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The unity of (social systems) science: The legacy of Bertalanffy

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Abstract

The article discusses Bertalanffy's project for the unity of science in the particular field of social sciences. The aim is to analyse shortcomings and to sketch new approaches to this matter. We identify two main obstacles, namely, the inner differentiation of social systems science and the threat of methodological nativism to Bertalanffy's project. Furthermore, the article examines the concepts of scientific system and cosmopolitanism as opposites to such obstacles and as legacies of Bertalanffy's view of science as well. The conclusion resumes the arguments and proposes new paths for general systems theory.

KEYWORDS

cosmopolitanism, general systems theory, methodological nativism, unity of science, world society

1 | INTRODUCTION

Ludwig von Bertalanffy's contributions to scientific thinking are immeasurable. Uniquely and originally, he revolutionized the scientific mainstream by synthesizing some of the most innovative ideas of his time, and struggling for the *unity of science* in a period of increasing differentiation of scientific disciplines.

It has been 50 years since his most important theoretical volume was published (von Bertalanffy, 1968), and his message remains in full force. The current scientific scene is still showing a growing specialization of disciplinary knowledge, but the situation is not the same as it was five decades ago, so we cannot evaluate as fulfilled or failed the four goals of the *Society for General Systems Research* created by Bertalanffy. Although, on the one hand, multidisciplinary, interdisciplinary, and transdisciplinary proposals are increasing in the scientific world—in the very spirit of the general systems theory—setbacks to Bertalanffy's project have been multiplied and diversified. The "unity of science" must be fundamentally reanalysed.[1]

[1]The same idea is proposed by Midgley (2007) but considered only from a methodological point of view.

In the history of philosophy, we find many interpretations for the kind of "unity" intended for science: reductive or connective, synchronic or diachronic, ontological or epistemological, vertical or interlevel, global or local, and many others (Cat, 2017). Bertalanffy, in turn, introduced his idea for the unity of science in contrast to the Logical Positivism of the Vienna Circle, which proposed that such unity is achieved by "method" (Carnap, 1934), taking the seemingly opposite way, that is, "theory." For Bertalanffy, scientific communication must facilitate interchanges between scientists and disciplines independently from their themes and methodological approaches, so concepts, no matter where they came from, must be uniform: "Where, then, is unity of science to be sought? From our viewpoint, the answer is expected in some uniformity of the conceptual schemes, the symbolic constructs in science" (von Bertalanffy, 1953, p. 237).

This paper discusses Bertalanffy's project for the unity of science in the particular field of social sciences because these disciplines show relevant problems regarding such unity. The aim is to analyse shortcomings and to sketch new approaches to the matter.

Chapter one analyses current versions of systems theory in social sciences highlighting two central opposed positions and their influence on the adoption and development of this theory in those disciplines. Chapter two introduces the term *methodological nativism* to describe a new and significant obstacle for Bertalanffy's project, which is the rejection of European theories due to their geographical origin. Chapter three proposes two solutions based on a systemic view of science in a cosmopolitan environment. The article concludes with a summary of the central aspects addressed, and a proposal for new paths for general systems theory.

2 | THE SYSTEM THEORIES OF SOCIAL SCIENCES

Bertalanffy had a lofty valuation of social sciences. He believed that they were intended to climb up to the highest of a systems hierarchy composed of "static structures," such as atoms or molecules, at its bottom and symbolism at its top (von Bertalanffy, 1968, pp. 28–29). He even accepted that such sciences were unable to reach the range of mathematics, because they could only define a concept of the system at the level of a "verbal model" (von Bertalanffy, 1968, p. 24). Despite the importance of those sciences, Bertalanffy had a problematic relationship with them; especially in two closely related aspects.

