Navigating the Landscape of Conflict: Applications of Dynamical Systems Theory to Addressing Protracted Conflict

Peter T. Coleman, Robin Vallacher, Andrea Bartoli, Andrzej Nowak and Lan Bui-Wrzosinska

Introduction

Conflict is a fundamental feature of social relations. People commonly differ in their respective interests, values and points of view, so social contact – whether between individuals or between groups – holds potential for promoting disagreement, tension and confrontation. Conflict is generally adaptive, promoting the evolution of new ideas and rules of conduct that enable individuals and groups to adjust to changing realities. But conflict can also be highly maladaptive, with the potential to destroy a relationship or undermine a social system. Some of the most pressing problems in the contemporary world – homicide, terrorism, war, genocide – are manifestations of social conflict. The destructive forms of conflict are also the hardest to explain with recourse to traditional motivational assumptions (Coleman 2003). The issue that initiated a conflict may be forgotten or even resolved without reducing the antagonism among the parties. Continuation of the conflict, moreover, often works in opposition to the satisfaction of the parties' respective self-interests with respect to resources, security and well-being. Yet, even though destructive conflicts are often self-defeating, they can become protracted to the point of apparent intractability (Coleman 2003, 2004).

We suggest that these hard-to-fathom features of destructive conflict can be understood from the perspective of non-linear dynamical systems, an approach that has revolutionized scientific understanding of phenomena in virtually every domain over the last 30 years (cf. Gleick 1987; Johnson 2001; Schuster 1984; Strogatz 2003).

Broadly defined, a dynamical system is simply a set of elements that interact over time in accordance with simple rules. The task of dynamical systems theory is to specify the nature of these rules and the system-level properties and behaviours that emerge from the repeated iteration of these rules. In recent years, the dynamical systems perspective has been adapted to investigate personal, interpersonal and societal processes under the guise of "dynamical social psychology" (cf. Nowak/Vallacher 1998; Vallacher/Nowak 1994, 2007). The most recent extension of this approach focuses on the defining features of conflict that are invariant across levels of social reality, from intimate relations to international war (cf. Coleman et al. 2007; Nowak et al. 2006; Vallacher et al. 2010). Our aim in this chapter is to present the essence of the dynamical approach to conflict, with emphasis on the added value of this approach for untangling the mysteries of intractable conflict and providing new guidelines for the resolution of such conflicts.

To demonstrate the practical utility of our perspective, we couch our discussion in a real-world context: the seemingly intractable 16-year long civil war and subsequent outbreak of peace in Mozambique in the late 1980s. The first section of the chapter provides an overview of this conflict, highlighting features that figured prominently in its eventual (and unexpected) resolution. Using the Mozambique case as an illustration, the second section presents the essential features of the dynamical account of seemingly intractable conflict. We emphasize the tendency of systems to evolve in the direction of increasing coherence, a dynamical property that is often adaptive but that can also trap systems in patterns that are maladaptive and difficult to escape. In the third section, we discuss the implications of our approach for the understanding and empirical investigation of protracted social conflicts, including feasible avenues of intervention for transforming these malignant conflicts into benign and peaceful social relations.

1. The Persistence of Conflict and the Emergence of Peace in Mozambique

Mozambique was a Portuguese colony for more than 400 years. Explored by Vasco de Gama at the end of the 1400s, it soon became part of the elaborate network of trade routes established by the Portuguese across the globe. After the end of World War II, when the process of de-colonization led European powers to relinquish control of their colonies, the Portuguese resisted and engaged in a long and bloody war with independence forces in Mozambique, led by the Frente de Libertação de Moçambique (FRELIMO). While these forces were able to control some territory, they were unable to fully liberate the country until a leftist military coup in Lisbon in 1974 made the metropolis change centuries' old policies and grant independence to Mozambique. The enthusiasm for the new found independence, which was formally declared on June 25, 1975, was tangible and vivid. Authentic expressions of joy and pride were shared across the whole country from the capital in the south to the northern border with Tanzania.

Unfortunately, the conditions of the country and in particular of the nature of the transition were far from auspicious. Portugal had had very tight control of the country's administration and so most qualified labour left the country at the moment of independence. Rhodesia and South Africa – at that time actively ruled by white supremacists – immediately sought ways to destabilize the new government. Moreover, the independence enthusiasm of the population was misinterpreted by the FRELIMO leadership as 'revolutionary fervour', setting the stage for harsh and demanding policies. Two of these policies were particularly relevant: 1) mass relocation of the population and 2) disempowerment of local traditional authorities. FRELIMO's aim was to bring Mozambique together as a unified country, overcoming tribal and ethnic distinctions. However, the haste and violent implementation of the policies, as well as the foreign meaning of the new identity imposed on the population, provoked a reaction that led first to boycotts and then to open rebellion by the Resistência National Moçambicana (RENAMO). This movement was actively supported by Rhodesia and South Af-

rica. RENAMO's strategy was to make sure that a government controlled by FRE-LIMO would never be functional. They intentionally attacked civilians and forcefully recruited young boys as soldiers. The two sides co-constructed a very stable and effective system of enmity.

The subsequent war ravaged the country for many years with the involvement of many external actors. The interests of neighbouring states such as Rhodesia and South Africa, as well as competing ideologies, made the emergence of a peaceful solution highly improbable. Exclusionary rhetoric was followed by adversarial posturing and moderate stands were marginalized and/or eliminated. Even at the end of a long and very destructive cycle of violence, the interlocking dynamics made it very difficult to find the pathway to a solution.

