

Commentary

Futurology Needs to Focus on Measurable Variables, Causality and Social Structural Models and Learn from Past Mistakes: A Response to “A History of Possible Futures: Multipath Forecasting of Social Breakdown, Recovery, and Resilience.”

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Abstract

Cliodynamics researchers are now reaching out to social science in a way that opens the door to productive collaboration to advance a predictive, applied and ethical science of social breakdown, social violence and social change. This commentary, from an interdisciplinary social anthropologist working on these questions for some 40 years, reviews the advances in these areas in the social sciences over the past 100+ years, highlights where *cliodynamics* can learn from these advances to avoid replicating earlier mistakes, and analyzes *cliodynamics* researchers' current efforts with suggestions for improvement and collaboration to unify and promote this area of study.

Introduction

As an holistic social scientist working over the past 40 years on neo-Malthusian approaches to predicting political violence, social breakdown, resilience, and change, I have been both pleased and also somewhat startled to watch, over the past 10 to 20 years, the entrance of researchers into this area of social science under the newly invented banner of *cliodynamics*. The work of the *cliodynamics* group (authors published to date in the journal *Cliodynamics*), including the attempt by some ten scholars affiliated with the journal to expand the research into the discipline of anthropology, where social scientists have been active on these

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issues for more than a century, is visible in the current theoretical framework and proposed research presented in this issue of *Cliodynamics* in the report, “A History of Possible Futures: Multipath Forecasting of Social Breakdown, Recovery, and Resilience”. This report, detailing the most ambitious work of *cliodynamics*¹ researchers to date, opens the door to discussion and future collaborations.

What has pleased me has been to see a group of colleagues from mathematics, biology, and other sciences offering to bring scientific methodologies to the decades old (and often ideologically driven) attempts within some of the social sciences to offer predictive models of political violence, social breakdown, resilience, and change. Better, still, they offer a journal in which some of this work can be published. While social scientific work on these phenomena dates back about a century in Western social science (indeed more than two centuries if it is dated back to Malthus [1798]), and while there have been some recent breakthroughs, political pressures on social sciences have largely eviscerated the ‘social science’ from social science and have made continuation of this work difficult today in the social sciences (Duncan 2013, 2018; Lempert 2018a). The ethical applications of social science to important humanistic questions have also been under threat (Duncan 1995). Indeed, in the one area of social science that *cliodynamics* specifically references for inclusion within its own repertoire from among the larger set of social sciences, that of ‘macro-sociology’,² the disappearance of macro-sociology from sociology was already being announced more than 20 years ago (Tilly 1995). Such work, if it is to occur and is to be available to the scholarly community, must now be done outside of the classic social science disciplines. *Cliodynamics* potentially offers a place for such collaboration with social science.

The *cliodynamics* group is not the only recent entrant into this area of futurology (prediction of behaviors of human groups) from outside of traditional disciplines. If recent trends are an indication, other natural scientists are also seeking to enter into this territory and will continue to do so. Many of these scholars are also now competing for attention with those who have been publishing in the *Cliodynamics* journal. Among them are also scholars who are

¹ My goal in this commentary is to focus on critiquing this proposed research. At the same time, since the proposal draws on material that presented in previous approaches they have published in *Cliodynamics*, and because there is an overlap between the ten authors of the report and previous approaches in *Cliodynamics* with both generally consistent with each other, I will try to address both while differentiating between “the report”/*cliodynamics* researchers/proposed research and the general approach of the *cliodynamics* group (work of authors appearing in the journal *Cliodynamics*).

² *Cliodynamics: The Journal of Quantitative History and Cultural Evolution* defines itself on its [website](#) as a transdisciplinary area of research integrating “macrosociology” with the newly defined fields of “cultural and social evolution” and “economic history/cliometrics” as well as with “mathematical modeling” and “analysis of historical databases”.

coming from within social sciences and are claiming to be scientific in the newly named but not well-defined interdisciplinary field of ‘cultural (and social) evolution’ that *Cliodynamics* now includes within its own definition of its affiliated fields.³ Within the *cliodynamics* group’s past work and the new team’s proposed research, as well as in the work of new entrants in ‘cultural evolution’, it appears that many researchers are seeking to replace the valuable advances made already by classic ‘four-field’ (physical, archaeological, social-cultural, and linguistic) anthropology; usurping, misusing, and neglecting what they need to most incorporate for effective predictions. Though a discussion of what is happening in ‘cultural evolution’ is outside of this critique, many of the concerns regarding the *cliodynamics* researchers’ proposed work applies to what is happening in ‘cultural evolution’.

Among those things that have startled me is not that the *cliodynamics* group would eventually recognize the need for more social science in their research (with the *cliodynamics* research team now noting the need to include “economic, political and cultural” factors); an understanding of culture to supplement their previous use of demographic variables and a small selection of political and economic indicators. Nor am I startled by their recognition of the need for a more humanistic approach.

What surprises me is that the places in social science where *cliodynamics* researchers are seeking help (anthropology) and the ways the group is now structuring its research suggests a return to the subjective, emotional, non-scientific approaches to social science that social scientists pursuing these questions long ago abandoned. At the same time that the *cliodynamics* researchers recognize the limitations of their previous approaches and the need for more cultural understanding to strengthen their modeling, they continue to base their frameworks on those narrow social science measures and approaches that have long been critiqued for lacking an understanding of cultural dynamics (the systems thinking and holism that are rooted in anthropology). Among classic anthropologists doing social science, ‘culture’ is not a ‘factor’ as the *cliodynamics* researchers see it, but a modeling framework itself. Anthropology provides the cultural and social context for understanding the workings of social structures and how particular variables and measures from the non-holistic social sciences (like political science and economics), which have been ideologically driven and limited in what they can predict, can be replaced with hard variables and predictive frameworks of how political, economic, and social institutions will behave under

³ Although there is now a Cultural Evolution Society, it appears to be driven more by political processes of membership competition than by any clear set of questions in a disciplinary framework with clear boundaries and principles. The Society’s [website](#) lacks a definition of the field and its mission. It is defining its goals by aggregating the results of membership [questionnaires](#).

sets of different conditions (Lempert 2018c; Sly 2018). Rather than applying the advances of holistic social science and seeing humanities as a place for thought experiments and ethical insights, the *clidynamics* researchers seem, therefore, to be continuing to use limited and outdated political science and economics frameworks in combination with mathematics and natural sciences while misusing concepts from anthropology. In doing so, they replace objective science with storytelling and subjectivity.