First, we find Bertalanffy's lack of familiarity with the social sciences of his time. His knowledge of these disciplines was mainly narrowed down to American scholars, and, even in such a circumscribed area, his theoretical decisions were not the timeliest ones either. For example, one of his most cited references in the field of sociology was Harvard professor Pitrim Sorokin, who had sympathy for systems theory but had already been displaced in the early 1930s by the sociologist—also from Harvard—Talcott Parsons as the most recognized exponent of systems theory (Johnston, 1986). Despite Parsons was a very influential figure within social sciences, and his theories were well known and widely discussed, Bertalanffy paid minimal attention to his extensive work. He showed instead more interest in cultural anthropology, but again only from the perspective of North American scholars. Thus, British social anthropology, decidedly influenced by the organicism and functionalism of Spencer (1873) and Durkheim (1982), was—despite the obvious parallelisms with general systems theory—out of his scope.

Second, the term "systems theory" had different meanings in social science due mainly to (a) a "misunderstanding" identified by von Bertalanffy (1968, p. 17) between general systems theory and cybernetics[2] and (b) a biased reading of Bertalanffy's ideas. As regards the first point, Bertalanffy considered cybernetics as a very important theory, but only as a subdiscipline of general systems theory; nevertheless, in social sciences, general systems theory is often mixed with cybernetics. Concerning the second point, Bertalanffy's ideas were interpreted in social sciences more as a mathematical manifesto than as a philosophical proposal; cybernetics, instead, was widely accepted as a theory for social phenomena. Thus, the adoption of systems theory in social sciences followed two theoretical paths which, although not entirely separated from each other, are distinguished by their interpretations of general systems theory and cybernetics.

On the one hand, we find a more mathematical version of general social systems theory, which was secondarily influenced by first and second cybernetics. This version, widely developed in the field of socioecological and complex adaptive systems (Buckley, 1967; Gell-Mann, 1994; Gunderson & Holling, 2002; Hoffman, Sharma, & Watts, 2017; Holland, 1992; Ostrom, 1990)[3] and also influenced by American materialist anthropologists as White (1949) and Rappaport (1968), is characterized today by interdisciplinary collaborations between social and natural scientists and is focused on the development of mathematical and computer modelling.

On the other hand, we find a more interpretative and philosophical social systems theory, highly influenced by first-, second-, and second-order cybernetics, and only secondarily related to general systems theory. This theory, linked with the writings of cyberneticians as Wiener (1948), Ashby (1952), and Maruyama (1963) and also with the information sciences (Shannon & Weaver, 1949) and radical constructivism (Maturana & Varela, 1980; von Foerster, 1984; von Glasersfeld, 1987), was early formulated by functionalist anthropologists as Malinowski (1922) and Radcliffe-Brown (1952) and also by the American sociologist Parsons (1937, 1951). A very influential sociocybernetical approach for theories such as anthropological structuralism (Lévi-Strauss, 1963), self-referential systems theory (Luhmann, 1984), the theory of communicative action (Habermas, 1982), and the so-called school of Palo Alto (Bateson, 1972; Watzlawick, 1978).[4]

Bertalanffy's theory was more complex than this coarse contradiction between the mathematical and the interpretative, so the two versions of systems theory in social sciences are not a direct consequence of his ideas.

[2]This is still a matter of discussion. See Pouvreau and Drack (2007); Pouvreau (2014); and Drack and Pouvreau (2015).

[3]I thank Anahi Urquiza for the references on this subject.

[4]This summary is obviously incomplete.

Instead, both traditions are reflecting a long-standing debate about the epistemological and methodological foundations of the social sciences—a schism between two positions that goes back to the early days of these disciplines in the European Eighteenth Century.

Social sciences emerged in the context of the *Enlightenment* and *Counter-Enlightenment* philosophies, and from their very beginnings, these two parties were crucial in the discussion about the place of the social in the world of sciences.

On the one side was the idea of naturalistic social science, founded on mathematical models and guided by methods of natural science, despite the difficulties caused by unpredictable human behaviour. French Enlightenment philosophers such as Comte, Montesquieu, Condorcet, or Voltaire and sociologists as Spencer and Durkheim were on this side.