While the conflict between FRELIMO and RENAMO became more entrenched, an unexpected group of actors began to explore alternatives to the harsh, exclusionary policies of both sides by seeking engagement and respectful inquiry. A young, native, national bishop, Msgr. Jaime Gonçalves, was linked to a Catholic NGO, the Community of Sant'Egidio, which had already engaged with the FRELIMO government to facilitate religious freedoms in the second half of the 1970s. These efforts had been successful and led in 1986 to the President of Mozambique, Samora Machel, visiting the Vatican. After the unexpected death of President Machel, the new leader, Joaquim Chissano, started seeking the help of religious leaders to establish contacts with RENAMO. Using its channels, Sant'Egidio was able to arrange for a secret visit by Bishop Gonçalves to RENAMO headquarters. This first meeting in 1988 became a turning point. At this meeting, Bishop Gonçalves and Afonso Dhlakama, the leader of RENAMO, were surprised to discover that they were of the same ethnic tribe and spoke the same dialect. This meeting was the cornerstone of a peacemaking process that led to the signature of the General Peace Agreement (GPA) on October 4, 1992, and beyond. It must be noted that Gonçalves and the Community of Sant'Egidio never had the power to force the parties to reach an agreement and that this attempt was the last of many prior attempts. Efforts to bring the two parties together were made by regional and international actors (Zimbabwe, Kenya, Malawi, private investors and so on) with the support of the Mozambique leadership, but failed due to the inability of the third party to design a process that was at the same time engaging and respectful. Today, Mozambique is united, stable, relatively prosperous and at peace. How could this have happened?

2. The Dynamical Framework for Understanding Intractable Conflict

A defining feature of intractable conflicts, like the protracted civil war in Mozambique, is that they display strong resistance to intervention even when rational considerations would seemingly defuse the animosities at work (cf. Azar 1990; Bar-Tal 2007; Bercovitch 2005; Burton 1987; Coleman 2003; Goertz /Diehl 1993; Kriesberg 2005). Research has identified numerous psychological processes relevant to conflict intractability (cf. Bar-Tal 2007; Coleman 2003; Deutsch et al. 2006). Because an intractable

conflict is entrenched in a wide variety of cognitive, affective and social-structural mechanisms, it is effectively decoupled from the perceived incompatibilities that launched it.

2.1 Attractor Dynamics

From the perspective of dynamical systems, conflict intractability develops when the various social and psychological processes interact over time to promote the emergence of a stable and coherent pattern of thought and behaviour organized around perceived incompatibilities. These patterns function as attractors (Schuster 1984) for the system of thought and behaviour, in that they constrain or 'attract' the mental and behavioural dynamics of each party to the conflict. As a conflict evolves towards intractability, each party's thoughts, feelings and actions – even those that seem irrelevant to the conflict – take on a meaning that maintains or intensifies the conflict. Metaphorically, the attractor serves as a valley in the psychological landscape into which the psychological elements – thoughts, feelings and actions – begin to slide. Once trapped in such a valley, escape requires tremendous will and energy and may appear impossible.

In psychological and social systems, an attractor represents a narrow range of mental states and actions that is experienced by a person or group. These psychological states are mutually congruent in their subjective meaning and thus provide a coherent frame of reference in processing information and deciding how to act towards others. Attractors thus promote stability in thought and behaviour despite changing conditions and contradictory information. In the absence of an attractor, a person or group can change in response to whatever influences and forces it experiences. When mental and behavioural dynamics are governed by an attractor, however, the person or group demonstrates strong resistance to external influences that would otherwise promote a different pattern of thought and behaviour. An external influence may promote a temporary change in the way a person or group thinks and behaves, but over time the entity will return to the pattern defined by the attractor.

This perspective provides a new way to conceptualize and address intractable conflict. Conflicts are commonly described in terms of their intensity (e.g. amount of violence), but this feature does not capture the issue of intractability. Even conflicts with a low level of intensity can become protracted and resistant to resolution. We propose instead that intractable conflicts are governed by strong attractors for negative dynamics and weak attractors for positive or even neutral dynamics. Hence, knowledge of the attractor landscape of a system – the ensemble of sustainable states for positive, neutral and negative interactions – is critical for understanding the progression, transformation and de-escalation of intractable conflicts. Attempts at conflict resolution thus are likely to fail if they do not work towards the achievement of sustainable positive states (i.e. attractors for positive interaction). They may result in a temporary ceasefire, but not in long-term co-existence or peace. If no positive sustainable states exist, the first step at intervention should focus on changing the ensemble of sustainable states. Only after such change has occurred can the system be effectively moved to a benign or positive state.

This scenario can be seen in the Mozambique case. A key experience associated with the Mozambique war was that the stakeholders in the conflict had little opportu-

nity for movement: they were locked into enmity positions by power structures, meaning systems and relational dynamics. Any alternative to the state of war and escalation was believed to be impossible. Communications and actions moving the system in the direction of a peaceful resolution were intentionally avoided and strictly controlled. Even the idea of reconciliation was dangerous; any person who broached the topic could be executed as a traitor. The emergence of the system of peace, correspondingly, was experienced as a consequence of 'movement'. Actors from opposite sides started to communicate cautiously, eventually becoming able to react to arguments and at least slightly and gradually begin to change their positions. The observed trajectory of the process as it moved from a tightly-coupled, constrained system of enmity towards a more dynamic and thus sustainable peace can be understood with regard to its dynamical and structural properties as movement away from a very strong and limiting attractor for war to a much less constraining, but nonetheless stable, attractor for peace.

2.2 Attractors and the Collapse of Complexity

The relationship between conflicting parties may be characterized by incompatibility with respect to many issues, but this state of affairs does not necessarily promote intractability. To the contrary, the complexity of such relationships may *prevent* the progression towards intractability or even enhance the likelihood of conflict resolution. Because each party may lose on one issue but prevail on others, conflict resolution is tantamount to problem solving, with both parties attempting to find a solution that best satisfies their respective needs (Fisher et al. 1991).

It is the *collapse* of complexity that promotes conflict intractability. When distinct issues become interlinked and mutually dependent, the activation of a single issue effectively activates all the other issues. The likelihood of finding a solution that satisfies all the issues is thus correspondingly diminished. For example, if a border incident occurs between neighbouring nations with a history of conflict, there is likely to be a reactivation of all the provocations, perceived injustices and conflicts of interest from the past. The parties to the conflict are thus likely to respond disproportionately to the magnitude of the instigating issue. Even if the instigating issue is somehow resolved, the activation of other issues will serve to maintain and even deepen the conflict. Mozambique is a good example of how single episodes were 'read' and 'understood' in the context of a general conflict 'reactivating' the whole system. Even after the signature of the agreement, some violent incidents – most probably caused by communication errors – created a whole resurgence of violence at the risk of the complete collapse of the peace process because they reactivated the reactionary, destructive responses.

