

Policymaking at the
Edge of Chaos:
Musings on Political Ideology
Through the Lens of Complexity

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Synopsis

Though there seems little reason why it should not yield insights when applied to the complex adaptive systems of human society, the field of Complexity Theory presents special problems for anyone looking to it for lessons in the field of public policymaking. In particular, complex systems' nonlinearity and sensitivity to initial conditions seems to have subversive implications for policymaking, inasmuch as the unpredictability that they imply undercuts the very possibility of purposive policymaking. Complexity presents a “policymaker's paradox,” for even as it suggests that small policy inputs can sometimes have an enormous impact upon systemic outcomes, it also seems to teach that we cannot predict what results our policy choices are likely to have over time. When outcomes are radically resistant to prediction, they are also necessarily resistant to the sort of deliberate control that policymaking traditionally assumes it possible to assert.

After outlining this dilemma, this paper explores one possible, albeit only partial, response: an approach to policymaking that focuses with special emphasis upon shaping the conceptual frameworks that guide and channel human behavior within complex adaptive social systems. Experts continue to debate the degree to which Complexity insights from the hard sciences can translate into the social sciences. A focus upon the ideational constraints upon, and drivers for, unit-level operational behavior in a social system seems warranted, however, because humans' susceptibility to tying behavior to such frameworks distinguishes them from unit-level elements of the complex systems investigated in other fields (e.g., chemistry, physics, computing, mathematics, or evolutionary biology). Accordingly, this paper suggests the possibility that policy interventions

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in the realm of ideas may have more potential to create transformative change than many other types of intervention. Such interventions are perhaps also able to produce change that is more “predictable” than Complexity would otherwise tend to suggest, inasmuch as conceptual “memetics” can create characteristic behavioral patterns over time as ideas propagate themselves in conceptual

provide no *a priori* answers. (By definition, the right balance point will shift with changing circumstances, and from one organization and institutional mission to the next.)

Charles Perrow and others have also done important Complexity-infused work on the ways in which organizational failure can occur in complex systems, particularly where their shaping variables “follow different periodicity patterns and are highly coupled with each other.” In this understanding, “crises are more the result of complex, tightly coupled relationships than the outcome of inadequate human actions.”³ Such analysis has potential implications in a range of endeavors, including public policymaking.

Scott Sagan, for example, has applied such insights to the very specific peculiar public policy challenges of accident avoidance in nuclear weapons command-and-control (C²) architectures. Taking Perrow’s analysis as his conceptual starting point, Sagan has argued that the high interactive complexity and “tight” organizational “coupling” of modern U.S. and Russian nuclear C² systems make them highly accident-prone regardless of the intentions of their leaders and operators, and irrespective of the precautions such officials may take.⁴ (Some traditional approaches to reducing accident risks, he warns – such as increasing the use of redundant systems – may actually make things worse.⁵) From this foundation, Sagan has made a number of suggestions about how to reduce nuclear weapons accident dangers.⁶

More broadly, Leon Fuerth has suggested that Complexity insights can also teach us something about the *methods* by which public policy decisions are reached. Borrowing the term from Horst Rittel and Melvin Webber, Fuerth describes a public policy world increasingly beset by “wicked problems” – that is, the challenges of managing situations characterized by resolutely nonlinear dynamics, complicated positive and negative feedback loops, and a mind-bogglingly intricate interconnection of myriad variables. These, he says, are “a new order of ... public policy issues that reflect the axioms and postulates of complexity theory.” (Cyber-security issues, he contends, are one such arena of “wicked” policy challenge, but hardly the only one.) Policymaking in such an environment, Fuerth argues, requires a different approach than has usually been taken within governments. Such matters cannot be stovepiped as the responsibility of a single functional department or agency, he says, and instead may have to be addressed on a government-wide basis.⁷

³ R.A. Thiétart & B. Forgues, “Chaos Theory and Organization,” *Organization Science*, vol.6, no.1 (January-February 1995), at 19, 25.