On the other side was the idea of spiritual, historical, and interpretative science, aiming at the human being as a whole, rejecting the methods of natural science, and proposing instead hermeneutic methods to address the emotional and particularistic. German Romantic philosophers such as Herder, Wilhelm von Humboldt, and Goethe and sociologists as Simmel and Weber were on this side.

Although we find more complementary approaches nowadays, these two perspectives created two different traditions, which are still in force today in debates such as quantitative versus qualitative methodologies, the rational versus the emotional, universalism versus particularism, and the like. Hence, systems theory was accepted, adapted, translated, and changed in many ways on both sides and beyond.

The Enlightened position adopted the mathematical version of general systems theory and the rational optimism of natural analytical sciences, producing advances under the format of computational models and mathematical predictions. The Romantic and hermeneutic position, in turn, found its way in the sociocybernetic approaches and their more philosophical aspirations, shaping today the theoretical agenda in the international scenario of social sciences.

At this point, the question is: Did Bertalanffy's project for the unity of science privileged one of these positions?

The answer is: He took the best of the two perspectives. He was theoretically influenced by the German Romantic philosophy (e.g., Spengler's theories) and the *Kulturwissenchaften*, but he embraced the methodological position of natural sciences and the faith in progress, unification, and formalization of science as well. Notwithstanding his public rejection of Logical Positivism, and his struggle against a mechanistic view of science, he accepted the idea of a positivistic and nomothetic science based on facts and founded on the neutral soil of mathematics. Still, he also proposed a scientific approach based on what he called "perspectivism" (von Bertalanffy, 1953), that is, the relativity of all scientific concepts since their inherent historical and cultural constraints, and claimed for multiple perspectives in order to grasp the truth. This approach was not for him a bias to overcome—because for him, science had its blind spots, and scientific knowledge had boundaries impossible to overcome—but an almost unavoidable situation to every human experience, from everyday situations to scientific observation.

In short, at the *methodological* level, he followed the Enlightened position, but at the *theoretical* level, he adopted a more Counter-Enlightened position.

Despite Bertalanffy's theoretical openness, his methodological decision was crucial for current debates on social sciences. In fact, the main criticisms against systems theory and the project for the unity of science come nowadays from neo-Romantic perspectives. In the next section, we will analyse a paradigmatic case.

3 | AGAINST METHODOLOGICAL NATIVISM

Romanticism became pessimism in the Twentieth Century. In the mid-century, former Enlightened (Materialist) Marxists became Romantic (Idealists), assuming Weberian sociology and Freudian Psychoanalysis in the so-called Critical Theory of Frankfurt School (Horkheimer & Adorno, 1947; Marcuse, 1955). In the same year that Bertalanffy published his book, France was shocked by the massive protests of May, and the criticisms of capitalist societies from the Frankfurt theorists and their rejection of any established form of social control-namely, the State, the family, the market, and even the university-where taken to the streets by the student movement, infecting almost the entire Western world (Nassehi, 2018). Although their revolutionary project failed in practice, it profoundly changed our understanding of scientific knowledge, as we will see.

A few years before, Kuhn (1962) emphasized the importance of locating scientific knowledge in its historical context, but the new critics had more radical ideas regarding science. Inspired by the writings of Foucault (1972), *post*-modernists, -rationalists, and -structuralists understood knowledge as power and saw science (mostly the Enlightened version) as a tool for *social domination*. Adopting the (Hegelian) political dichotomy of the dominating and the dominated, they morally judged science, and the dictum was that the dominated had

to be *esteemed* and the dominating *disesteemed* (Luhmann, 2008).

The skepticism grew up in the core of social sciences, and science was seen as a field of power relationships (Bourdieu, 1984), as a struggle for recognition (Latour & Woolgar, 1979), as an instrument for cultural domination (Clifford, 1986), or as an ideology (Habermas, 1968). Suspicious or naive, the unity of science found no place in the new milieu.