The loss of issue complexity is directly linked to the development of attractors. Interpersonal and intergroup relations are typically multi-dimensional, with various mechanisms operating at different points in time, in different contexts, with respect to different issues and often in a compensatory manner. The alignment of separate issues into a single dimension, however, establishes *positive feedback loops*, such that the issues have a mutually reinforcing rather than a compensatory relationship. All events that are open to interpretation become construed in the same fashion and promote a consistent pattern of behaviour vis-à-vis other people and groups. The common state,

towards which diverse thoughts and behaviours converge, represents a fixed-point attractor for the system. Even an unambiguous event that runs counter to the attractor can be assimilated to the attractor. A peaceful overture by the out-group, for instance, may be seen as insincere or as a trick if there is strong antagonism towards the out-group. When the Catholic Bishops Conference of Mozambique produced the pastoral letter on peace, for example, the intention was to open a space for dialogue and explore possibilities that were not currently available to a political system dominated by the conflict. The response from the forces controlling the conflict was exceedingly vicious, calling the bishops 'macacos' (apes) in public and associating them with the enemy.

2.3 Manifest and Latent Attractors for Conflict

A psychological system may have multiple attractors (e.g. love and hate in a close relationship), each providing a unique form of mental or behavioural coherence. When the system is at one of its attractors, the others may not be visible to observers, perhaps not even to the participants. These *latent attractors*, though, may be highly important in the long run because they determine which states are possible for the system if and when conditions change. Critical changes in a system, then, might not be reflected in the system's observable state but rather in the creation or destruction of a latent attractor representing a potential state that is currently invisible to all concerned.

The potential for latent attractors has important implications for intractable conflict (Coleman et al. 2006, 2007; Nowak et al. 2006). For example, although such factors as objectification, dehumanization and stereotyping of the out-group can promote intractable intergroup conflict (Coleman 2003; Kriesberg 2005), their impact may not be immediately apparent. Instead, they may create a latent attractor to which the system can abruptly switch in response to a provocation that is relatively minor, even trivial. By the same token, although efforts at conflict resolution may be fruitless in the short run, they may create a latent positive attractor for intergroup relations, thereby establishing a potential relationship to which the groups can suddenly switch if conditions permit. A latent positive attractor, then, can promote a rapid de-escalation of conflict, even between groups with a long history of seemingly intractable conflict. This possibility is consistent with research on the dynamics of social judgement (cf. Latané/Nowak 1994). When the judgement context has strong personal relevance, thoughts and feelings tend to sort themselves categorically, with each category representing a different value (very positive versus very negative). If a person's judgement changes, it does so in an abrupt, non-linear, qualitative manner rather than in a slow, linear and incremental fashion.

2.4 Changing Attractor Landscapes

Peaceful relations correspond to the existence of a strong attractor for positive interactions. If an external event moves the system out of its attractor (e.g. a momentary increase in hostility), the system will shortly return to its attractor (e.g. the parties will resolve the issue). With increased provocation (e.g. sustained hostility by one party),

however, the positive attractor may be weakened or replaced at some point by an attractor corresponding to negative interactions. There are two different routes by which this may happen (cf. Ruelle 1989; Thom 1975).

In a *linear scenario*, observed under conditions of high complexity, increased provocation on one side will result in a gradual change of the positive attractor to increasingly negative values (e.g. from friendly to neutral, unfriendly and hostile). Although the value of the attractor changes, it represents the only attractor for the system. In a *non-linear scenario*, observed under conditions of low complexity, the initial attractor for peaceful interactions does not change its value, despite increasing provocation, but instead becomes progressively weaker. At some threshold value of provocation, however, a second latent attractor at high values of negativity is created. With further provocation, the positive attractor progressively weakens and the negative attractor strengthens. At some point, the positive attractor loses its stability and the relationship abruptly moves to the values defined by the negative attractor, which then governs the dynamics of the relationship.

De-escalation mirrors the escalation scenarios. In the linear case (high complexity), the attractor moves incrementally to positive values. In the non-linear case (low complexity), the progression of reconciliatory actions weakens the negative attractor and reinstates the positive (latent) attractor. At some point, the system abruptly switches from values defined by negative interaction to values defined by positive interaction – in effect, the positive attractor has become manifest and the negative attractor has become latent. This switch, however, is likely to occur at higher positive values of interaction than those values at which the system switched from negative to positive. The tendency for a system to remain at its current attractor, termed *hysteresis,* is a defining characteristic of non-linearity. It should be noted, though, that even if the interaction between parties changes to quite positive values, the presence of a latent negative attractor indicates the system's tendency to return to high negativity in response to even slight provocations.

2.5 A Scenario of Progressive Self-Organization

The dynamical framework can be made concrete by means of a hypothetical scenario in which conflict escalates to intractability. The conflict starts with someone's thoughts concerning another person that centre on a particular incompatibility with that person. A structure begins to form as separate (negative) thoughts begin to support each other. This structure grows by assimilating a growing number of other psychological processes and emotions. As a result, judgements of the person become increasingly undifferentiated and unidimensional, organized around incompatibility with the person. Eventually, hostile intentions are likely to be communicated and initiate similar processes in the other person. At this moment, two systems of conflict existing on individual levels reinforce each other and reduce the probability of positive interaction. The thoughts, feelings and behaviours of both people are processed within the structure of conflict. Conflict now exists at the interpersonal level.