⁴ See, e.g., Scott D. Sagan, *The Limits of Safety* (Princeton: Princeton Univ Safety

We may also need different approaches to *who* it is who makes such decisions, insofar as there may be no single human capital “skill set” that is “optimal” for leading a response to such challenges. Addressing “wicked” public policy challenges may demand a variety of inputs and perspectives beyond that which normal functional specialization can provide. Theories of conceptual “requisite variety” have thus been offered in order to encourage decision-makers to seek input from as diverse a collection of cognitive perspectives as possible – thus arguably providing a more “scientific” basis for well-established managerial clichés about the need to be able to “think outside the box.”

In more specific applications, attempts have been made to use “non-linear dynamical models” as a way to understand terrorist networks – and from this starting point perhaps devise strategies for damaging such networks.⁸ Unsurprisingly, the seemingly nonlinear dynamics of the stock market have also been the subject

configurations starting close to each other will remain close over time. A positive coefficient, on the other hand, is “the signature of chaos or instability.”¹⁴

Saperstein’s attempt to suggest lessons for real-world geopolitics in these terms is highly abstract and stylized, relying, as it does, upon the assumption of hypothesized “confidence” and “fear and loathing” coefficients for an international relationship, which are then assumed to be keyed to arms procurement decisions. Nevertheless, his conclusion that tripolar relationships have a positive Lyapunov coefficient and are thus considerably more unpredictable and therefore unstable and dangerous than bipolar ones¹⁵ is interesting – and could be seen as providing a sort of mathematical underpinning for the common insight that the continued progress of nuclear weapons proliferation in adding “players” to the world of nuclear deterrence presents a grave threat to international peace and security. In policy terms, such conclusions should presumably reinforce our determination to enforce nonproliferation norms, and encourage us to bear even greater burdens and accept greater risks in order to forestall a world in which the number of near-peer global nuclear “players” is greater than two. (Saperstein’s Lyapunov analysis might also inject a cautionary note into contemporary disarmament debates, inasmuch as continued reductions by today’s two nuclear superpowers will presumably create a positive-Lyapunov situation – well prior to nuclear weapons abolition – when the number of near-peer nuclear players is considerably *greater* even than the three analyzed in his paper.) Saperstein has not, to my knowledge, attempted to tease out such specific policy lessons from these calculations. Nevertheless, it takes little imagination to see that it would likely be good policy to try to avoid high-Lyapunov situations in which “[t]here is no way of knowing – even approximately – the outcome of any policy or action, and hence major fluctuations may result from minor perturbations ... [creating the conditions] for crisis instability and war.”¹⁶

Robert Jervis has also attempted to apply Complexity insights to the field of high-level policymaking in the international arena. Though the examples he discusses are subtle and wide-ranging, however, he offers remarkably little that seems likely actually to be *useful* to most policymakers – little, that is, beyond the importance simply of being aware that one *do* temporary disarmal. S

predictions.¹⁹ Systems as complex as human society are expected to be characterized by significant and irreducible uncertainties,²⁰ and if “[a]ny effort at long-term prediction in nonlinear systems is highly suspect” under the best of circumstances, it is surely “impossible to make long-term predictions concerning group interactions” in society.²¹

Complexity scholars have long recognized that applying its insights to the understanding of human systems offers us, in Ilya Prigogine’s words, “both hope and threat.” It offers “hope, since even small fluctuations may grow and change the overall structure,” but it also contains a sort of threat, “since in our universe the security of stable, permanent rules seems gone forever.”²² In Thad Brown’s delightful description, if it is true that “[t]he purpose of theory is to make nature stand still when our backs are turned, [as] Einstein reportedly said,” political scientists must confront the fact that “nature often laughs and dances around behind us.”²³ In this sense, complexity seems quite unkind to theorists.

From a policymaker’s perspective, however, the problem is more insidious than just teaching us lessons in impermanence and insecurity, or confounding our ability to articulate an explanatory model. Complexity is particularly subversive of policymaking because of its implications for our ability to *control* the world around us. If the animating idea of public policymaking is to apply effort and resources today in order to bring about a desired change in the future state of affairs, Complexity seems to subvert its very core. If Michael McBurnett is right, for instance, the opinion shifts associated with U.S. primary election campaigns have “a positive Lyapunov exponent,”²⁴ perhaps the most important thing this demonstrates is that they *cannot* be predicted. This sort of conclusion is very problematic for the policymaker, for as Saperstein has observed, “[t]he possibility of prediction implies the possibility of deliberate control.” “If prediction is not possible,” however, “there is no way of knowing the outcome of a given act or policy, which is synonymous with saying control doesn’t exist.”²⁵ And if, in turn, there is no control, what do we have policymakers for?