Nowadays, new theories of the marriage between knowledge and power spread in universities around the globe. Under labels such as *postcolonialism*, *decolonialism*, *subalternity*, and the like (Bhabha, 1994; Said, 1978; Sousa Santos, 2018; Spivak, 1990), these approaches evaluate the negative consequences on dominated countries, cultures, and groups caused by current and past colonial relationships and subordination to dominating metropoles. In its beginnings, this perspective was more interested in the literature and the humanities, but it rapidly expanded to social sciences. Furthermore, although we find most of its writings published in English language, it occupies a practically hegemonic position in social sciences faculties and research institutions in places such as Latin America, where the writings of intellectuals of this line, such as Dussel (2005), Escobar (2007), Castro-Gómez (2005), Mignolo (2003), or Quijano (2000) are well known and cited.

Despite their seemingly good intentions, this approach entails a biased appraisal of science and also negative consequences for the project of the unity of science. We shall call this bias "methodological nativism." In its positive version, it means that inborn inhabitants of a territory have the only authentic explanation of their social reality because they live in it and are its direct observers; in its negative version, it means that foreign observers can only achieve a partial, incomplete, and even prejudiced view.

The term nativism is often used in the political analysis to explain migration policies in favour of local inhabitants of a country (Payne, 2017), but the concept itself also implies preconceptions based not on race, culture, or gender but on the very place where people were born. Methodological nativism comes from the same romantic tradition of concepts such as ethnocentrism or methodological nationalism. However, although culture and nation-state are the concepts for ethnocentrism and nationalism, respectively, for methodological nativism, the more concrete *strangers*, *foreigners*, or *immigrants* are the main issue; and although ethnocentrism focuses on the scientific observer and methodological nationalism on the observed, methodological nativism affects the *observer* just as much as the *observed*.

In their colourful range of themes, methodological nativism has a particular place for science. Scientific knowledge produced by old colonial metropolises (mainly Europe and the United States) would have biases in its origin, such as *Eurocentrism*, *Occidentalism*, *Neocolonialism*, *Westernalism*, and the like; and theories—such as general systems theory—have significant shortcomings in seeking to explain other societies. (Ascione, 2016; Gunder-Frank, 2007; Leite, 2017).

In this context, Harding (2011, p. 6) proposed the concept of "Western views of science" distinguishing two different perspectives: the so-called "triumphalist" and the "exceptionalist." Although triumphalism refers to the more enthusiastic part of what we have called Enlightened science, exceptionalism aims at the very core of Bertalanffy's project. Harding argues that the latter entails the assumption that Western science is the only one capable of understanding the structure and functioning of the entire world, and "it has reigned in philosophy of science as the unity-of-science thesis" (Harding, 2011, p. 6). The solution to this deficiency would be the recognition of exceptionalism's prejudices and also the value of non-Western knowledge.

Paradoxically, this resembles the claim of Bertalanffy for "perspectivism" (see *Chapter 1*) and shows that methodological nativism has much higher expectations on science than Bertalanffy himself.

Is general systems theory a mere "Western view of science," and what would this mean? Naturally, general systems theory was geographically produced in the Western hemisphere, by Western scholars, following Western paradigms; so yes, in these terms, it is indeed a Western view of science. The real question is: is it a *wrong* view of science? Still, methodological nativism has no answer to that kind of question because it fails to provide its version of science, and it is blind to its prejudices as well.

Nonetheless, we are aware that Bertalanffy's project has hard obstacles to overcome and that the unity of science implies more than a conceptual consensus. In the next chapter, we will address this issue, and we will propose a possible solution to the dilemma.

4 | THE UNITY OF SCIENCE FOR A COSMOPOLITAN SOCIETY

In order to overcome some of the obstacles previously noted, we see two possible solutions: a concept of world science transcending territorial boundaries and a very specific ethics for science.