Over time, social scientists, including some whom *Clidynamics* authors have recognized (and many others whom I view as important, whom they have not, and whose work I describe below), have begun to perfect a scientific framework of analysis that has included much better specification of variables and measurements to eliminate subjectivity, emotion or 'magical' thinking. Successful social scientists have been testing these variables within a context that recognizes natural laws of human (and primate) behaviors in groups and the holistic workings of societies and social structures that also follow certain laws. They adhere to the scientific method of offering testable theory with clear causality. Of the ten authors of the *clidynamics* report, I find it hard to identify any with a background and commitment to classic, holistic social science (anthropological) modeling prediction and hypothesis testing, which may be part of the reason for their not incorporating this other work. Some authors in *Clidynamics* do draw from different pockets of social science, as do the authors of the report, but they miss the lessons from holistic social sciences and the coherent framework that it offers.

In reading articles in *Clidynamics*, it is not surprising that the authors' selective use of social science seems to follow a similar path of those discoveries from a century ago, albeit with more mathematical representations, newer cases and newer data sets. The early social scientists (see below), like the scientific researchers of *clidynamics* today, started by just looking at cycles of time series data in the earlier equivalent of 'Big Data' and drawing inferences. Then, as scientists, they took the next step following the logic and methodology of science. They began to offer models and hypotheses to test, followed by the systematization and structuring of their approach. That was decades ago. It is surprising that *clidynamics* researchers seem to be unaware of this other work and on a path to making the same mistakes, saying that they are "link[ing] the humanities with complexity science to create something radically new" without referencing what was done before.

Although it is a limited amount of space, the editor of the *Clidynamics* journal, Peter Turchin, who is also one of the authors of this new research report in the journal, has graciously offered me some 4,000+ words (including answers to several queries of his and two reviewers of my first draft of this commentary) to present as much as I can from the decades of social science experience on these questions to *clidynamics* researchers. Below, I offer capsule descriptions of work and lessons from the actual 'macro' social science, anthropology (in its four fields

of primate study, archaeology, cultural behavior and linguistics), in the sub-areas of this macro-social science where social breakdown and violence have been modeled, how it includes and differs from approaches in sociology, political science, and economics; along with information on the micro-social science of psychology that has offered some relevant models, and approaches from other related or interdisciplinary sub-fields. I present a brief history of social science futurology study on the questions of social breakdown, social and political violence, resilience and social change, noting many of the problems that were recognized and the framework that social scientists have adopted to overcome them. I then analyze the *clidynamics* researchers' approach, troubleshooting it and offering constructive suggestions that incorporate the lessons of holistic social science, including previous social scientists' critiques of the approaches that the researchers are using (many of which anthropologists long ago discarded) in this area.

A History of Futurology: Using Social Science to Replace Magical and Subjective Thinking while Learning Hard Lessons Over Time

The goal of the *clidynamics* research group to link scientific measures with history and multi-disciplinary social science, to turn the study of history into a predictive science and to use a model of 'social breakdown' that, in their words, "results from multiple interacting factors: economic, political, cultural, and emotional [psychological]" is not just one with which I agree. It is an approach that some historians and anthropologists (in the holistic discipline of social science) established in coherent frameworks some 60 to 80 years ago (see below), with several developments following since then that are largely outside of the current disciplines or sub-disciplines and perspectives of the researchers in *clidynamics*. These historic advances have been painstaking. Those who have worked on a scientific theory of culture applied to social breakdown, social violence, and social change have learned and offered several lessons. Their achievements have often come in the face of resistance both within and outside of their professions, including political and funding pressures that have politicized and led to misuse of science and social science, and fervent religious doctrines that have opposed deterministic and empirical approaches to prediction of human behaviors for the purpose of social progress. Much of this work is now hard to find and it is challenging for scholars in any discipline today to:

- Overcome isolation of information within individual disciplines that has prevented building on what is being done and has been done in other fields

- Synthesize the studies of different individual causal factors and the use of different integrated models in a meaningful way rather than rhetorically and randomly
- Maintain a scientific and objective framework not distorted by individual hopes or by ideology given that there is a natural tendency to oppose any work that offers deterministic explanations that either deny the possibility of (rapid) human change or that suggest inevitable human misery or extinction
- Offer ethical uses of scientific results that promote human aspirations for human rights and social progress in order to overcome inequality and suppression of human aspirations and differences.

While the *clidynamics* group has elevated macro-sociology as the integrating social science, the most useful holistic framework for the questions the group is asking is the one created during World War II in anthropology by Bronislaw Malinowski, specifically to predict the social breakdown and political violence in Europe, in his “scientific theory of culture” (1944). Later key frameworks are found in holistic modeling for prediction of wars and violence by Marvin Harris in “the struggle for the science of culture” (1979) and in the use of structural models (similar to the multi-factor models of Mendelian inheritance) of Claude Lévi-Strauss (1958). Historians have also been developing this kind of scientific modeling dating back 80 years (Beard 1938; Becker 1955; Meyerhoff 1959) and maybe dating back to H.G. Wells modeling of societies (1905).

The idea of using ‘Big Data’ in the form of time series dates back farther, perhaps more than 200 years, and is in those disciplines, outside of those of *clidynamics* researchers, where social scientists long ago began to recognize that time series variables quickly lose predictive content. The real key to prediction, they found, was to specify variables objectively to avoid the problem of ‘multicollinearity’ (essentially measuring the same thing under different names in ways that produce spurious correlations of no predictive value) and to have a clear framework, within the level of holism of societies, that offers a specific and measurable theory of causality. Without learning this lesson, the result is either a tangled mess of variables or patterns of cycles that never really offer any testable predictive theory or a return to subjective, humanistic variables, to substitute explanations that are ‘psychological’, ‘emotional’, and ‘narrative’ and that hark back to the ancient Chinese I-Ching (1964 [Late 9th century B.C.E.]) and Confucius (1938 [206 B.C.E. to 200 C.E.]).

Malthus (1798), an early economist, and essayist Jonathan Swift (1740) seem to have been the first to model collapse using objectively measurable (but not necessarily completely independent) variables of population and production. Hegel and Marx’s early cyclic, dialectic theories of history (Hegel 1837; Marx 1970 [1867]; Marx and Engels 1868), and then the works of ‘macro-sociologists’ Pitirim

Sorokin (Sorokin 1937) and Oswald Spengler (1926-28), began to introduce what are viewed today as mostly pseudo-scientific variables using terms like “capital” or other ‘isms’ (Bell 1960), “charisma”, “democratic culture”, “frustration” (Feierabend and Feierabend 1972), “dysfunction” (Johnson 1966), or “cultural mentality” (Spengler) and “life force” (Spengler) in efforts that failed to offer predictive value. The early cycle theories were also in vogue in studies of business cycles (American Economic Association 1944), American election cycles (Burnham 1970; Elazar 1978; Kristi 1976), and development and stability (Fenoaltea 1987; Kuznets 1930); all of them today serving as examples of the failure of using ‘barefoot empiricism’ (a search through data rather than testing of a clear theory) to explain cycles.

