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Applying Complexity Science to Conflict Theory and Analysis

In 1998, I proposed applying complexity science to qualitative case study analysis of public conflicts for my doctoral research. My committee wanted me to include a dissertation chapter ‘proving’ that conflicts are complex systems. The external dissertation reviewer later wrote: “As far as I know there is nothing in the way of a model for Ms. Sword to have followed. Neither is there any literature that examines social conflict through the lens of complexity theory…”

What a difference a decade has made. By 2008, complexity science’s applicability is being presumed as often as it is being proven, in organizations (Price, 2004), leadership (Hazy, 2008), policy analysis (Elliott et al. 1999), human violence (Spohn, 2008), strategic planning (Shaw, 2002), and economics (Holling, 2003) to name a few. It is axiomatic that conflict is being researched from a complexity science perspective, which will benefit and inform both fields. While complexity scientists seem adept at using conflict data in computer simulations, doing the conflict research and practice from the conflict perspective using complexity science is still in the early stages and still controversial. Some fundamental questions need answering:

- A timely next question seems to be, what does “complexity science is being applied to conflict…” actually mean? There is now a respectable literature about complexity science in multiple contexts, and there are consultants, organizations and institutes claiming to employ ‘complexity principles’. If complexity science research is agent-based computations and conflict practice is jargon-based consultations, how can they be used together? Conflict interventions run in real time. Often, all I can do is keep up with the parties, not ask them to put their struggle on hold while I run simulations.

- A challenge for research and practice at the intersections of complexity science and conflict theory is knowledge transfer. Perhaps, like me, you are a theorist who loves practice and a practitioner who loves theory or, you may be a specialist in one. Conflict processes generate lifetimes of computational models. Complexity science innovations could improve the practitioners’ intervention processes. Unless lab findings get into the field, and field data get into the lab, we are not doing our best in either place. Conflict, as anyone who has lost sleep over one knows, is more nuanced than simulations describe; complexity science, as anyone who has been stymied when the parts did not sum up knows, has a lot to offer in explaining conflict phenomena. The methodology for using them jointly in practice is still being worked out. There are stalwart beginnings of qualitative case study research to complement the quantitative computational modeling (Anderson et al., 2005). More would be helpful.

- Interdisciplinarity in espoused theories requires interpreters adept in complexity and conflict. Conflict is interdisciplinary. Complexity science is interdisciplinary. Practically, that does not leap the disciplinary boundaries between them. Keeping up with the burgeoning conflict literature or complexity literature is daunting enough without tackling jargon-laden literature from the other field. Someone has to connect the dots between complexity science modeling and conflict theory models. In situation-specific processes, such as hostile negotiations, toxic workplaces, or wildcat strikes or lockouts, I need complexity science translated into a theory-in-use that I can add to my conflict mental maps. More opportunities for cross-fertilization like the Complexity, Chaos and Conflict conference in Omaha are needed.

I experimented in applying complexity science concepts to qualitative conflict case studies because I had no model to follow. For my doctoral research, I selected non-violent large-scale public conflicts in which the policy makers came up with three
policy ideas and pushed them through the political process against massive opposition (Sword, 2003). That meant there were no interventions; no public participation processes, negotiation or mediation. Thus, this research would not seem to advance conflict theory, yet made sense when combined with complexity science. I could mentally visualize a conflict fitness landscape (Kauffman, 1995) as my interviewees’ narratives about their public conflicts unfolded.

Mental maps are cognitive processes for making sense and meaning of situations and beliefs (Peterson, 1999). Conflict mental maps are especially useful in the stress and immediacy of conflict situations. Conflict theory’s contributions to my conflict mental maps resemble blitz chess under time constraints, with accelerated decision-making about the current action and future directions. I also must make sense and meaning of conflicts’ initial conditions (Tidwell, 1998). Complexity science’s contributions to my conflict mental map includes the line of sight from the future looking backwards (Holland, 1995).