As both parties seek support by recruiting other members of their respective groups, the conflict escalates on the social level, where it is sustained by links between the groups

and by positive feedback within each group. The conflict becomes sustainable because even if the person who was the source of the conflict tries to disassemble the conflict, feedback from others in either group will reinstate the conflict. With the growth in intensity of the conflict, hostility and violence become increasingly likely as a result of the mutual feedback. The structure of conflict now permeates individuals, groups, and the whole society, recruiting a preponderance of processes and events and thereby eliminating almost all chances of positive interactions between the opposing groups. At some point, the multitude of feedback loops within and between levels that sustain and support the conflict renders fruitless the attempt to disassemble even large parts of the conflict, because the conflict would become reinstated in other parts of the structure.

Protracted existence of conflict at the societal level is likely to start shaping the symbol system of those involved. Identities are built around out-group incompatibility. The terms used for referencing the out-group become dehumanizing in nature and preclude positive interactions. In effect, the protracted conflict becomes embedded in the culture of the society. When this happens, the conflict acquires a new means of maintenance and spreading. Anyone adopting the culture is likely to adopt the conflict embedded within it. People who never had contact with out-group members are nonetheless unlikely to form sustainable positive or even neutral relationships with the members of the out-group. In this way, conflict is passed on through generations.

An intractable conflict can be looked upon as a 'malignant' social relation (Coleman 2003). Cancer works by penetrating the structure of the organism and enslaving essential elements of the body, which then lose their original functions and begin working in service of the structure of cancer. The collapse of complexity associated with intractable conflict is visible in the same process. The multitude of psychological and social processes necessary for the maintenance of mental structures, religions and societies become enslaved into the one-dimensional structure of conflict. Their original functions essentially vanish. As the machine of war is established and grows, it encompasses a growing number of social, economic and political processes, focusing them all in a single issue within the conflict.

In such a structure, love, friendship, or even professional contact between members of the opposing parties will not be recognized as such but rather interpreted as collaboration with the enemy, weakness or treason. The richness and multidimensionality of all the processes occurring in a healthy society become entrained in the structure, leaving no opportunity for positive interactions. The structures of intractable conflict can sustain multiple states, such as attack, revenge, temporary truce and strategic withdrawal but not co-existence or long-term cooperation.

The cost of conflict is not limited to suffering, loss or death in the centre of the conflict. Indeed, the most costly long-term consequences are not associated with direct damage but rather with the elimination of possibilities of positive events that are necessary to the functioning of any healthy society. Conflicts dramatically diminish the social capital of a society, an effect that inevitably results in dramatic social and economic decline. Such consequences, however, may not be observable for a considerable period of time. Thus, the ability to diagnose the sustainable states of the society is likely to provide an early measure of potential long-term damage to the society, as well as indicate the potential for a peace process. Such diagnosis would also provide a measure of the effectiveness of various intervention attempts before they actually im-

pact the visible states of the conflict, and it would allow one to estimate the damage done by aggravating events before the damage is manifest. Attempts at conflict resolution are unlikely to succeed if they do not work towards the achievement of positive sustainable states.

3. Implications for Addressing Protracted Social Conflicts: Some Guidelines for Navigating Attractor Landscapes

Below we outline some general guidelines for working with long-term conflicts that have emerged from our work or are consistent with our framework, and that also build on the work of others working on complexity and conflict from similar perspectives (see Conway et al. 2001; Dörner 1996; Gersick 1991; Jones/Hughes 2003; Lederach 1997; Maruyama 1963, 1982; Morgan 1997; Pearce/Littlejohn 1997).

Guideline 1: See the System

In conflict, a central task for interveners is to avoid oversimplification of the problems they face, and identify and work through key elements of the system that are driving or constraining change in a manner that is informed by the complexities of the situation. For example, the events in Mozambique were situated in a broader field of forces that played important roles in the destructive patterns that unfolded. The decolonization process was not – as in India – led by non-violent, visionary personalities such as Mohandas Gandhi. On the contrary, the long and bloody war of independence was led by a small group of very committed militants that were constantly reminded of the power of arms by the violent repression of the Portuguese. In addition, a Marxist-Leninist ideology fuelled the radicalized formation and growth of FRELIMO. Thus, violence was deeply rooted in the very formation of Mozambique as an independent country, as evidenced by the inclusion of the symbol of the rifle on the new national flag. It was also the established framework of confrontation during the Cold War and in the regional context of white supremacist governments such as Rhodesia and South Africa.

Consequently, one of the first challenges for interveners working in a system with a collapse of complexity (i.e. strong 'us versus them' polarisation) is to maintain or enhance their own sense of integrative complexity with regard to the case (Conway et al. 2001). This is the capacity to view the system holistically, to begin to see different aspects of the problem – and how they relate to one another – and then to put this information together in a manner that informs decisions to act.

The dynamical systems perspective suggests that four key psychological and social mechanisms fostered intractability in Mozambique: 1) a collapse of the subjective and social complexity of many stakeholders; 2) a loss of balanced feedback leading to escalation; 3) positive feedback between levels; and 4) catastrophic changes in the quality of the conflict. For instance, immediately after the collective expression of enthusiasm by the population for their independence victory, the ideological frame of FRELIMO imposed a very narrow perception of discontent. Non-supportive responses were labelled as

'anti-revolutionary' and 'anti-patriotic', forcing individuals and groups into a bind: either renounce their discontent and join the party-line or harden their critique and be marginalized further. Feedback was not welcomed unless it was supportive.

The escalation of a new conflict was the direct consequence of this exclusionary approach, which sharply reduced the opportunity for self-correction within the system. Moreover, the more the discontent hardened, the more those committed to FRELIMO's policies of collectivization and the national project felt compelled to redouble their commitment to those policies and their implementation. Local, regional and national levels became tightly coordinated to ensure full implementation of centralized directives. This accumulation of acts and policies led to a catastrophic moment of transformation when the violence – already present in the system at the levels of symbols and collective memory – was reoriented against FRELIMO, creating two active and self-reinforcing enmity systems.