In early applications of ‘neo-Malthusian’ thinking (looking at population and social variables linked to it), social scientists began to understand the need to fully understand the variable of population as well as links to violence and social change. This led to some sophisticated theories, including the use of social structure (Harris 1973, 1977, 1979; Spooner 1972), technology in specific environments, and the feedback links to development of technology (Boserup 1981; Chamberlain 1970; Downs 1957; Dummond 1965; Handwerker 1980; Stewart 1947).

Indeed, the social structures of cultures specify pathways to deal with population density in ways that are much more complex than direct sociobiology applications of studies of rats (Calhoun 1962) to humans and that require very difficult specification of an interacting set of structural variables in an anthropological model (Freedman 1975; Freedman, Levy, Buchanan, and Price 1972; Stokols 1976). This has partly led to some of the recent modeling of collapse (Diamond 2005; Tainter 1988). A key lesson here comes from the failures of population biologists who use sociobiology (Wilson 1978) as a model, analogizing human behavior to other species and then adding ‘humanistic’ or social science variables but without understanding that each species needs to be modeled on its own and holistically, rather than just with a focus on ‘political’ structures or individual ‘incentives’ as posited (but without empirical basis) by economists. While *clidynamics* researchers are long aware that the ‘social structures’ of ants or bees, for example, cannot be transformed to those of humans simply by adding more variables, since each species has its own set of structures, this is exactly what their past work seems to have been doing through an ‘additive’ approach that continually adds political, economic, and now cultural ‘variables’ into what starts as a biological model (discussed in more detail below). Holistic modeling of group behaviors at the level of culture and society, the approach of classic ‘four-field’ anthropology, including modeling of primate societies, primate social violence and breakdown (van der Waal 1982), is the approach that has offered the most promise for coherent prediction.

While the earlier models of social and cultural evolution that were used in classic anthropology usually just offered a shallow, linear, teleological explanation

of the development of technologies and social structures (Service 1975) or those variables of 'ethos' and religious stories or narratives as driving forces like the "Protestant ethic" and the "spirit of capitalism" (Weber 1958 [1904]) or business ethos (what economists call 'social and cultural capital' without any deeper predictive explanation), those that had firmer structural variables to describe how productive systems worked and shaped relationships have offered some use for prediction. The early models of division of labor (Durkheim 1893) and bureaucracy (1947) are still important to use in developing models of how technologies also create the new 'environment' and are among the variables underlying social structures that outline pathways of social behavior (e.g. the theories of convergence [Galbraith 1967]).

There has been some good holistic social modeling of social breakdown and violence over the past 50 years, mostly in classic, 'four-field' anthropology, within the tradition of Malinowski and Harris. Starting some 40 years ago, the best conceptual models of social breakdown, social violence, and social change were those of Marvin Harris (Harris 1973, 1977, 1979) and those working with or with similar holistic, anthropological approaches on warfare (Ferguson 1984; Fried, Harris, and Murphy 1988; Harris 1973) and cultural change (Nelson 1984). These were not formal, mathematical models describing every possible case, but they were models with explanatory and predictive value using social science techniques from anthropology, based on understandings of social structure, holism, cultural continuity/resilience, and vulnerability that offer a firm basis for more refined modeling. Despite this, or as a result of it (Lempert 2018a), anthropology has mostly driven work in this line out of the profession over the past 40 years and it is hard to find it if it exists. Like the *clodynamics* group, I am fond of our colleague Jack Goldstone's social historical modeling of the English revolution some 30 years ago (Goldstone 1983, 1991). Goldstone's work either followed or appeared simultaneously with my own modeling of a contemporary case that added ethnic interactions and a model of political interest-balancing (democratic culture) to describe cycles of resilience rather than revolution in an integrated neo-Malthusian model of cultural breakdown and violence, linking demographic, economic and political variables in cultural context in Mauritius (Lempert 1987 [1980])⁴.

In contrast to these approaches, the problem with work in the other (non-holistic) social science disciplines is that it has tended to focus on only one or two

⁴ My first work in this field, that won a prize at Yale in 1980 in Comparative Politics, was published before Goldstone's work, though it is not yet acknowledged by *clodynamics*. Goldstone predicted revolution using the variable of "prices" rather than actual production variables. I designed what I believe was the first integrated neo-Malthusian model of generational demographic-political-economic, cycles explaining the absence of violence where other models might have predicted it, in a long-term model of multi-ethnic Mauritius.

types of variables that are still badly specified (not objectively measurable or not of real predictable significance) or has used statistical models (time series or regression analyses) that rip independent variables out of context in ways that undermine the idea of integrated modeling. Trying to address the problem of focusing on too few (political and economic) variables in a way that lacks a framework of social structures and principles of culture, or by adding in culture as 'variables' to try to improve predictions within the context of outdated political concepts that are socially constructed and subject to ideological bias (like 'state' and 'society' or 'classes'), or by using statistical and mathematical models has long been viewed as a failure and has been replaced by the current integrated approach described above. Despite the recognition of Goldstone's work, my fear (elaborated more fully in the next section) is that the *clidynamics* researchers are still working from within the earlier, non-holistic frameworks and with similar soft variables. Such non-holistic and non-integrated modeling failures are found in categories of work on 'political violence' (Brinton 1965; Davies 1962; Ellwood 1905; Gurr 1970; Skocpol 1976) and 'social conflict' (Coser 1952; Galtung 1964; Gatewood 1987; Geschwender 1964; Muller and Dieter-Opp 1986; Oberschall 1978; Snyder 1978) as well as work within and across disciplines in the form of 'cross national' studies (Feierabend and Feierabend 1966, 1972; Gurr 1968; Gurr and Lichback 1986; Harff and Gurr 1988), in work that has sought to look at population in terms of hard to specify 'generations' or 'cohorts' (Easterlin 1978; Feuer 1969; Kingsley 1970; Ryder 1965; Wallimann and Zito 1984), and in work on 'class' as a variable (without looking at the underlying variables that shape the fluidity of class including the variables of production technology and its operation, the special case of weapons and security technology, and their impact directly on inequalities and indirectly on other social institutions that pattern relative power, and failing to recognize the superiority of models of economic productive units such as family, community, guilds/professions) (Dahrendorf 1959; Downs 1957; Manoucher 1973; Midlarsky 1988; Muller and Dieter-Opp 1985; Sigelman and Simpson 1977; Weede 1981). A focus in sociology on 'social movements' (Cohen 1985; Deutsch 1961; McCarthy and Zald 1977; Smelser 1963; Tilly 1985) is also mostly a record of lessons in failures of social science modeling (Lempert 2014a).