Until definitive articles are written on how to apply the mathematical models of the laboratory to the hotbed of real world conflict, and to get the heat of the conflict into the analysis in the models, all I have to offer is an anecdotal commentary on how I translate complexity science conflict analysis into conflict mental maps.

**Rationale for Complexity Science Conflict Analysis**

Conflict theory proved only partially effective to analyze my three case study conflicts. First, conflict theory tends to focus on issues that were not part of my inquiry. Fisher (1997) summarized the three issues addressed by most conflict research: why or why not does a conflict intervention succeed; what will prevent, mitigate or resolve conflicts; and how conflict skills can be improved. Complexity science’s “central enigma”, on the other hand, is the “question of coherence under change” (Holland, 1995: 4). I was not inquiring into how some unwanted facility got sited somewhere, or how a conflict was mediated to resolution, or to generalize an intervention model. Complexity science added fresh perspectives to the conflict analysis of how three public conflicts cohered over a five-year time period.

Second, conflict theories’ usual definitions of conflict as actual or perceived incompatibilities of needs, values, or interests (Rubin et al., 1994; Fisher, 1997; Kriesberg, 2000) have limited application in some conflicts. Sometimes, siding with one group does not mean sharing the group’s needs, values, motives, identities, attitudes, or interests. Public conflict, for example, binds people together despite their differences (Sword, 2007). Conflict as Rex (1981: 3) defined it: “action which is oriented intentionally to carrying out the actor’s will against the resistance of the other party or parties” fits complexity science’s studying “processes that change over time” (Guastello et al., 2005: 298). My interviewees described the challenge when “disparate interests left the steering committee struggling to keep the thousands of supporters on task” (Interview with Hilary; Citizens for Local Democracy) in a conflict that was more a “movement with adherents” (Interview with Rachel; Citizens for Local Democracy) than a unified organization.

Third, professional conflict resolvers seek out different perspectives about what is happening, determine the parties’ interests, and convene safe, orderly conflict intervention processes. Complexity science, however, suggests that finding causes or analyzing outcomes after something happens may or may not be useful. Complex systems tend not to repeat the same story or events. Each conflict, electrical outage, and traffic jam is unique and also follows patterns. The cause might be interdependencies inherent to the system that create the conditions for the event (Watts, 2003). In some situations, conflict theory alone might not expose tightly coupled systemic interdependencies that are features of conflict systems (Homer-Dixon, 2000).

**Complexity Science Conflict Analyses Enrich Conflict Mental Maps**

Everyone makes a mental model of how their conflict happened, where the conflict currently stands, and what they wish would occur. People take actions to achieve whatever conflict goals seem possible and optimal, based on that subjective analysis of conflict history, present, and future (Furlong, 2005). Sometimes their analysis is global, altruistic, and/or correct, sometimes it is local, self-centered, and/or irrational, and always it is constrained by imperfect and incomplete data. We do our best within the boundaries of unique personal, factual, and skills limitations. Conflict analyses are based on and, in turn, inform the parties’ conflict mental maps, which, in turn, influence the conflict analyses, and so on, whether intentionally or intuitively, artfully or ineptly. Conflict mental maps are usually unnoticed background noise even though they guide conflict decision-making.

Diverse explanations about conflicts are found in espoused theories (de Bono, 1985; Kolb & Bartunek, 1992; Schellenberg, 1996; Tidwell, 1998). Conflict practice, on the other hand, offers multiple theories-in-use. Crocker (1999) commented on this disparity between espoused conflict theory and the practical uses. Theorists, he noted, classify interventions into schools, and conflicts into stages or phases, while conflict interveners in the fray likely use whatever works, whenever, and however they can. Complexity scientist Watts (2003) noted that all the relevant ideas from each discipline must be brought to bear, creating a network of scientists with information that each alone could not have. There are many models available and “only by thinking like sociologists as well as like mathematicians can we pick the right one” (2003: 156). With Crocker and Watts, I incorporate anything that contributes helpful insights when the pressure is on.

