

# In defence of Chaology in Political Science

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## Resumo

Tradicionalmente, a aproximação à teoria da Ciência Política (e Social) enfatiza a análise da natureza determinista, previsível e reducionista dos objetos e fenômenos. No entanto, muitos autores afirmam que os fenômenos políticos (e sociais) não são totalmente aptos para esse pressuposto ontológico; mas sim o contrário, que eles são muito mais complexos do que essa perspectiva pode sugerir.

De fato, e seguindo padrões similares a outros ramos do conhecimento, desde a década de 1990, muitas obras se multiplicaram numa ampla gama de subcampos em Ciência Política; acentuando que o resultado político não pode ser entendido somente como um equilíbrio instável entre necessidade e contingência. Este foi um marco que sugeriu a muitos autores, a inserção histórica dos fenômenos que estão em jogo.

E, ainda mais relevante para o propósito desta contribuição, essa evidência também abriu o caminho para a introdução e consolidação do quadro conceitual da Teoria do Caos em Ciência Política (e Social).

De acordo com o exposto, defende-se aqui que muitos *lieux communs* da Ciência Política (e Social) deveriam ser revisados através da lente da Teoria do Caos, em um esforço para promover o carácter transdisciplinar das metodologias do conhecimento e de pesquisa no curso das nossas disciplinas. A Teoria do Caos chegou para ficar, e agora é o momento para aceitá-la como é

## Abstract

*The mainstream approaches to Political (and Social) Science(s) have traditionally emphasized the deterministic, predictable and reductionist nature of the objects and phenomena under scrutiny. Nonetheless many authors have also stress that political (and social) phenomena did not fully fit into that ontological assumption, and rather the contrarily, that political (and social) phenomena are much more complex than what this perspective might suggest.*

*In actual, and following the same patterns as in many other branches of knowledge, since the 1990s many works have mushroomed in a wide range of disciplinary subfields in Political Science stressing the fact political outcome cannot be understood but as an unstable equilibrium between necessity and contingency. This was a milestone that, at the same time, suggested to many authors to the historical embeddedness of the phenomena at stake.*

*And even more relevantly for the purpose of this contribution, this evidence also paved the way to the introduction (and consolidation) of the conceptual framework of Chaology into Political (and Social) science(s).*

*According to the above, it is defended here that many *lieux communs* of Political (and Social) science(s) might be reviewed through the lens of Chaology, in a transdisciplinary effort to boost the current knowledge and research methodologies in our disciplines.*

devido.

*Chaology is here to stay, and it is now the moment to accommodate as it worth's.*

**Palavras-chave:** Caologia, Ciência Política, Sistemas Dinâmicos, Não linearidade, Path-Dependency

**Keywords:** *Chaology, Political Science, Dynamical Systems, Nonlinearity, Path-Dependency*

Although it is not clear whether Chaology can be considered a proper theory or not (Herman, in this same volume) there is no doubt that it has reached a place among the methodological alternatives within Social Sciences. Yet still minority. Since 1990s an increasing number of scientific works have considered certain political (and social) outputs as the result of particular patterns of evolution of dynamic systems far from their respective points of equilibrium, which is possibly the adequate way to describe a chaotic behaviour. Most of those works have mostly remained metaphorical and have confined themselves to use chaos' conceptual apparatus to describe a varied rang of political and social phenomena, such as wars, revolutions, social movements and policy results (Plaza i Font and Dandoy 2006). However, they have expanded our understanding of the phenomena concerned at the same time as they have challenged the most consolidated and mainstreaming analytical traditions in the field.

Just to mention very few examples, Peled (2000) suggested to approach the rise of the German III Reich as the result of chaotic dynamics in the inter-wars period politics in Germany. As regards a totally different historical setting, (Farazmand 2003) saw the Iranian revolution of 1978–79 as a massive chaotic rupture leading the previous Sha's political regime trough a path of uncertainties and potential abrupt bifurcations.

Much more recently, Acikalin and Bölücek (2014, 29) proposed that the self-immolation of a young protestor in December 2010 in the city of Tunis, event that was followed by mass demonstrations that eventually led to the first change of regime in the so-called Arab Spring, "can be analyzed under the butterfly-effect perspective within chaos theory".