While the *clidynamics* group seems to be largely continuing to work within Goldstone's original political-sociological framework with more specification and addition of economic and political variables (Turchin 2013; Turchin, Gavrillets, and Goldstone 2017), my own work has long moved past these frameworks to use holistic anthropological models and hard (more objectively measurable) variables like geography, climate, boundaries, and technologies, using case studies to generate testable theories. In work on 20th century Russia, I have offered new models of revolution and genocides within Russia that challenge the 'isms' approaches and that also uses the concept of cultural 'syncretism' (cultural continuities and one-to-one replacements of symbols) to examine the social

structures that continued from the Tsarist period until today and their (homeostatic) 'resilience' along with the pathways of changes with technological change (Lempert 1995). I have recently worked on how to specify this kind of social change to better map these pathways (Lempert 2013). I believe that some of my most useful predictive modeling of political breakdown and change is in areas where I have used 'hard' geographic and environmental variables (Lempert 2016) as well as 'hard' ecological and 'pecking order' variables from social psychology to predict cultural patterns (Lempert 2014b). I have recently offered theories with new specifications of causality in order to predict social breakdown using biological and psychological models to describe "cultural suicide and cultural change" (Lempert 2017, 2018). I believe I may soon be able to update some of Marvin Harris' theories on war to describe military spending and economic waste as part of a structural approach to slowing population growth without war itself but with ritualized preparation for war (directly challenging the variable of 'productivity' that *cliodynamics* researchers seem to want to see as a hard variable rather than something socially constructed). I have also been challenging the modeling assumptions used for predicting 'social progress' in ways that may explain genocides and assimilation (Lempert 2015).

Improving the Research: The Social Science Framework that *Cliodynamics* Should Use to Avoid Decades of Previous Mistakes

The lessons of social science in the prediction of social breakdown, social violence, resilience, and social change include three key attributes of success along with an ethical dimension required for social science work. These are:

- Variables should be clear, measurable, not subjective, and not likely to be multi-collinear with dependent variables.
- Causality assumptions that are being tested should be clear and with a theoretical basis.
- Contextual, integrated, structural models of society/culture should be presented as part of the foundations of the research, with the variables and pathways that are being tested examined within each society that is used as a research case, with societies viewed holistically and with research findings aggregating the results from multiple societies.

In short, the research should employ the scientific method of hypothesis testing in place of 'barefoot empiricism' that just begins with a soup of independent variables and dependent variables. The humanistic ethical requirement for the research is that it reflect concepts of human rights, social justice and equality that are found in international law without the possibility that it will be used to violate those rights. While many of the *cliodynamics* researchers may believe that they already follow this prescription or that they are familiar with the full range of work

in this area in social science, it is hard to see this reflected in the current research proposal. An analysis of *clidynamics* research using these standards offers sharp, constructive advice. The *clidynamics* approach requires significant improvement, if not rethinking, in several areas to avoid generating meaningless results or generating conclusions that are no better than subjective guesses.

Overall Theory

The overall premise of the *clidynamics* research (from the abstract of the MPF article) to use a “transdisciplinary approach to forecasting social breakdown, recovery and resilience” (later defined as including “multiple interacting factors: economic, political, cultural and emotional”) is theoretically sound in the abstract, though there are questions on how ‘emotional’ measures and variables would be integrated with the social science categories. The question is how it works in practice and that is where there are problems. The *clidynamics* researchers do not seem to have any testable theoretical hypothesis. There is no presentation of assumptions or of the contextual social frameworks of social structures and social processes that are being used. There are no clear statements on causality. There is a mention of “agent-based models” which is an interest-group approach from political science, but it does not rise to the overall level of a predictable social structure and pathways approach. The mention of “qualitative insights of historical and semiotic investigations” is troubling. This suggests a reliance on non-measurable subjective variables as well as analysis of symbols rather than behaviors. The suggestion of the use of “micro-dynamics” and “collective macro-level events” indicates a confusion of two different levels of analysis (group behaviors, that historically have been explained by models in anthropology, the holistic social science, and individual behaviors, that have historically been explained by psychology) without a clear model of how they fit together. As far as I know, no such model exists that would link the two levels and trying to do so is premature.

The model that the *clidynamics* researchers do offer, partly funded by the U.S. Army and published a year ago (Turchin, Gavrillets, and Goldstone 2017), does not recognize these two distinct levels of human behavior as reflected in the two core social science disciplines; human behavior in groups (macro level), within holistic anthropology models, and human individual behaviors (micro levels), within complex behavioral frameworks from psychology that go well beyond simple models of ‘rational’ actors ‘maximizing’ benefit. Instead of this, the *clidynamics* researchers’ model starts within the social sciences that work on discrete social structures and functions (economic, political and social). The model is based in economics (using the increasingly abandoned idea of the rational utility maximizing human actor, to describe what may be irrational behaviors) and in political science; using a model that distinguishes between ‘the state’ (something anthropologists view as a social structure performing political functions of a

culture or collection of cultures) and 'the society' (the culture or collection of cultures, itself) or 'social movements'. This kind of modeling was long ago critiqued as being an ideological approach used to stigmatize specific societies (Bell 1960). Though a longer discussion of the model the *cliodynamics* researchers have cited from previous work is outside of the scope of this essay, I find no clear measure in it of what they describe as two (micro and macro) levels. Their model, in fact, also includes a third ('meso') level along with a set of some eight idiosyncratic equations and a voluminous number of what may be unmeasurable terms that they suggest can be measurable variables, like "representational utility", "state strength", "trigger events", "moral integrity utility", "days of rage," "private preference" versus "publicly expressed preference", "numbers of commoners", and "spiral of violence", among others. I have offered a sketch of how a link between the cultural/society group level and psychological/individual level might actually work, within the context of holistic social science, in a recent paper (Lempert 2018b).

Variables

There appear to be serious problems in the *cliodynamics* group's selection of variables. The group seems to be replicating mistakes made some 50 to 100 years ago, with apparent problems both of multicollinearity and subjectivity.