These mechanisms resulted in the emergence of a strong negative attractor that pulled the thoughts, feelings and actions of the community into a self-perpetuating, polarized dynamic. In this state, the resolution of specific issues (as represented in previous peace attempts) did little to quell the tide of hostility and suspicion. More relevant was the role of 'catalysts' like Msgr. Jaime Gonçalves, who was able to internalize the various points of views and contradictions without being completely constrained by the enmity system. With the help of the Community of Sant'Egidio, Msgr. Gonçalves was able to acquire and maintain connectivity with both enmity systems, thus enabling him to challenge the tight structures of coherence built around power, meaning and relationships in both systems.

Guideline 2: Map the Dynamic Ecology of the Conflict

The dynamical system of the conflict – in the form of a dynamic network – can be represented through a series of feedback loop analyses. Loop analysis, developed by Maruyama (1963, 1982), is useful for mapping positive and negative feedback processes that escalate, de-escalate and stabilize destructive conflicts (see Figure below for a depiction of the Mozambique case). Positive feedback occurs when one element (such as a hostile act) stimulates another element (such as negative out-group beliefs) along its current trajectory. Negative feedback occurs when one element inhibits or reverses the direction of another element (such as when guilty or compassionate feelings damper hostilities). Strong attractors are created when positive feedback loops are formed between previously unrelated elements (such as when hostile acts by FRELIMO are interpreted as an occasion for its supporters to rally against 'provocative stands', relating movement of people to threats that must be addressed, and so on), while negative feedback dissipates in the system. It can be argued, for example, that the absence of space for dissent and negative feedback provoked the hardening of positions that led many to form RENAMO. A pattern of dynamics occurs over time that is the product not only of both positive and negative feedback but also of the relationship between the two.

This method not only captures the multiple sources and complex temporal dynamics of such systems but can also help identify central nodes and patterns that are unrecognisable by other means.
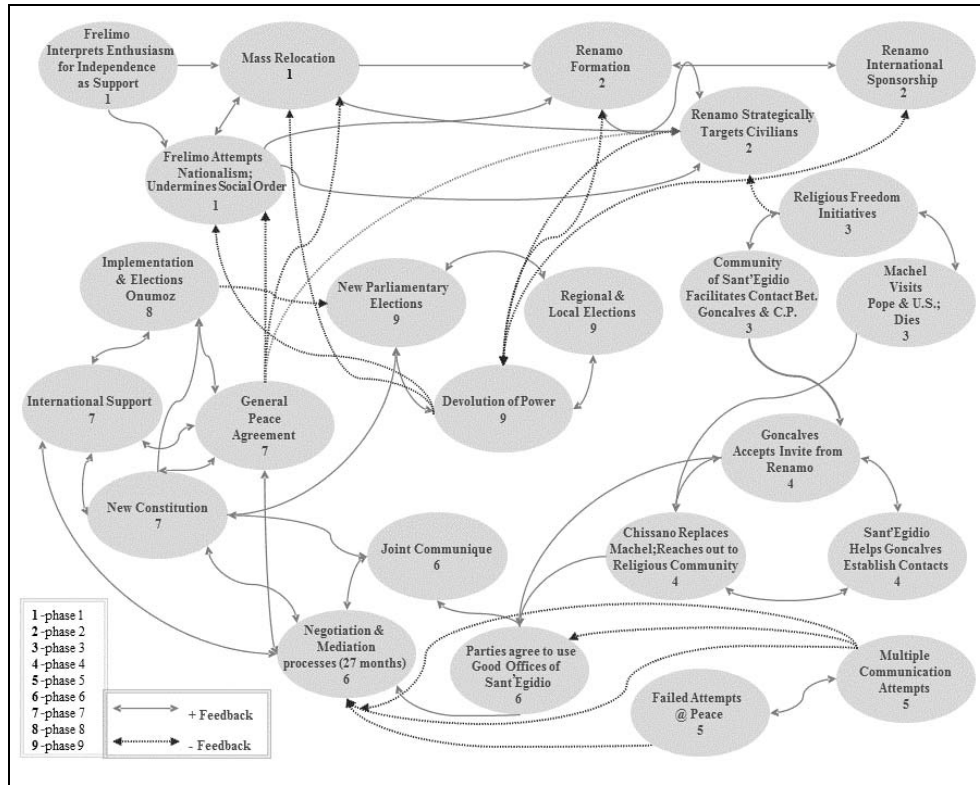
Figure 1: Feedback Loop Analysis of Mozambique Conflict and Peace

Feedback mapping begins by identifying the key elements in the conflict that emerge during different phases of escalation, as well as specifying the nature of the linkages among these elements. This analysis should be characterized as evolving through various developmental stages (such as phases 1-9 in the figure above). Maps can be generated at the individual level (identifying the emotional and cognitive links that parties hold in their attitudes, feelings and beliefs – associations related to the problem and to their sense of the other), at the interpersonal level (allies, enemies, power structures and so on.) and at the systemic level (e.g. mapping the feedback loops that allowed a particular series of events to escalate). This can be useful for remaining mindful of the systemic context of the conflict and for restoring a sense of complexity into the parties' sense of events.

Guideline 3: Apply Network Analysis to Locate Gateways and Leverage Points

Once the system is mapped, one can employ basic measures of network analysis and centrality to assess the different qualities of the elements, such as their levels of in-degree (how many links feed them), out-degree (do they serve as a key source of

stimulation or inhibition of the conflict for other nodes) and betweenness (the degree to which they are located between and therefore link other nodes); see Wasserman/Faust (1994). This can help to focus the analysis and manage the anxiety associated with the overwhelming sense of complexity of the system. However, it does so in a manner informed by its complexity.

Leverage points in the system are typically identified over time and reveal themselves through trial and error. Agents in the system use enmity patterns during conflict but are theoretically always open to new stimuli. The new stimuli are usually constrained, avoided and eliminated. When an agent initiates a non-enmity link, it exposes itself to retaliation and can disappear (both physically and/or politically). However, if the actor is able to choose its links appropriately, its leverage grows. The more links it is able to establish, the more able it is to restructure and reorient the whole system. To link beyond the limits of the enmity system is a risky but rewarding operation. Leverage grows over time and can be measured through in-degree, out-degree and betweenness.