This short contribution aims to evaluate the irruption of Chaology in political (and social) science(s) and it it seeks to add few new words to the open question on the Political

Science's place among the scientific disciplines. In so doing, it addresses three different questions. Firstly, it contextualizes the core notions behind the general reference to Chaology. Secondly, it considers

how this analytical framework fits in the present research program of the discipline, and consequently it considers the possibility to review some of existing notions in Political Science into the larger framework of Chaology. Finally, it detects and discusses different challenges that Chaology poses to the mainstream analytical schools in Political Science, and that should oblige scholars to undertake serious debates on the nature of the discipline and the consequences of the current ontological and epistemological assumptions within it.

## I

Coincidence or not, it is worthy to notice that this greater attention paid to the analytical potentialities of Chaology came hand in hand with the "Historical Turn" in Social Science (McDonald 1996). To put it differently, the partial application of the Chaology conceptual tool-kit started mushrooming at the same time that scholars in Political and Social Sciences accepted that they were dealing with fully historical-embedded phenomena. Chaology appeared thus as an alternative way to demonstrate the obvious: history matters.

Through the lens of Chaology, political processes emerge as a sequence of events connected by means of causal relationships, in a unrepeatable and unique way, in a subtle combination of determinism and indeterminability. At the end of the day, as Herman (1994) stresses, any chaotic behavior might be understood as a deterministic complex behavior, irregular and non-periodic, with random appearance but maintaining a latent order.

This is quite obvious, for instance, in Brown's work (1994) on the environmental policy-making in the United States. He observed that the environment policy positions are oscillating due to changes of partisan control of the White House as well as the public concern for environment and the economic costs of environmental cleanup. Yet the small number of variables included in the model, it suggests a high level of complexity, and the simplified system shows a clear non-linear behavior. Once again, it is revealed that minor parametric changes in the system can lead to major alterations in the output variable which makes any policy prediction impossible, but constrained by the previous stages.

All in all, Chaology warns Political Science that the political and social phenomena are not the result of simple relations between independent monads, particularly interrelated in unique cause-consequence linkages, always the same and in the same way. Along with its view, the political phenomenon is configured as the result of many causes acting diachronically, so that the cause and the effect are often distant in time and space. Among the many metaphors that could be brought up here, perhaps the so-called butterfly effect (Lorenz 1972; 1993; 2000) is the one that has best captured the attention of not only academic but also a much wider public. Nonetheless, Ferreira and Filipe (2012) interestingly propose to label this evidence as the drop of honey effect, after the famous Armenian poet Hovhannes Tumanyan's tale, that explains the story of a King who lost his kingdom because a drop of honey that dripped from his bowl of puffed rice.

## II

It is not surprising then that Tilly (1995, 1602) maintains that students of revolutions (as well as students of any other large-scale political phenomena) have imagined they were dealing with phenomena like ocean tides when they were actually confronting phenomena like great floods. Equally to the former, the later have to be considered a casual product, but its final consequences are extremely dependent on the previous conditions.

As stressed elsewhere (Plaza i Font 2014), this differentiation between a flood and a tide clearly highlights the main feature of any political phenomenon: their historical embedding. While tides evoke a cyclical and a historical phenomenon, where yesterday's tide is equivalent to tomorrow's tide, and where the current tide has no open consequences to the one to come tomorrow; with floods, the same does not occur. These are the results of a very particular sequence of events, and each one is different and distinguishable from its predecessors as well as its successors. Not only does the flood somehow foreshadow future ones, it is also constrained by past ones. Following Middelaar (2012, 34) politics is a game that creates a connection in the present between "an ever open future and a never totally closed past". And the recognition of this fact has crucial implications both in the ontological and epistemological disciplinary debates within Political Science. As Tilly (1995, 1602) himself recognizes:

If the social world actually fell into neatly recurrent structures and processes, the epochal theories, invariant models, and the testing of deductive hypothesis would become more parsimonious and effective means of generating knowledge. Because the social world does not conform to that prescription, we need other programs on both ontological and epistemological grounds [original emphasize].