IV. *Responding to the Paradox: The Power of Ideas*

How might one respond to this predicament? Despair, of course, is one option. After losing money in the collapse of the infamous South Sea Bubble investment scheme, Sir Isaac Newton allegedly observed in frustration that “I can calculate the motions of heavenly bodies,

¹⁹ David L. Harvey & Michael Reed, “Social Science as the Study of Complex Systems,” in *Chaos Theory in the Social Sciences*, *supra*, at 295, 309.

²⁰ Hatt, *supra*, at 316 (*citing*

but not the madness of men.” If the human world of complex adaptive social systems is indeed fundamentally non-predictable and non-manipulable in any kind of deliberate way over the long term, is public policymaking in the end no more than a vain conceit – a sort of joke we play on ourselves rather than admit our powerlessness, or perhaps an outright fraud promulgated by those in positions of power in order to justify their existence?

Such despair seems premature, however, in part because we cannot be *entirely* sure how

theory to deal with, or profoundly elucidate,” and “complexity theories do not provide a particularly effective metatheory of social processes” in the first place.³⁰ Harvey and Reid appear more optimistic, but even they seem to think that merely metaphorical or impressionistic analyses may sometimes be all that one can bring to bear on human problems. In fact, they suggest the greater use of what they call “iconological modeling” – a “heavily intuitive” approach “rooted in a *pictorial method*, in visual correspondences rather than in deductive reasoning” and conventional methods of social scientific data collection and analysis.³¹

It is important to keep such concerns in mind when attempting to leap from the hard to the soft sciences, but it seems too early to give up. In fact, one might imagine there to be reason to believe that the policymaker’s paradox is not *quite* as debilitating as it might at first appear. Just *how* different human interactions are from those of molecules or the bundles of software code used in agent-based modeling, for instance, is no doubt a question on which experts will disagree. It would certainly seem to be true, however, that complex adaptive *social* systems – that is, the subset of complex adaptive systems the unit-level constituents of which happen to be sentient humans – are capable of responding to a type of input that no other complex system seems to be: *ideational* ones. Inputs at the level of conceptual organizing frameworks, narratives that structure people’s understandings and expectations of the world around them, seem to be important motivators for behavior in social systems and the political world.

As Robert Artigiani has noted, complex systems – including societies and idea-systems – have ways to police themselves in order to maintain a degree of stability as they dance at the “Edge of Chaos.” This he conceives as helping give rise to the phenomenon of purpose or *telos* in a self-organized system, and the need for systemic self-maintenance “exerts top-down constraints on how members perceive and react to the world and ... how the world responds to their actions.”³² It is in this fashion that “values, ethics, and morals” can be seen as helping “reprogram” behavior of individual humans in a system by mapping desired and undesired social states. Moral symbols stored in individual minds shape – though by no means rigidly determine – how individuals react in society.³³ Idea frameworks, therefore, can be important drivers for situational outcomes within complex adaptive social systems.

Just as importantly – especially if one is looking for some way to escape, or at least attenuate, the erosive impact of Complexity upon the very *possibility* of public policy – it must also be observed that ideational inputs clearly *can* be deliberately manipulated, for good or ill, by members of the policymaking community. If there are ways to escape or at least attenuate the here

culture that shapes decisional behavior in conscious actors and which has a specific information content that can be transferred through mimicry, interaction, and teaching.

Memetics would surely make little sense as a way of understanding systems that did not consist of conscious, willful human actors. But as a way of understanding complex adaptive *social* systems – which is precisely what we need to do if we are to bring Complexity with us as we make the leap from hard science to the human world – there are surely worse ways of conceptualizing the problem than to see systems as being potentially subject to transformative effects as a result of competitive and recombinative meme dynamics. And from this insight, if indeed it proves a valid one, it is but a short step to imagine policymaking aspiring to *affect* the paradigmatic “memotypes” of the social system – that is, to deliberately alter (or alternatively, better cement in place) the conceptual frameworks upon which human decisions are based as people evaluate their environment, determine what they wish to see happen, and apply themselves in myriad disaggregated ways to whatever tasks they perceive to be most immediately at hand.