- Since the behaviors to be predicted are those of social breakdown, resilience and violence (dependent variables), the independent variables must not include the symptoms or emotions of breakdown and violence since these are symptoms, and a symptom cannot be a cause. Here, the choice of "levels of cooperation, trust and feelings of (in)justice" are all subjective variables rather than hard, objective variables or classifications of social structures that are directly connected to them. The measures of "the level of cooperative social practices and values" (which is just another way of saying, 'disunity' and 'social breakdown') have the same problem. This was the failure of the social mobilization theorists, the social conflict theorists, the early theorists of revolutions and of 'social inequality'/class and the early social cycle theorists.
- The research also seeks to offer newly defined categories of variables that are all subjective, which they call "habitus" ("cultural dispositions" and "values" among them) along with what they call "narrative/mythic drivers of social breakdown". Such variables do not come out of science, but out of recent social philosophy (authors like Bourdieu, whom they cite) in a movement seeking to replace science with approaches from the humanities disciplines in which many current anthropology and sociology scholars are actually trained (literature and philosophy among them). *Cliodynamics* researchers want to use 'metaphors', 'cultural

narratives', 'ethos', 'affect', 'emotional tone', 'optimism', 'semi-emotional clusters', 'cultural program' and 'crisis and renewal' as variables. This idea of 'ethos' and measuring stories ('narratives') goes back to the same stereotyping and ideational categories of 'spirit' or 'geist' that Sorokin and Spengler offered nearly a century ago and that have long been abandoned as pseudo-science (in some cases, potentially racist). In classic anthropology, narratives (folklore) and ideologies have long been seen as 'superstructure'; the story versions of a culture's underlying 'structure' or its 'deep structure' that are designed to reinforce these structures (the interacting set of political, economic and social institutions and behaviors to achieve a set of functions that all societies need to survive). In this sense, these variables are really shadows of the actual structures, rather than actual measures of them and how they work. Using them as variables means that it is these shadows or ideologies that are being measured rather than the actual institutions/behaviors or the natural and physical factors that shape them. Trying to determine which narratives are dominant and what their elements really mean can be a guide to measuring the actual institutions/behaviors and the natural variables underlying them, but they are subjective and unreliable, which is why they have long been discarded in social scientific models. The *clidynamics* researchers, themselves, say that they are purposefully adding in these qualitative measures that lack objective verifiability in order "to link the humanities with complexity science to create something radically new". They seem to be mistaking the return to something long ago discarded for something "radically new". In my view, this 'link' is what the ancient Chinese and Greeks and others were doing with the I-Ching and fortune telling. The purpose of predictive and applied science and social science is, by definition, to avoid this kind of subjectivity and 'magic'/'spirituality' and idiosyncratic philosophizing that characterizes much of both the social sciences and the humanities today.

- While the researchers' report only briefly references the data sources to be used, *clidynamics* researchers are now linked with The Evolution Institute's [Seshat: Global History Databank](#) project. My fear is that this dataset appears to be introducing several biases into both the selection of cases and the specification of variables that will make it difficult to come up with a predictive model, even though the Seshat team is including a small sample of holistic social scientists⁵. A good way to avoid

⁵ On the project site's ['Who We Are'](#) page, some 24 scholars are listed as "Variables Coordinators and Consultants". By my count, two are archaeologists, one is a physical

ideological biases in testing a theory of behaviors of human populations is to include a spectrum of human (and primate) cultures. Predictions of social breakdown, social violence, and resilience should be applicable to industrial societies, indigenous peoples of small populations in specific ecological niches, and even primate groups (like chimpanzees) in different settings. If the basic variables and contexts do not work for all of these groups, first, starting with the smaller groups and then adding more complexity into the model for the larger societies, the overall approach is probably flawed. In looking at the coding used so far by Seshat, their approach seems to indicate a lack of understanding of how groups adapt to environmental variables and how social structures are codified in relation to the material environment. The codification used for the Iroquois, for example, for its legal and political structures, codifies for 'judges', 'courts', 'formal legal code', 'professional lawyers', 'full time bureaucrats', and 'kinds of written documents'. These are essentially markers of complexity and industrialization that have little to do with the areas the research seeks to predict.

Model of Causality and Context

In place of any starting model of society, social structure, and causality that is based on decades of work on social continuity and social change, the *clidynamics* researchers seem to start with no causal or contextual model at all. Their goal seems to be to generate variables and vast amounts of data and to use statistic programs to see if they can generate a new model that has no reference to any existing work. The researchers call this "multipath forecasting (MPF)". In place of causality, they offer an unspecified "thick web of feed-forward and feed-back loops between the different methodologies that integrates them into a seamless whole" linking "text/emotional analysis" with "macro-models". They appear to have a set of subjective, multicollinear variables that will loop with each other, measuring the same thing.

Since the authors claim that their research approach is described in one of Turchin's recent articles, rather than made explicit in the MPF report, the framework they may be using is one that Turchin calls, in that piece, "structural demographic theory" (2013). His approach seems to be mostly be a restatement of the early neo-Malthusian work by Goldstone back in 1991 (Goldstone 1991) within the same (in my view, anachronistic and particularistic) political science framework of 'state', 'elites' and 'general population' that was long ago replaced by the holism of anthropological modeling of cultures/societies. Rather than

anthropologist, one is a social psychologist, two are cultural anthropologists and two are sociologists.

recognize the holistic cultural models that include social structures as part of the overall model, Turchin seems to be trying to add the larger framework into that model in the form of a single variable of “social norms” and “power relations” that he labels as “C” (!). He fits ‘C’ into mathematical equations in an attempt to formalize the original model. He simultaneously creates other variables like “Mass Mobilization potential” that mix other socially constructed variables (“urbanization”, “wages”) with demographic variables and then he adds other variables (e.g. “labor demand”, “labor supply” and “productivity”) to deal with the imprecision of the first set of socially constructed variables. In *clidynamics* researchers’ report, the approach seems to be to continue to add in culture to this model in the form of an increasing number of new variables, again without recognizing that culture and its structures are themselves the appropriate framework. In my view, the approach is backwards; starting with a biological Malthusian theory (essentially a biological model), placing it in a narrow context of dubious (probably immeasurable and ideological) political science concepts like ‘the state’ and then continually adding in human culture measures (that the team does not seem to know how to do) and claiming that this can all be formalized in mathematical equations. In my view, the better (more logical and more measurable, though still far from perfect) alternative that is rooted in the classic anthropological approaches is to start with the social science of human (and primate) societies in an holistic social model and then, both using (1) the external factors that perturb economic production, population, and various social system balances and (2) the internal changes that are predictable attributes of the chosen systems over time, to predict the different forms of instability that result. It will likely be possible to define certain types of social structures with variables, but the specifications will need to come out of the cultural models and will need to be more specific than current variables from political science, economics or sociology.