I am especially aware of sensitive dependence in a conflict where multiple paths diverge at unforgiving bifurcation points, which
are forks in the road similar to Robert Frost’s *The Road Not Taken*. In movies, like *Time Cop* and *Sliding Doors*, characters travel backwards to try paths to alternative futures. Lacking that time machine, nonfiction characters decide on a direction at a bifurcation point, and the decision becomes a prior ‘frozen accident’ (Gell-Mann, 1994), that is, a chance event leading to long-term consequences related by common ancestry to one decision. Looking back at what today seems inevitable history is just a frozen selection(s) made from that time’s available options. Hopefully, a robust conflict mental map removes the ‘accidental’ quality from the freezing, and makes the decision making process deliberative and wise.

With the future at stake, I continually envision the conflict’s fitness landscape. Depending on the parties, some paths will lead to dead ends, some might rile things up, and one or two are potentially helpful. Complexity science enhanced my conflict analyses of: what I am observing, how to interpret it, the meaning others ascribe to it, what process design might be beneficial, when and what intervention is appropriate, who the parties and allies are, where the power/resources are found, the boundaries around the conflict landscape, and everything else that impacts the conflict system.

Thus, conflict mental maps are tuned by instantaneous conflict analyses, generating and weighing options, checking for efficacy, reassessing criteria, rejecting some words, anticipating how particular personalities might interpret things, and selecting words least likely to be misunderstood and most likely to accomplish something positive.

With operating conflict mental maps, I turned raw meaningless data being hurled by distressed people into the following concrete examples:

### Risk assessment

Change and conflict travel together. Once a change is announced, people assess the information against their individual risk tolerances, and form a personal conflict mental map that leads them to resist, or support, the change. In the case studies, where experts expressed uncertainty about forecasting what might happen, the parties expressed certainty it could not possibly go as the other sides predicted. Although acknowledging the data was imperfect, they derided the other sides’ data and defended their own, saying, ‘my data proves risks and impacts your data conceals.’ In the three cases, the policymakers’ conflict mental maps did not include pollution from the proposed landfill, evicting the poor to build sports facilities, or destruction of local democracy. However, that does not ensure those unintended consequences would not occur, because amplification in complex adaptive systems makes policy outcomes difficult to predict (Homer-Dixon, 2000).

### Power

A feature of the three case studies, using a traditional conflict analysis, was power imbalances so overwhelming that there was little incentive to negotiate. Yet the weaker parties continued behaving as if they believed they could ‘win’ (Sword, 2007). Instead of attempting to use traditional power, defined as the ability to get what you want (Boulding, 1989), they used power of the nature that complexity science recognized. They perturbed the policy making systems as often, as robustly, and in as many creative ways as they could manage. Their conflict mental maps gave them hope that government would change the outcome if enough inputs accumulated, or one input caused a cascade (Watts, 2003).

### Agents

Like any complex system, conflict is “formed out of many components whose behavior is emergent, that is, the behavior of the system cannot be simply inferred from the behavior of its components” (Bar-Yam, 1992 :10). Public conflict is, conceptually, an emergent property of a public policy system. Therefore, complexity science conflict analysis revealed unusual parties that traditional conflict analyses ignore. Public participation theorists ask who should be consulted, and conflict theorists ask who has a mediation interest. These could not explain my interviewees including, for example, the Pope, the Governor General of Canada, and the International Olympic Committee in their conflict mental maps (Angus 10-16 August 2000). Complexity concepts prompted me to ask what and who contributed inputs into the conflict system that could amplify or dampen changes over time? Conflict theory mental maps excluded some agents as parties even though their influence was explicit, while complexity science mental maps even included agents who denied being parties yet contributed inputs.