A Complexity-informed approach to public policymaking, therefore, might be supposed to require a twofold focus. First, acting upon the important insights into

once pronounced himself more awed by the founder of a religion than of a state,³⁷ the Complexity-informed policymaker may wish systematically to devote attention to shaping the world of ideas in the broadest and deepest sense.

In this sense, the practical applications of public policymaking tend to shade into public diplomacy, intellectual vision-brokering, or even propaganda. This is not really news to true statesmen, however, for the most accomplished practitioners have always understood their work to be as much art as science, and as much about persuasive alchemy as anything resembling an exercise in precision engineering by scientifically-informed experts or policy “czars.” It is nonetheless useful to recognize the ways in which Complexity Theory seems to reinforce such wisdom, lest we forget it in the hubris of our technocratic conceit. There is rich irony, of course, in having the *science* of Complexity teach us that there may be sharp *limits* to the utility of “science” as a guide to decision-making in the human world, but we should perhaps take our lessons where we can.

VI. *A Case Study: South African Racial Ideology*

The political world, after all, seems to offer many examples of how ideas shape decision-making, how such concepts are sometimes purposefully manipulated, and yet how they can also come to acquire considerable power in shaping actors’ behavior and acquiring a sort of cognitive “momentum” of their own – in which particular thrusts and themes propagate themselves both laterally (“catching on” among greater numbers of people) and forward in time, maintaining a recognizable “family” resemblance even while changing in response to circumstances. Indeed, one might perhaps imagine cognitive frameworks and socio-political ideologies as being complex adaptive meme-systems that *themselves* function in some of the ways Complexity-derived organizational theories might expect.

A “fit” cognitive framework, in other words, might be understood to thrive “on the Edge of Chaos” by being tightly coupled enough that its conceptual elements provide, in a single “package,” a coherent way for adherents to understand and cope with the principal challenges presented by their socio-political environment, yet without proving so rigid and doctrinaire that the schema crumbles upon encountering the first perturbation not foreseen by, or intelligible within, its frame of reference. Fit thought-systems are loosely-coupled enough that they can “explain” and accommodate a good deal of circumstantial caprice without suffering a catastrophic collapse of legitimacy or coherence, but they yet manage to hang together in a form recognizable by their adherents (and third parties) as being the “same” framework over time.

One fascinating example of these dynamics – an illustration I take from my own work as a graduate student years ago – can be found in the odd history of the old and now long-discredited ideology of racial “separate development” propounded for decades by the White minority government of the Republic of South Africa. This ideology of “separate development”

³⁷ Niccolò Machiavelli, *The Discourses on Livy* (Ninian Hill Thompson, trans.) (Stilwell, Kansas: Digireads.com Publishing, 2008) at Ch.X, at 27 (“Of all those who are pra7 122ETE.Span .pra7 122ETE. most, whopan .the authors and founders of religions. After whom come the founders of kingdoms and commonwealths.”22).

was the intellectual foundation for the cruel system of racial *apartheid* practiced there prior to that country's long-awaited transfer of power to a government democratically elected by universal franchise. "Separate development" is not hard to evaluate in moral terms, and indeed the *apartheid* system it spawned was almost unanimously condemned as immoral and unjust around the world. As an analytical matter, however – as a study in memetics, if you will – its ~~development~~ and evolution as an intellectual organizing and just

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began to experience significant black unrest, with the infamous Sharpeville Massacre taking place the very next month – the pressure had built to a fever pitch.