Chaology in Political Science stresses that modeling political and social phenomena separately of their own historical context can lead to serious misunderstandings in the final comprehension of the process. Far from being independent observations, political outputs only maintain its full meaning if they are treated as elements of a broader process (Bu' the 2002). The temporality therefore understood as the sequencing of different steps and stages of a political and social process, is a key element to the model the change in the discipline. Hence it is not surprisingly that Bartolini (1991) arguably defends that the goal of any political analysis is actually to identify the sequencing rules to define the plausibility of transition from one equilibrium to another, as a result of changes in the explicative variables under scrutiny.

This notion happily converge in the some concepts developed by the analytical school of historical institutionalism (Pierson 2000, inter alia). The first of them is the notion of path-dependency. Despite the lack of consensus in the univocal definition of this concept and the many controversies that collects the literature (Goldstone 1998) the idea of path-dependency denotes that the political and social phenomena are part of a historical process whose genesis is rooted in a previous event which largely constrains, if not determines, the flow action hereinafter. Thus, any analysis of a political or social process that adopts the theoretical view of path-dependency focus, exactly as Chaology does, on the unstable equilibrium between necessity and contingency of any political outcome.

On the other hand, the notion of path-dependency also points to another aspect highlighted by Chaology: the sensibility to initial conditions. As the butterfly effect or the drop of honey effect metaphors show, dynamics systems -political ones included-, are highly sensitive to little variations in their start-up point. As Zuckerman (1997) stresses, in any institutional setting, formative characteristics of the structures and the decisions constrain subsequent processes and events. Similarly, Pierson (2000) maintains that the basic contours of social life are punctuated by courses of action that, once introduced it is hard to reverse.

Taken this vision to the extreme, however, no researcher in Political Science, nor an research device, would ever go back to the initial conditions of any of the many objects and phenomena in political science. Actually, the pertinent question of whether there is indeed such a moment could hardly be addressed. If one reviews the process of European integration, for instance, it is commonly maintained that the first European Communities were founded as a mechanism to ensure a lasting peace between European nations in the aftermath of WWII. What event should then be considered as the initial condition that paved the way to the European Union that we know today? Should it be the capitulation of the III Reich army? The end of the war in the Pacific? The outbreak of the Sudetenkriese on October 1st, 1938? Or the June 28th, 1919, the date of the signature of the Treaty of Versailles that ended the state of war between Prussia and the Allied Powers during WWI?

This led us to the so-called Cleopatra's nose Paradox. As Hoffer (2008, 63) intelligently points out:

In history itself, irony abounds, The impact of chance, contingency, the unexpected development, and the accident on events can change the entire course of history in an unanticipated direction. The theory is called Cleopatra's nose because, had her nose been a little shorter or longer, she might have not been so attractive to both Julius Caesar and Mark Anthony, and the Roman Republic might still be with us.

This perspective on the sensibility to initial conditions of any given chaotic system is intimately linked to the notion of patterns of innovation Lewin (1992). In this vein, the fact that at the moment when initial conditions are considered potential long-term outcomes are too numerous and too diverse to suggest a possible prediction (in Newtonian terms), also reflects the sensibility of the political systems to such moments. Moreover, it is important to mention that, as the system evolves, the range of variation of these potential future states finishes shuffling only minor variations on one of those potential outcomes. So much so, that the specification of a tiny elements at these initial conditions just sets a pattern of evolution that happens to turn from considering a wide range of alternatives at the beginning into refining certain small differences in some of them at the end. This is reflected in Pierson's words (2000, 263) when he argues that "the necessary conditions for current outcomes occurred in the past", even though he should arguably maintain that these conditions are not sufficient, otherwise the undeterminability of chaotic processes would easily vanish.

To reduce the uncertainty in the initial conditions (where this is technically possible) is however costly in any term. In this vein, Chaology also alerts that the precise definition of the initial conditions is not the only way to deal with the extreme sensitivity that political systems show to their formative events. In other words, the exact measurement of Cleopatra's nose is not the only mean to generate valid scientific knowledge in political science. Smith (2007) falls on it when he maintains that given the uncertainty about the initial conditions (higher or lower, but real), is crucial not only to improve techniques of measurement, but also to develop better mathematical maps that allow for more precise definitions of the possible states that can reach the system analyzed.