Regarding the first point, we find Luhmann's (1990, 1997) proposal for science as a world social subsystem. He observed science as a social system of communication,

which codifies information as *true* or *false* based on criteria produced in the system itself, withdrawing territorial limitations or privileged positions to observe (Luhmann, 1990). Scientific truth does not refer to particular content but to a highly abstract framework to discuss scientific issues. Scholars succeed or fail to establish their arguments in the scientific community, and their findings must struggle for attention in order to prove their value. What we have today as a centre tomorrow will be maybe a periphery, peaks will be troughs, and nothing of this is pathological or unusual for the system.

For Luhmann (1997), science has to be understood in the context of a modern world society internally differentiated in functional subsystems of codified communication specialized on particular aspects of human life; they operate without physical boundaries and interlink people from all around the world. Thus, we have a mass-media system communicating news to the globe; a world legal system specialized on normative decisions in countries and for transnational organizations; a political system for binding decisions; educational systems, economic systems, and so on. In modern society, people from all over the world participate in those systems communicating in simple ways such as payments, rituals, decisions, and the like.

Luhmann (1990) argues that there is no other world social system for the function of producing knowledge under the code of truth/false, because this is the only one that has developed a complex internal network of writings, procedures, persons, labs, norms, theories, traditions, or histories for deciding whether information can be qualified as true or not. The inner differentiation of scientific system between methods and theories helps to distinguish truths from the background of non-scientific truths (Stichweh, 1994, 2003). Science as a system tries to comprise the world under its code and procedures—no matter where the knowledge comes from.

Regarding the second point, we find *cosmopolitanism* (Beck, 1998, 2002) as an ethics and attitude alternative to nativism. Cosmopolitanism accepts nationalities, ethnicities, and every kind of self-identification but it also recognizes their contingency. It defines social otherness but it also includes them. For science, this means accepting the *universal* "citizenship" of scientists no matter their places of origin.

Scientific cosmopolitanism is, in fact, inherent in the *ethos* of science and this is particularly important for general systems theory. System theorists have always been crossing national or geographical boundaries to establish active knowledge communities for discussing concepts and ideas (Cadenas & Arnold, 2015).

Unlike methodological nativism, for cosmopolitanism, the place where scientists were born says nothing about their insights—system theorists such as Ludwig von Bertalanffy and Heinz von Foerster born in Austria; Humberto Maturana and Francisco Varela in Chile; Magoroh Maruyama in Japan; Niklas Luhmann in Germany; Lotfi Zadeh in Azerbaijan; and Norbert Wiener, Walter Buckley, and Talcott Parsons in the USA. All of them *shared* a perspective, they wanted to *communicate* with each other, and it would have been senseless if they had discarded ideas because of their countries of origin.

5 | CONCLUSIONS

Bertalanffy contributed to science by creating a common language for the entire world scientific system. Thus, he embraced external variety as an internal variable (Ashby, 1952), and he produced internal complexity in order to cope with the social environment of science. By doing this, he inspired a scientific cosmopolitanism to enforce relations between scientists.

The unity of science cannot be a world scientific consensus without opposition, because consensus is only one of the many options of scientific activity, and opposition belongs to the core of the system as it moves it constantly towards new horizons. It cannot be either a final truth because scientific truths are always on a precarious equilibrium to facilitate the renewal of information. In short, the unity of science is neither a matter of form nor content, and science cannot be reduced to a plane, anodyne, and unrealistic view of human praxis (cf. Cat, 2017).

The project for the unity of science implies for social sciences overcoming the opposition between Enlightened and Romantic science by integrating insights from both positions, recognizing the contributions of each, instead of seeing them as mutually incompatible.

General systems theory has pushed our understanding of the world by moving us to recognize the variety of phenomena in communicative forms to facilitate relations among scholars and researchers. The common language proposed by Bertalanffy allows scientific communication to share findings and perspectives by accepting a minimum set of symbols, and—like no other before him—he succeeded in moving the system to begin to "talk" in his terms.

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