Guideline 4: Take Time Seriously

The elements of complex conflict systems interact in a *non-linear* fashion. A change in any one element 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. Non-linearity requires that interveners have humility, because specific changes are often unpredictable and uncontrollable. The recognition that conflict and peace arise and develop within complex, non-linear systems suggests that we learn to attend to temporal patterns and trends, not specific outcomes. This has two major implications for conflict transformation and peacebuilding.

First, it is important to recognize that a system's states and attractors change according to different time scales. Manifest conflicts can evidence dramatic changes in their states – from relatively peaceful states to violent ones, or from intensely destructive states to peaceful. This is seen when social processes move from one attractor pattern to another, across what has been termed a "tipping point" (Gladwell 2000). However, such changes in the current state of the conflict should not be confused with changes in the underlying attractor landscape. Attractors tend to develop slowly and incrementally over time as a result of a host of relevant activities. In Mozambique, the first contacts between the Community of Sant'Egidio and the FRELIMO governments were established in the second half of the 1970s, almost 15 years before the peace agreement. This began a slow, incremental process of trust-building that established the conditions (an attractor) for facilitating talks. It was more than four years between the first meeting of Msgr. Gonçalves and Afonso Dhlakama (the RENAMO leader) and the signing of the final General Peace Agreement.

Second, the effects of different change initiatives also have different temporal patterns (Coleman 2006). *Episodic* initiatives are typically responses to crises associated with conflicts that attempt to quell outbreaks of violence or suffering and reinstate a sense of safety and stability. In Mozambique, the repressive and violent response to the initial expression of political dissatisfaction with the direction taken by the country after independence actually escalated the conflict tremendously. A military response,

which was intended to quell discontent, had the opposite effect. *Developmental* initiatives can have an eventual impact on the pattern of a conflict, but such effects are typically gradual, particularly when they are introduced at lower-levels of the system. *Radical* initiatives can trigger extreme shifts in attractor patterns (from destructive to constructive) through small but important changes (Gladwell 2000). For example, in Mozambique the very exploration of direct talks between FRELIMO and RENAMO, using the good offices of a small and unknown NGO, was a small but very radical step in addressing the dynamics of the enmity system. However, it is not always easy to discriminate among the three qualifiers (episodic, developmental and radical) prior to their effects. Intentionality is not always matched by results and in a dynamical system actual outcomes are often unexpected.

Guideline 5: Create Conditions for Positive, Adaptive Latent Attractors to Emerge and Be Sustained Internally

Solving intractable conflict requires changing the system's dynamics. Because such conflicts are associated with a loss of complexity and an imbalance between positive and negative feedback loops, attempts at de-escalation should focus on restoring multi-dimensionality and enhancing the availability of negative feedback mechanisms. Translating these general recommendations into practice is no trivial matter. The idea of latent attractors, however, provides an important new perspective on conflict de-escalation. The malignant thoughts, feelings and actions characterizing a group's dynamics may represent only the most salient and visible attractor for the group. If there is a long history of interaction with the out-group, there may be other potential patterns of mental, affective and behavioural engagement vis-à-vis members of the out-group, some of which foster positive intergroup relations. Accordingly, identifying and reinforcing latent (positive) attractors, not simply disassembling the manifest (negative) attractors, should be the aim of both conflict prevention and intervention.

In short, the identification and support of constructive actors and forces within the system is a key strategy for increasing the probability for peace. There are many such tactics, including:

> *Support latent networks of effective action.* Virtually every conflict system, even the most dire, will contain people and groups who, despite the dangers, may be able to reach out across the divides and work to foster dialogue and peace but are constrained by the dynamics of the conflict. During times of intense escalation, these people and groups may become temporarily inactive – even going underground (a component of latent attractors) – but are often willing to re-emerge when conditions allow, becoming fundamental players in the transformation of the system.

> *Employ weak power.* Strong enmity systems are associated with stable states of hostility, strong attractors for destructiveness and weak attractors for peace. Hence, they will typically reject out-of-hand most strong-arm attempts to promote peace. History has provided countless examples of the failure of strong outside parties to forge a peace in such systems. Nevertheless, sometimes peace does emerge. The

events in Mozambique provide us with an excellent example of the utility of 'weak power' in strong systems. During the conflict, the internal coherence of the two hostile systems was very high. Ideologically, militarily and politically, there was no communication and exchange between the systems. Change emerged at the margins through non-threatening communication processes that allowed some key actors in the enmity system to consider alternatives to the current status quo. This initial consideration was made possible by the 'weaknesses' of the propositions and of the proponents (Sant'Egidio).

Employ negotiation chains. An increasingly popular tactic employed to initiate peace talks in protracted conflicts is the use of negotiation chains (Pruitt 2007). This is the practice of involving a sequence of actors in the exploration of more formal talks: allowing each actor to speak directly with another actor with whom they are not constrained politically from speaking, but who has contacts further down the chain with the other side. Thus, talks transpire through a series of encounters, which allow for communications between parties who 1) need to be able to maintain deniability in the talks and 2) who would otherwise not be able to communicate. This tactic allows for movement and communication in systems that are otherwise tightly controlled and constrained.

Identify discontinuities (carefully increase complexity). Weak power third parties may be able to carefully introduce a sense of doubt or dissonance in an otherwise coherent 'us versus them' meaning system. Such discontinuities may address the parties' sense of their enemies, the issues at stake, the history of events, their own in-group, and useful processes for advancing the parties agenda. The introduction of dissonance must be applied carefully, and may have no short-term effects but can plant seeds of doubt and possibility that come to fruition at a later point.

Work on positivity away from conflict attractors. Recognizing that systems with strong negative conflict attractors often construct peacemakers as part of the conflict system and position them in one camp or another, some interveners attempt to work constructively by circumventing the conflict. This tactic aims to reduce the misery associated with these situations but does so in a manner that is framed as outside the conflict. Some development efforts achieve this.

