

Political Process as a Complex Dynamical System: Chaos and Emergence

Extended Abstract

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Historical research is fundamentally the study of process. How do large-scale, complex sociopolitical transformations emerge, evolve, and culminate in specific outcomes? Conventional explanations often attribute such processes to conflicts of interest between opposing groups, with victory going to the most powerful. However, this perspective overlooks additional causal dynamics. A comprehensive understanding of sociopolitical change requires a broader analytical lens that considers multiple interacting factors.

Social science offers a diverse array of theories, each proposing different causal mechanisms. These theories rest on distinct axioms regarding the sources of social order and change, generating long-standing debates: structure versus agency, material versus cultural, micro versus macro, rational versus value-driven, and others. Faced with this theoretical diversity, researchers often commit to one framework, apply its assumptions, and claim explanatory power. While such reductionism ensures internal coherence, it risks oversimplifying the complexity of social reality. As Einstein purportedly advised, explanations should be as simple as possible, but no simpler. The challenge, then, is to assess the relative explanatory power of competing theories and integrate them into a more comprehensive account.

If all theories are considered potential explanations, how can their relative validity be systematically evaluated? Charles Tilly argues that this task is infeasible given current methodological constraints. Some scholars contend that theoretical paradigms are incommensurable due to their differing foundational axiomatic assumptions. Moreover, social science lacks a standardized metric for empirically determining the relative validity of theories in explaining macro-scale sociopolitical processes.

This paper proposes a solution: the Integrated Structural Analysis (ISA) method, which offers a systematic framework for evaluating competing theoretical explanations. ISA identifies micro-power relations between actors (dyads) as the fundamental metric of theoretical validity. It classifies the micro-power relations into 24 distinct modes, each corresponding to a specific theory and causal factor. The classification is based on two foundational axiomatic dimensions: (1) the structural dimension, which includes 4 categories--structural (power of), interactional (power over and power with), and agentic (power to) categories, and (2) the power medium dimension, encompassing 6 categories--material-economic, coercive-political, social-normative, knowledge-based, moral, and emotional categories. The combination of these two dimensions generates a 24-cell analytical framework, with each cell representing a unique theory-factor-mode set.

For instance, the structural-material cell holds Marxist theory, which posits class exploitation as its core causal factor. In contemporary sociopolitical processes, the factor's micro-mechanism manifests when capitalists use financial resources to secure favorable policies by influencing politicians. To validate Marxist theory in a given case, empirical evidence must demonstrate that

this micro-mechanism operates among actors and influences outcomes. The same logic applies to all 24 theory-factor-mode sets within the ISA framework.

Applying ISA requires micro-analytical investigation of a macro-scale sociopolitical process. At the micro level, the case consists of numerous interactions between actors from individual, community, national, and global levels. Through detailed fieldwork, the researcher identifies actor dyads that constitute and influence the process. Each dyad's micro-power relation is coded for the 24 power modes, their relative proportions quantified from 0 to 100%. The impact of each dyad on the process outcome is assessed on a scale of 1 to 9. Multiplying each dyadic mode's proportion score by its dyad's impact score and then adding these scores for all the dyads indicates the relative presence of the 24 modes in the process. Their relative presence indicates the relative explanatory validity of the 24 theories and factors. Connecting the dyads into extended networks reveals meso-level formations—power structures, contentious oppositions, and dynamic interactions—that evolve over time and drive the political process.

Both structurational and power media dimensions have been explored in sociological research, but their integration into a systematic analytical framework remains underdeveloped. ISA advances methodological precision by systematically tracing and quantifying the diverse factors shaping sociopolitical processes. The approach captures causal flows over time, identifying whether the effective causal factor or factors remain stable or undergo dynamic transformations. Temporal analysis reveals the patterns of flow and transformation in the causal mixture. Graphical representations, such as temporal line graphs, illustrate this evolving causal flow across the entire process and at critical phases.

Sociopolitical processes may exhibit chaos and complexity. Chaos occurs when minor initial factors unexpectedly amplify to determine outcomes—the so-called “butterfly effect.” Complexity happens when new causal factors unpredictably emerge, producing novel interactions, developments, and outcomes. If a sociopolitical process demonstrates both chaos and complexity, it can be conceptualized as a complex dynamical system (CDS). Unlike earlier structural-functional systems, which assume equilibrium and subsystem differentiation on a biological model, the CDS model characterizes the sociopolitical process as a turbulent, multidimensional process driven by nonlinear interactions to uncertain outcomes. This model developed in third-wave complexity theories (Sawyer 2005; Byrne and Callaghan 2023; Kiel and Elliott 2021).

The motivation for this research emerged from longstanding theoretical frustrations. Confronted with sociology's competing theoretical frameworks, I rejected the conventional approach of selecting a favored theory and testing its hypotheses. Instead, I pursued an inductive strategy, gathering empirical evidence to determine which theories best explained observed patterns. My case study examined a 27-year sociopolitical conflict over industrial development and environmental pollution in Oita Prefecture, Japan. Conducting 2.5 years of immersive fieldwork, I collected extensive qualitative data through over 500 interviews, participant observation, and archival research. Inspired by Geertzian cultural interpretation and social exchange theory, I focused on the meanings and sanctions embedded in power interactions.

Initial findings, published in *Environmental Politics in Japan* (Broadbent 1998), narrated the contentious process but lacked a comprehensive theoretical synthesis. Further analysis required a method for empirically testing competing theories against the field data, leading to the development of ISA. Applying this framework to the Oita case, I identified 257 (outcome influencing) actor dyads and systematically coded the proportions of different modes in their micro-power relations. The results revealed a dynamic flow of causality, with different theoretical explanations gaining or losing explanatory power across different phases of the process. Rather than supporting a single overarching theory, the findings indicated a “dappled” ontology of shifting causal mixtures, akin to Cartwright’s (1999) concept of a patchwork of causal laws rather than a universal governing principle.

A recent paper (Broadbent 2024) presented the initial findings by mapping the changing dominance of six broad theoretical categories (economic, coercive, expertise, normative, legitimacy, and emotional) across nine three-year phases. The results highlighted key shifts:

- **Phase 1:** Legitimacy (Symbolic Realism) dominated as local actors unquestioningly accepted the governor’s promise of economic prosperity.
- **Phase 3:** Economic (Marxian Class) explanations prevailed as large corporations pursued raw material investments with little local benefit.
- **Phase 6:** Legitimacy (Symbolic Interactionism) re-emerged as public protests delayed implementation over pollution concerns.
- **Phase 9:** Economic (Rational Choice) explanations dominated the outcome, as corporations, deterred by delays, relocated their investments abroad, inadvertently securing a protest victory.

The current research extends this analysis by incorporating all 24 theoretical categories, exploring interactions among causal factors, and examining transitional dynamics between phases. Key inquiries include the roles of structural and agentic interactive determinations; material, social, and cultural influences; and potential evidence of chaotic and emergent complexity.

If these analyses confirm the presence of chaotic and complex dynamics, they will substantiate the case sociopolitical processes as a complex dynamical systems. The ISA method, combined with CDS modeling, offers a novel approach to conceptualizing, measuring, and explaining sociopolitical transformations. By systematically integrating diverse theoretical perspectives according to their empirically tested relative validity as a transforming causal flow, this framework moves social science closer to an ontologically grounded understanding of real-world political change.

References

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