Enter Hendrik Verwoerd, an Afrikaner Nationalist politician who had recently become South Africa's prime minister,

But what was anathema to Verwoerd in the mid-1950s apparently seemed more attractive after MacMillan's "wind of change" had begun to howl down from the north. In what it is hard to imagine being anything other than a cynical and propagandistic ploy, Verwoerd in 1960 – now as Prime Minister – began to seize upon the "separate development" ideal as a way to reject foreign (and domestic) calls for majority rule within a unitary South Africa. Separate development offered him a way to articulate this opposition in a discourse that did not require simply *rejecting* the ideology of self-determination and political rights. Instead, he could use separate development to *oppose* majoritarian politics while yet claiming *fidelity* to the ideal of democratic self-determination, which in its "truest" form was now said to require the avoidance "majority domination" of *any* group over any other group. Verwoerd and his successors clearly had no interest whatsoever in building "separately developing" racial sub-states into *genuinely* viable proto-states, but they were delighted to appropriate a concept that allowed them to argue against majoritarianism by using its *own* language of rights and political justice.

But what seems to have begun in Verwoerd's cynical intellectual opportunism was powerfully internalized and acquired enormous self-persuasive power within the Afrikaner political elite that dominated South Africa until the end of the *apartheid* system in the 1990s. In the ensuing years, the National Party government proved enormously attached to the idea, not merely as a rhetorical trope – a sort of propagandistic debating point – but indeed as a guide for transforming South African politics. Tw oTuntil the en7naA6.Cedl trope – a

National Party ideologists keenly perceived the dilemma. Vorster's successor P.W. Botha, however, proved more flexible.

Botha's flexibility, however, was not a result of his being less ideological. He simply prioritized a *different* organizing principle: national mobilization against communism. As Vorster's Defense Minister, Botha had become fixated upon the idea that South Africa was beset by what he and his Defense Ministry colleagues came to term a "total onslaught" of coordinated

precisely *because* of this conceptual inertia, for elements *within* an ideological system can come to exist in tension with each other, driving the system in new directions as participants seek to resolve its contradictions or escape its paradoxes.) And while ideological systems can sometimes absorb considerable perturbations, they can also reach the point at which the entire system disaggregates – thus permitting the crystallization of a new order around a *different* organizing concept.

Much of this can be seen in the history of separate development, which one might describe as a complex adaptive *memetic* system (CAMS). It was precisely because National Party ideologists *did* believe in separate development that they found it necessary to engage in the conceptual debates that led to tricameralism. “*Tripartment*” became a political reality, however, in part because “total onslaught” thinking developed in some sense as a *competitor* to separate development as the principal organizing principle for the South African state – thus permitting P.W. Botha’s opportunistic openness to Coloured and Indian co-optation to join forces with those Nationalist ideologists who saw power-sharing as the way out of the conceptual dilemma of territorially-focused groupism. And it was precisely because National Party thinkers *did* come to accept power-sharing as the natural and inevitable product of *fidelity* to separate development in South Africa’s peculiar demographic context, that they were more able to expand the “group rights” concept to black Africans – which then, in turn, set the stage for separate development’s final collapse and replacement by a constitutionalism based on *individual* rights.

As with other complex adaptive systems, the CAMS of separate development seems to have survived for some time precisely because it was ordered and structured in distinctive ways that made it attractive to its host population of Afrikaner politicians and voters, yet it was able to evolve over time both as a result of deliberate choices by key actors and as a result of its own internal dynamics and tensions. This is consistent, for instance, with what organizational theorists informed by Complexity have seen in the phenomenon of entrepreneurship, which is envisioned as a form of structured and deliberate *instability* vital to the self-renewal and survival of an organization (or any other complex system) in new forms of order, but which must nonetheless be coupled with a degree of certainty and predictability so that it avoids the disorder of outright chaos.³⁸ The perpetuation of memetic themes forward through time in progressive variations, each differing but nonetheless recognizable as part of the same conceptual “genealogy,” recalls Robert Artigiani’s point that in social systems operating on the edge of chaos, survival does not call for “stability” as much as “evolvability.”³⁹

sense that they constantly seek new organizational states” in their effort to survive over time in a changing environment.⁴¹

Alternatively, a CAMS might be discovered to have its own internal contradictions. Artigiani suggests, in fact, that Gödel’s Theorem may indicate that some internal contradictions of some sort are unavoidable for any system claiming to have theorems and axioms that are logically consistent.⁴² In the language of formal mathematics, an axiomatic system is said to be *consistent* if the operation of its rules can never produce two mutually-contradictory statements. Gödel tells us, however, that a consistent system will necessarily be *incomplete*, in that it will

Source: Artigiani, Mitchell, and Engstedt, *Chaos in Organizations*, p. 181. Table A5() TJ0.0011 239199939 T005 -181TDanoequil 2ns

“dynamic tension between their ability to accumulate negentropy [negative entropy] and their need to transfer their positive entropy to the environment. If they can sustain this tension, then under proper circumstances they can achieve a state of *net negative entropy* and persist.”