Acknowledge superordinate identities and goals. This is a classic approach to intergroup conflict that involves the identification or development of joint goals and identities in an attempt to establish a foundation of cooperation and eventually trust between parties (Sherif et al. 1961; Deutsch 1973; Worchel 1987). Even if peacekeeping missions, reconciliation processes, trust-building activities and cooperative conflict resolution initiatives appear to be largely ineffective in situations locked in an ongoing protracted struggle, they may very well be acting to establish a sufficiently wide and deep attractor basin for moral, humane forms of intergroup interactions that provide the foundation for a stable, peaceful future. The gradual and long-term construction of a positive attractor may be imperceptible, but it prepares the ground for a positive state that would be impossible without these actions.

Guideline 6: Reverse Engineer Negative, Destructive Attractors

Of course, establishing latent attractors for peace is only part of the story. The most obvious need is to quell the current state of violence and contain actively destructive processes. This is often done by introducing peacekeeping troops or other forms of regional or international military or police support. However, even when systems de-escalate and appear to move into a state of peace, it is critical that we recognize that the potential for destructive interactions (destructive attractors) are still functioning. Here, it is important that we work actively to begin to deconstruct and dismantle the negative attractors.

Decouple positive feedback loops. The first step is to identify the relevant elements and the nature of their linkage through feedback loop mapping. With this information, one is in a position to disrupt the most important linkages and thereby decouple the elements and issues. Depending on the nature of the conflict, disassembling the structure of the conflict may take different forms. If the structure of conflict binds together perceptions of all the out-group members, showing positive examples of specific out-group members can increase complexity since a single judgement cannot accommodate all of the out-group members. Another tack is to find an important (e.g. high status, charismatic) in-group member who does not share the in-group's view of the conflict. If this person is sufficiently central that he or she cannot be marginalized within the group, the homogeneity of the in-group's perspective will be destabilized.

Introduce negative feedback loops (early-warning systems, cross-cutting structures, international monitoring etc.). Once the positive feedback system of conflict escalation is mapped, it can help target specific links for the introduction of negative feedback mechanisms. For example, in Mozambique one of the greatest concerns of the parties was the possibility of breaking the safety of the corridors negotiated during the first round of talks in Rome. It was agreed that an independent commission would monitor military activity and – as in many other peacekeeping operations – the positioning of independent monitors reduced the mistrust between the parties and the chance of escalation drastically.

Institutionalize more nuanced, alternative conflict narratives (through media, textbooks, official accounts etc.). Strong enmity systems typically result in distinct and polarized narratives about the history of the conflict: who played the hero and villain roles and what is still at stake. Mechanisms to monitor and revise such one-sided narratives are a key element for preventing future generations from returning to the same destructive patterns. In Mozambique, the first step towards peace emerged when the enemy was not described in derogatory terms as 'macacos' (apes) and the new rhetoric was expressed throughout the system from leadership to grassroots levels.

Conclusion

This chapter provides the most detailed discussion to date of the practical implications of dynamical systems theory for addressing protracted conflicts. Mozambique underwent a remarkable transformation and is now independent, united and at peace. Moving beyond the language of interests and positions, a dynamical systems approach allows us to understand the contradictory and paradoxical moves that created the enmity system, maintained the conflict over time, blocked the system in recurrent, self-organized patterns and made solutions highly improbable. It also allows us to understand better why an unknown external actor with little power (Sant'Egidio), working with a catalyst within the system (Bishop Gonçalves), was a key element in this transformation.

The dynamical systems approach enables us to see elements, trajectories and relationships in a new and – we believe – powerful way. Pending further verification in other real-world contexts, however, we are cautious about claiming too much at this stage of our understanding and offer the above guidelines in a spirit of modesty and humility. The transformation that made possible the emergence of peace in Mozambique is tangible and well-documented, but our understanding of how it came about is just rudimentary. Nonetheless, it is our hope that this contribution, in conjunction with the work of future dynamical-systems conflict specialists, will serve to increase the probabilities of peace in our time.

Bibliography

Azar, Edward E. 1990. *The Management of Protracted Social Conflict: Theory and Cases*. Hampshire, UK: Dartmouth.

Bar-Tal, Daniel 2007. Social-Psychological Foundations of Intractable Conflict, in: *American Behavioral Scientist*, 50, 11, 1430-1453.

Bercovitch, Jacob 2005. Mediation in the Most Resistant Cases, in: Chester A. Crocker, Fen O. Hampson, and Pamela R. Aall (eds.). *Grasping the Nettle: Analyzing Cases of Intractable Conflict*, Washington, DC: United States Institute of Peace, 99-122.

Burton, John W. 1987. *Resolving Deep-rooted Conflict: A Handbook*. Lanham, MD: University Press of America.

Coleman, Peter T. 2006. Conflict, Complexity, and Change: A Meta-Framework for Addressing Protracted, Intractable Conflicts – III, in: *Peace and Conflict: Journal of Peace Psychology*, 12, 4, 325-348.

Coleman, Peter T. 2004. Implicit Theories of Organizational Power and Priming Effects on Managerial Power Sharing Decisions: An Experimental Study, in: *Journal of Applied Social Psychology*, 34, 2, 297-321.

Coleman, Peter T. 2003. Characteristics of Protracted, Intractable Conflict: Towards the Development of a Meta-Framework – I, in: *Peace and Conflict: Journal of Peace Psychology,* 9, 1, 1-37.

Coleman, Peter T., Andrzej Nowak, Robin R. Vallacher and Lan Bui-Wrzosinska 2007. Intractable Conflict as an Attractor: Presenting a Dynamical Model of Conflict, Escalation, and Intractability, in: *American Behavioral Scientist,* 50, 11, 1454-1475.

Coleman, Peter T., Lan Bui-Wrzosinska, Robin R. Vallacher and Andrzej Nowak 2006. Approaching Protracted Conflicts as Dynamical Systems: Guidelines and Methods for Intervention, in: Andrea K. Schneider and Christoph Honeyman (eds.). *The Negotiator's Fieldbook.* Chicago: American Bar Association Books, 61-74.