### Governance and Democracy

Public conflict has been framed as evidence of citizen alienation from democratic processes. However, a typical comment from my interviewees demonstrated that they placed themselves on the fitness landscape as engaged citizens, participating in more than merely voting:

> Citizens had taken control of the public debate. I was euphoric. We told the representatives that it was a public space. The cab driver that night, and the store clerk the next morning were discussing it. I had the feeling that all the little bits were coming together to create legitimacy. People who didn’t know who I was were talking about it … We got to a place where people...
Emergence: Complexity and Organization

Complexity science and conflict theory are complementary co-contributors to conflict mental maps. On a local time sequence, the public conflicts ended and the policy systems recovered from the turbulences. Conflict theory suspended when the conflicts

Adaptation

Limited resources, power, and time bounded the interviewees’ conflict mental maps. Stretched thin, they created adaptive organizations optimal to their fitness, with coordination hubs, clustered nodes and interlinked social networks that Arrow (2002) suggested are effective for dealing with turbulence and crises. Their virtual structures drew on ‘small world networks’ that were resilient and inspirational in strength and information transfers (Arrow et al., 2000; Watts, 2003). Zimmerman (1998), citing Kelly, referred to flexible, networked leadership structures as “swarmware,” with rapid responses to new information coming at high speeds and turbulence. The control of the opposition in my case studies was so many-headed, leaderless and self-organizing that they had, intentionally or otherwise, built-in efficiencies. Swarmware is distinguished from less responsive hierarchical “clockware” opponents.

Learning

Complex systems accept positive and negative feedback from which they adapt and learn. The parts are interdependent, meaning they influence each other in feedback learning loops, not in linear action and reaction. Simple, single cause and effect, however neat its solution, does not apply in complex systems (Waldrop, 1992). In essence, the parties learned their way through conflict:

We took knowledge out there, made it locally relevant and got it to people in non-technical language. We helped locals hold big public meetings. We helped negotiations with proponents and media. We held rallies and the hands of the overwhelmed. We gave them the confidence to keep going and supported them (Interview with Peter, anti mine landfill coalition).

Politicians became very knowledgeable and that’s my goal. Some were on a learning curve, which is necessary for good decision-making (Interview with Peter, anti mine landfill coalition).

Whatever the conflicts’ outcomes, the learning from the conflict stayed in the public systems. For example, then Toronto Mayor Mel Lastman, who had shown little environmental interest before the landfill conflict, promised increased recycling and composting afterwards (Palmer 29 October 2000).

Media

I began with news media as a data source, and discovered that they were also agents with their own interests. Media do not merely capture action, but frame action for how the publics will receive it (Peterson, 2001). News media is where meaning of the conflict is made for the publics’ conflict mental maps. Media has the power to “amplify in political significance activities that might otherwise be invisible and their messages obscure” (Peterson, 2001:143). Media’s boundaries put public conflict outside legitimate politics by ignoring or disrespecting it, thus supporting social order and marginalizing disorder. Without media coverage, agents in conflict have no audience. The interviewees’ tactics were attributable, in part, to their need to capture the media’s attention, and thus the publics’ attention. I could analyze news media contributions to shaping the debate about the issues, and to co-creating the evolving conflict system.

Conclusion

Complexity science and conflict theory are complementary co-contributors to conflict mental maps. On a local time sequence, the public conflicts ended and the policy systems recovered from the turbulences. Conflict theory suspended when the conflicts...
ended. Over a global time scale, conflict added inputs into the system that might yet create a bifurcation. Complexity science looks back from the future to study change over time. Despite differences in focus, both complexity science and conflict theory are characterized by changes and coherence. I adapted my conflict mental maps to what complexity science conflict analysis described was going on. Complexity science is poised to establish its usefulness outside the realm of agent-based modeling to real world experience, and few experiences—other than love—are more real world than conflict.

Notes

1. The three public conflicts were: Bread Not Circus’ opposition to Toronto’s bid to host the 2008 Olympics that were awarded to Beijing; Citizens for Local Democracy’s protest against the amalgamation of six municipalities into a mega-city of Toronto; and the objections to Toronto’s proposal to dispose of trash in a depleted mine pit in Northern Ontario.

2. All interviewees are identified by pseudonym.

References