Ethics

There is no clear statement of ethics or oversight in the research. The *clidynamics* researchers say that prediction of “crises” and “resilience of different countries to various shocks” is of foremost importance in averting “potentially huge human costs of state collapse and civil war”. In place of protections of ‘cultures’ and ‘ethnic groups’, *clidynamics* researchers seem wedded to the continuation of the current arrangement of ‘states’ and to their ‘resilience’. Sometimes states collapse and civil wars erupt due to human rights violations as the cause. Their research does not include a statement of protection of rights under international law, to commitment to promotion of social justice, cultural diversity, or equity as the means of creating resilience and avoiding war. While the *clidynamics* researchers note the value of the “humanities”, they stress only “cultural narratives” and “semiotics” but not actual human rights or justice, that are among the stated goals of humanities studies.

Conclusion

In reading the *cliodynamics* research proposal, I worry that my colleagues from outside of holistic social science who started out with the right questions and a commitment to scientific study of social behaviors, may now be misled by what is happening in current social science disciplines, in their attempt to add in social science to their models. There is a long history of social science research on the questions of social breakdown, social violence, resilience, and social change that would fit well with a scientific approach that uses hard data and current scientific methods. It is hard to find it today because it is currently being driven to the margins of social science disciplines. In its place there is a return to pseudo-science that transforms predictive study and modeling into study of ‘narratives’ and subjective emotions that prevents any real understandings or applications. It is magical thinking, but with a ‘New Age’ philosophy of ‘imagined’ social constructs. In claiming to be doing something “new”, the *cliodynamics* founders, coming from outside of the social sciences, chose a name that harks back to the ‘Greek muse’ of change, rather than social science. In neglecting the historic lessons of social science, I worry that *cliodynamics* may subconsciously be combining the contemporary fascination with ‘Big Data’ with the similar contemporary return to small ideas, if not a return to magical thinking. By reaching out to those disciplines and the line of classic holistic scholarship outside of its current boundaries, *cliodynamics* has the potential to be a valuable multi-disciplinary collaborative effort on important social problems. I urge my *cliodynamics* colleagues to be open in their modeling not only to applied anthropologists and theorists from the now maligned structural-functionalist/cultural materialist traditions, but also to the theoretical approaches of classic archaeologists, primate anthropologists, human geographers, social psychologists, and others who can contribute to this effort of predictive social science⁶. While some *cliodynamics* researchers seem to be involved in efforts, such as those of data collection and specification, that includes such interdisciplinary collaboration, it seems that the data collection may still be outpacing the more difficult conceptual understanding and failing to integrate disciplinary perspectives in ways that are not just additive but that are coherent.

References

American Economic Association. 1944. *Readings in Business Cycle Theory*. Philadelphia: The Blakiston Company.

⁶ The traditions that I look for and find absent in the representation of *cliodynamics* researchers would include representation of social scientists in areas of primate behaviors like Jane Goodall and Franz van der Waal, classic anthropologists like Brian Ferguson and Morton Fried, human geographers like Jared Diamond and social psychologists in the tradition of Irv Janis, Hannah Arendt, and Stanley Milgram.

- Anderson, Kristi. 1976. "Generation, Partisan Shift, and Realignment: A Glance Back to the New Deal." In *The Changing American Voter*, edited by Norman H. Nie, Sidney Verba, and John R. Petrocik, 74–95. Cambridge, MA: Harvard University Press. doi: 10.4159/harvard.9780674429147.c9.
- Beard, Charles A. 1934. "Written History as an Act of Faith." *American Historical Review* 39 (2): 219–229. doi: 10.2307/1838720.
- Becker, Carl, 1955. "What are Historical Facts?" *The Western Political Quarterly*, 8 (3): 327–340. doi: 10.2307/442890.
- Bell, Daniel. 1960. *The End of Ideology*. Glencoe, IL: The Free Press.
- Boserup, Ester. 1981. *Population and Technological Change*. Chicago, IL: University of Chicago Press.
- Brinton, Crane. 1965. *The Anatomy of Revolution*. New York: Vintage Press.
- Burnham, Walter Dean. 1970. *Critical Elections and the Mainsprings of American Politics*. New York: W.W. Norton & Company.
- Calhoun, John D. 1962. "Population Density and Social Pathology." *Scientific American* 306: 139–148.
- Chamberlain, Neil W. 1970. *Beyond Malthus: Population and Power*. New York: Basic Books.
- Cohen, Jean L. 1985. "Strategy or Identity: New Theoretical Paradigms and Contemporary Social Movements." *Social Research* 52 (4): 663–717.
- Confucius. 1938 [206 B.C.E. to 200 C.E.]. *The Analects*, translated by Arthur Waley, New York: Vantage Press.
- Coser, Lewis. 1952. *Functions of Social Conflict*. Glencoe, IL: The Free Press.
- Dahrendorf, Ralf. 1959. *Class and Class Conflict in Industrial Society*. Stanford, CA: Stanford University Press.
- Davies, James C. 1962. "Toward a Theory of Revolution." *American Sociological Review* 27 (1): 5–18. doi: 10.2307/2089714.
- Davis, Kingsley. 1970. "The Sociology of Parent-Youth Conflict." *American Sociological Review* 5 (5): 23–535. doi: 10.2307/2084427.
- Deutsch, Karl. 1961. "Social Mobilization and Political Development." *American Political Science Review* 55: 493–514. doi: 10.2307/1952679.
- Diamond, Jared. 2005. *Collapse: How Societies Choose to Fail or Succeed*. New York: Penguin Books.
- Downs, Anthony. 1957. *An Economic Theory of Democracy*. New York: Harper & Row.
- Duncan, Brooks. 1995. "Anthropological Perils: Dilemmas in the Cold War's Wake." *PolAR: Political and Legal Anthropology Review* 18 (2): 7–16. doi: 10.1525/pol.1995.18.2.7.
- Duncan, Brooks, 2013. "Post-Cold War Anthropology as Ideological Blog: Purging Klukhohn and Mead for a Diary Read" (Essay and Book Review of Melissa Caldwell. *Not by Bread Alone: Social Support in the New Russia*)." *Journal of Developing Societies* 29 (1): 61–87. doi: 10.1177/0169796x12470555.