Conway, Lucian G., Peter Suedfeld and Philip E. Tetlock 2001. Integrative Complexity and Political Decisions That Lead to War or Peace, in: Daniel J. Christie, Richard V. Wagner, and Deborah

DuNann Winter (eds.). *Peace, Conflict, and Violence: Peace Psychology for the 21st Century*. Upper Saddle River, NJ: Prentice Hall, 66-75.

Deutsch, Morton 1973. *The Resolution of Conflict: Constructive and Destructive Processes*. New Haven, CT: Yale University Press.

Deutsch, Morton, Peter T. Coleman and Eric C. Marcus (eds.) 2006. *Handbook of Conflict Resolution: Theory and Practice* (2nd ed.). San Francisco: Jossey-Bass.

Dörner, Dietrich 1996. *The Logic of Failure: Why Things Go Wrong and What We Can Do to Make Them Right*. New York: Holt.

Fisher, Roger E., William Ury and Bruce Patton 1991. *Getting to Yes: Negotiating Agreement Without Giving In* (2nd ed.). New York: Penguin Books.

Gersick, Connie J. G. 1991. Revolutionary Change Theories: A Multilevel Exploration of the Punctuated Equilibrium Paradigm. *Academy of Management Review,* 16, 1, 10-36.

Gladwell, Malcom 2000. *The Tipping Point: How Little Things Can Make a Big Difference.* Boston: Little, Brown.

Gleick, J. 1987. *Chaos: Making a New Science.* New York: Viking.

Goertz, Gary and Paul F. Diehl 1993. Enduring Rivalries: Theoretical Constructs and Empirical Patterns, in: *International Studies Quarterly,* 37, 2, 147-171.

Johnson, Steven 2001. *Emergence: The Connected Lives of Ants, Brains, Cities, and Software*. New York: Scribner.

Jones, Wendell and Scott H. Hughes 2003. Complexity, Conflict Resolution and How the Mind Works, in: *Conflict Resolution Quarterly,* 20, 4, 485-494.

Kriesberg, Louis 2005. Nature, Dynamics, and Phases of Intractability, in: Chester A. Crocker, Fen O. Hampson and Pamela R. Aall (eds.). *Grasping the Nettle: Analyzing Cases of Intractable Conflict*, Washington, DC: United States Institute of Peace, 65-98.

Latané, Bibb and Andrzej Nowak 1994. Dynamic Attitude Change: Is It Gradual or Catastrophic?, in: Robin R. Vallacher and Andrzej Nowak (eds.). *Dynamical Systems in Social Psychology*. San Diego: Academic Press, 219-250.

Lederach, John P. 1997. *Building Peace: Sustainable Reconciliation in Divided Societies*. Washington, DC: United States Institute of Peace.

Lewin, Kurt 1936. *Principles of Topological Psychology*. New York: McGraw-Hill.

Maruyama, Magoroh 1982. Mindscapes, Management, Business Policy, and Public Policy, in: *Academy of Management Review,* 7, 4, 612-619.

Maruyama, Magoroh 1963. The Second Cybernetics: Deviation Amplifying Mutual Causal Processes, in: *American Scientist,* 5, 2, 164-179.

Morgan, Gareth 1997. *Images of Organization*. London: Sage.

Nowak, Andrzej, Robin R. Vallacher, Lan Bui-Wrzosinska and Peter T. Coleman 2006. Attracted to Conflict: A Dynamical Perspective on Malignant Social Relations, in: Agnieszka Golec and Krystyna Skarżyńska (eds.). *Understanding Social Change: Political Psychology in Poland*. Haauppague, NY: Nova Science Publishers Ltd, 33-49.

Nowak, Andrzej and Robin R. Vallacher 1998. *Dynamical Social Psychology*. New York: The Guilford Press.

Pearce, W. Barnett and Stephen W. Littlejohn 1997. *Moral Conflict: When Social Worlds Collide*. Thousand Oaks, CA: Sage.

Praszkier, Ryszard, Andrzej Nowak and Peter T. Coleman 2010. Social Entrepreneurs and Constructive Change: The Wisdom of Circumventing Conflict, in: *Peace and Conflict: The Journal of Peace Psychology*, 16, 2, 153-174.

Pruitt, Dean G. 2007. Readiness Theory and the Northern Ireland Peace Process, in: *American Behavioral Scientist*, 50, 11, 1520-1541.

Ruelle, D. 1989. *Elements of differentiable dynamics and bifurcation theory*. New York: Academic Press.

Schuster, Heinz G. 1984. *Deterministic Chaos*. Vienna: Physik Verlag.

Sherif, Muzafer, O.J. Harvey, B. Jack White, William R. Hood and Carolyn W. Sherif 1961. *Intergroup Cooperation and Competition: The Robber's Cave Experiment*. Norman, OK: University Book Exchange.

Strogatz, Steven 2003. *Sync: The Emerging Science of Spontaneous Order*. New York: Hyperion Books.

Thom, R. 1975. *Structural stability and Morphogenesis*. New York: Addison-Wesley.

Vallacher, Robin R., Peter T. Coleman, Andrzej Nowak and Lan Bui- Wrzosinska 2010. Rethinking Intractable Conflict: The Perspective of Dynamical Systems, in: *American Psychologist*, 65, 4, 262-78.

Vallacher, Robin R. and Andrzej Nowak (eds.) 1994. *Dynamical Systems in Social Psychology*. San Diego: Academic Press.

Vallacher, Robin R. and Andrzej Nowak 2007. Dynamical Social Psychology: Finding Order in the Flow of Human Experience, in: Arie W. Kruglanski and E. Tory Higgins (eds.). *Social Psychology: Handbook of Basic Principles* (2nd ed.). New York: Guilford Publications, 734-758.

Wasserman, Stanley and Katherine Faust 1994. *Social Network Analysis: Methods and Applications*. New York: Cambridge University Press.

Worchel, Stephen 1987. The Role of Cooperation in Reducing Intergroup Conflict, in: Stephen Worchel and William G. Austin (eds.). *Psychology of Intergroup Relations*. Chicago: Nelson-Hall, 288-304.