The problems to determinate the exact initial conditions of any political phenomena are actually interrelated with the concept of critical junctures, that many scholars have observed in distinct empirical framings (Collier and Collier 1991; Capoccia and Kelemen 2007, *inter alia*) have also an insertion in the wider background of Chaology. These critical junctures, also called bifurcation points or even turning points (Abbott 1997), mark the political processes as they constitute an evidence of the fact that what might seem irrelevant may actually be a substantial shift lever. As in the case of the drop on honey, this is a gripping element to explain patterns of continuity and change in social and political phenomena in the real world. Critical junctures show that the small variations in the particular path of any political phenomena (maybe due to chance, maybe determined by the original conditions) can give rise to very different outcomes in magnitude, both quantitatively and qualitatively.

In this vein, in 1991 the European People's Party approved the opening of its organization to new member parties not belonging strictly to the Christian-Democrat ideological tradition and thus broke with the strict rule of membership until this date. Regardless of the goals sought, there is no doubt that this moment introduced the possibility of (even unexpected, and perhaps undesired) changes in the party, both in terms of organizational structure and, most importantly, ideological references. This moment marked one before and one after in the development of the party, and has widely regarded as a true bifurcation point in its history (Plaza i Font 2009). The party was then closest than ever to edge of chaos (Lewin 1992), in the sense that this event largely influenced the evolution of the party, and also that the decision taken at that very precise moment revealed some lasting effects (Mahoney and

Villegas 2007) even after the initial motivations to opening the European People's Party had disappeared.

### III

As concerns to third issue of interest, and consequently with all what have been state above, Chaology makes evident that Political Science, as a scientific discipline, should definitively abandon the paradigm of order (Geyer 2003). Since political (and social) objects and phenomena have proved extremely complex (not coincidentally, August Compte placed politology and sociology at the very top of his hierarchy of sciences), Chaology does not actually suggest to give up on particular ontological and epistemological assumptions that have shaped the mainstream approaches in Political Science for the last decades, and to give way to new ways to approach, model and understand the political phenomena. In this moment, Chaos Theory provides an unbeatable analytical framework, which largely incorporates the shortages of these previous schools, specially Rational Choice or Behaviouralism.

Thus, without underestimating their intensive contribution to make the study of politics definitively shift towards a normal science, and independent from the ideological criticism that these schools have swept along, they assumed the notions of order, reductionism, predictability and determinism as intimate constituents of the study of politics. In so doing, they proposed a conception of political phenomena as the pure collection of monadic - individual- choices, whose immediate consequence was the view of the political world as a collection of impacts of billiard balls (Goodin and Klingemann 1996). To put it the other way around, the assumption of the Newtonian paradigm was probably the trade-off that the study of Politics paid to gain the status of science.

The consolidation of this disciplinary approaches introduced a quite simple idea of causality and linearity in social and political outcomes. By means of these approaches, Political Science assumed the inherent vision to the Newtonian paradigm of an orderly world, functioning as a clockwork with observable and constant laws. As Geyer (2003, 23) himself maintains:

The high point of the linear paradigm was reached in the 1950s and 1960s (. . .). This traditional Newtonian approach was clearly expressed in the modernization theories of Third World development, the realist vision of international relations, the behaviouralist writings of sociologists, the positivist foundations of liberal economics and the rational plans of public policy experts and urban planners. Using the Newtonian frame of reference, modern social scientists unjustifiably assumed that physical and social phenomena were primarily linear and therefore predictable.

These attitudes towards the scientific object and the scientific endeavor itself, presented another side-effect, which is the delegitimation of any analysis of politics outside the scientific program it fixed by the mainstream approaches in the discipline. The mistake, in our view, lies in the presumption that the small amount of plausibility evidenced by certain Rational Choice studies and their total lack of attention to other possible sources of meaning out of the strict framework of measurable variables, completely nullify the possibility of generating scientific knowledge in the field of politics. But this assumption induces the confusion of the whole and the part, by introducing the idea that the knowledge of the political as a whole can not be scientific because a part of political analysis has not totally succeed in its attempt to explain politics through the use the lens of rationalism and empiricism. And this is a paramount element to consider the impact and the potentiality of Chaology.

What is at stake is not the possibility of the scientific approach to the study of politics, that which is assumed here to be possible and desirable, but the very foundations, which it has been done so far. Chaology is here to stay, and Political Science scholar should perhaps to find the way to accommodate its analytical potential in the traditional explanations about the political order, in order to be in a better position to deal with the political phenomena of our contemporary societies.

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