- Duncan, Brooks. 2018. "Professor Rip Van Winklestein Applies for a Teaching Job ... and Finds His Disciplines (and Much of Social Science) Have Disappeared." *Catalyst: A Social Justice Forum* 8 (1/3): 53-58. <http://trace.tennessee.edu/catalyst/vol8/iss1/3>.
- Dummond, D.E. 1965. "Population Growth and Cultural Change." *Southwestern Journal of Anthropology* 21 (4): 302-325. doi: 10.1086/soutjanth.21.4.3629434.
- Durkheim, Emile. 1893. *The Division of Labor in Society: Study of the Organization of Higher Societies*. Paris: Alcan.
- Easterlin, Richard. 1978. "What Will 1984 Be Like? Socioeconomic Implications of Recent Twists in Age Structure." *Demography* 15 (4): 397-432. doi: 10.2307/2061197.
- Elazar, Daniel. 1978. "The Generational Rhythm of American Politics." *American Politics Quarterly* 6 (1): 55-94. doi: 10.1177/1532673x7800600103.
- Ellwood, Charles A. 1905. "A Psychological Theory of Revolutions." *American Journal of Sociology* 11: 49-61. doi: 10.1086/211375.
- Feierabend, Ivo K. and Rosalind L. Feierabend. 1966. "Aggressive Behaviors within Politics, 1948-1962: A Cross National Study." *Journal of Conflict Resolution* 10 (3): 249-271. doi: 10.1177/002200276601000301.
- Feierabend, Ivo K. and Rosalind L. Feierabend. 1972. "Systematic Conditions of Political Aggression." In *Anger, Violence and Politics*, edited by Ivo K. Feierabend, Rosalind L. Feierabend, and Ted Robert Gurr, 136-82. New Jersey: Prentice Hall.
- Fenoaltea, Stefano. 1987. "The Kuznets Cycle in Italy, 1861-1913." Harvard University Department of Economics working paper.
- Ferguson, R. Brian. 1984. *Warfare, Culture and Environment*. Cambridge, MA: Academic Press, Inc.
- Feuer, Lewis S. 1969. *The Conflict of Generations*. New York: Basic Books, Inc.
- Freedman, Jonathan L. 1975. *Crowding and Behavior*. New York: Viking Press.
- Freedman, Jonathan L., Alan Levy, Roberta Welte Buchanan, and Judy Price. 1972. "Crowding and Human Aggressiveness." *Journal of Experimental Social Psychology* 8 (6): 528-544. doi: 10.1016/0022-1031(72)90078-9.
- Fried, Morton, Marvin Harris, and Robert Murphy. 1988. *The Anthropology of War*. New York: The Natural History Press.
- Galbraith, John Kenneth. 1967. *The New Industrial State*. New York: Houghton Mifflin.
- Galtung, John. 1964. "A Structural Theory of Aggression." *Journal of Peace Research* 1-2: 95-119. doi: 10.1177/002234336400100203.
- Gatewood, John B. 1987. "Endogenous versus Exogenous Theories of Culture Change." paper presented at AAA Conference, Chicago, November 18-22.
- Geschwender, James A. 1964. "Social Structure and the Negro Revolt: An Examination of Some Hypotheses." *Social Forces* 43 (2): 248-256. doi: 10.2307/2574339.

- Goldstone, Jack, 1983. "Modeling the English Revolution." Stanford Berkeley Faculty Colloquium, October 6.
- Goldstone, Jack, 1991. *Revolution and Rebellion in the Early Modern World*. Berkeley, CA: University of California Press.
- Gurr, Ted Robert and Mark Iving Lichback. 1986. "Forecasting Internal Conflict." *Comparative Political Studies* 19 (1): 3–38. doi: 10.1177/0010414086019001001.
- Gurr, Ted Robert. 1970. *Why Men Rebel*. Princeton, NJ: Princeton University Press.
- Gurr, Ted. 1968. "A Causal Model of Civil Strife: A Comparative Analysis Using New Indices." *American Political Science Review* 62: 1104–1125. doi: 10.2307/1953907.
- Handwerker, W. Penn. 1980. "Population, Power and Evolution." In *Births and Power: Social Change and the Politics of Reproduction*, edited by W. Penn Handwerker. Boulder, Colorado: Westview Press.
- Harff, Barbara and Ted Robert Gurr. 1988. "Toward Empirical Theory of Genocides and Politicides: Identification and Measurement of Cases since 1945." *International Studies Quarterly* 32: 359–371. doi: 10.2307/2600447.
- Harris, Marvin. 1977. *Cannibals and Kings: The Origins of Cultures*. New York: Random House.
- Harris, Marvin. 1973. *Cows, Pigs, Wars and Witches: The Riddles of Culture*. New York: Random House.
- Harris, Marvin, 1979. *Cultural Materialism: The Struggle for a Science of Culture*. New York: Random House.
- Hegel, George Wilhelm Friedrich. 1837. *Vorlesungen über die Philosophie der Weltgeschichte*. Berlin: Edward Gans Publishing.
- I Ching, Book of Changes. 1964 [Late 9th century B.C.E.], translated by James Legges. New York: Bantam Books.
- Johnson, Chalmers. 1966. *Revolutionary Change*. Boston: Little Brown.
- Kuznets, Simon. 1930. "Equilibrium Economics and Business Cycle Theory." *Quarterly Journal of Economics* 44 (3): 381–415. doi: 10.2307/1885790.
- Lempert, David. 1987. "A Demographic Economic Explanation of Political Stability: Mauritius as a Micro-cosm." *Eastern Africa Economic Review* 3 (1): 77–90.
- Lempert, David. 1995. *Daily Life in a Crumbling Empire: The Absorption of Russia into the World Economy*, two vols. New York: Columbia University Press, Eastern European Monograph Series.
- Lempert, David. 2013. "Taking History Back to the People: An Approach to Making History Popular, Relevant and Intellectual." *Democracy and Education* 21 (2): Article 1. <http://democracyeducationjournal.org/home/vol21/iss2/1>
- Lempert, David. 2014b. "Classifying Cultures by Their Relations in Groups: Drawing from Models in Psychology and Ecology." *Social Evolution and History* 13: 199–134. <http://www.sociostudies.org/journal/articles/242737/>

