systems in physics and biology.

Dynamical systems have also been used to gain a better understanding of how local interactions between small parts in a physical system can produce "emergent" global behavior. For example, in many physical systems, added stress is tolerated between small parts until a threshold is exceeded and then that stress is relieved by being distributed to the neighboring parts. The eponymous example is that of a sand pile. Sand is added at the top until the local slope exceeds a critical value sending some sand downhill. The sand that flows downhill may then increase the local slope there to beyond the critical value and so on down the sand pile. The result is called "self-organized criticality" because the system self-organizes itself to being just under the critical slope everywhere needed for the sand to move downhill. The lesson from dynamical systems here is that some systems are poised to be near their least stable configurations and thus far from their stable equilibrium.

Self-organizing criticality has been useful in understanding many different systems, including the timing and severity of earthquakes, forest fires, traffic jams, city growth, market fluctuations, and the sizes of companies (Bak, 1997; Turcotte & Rundle, 2002). What is perhaps most relevant for social psychology is that self-organizing criticality produces a characteristic signature in the statistical distribution of the fluctuations in the variables that measure the properties of a system (issue #6). That characteristic statistical distribution is called a *power law* or *fractal distribution* (Brown & Liebovitch, 2010). If this statistical distribution is observed in a social system, self-organized criticality is a possible mechanism that could have produced that self-organization.

In summary, dynamical systems have been useful in analyzing physical and biological systems to understand threshold effects, how emergent patterns self-organize, sensitivity to initial conditions, whether chance is really needed to explain seemingly random data, and the statistical properties of the variables of those systems. This suggests that the use of dynamical systems may be equally valuable in understanding similarly important issue in the social psychology of conflicts.

Summing Up and Looking Ahead

Although a relatively new perspective, the dynamical systems approach to conflict has deep roots in other theoretical orientations and research. This chapter briefly sketches the theoretical origins of the dynamical systems approach to conflict,

tracing its trajectory through (1) peace and conflict studies, (2) social psychology, and (3) complexity science. Each of these traditions is valuable yet limited. The peace and conflict perspective has revealed paradoxical features of conflict and established the diverse forms that conflict can take at different levels of social reality. Within this tradition, five paradigms have been advanced to provide insight into the principles by which conflict has been studied: realism, human relations, pathology, post-modernism, and systems.

Next, we have briefly outlined six influential social psychological perspectives on conflict: game theory, social interdependence theory, social motivation theory, dual-concern theory, power dependence theory and social identity theory. Although these traditions and theories constitute rich soil for comprehending conflict, they still fail to address the key theoretical, methodological and practical challenges posed by intractable conflicts.

In the last sections of this chapter we presented recent developments in complexity science and dynamical systems, and broached the potential value of these developments for a comprehensive study of conflict. We demonstrate that dynamical systems have been useful in analyzing physical and biological systems to understand threshold effects, self-organization, emergent properties of complex systems, or sensitivity to initial conditions. We propose that the use of dynamical systems may be equally valuable in understanding important issues of social conflict. What is more, the language and concepts of this approach offer a promise of integration of existing knowledge in the fragmented field of conflict studies.

In sum, although classic and contemporary research on conflict has made great strides toward understanding the conditions and processes that determine whether conflict will take a constructive or destructive course, none of these ideas fully explain the paradoxical and diverse nature of intractable conflict. The ideas are especially wanted when it comes to the small proportion of conflicts that progress to intractability. This is where the core assumptions and insights of dynamical systems add value. This perspective has transformed the way scientists conceptualize and investigate phenomena in the physical sciences and there is reason to believe that they will do the same for the social sciences in general, and for the study of social conflict in particular. The dynamical systems approach to conflict constitutes an integrative platform for several traditions of research and theories; such a platform can promote the emergence of a unique and coherent understanding of some key features of intractable conflicts.

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