The self-determination and race-group-political memes might be said each to have its *own* internal dynamics and to exist in some sense as a CAMS all unto itself. It is probably most useful here, however, to regard them as being constituent elements of the broader CAMS of separate development – an ideological system for organizing South African politics that emerged, developed, and ultimately dissolved through complicated mechanisms of ideational entrepreneurship, environmental reactivity, and internal contradiction. It has long been understood that ideology is

“a realm of contestation and negotiation, in which there is a constant busy traffic: meanings and values are stolen, transformed, appropriated across the frontiers of different classes and groups, surrendered, repossessed, reinflected.”⁴⁶

Complexity Theory provides a prism through which to express and help understand the development of such complicated conceptual relationships and their development over time.

The concept of complex *memetic* systems may provide only an incomplete answer to the policymaker’s paradox inherent in Complexity, but it is something of an answer nonetheless. Within the ideational “space” of a particular conceptual “attractor,” behavior may indeed be unpredictable and hence uncontrollable. The memetic conception of Complexity, however, suggests that one might retain at least some hope of effecting purposeful systemic change by seeking to alter the very concepts and conceptual interrelationships that help constitute the attractors around which orbit the ideological patterns that help shape unit-level operational behavior and thus drive concrete system outcomes.

In South Africa, Prime Minister Verwoerd gambled that the compelling power of post-colonial universal-franchise majoritarianism would be answerable by the articulation and operationalization of a group-keyed ethic of “separation” that claimed fidelity to the very ideal of self-determination that gave universal franchise its legitimacy. *Apartheid*’s opponents, in South Africa and around the world, opposed separate development in the name of that same ideal. On this sharply and bitterly contested conceptual terrain, Verwoerdian approaches had some success for a while, before being superseded by a variation offered by P.W. Botha as a way to mitigate separate development’s internal contradictions and to make the South African system more consonant with Botha’s own *separate* but overlapping ideology of defensively militant anti-communism. Before long, this Botha variant was itself superseded by what was in a sense the hybridization of majoritarian self-determination with the kind of formal protections that National Party ideology had earlier demanded for race-group “selves” competing within the political system, but were now applied to *individual* human selves in the form of consitutional rights.

Memetic competition, including deliberate and self-conscious ideological advocacy and counter-advocacy, was a critical part of the process. Indeed, key participants seem to have been keenly aware of the politically morphogenic properties of their ideological articulations. There was, throughout this period, a clear relationship between the ideas expressed about how the South African political system should work and the forms it actually took when acted upon by leaders guided by such formulations. Ideas *did* matter, and they were perceived – apparently

⁴⁶ Terry Eagleton, “Ideology and its Vicissitudes in Western Marxism,” in *Mapping Ideology* (Slavoj Žižek, ed.) (London: Verso, 1994), at 179, at 187.

quite accurately – as being capable of having significant, or even transformative, consequences. That, in fact, was the whole point.

Even given all the difficulties of applying Complexity science in the human realm, therefore, this may be one lesson that policymakers can learn. If indeed Complexity thinking reinforces the intuitive insight that an “ideology has its own law of motion”⁴⁷ – and if such “laws” exercise a real influence upon outcomes that is predictable at least in the sense that memetic schemes tend predispose specific *types* of behavior and relationship patterns – then the policymaker may have to become ideology’s lawyer.

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⁴⁷ Nicholas Abercrombie, Stephen Hill, & Bryan S. Turner, “Determinacy and Indeterminacy in the Theory of Ideology,” in *Mapping Ideology*, supra, at 152, 155.