- Lempert, David. 2014a. "The Future of Social Movement Research: review of Jacquelen van Stekelenburg, Conny Roggeband, Bert Klandermans, and others." *New Political Science* 36: 284–287. doi: 10.1080/07393148.2014.886454.
- Lempert, David. 2015. "Measuring Human Progress in the New Millennium and The Jewish Question as the U.S. Empire Collapses." *Miscelanea de Estudios Arabes y Hebraicos* 64. <http://www.meahhebreo.com/index.php/meahhebreo/article/view/690/916>.
- Lempert, David. 2016. "Predicting Political Systems Using Economic, Environmental and Relational Variables." *Social Evolution and History*, 15 (2): 164–194. <https://www.sociostudies.org/journal/articles/588599/>
- Lempert, David. 2017. "The Logic of Cultural Suicide and Application to Contemporary Environmental Strategies: Drawing from Models in Psychology and Biology." *Journal of Globalization Studies* 8 (1): 120–139. <https://www.sociostudies.org/journal/articles/939397/>.
- Lempert, David. 2018a. "Foreword: The Death of Social Sciences in an Era of Multi-Cultural Corporatism (Neo-Liberalism): With Efforts at Resuscitation." *Catalyst: A Social Justice Forum* 8 (1/2): 1-52. <http://trace.tennessee.edu/catalyst/vol8/iss1/2>.
- Lempert, David. 2018b. "The Psychology of Cultural Suicide and Culture Change." *Journal of Globalization Studies* 9 (1): 107–130. doi: 10.30884/jogs/2018.01.08
- Lempert, David. 2018c. "Is Economics in Violation of International Law?: Remaking Economics as a Social Science." *Catalyst: A Social Justice Forum* 8 (1): Article 6. <http://trace.tennessee.edu/catalyst/vol8/iss1/6/>.
- Lévi-Strauss, Claude. 1958. *Anthropologie Structurale*. Paris: Presses Universitaires de France.
- Malinowski, Bronislaw. 1944. *A Scientific Theory of Culture*. Chapel Hill, NC: University of North Carolina Press.
- Malthus, Thomas R. 1798. *An Essay on the Principle of Population*. London: J. Johnson.
- Marx, Karl. 1970 [1867]. *Capital: The Critique of Political Economy*, 3 vols. London: Lawrence and Wishart.
- Marx, Karl, and Friedrich Engels. 1868. *The Communist Manifesto*. London: Bildungs-Gesellschaft für Arbeiter.
- McCarthy, John D., and Mayer N. Zald. 1977. "Resource Mobilization and Social Movements: A Political Theory." *American Journal of Sociology* 82 (6): 1212–41. doi: 10.1086/226464.
- Meyerhoff, Hans. 1959. *The Philosophy of History in Our Time*. New York: Doubleday.
- Midlarsky, Manus I. 1988. "Rulers and the Ruled: Patterned Inequality and the Onset of Mass Political Violence." *American Political Science Review* 82 (2): 491–509. doi: 10.2307/1957397.

- Muller, Edward N. and Karl Dieter-Opp. 1986. "Rational Choice and Rebellious Collective Action." *American Political Science Review* 80 (2): 471–487. doi: 10.2307/1958269.
- Muller, Edward. 1985. "Income Inequality, Regime Repressiveness, and Political Violence." *American Sociological Review* 50: 47–61. doi: 10.2307/2095339.
- Nelson, Stephen D. 1984. "Nature/Nurture Revisited I." *Journal of Conflict Resolution* 18: 285–330. doi: 10.1177/002200277401800206.
- Oberschall, Anthony. 1978. "Theories of Social Conflict." *Annual Review of Sociology* 4: 291–315. doi: 10.1146/annurev.so.04.080178.001451.
- Parvin, Manoucher. 1973. "Economic Determinants of Political Unrest." *Journal of Conflict Resolution* 17 (2): 271–296. doi: 10.1177/002200277301700205.
- Ryder, Norman B. 1965. "The Cohort as a Concept in the Study of Social Change." *American Sociological Review* 30: 843–861. <https://doi.org/10.2307/2090964>
- Service, Elman R. 1975. *Origins of State and Civilization*. New York: W.W. Norton & Co., Inc.
- Sigelman, Lee and Miles Simpson. 1977. "A Cross National Test of the Linkage between Economic Inequality and Political Violence." *Journal of Conflict Resolution* 21 (1): 105–28. doi: 10.1177/002200277702100106.
- Skocpol, Theda. 1976. "Explaining Revolutions: In Quest of a Social Structural Approach." In *The Uses of Controversy in Sociology*, edited by Lewis A. Coser and Otto N. Larsen, 99–119. Glencoe, IL: Free Press.
- Sly, Polly. 2018. "The Nonsense and Non-Science of Political Science: A Politically Incorrect View of 'Poly-T(r)icks.'" *Catalyst: A Social Justice Forum* 8 (1): Article 9. <http://trace.tennessee.edu/catalyst/vol8/iss1/9>.
- Smelser, Neil J. 1963. *Theory of Collective Behavior*. New York: Free Press.
- Snyder, David. 1978. "Collective Violence." *Journal of Conflict Resolution* 22 (3): 499–531. doi: 10.1177/002200277802200309.
- Sorokin, Pitirim A. 1937. *Social and Cultural Dynamics: Volume Three: Fluctuation of Social Relationships, War and Revolution*. New York: American Book Company.
- Spengler, Oswald. 1926-28. *Decline of the West*. New York: A.A. Knopf.
- Spooer, Brian. 1972. *Population Growth: Anthropological Implications*. Cambridge, MA: M.I.T. Press.
- Stewart, John Q. 1947. "Empirical Mathematical Rules Concerning the Distribution and Equilibrium of Population." *Geographical Review* 37: 461–485. doi: 10.2307/211132.
- Stokols, Daniel. 1976. "The Experience of Crowding in Primary and Secondary Environments." *Environment and Behavior* 8 (1): 49–86. doi: 10.1177/001391657600800104.
- Swift, Jonathan, 1729. *A Modest Proposal*. London: S. Harding.
- Tainter, Joseph. 1988. *The Collapse of Complex Societies*. Cambridge, England: Cambridge University Press.

- Tilly, Charles. 1985. "Models and Realities of Popular Collective Action." *Sociological Research* 52 (4): 717–747.
- Tilly, Charles, 1995. "Macrosociology Past and Future." *Newsletter of the Comparative & Historical Section, American Sociological Association* 8: 1, 3, 4.
- Turchin, Peter. 2013. "Modeling Social Pressures Toward Political Instability." *Cliodynamics* 4: 241–280.
- Turchin, Peter; Sergey Gavrilets, and Jack A. Goldstone. 2017. "Linking 'Micro' to 'Macro' Models of State Breakdown to Improve Methods for Political Forecasting." *Cliodynamics* 8 (2): 159–181. doi: 10.21237/c7clio8237429.
- Van der Waal, Frans. 1982. *Chimpanzee Politics: Power and Sex Among Apes*. London: Jonathan Cape.
- Wallimann, Isidor and George Zito. 1984. "Cohort Size and Youthful Protest." *Youth and Society* 16 (1): 67–81. doi: 10.1177/0044118x84016001004.
- Weber, M. 1947. *Theory of Social and Economic Organization*. New York: Free Press.
- Weber, Max. 1958 [1904]. *The Protestant Ethic and the Spirit of Capitalism*. New York: Scribner.
- Weede, Eric. 1981. "Income Inequality, Average Income and Domestic Violence." *Journal of Conflict Resolution* 25: 639–653.
- Wells, H.G. 1905. *A Modern Utopia*. London: Chapman and Hall.
- Wilson, Edward O. 1978. *On Human Nature*. Cambridge, MA: Harvard University Press.