Verstehen (causal/interpretative understanding), *Erklären* (law-governed description/prediction), and Empirical Legal Studies

Comment

by

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> *Un chef est un marchand d'espérance.*
> *(A leader is a dealer in hope.)*
> – Napoleon Bonaparte (1769–1821)

"For empirical work in social science to carry weight, the research must be able to show that the researcher knows the concepts the actors are using. […] Do the subjects have the same understanding of consequences of their actions as the researchers do? Do the subjects have the same understanding of the causes of those consequences as the researchers do? In short: is the subject understanding the situation in the way the researcher presupposes the subject is understanding the situation?" (Mathew D. McCubbins and Mark Turner, 2012, p. 397)

1 Introduction

The paper by Katz and McCubbins (2018) focuses on the analysis of correlations between a well-defined variable of interest and a large set of covariates. It offers a carefully crafted and accurate statistical description of the phenomena of interest. Technically, the paper is at the state of the art, and yet I felt disappointed, for the paper gives me no real understanding of *why* things happen the way they do; the paper offers no causal explanations for the processes that drive individual action or trigger collective phase transitions.

Am I justified in my disappointment? Not according to Karl Pearson (1857–1936), the founder of modern statistical science. According to him, science should not explain anything. Its role is and must be restricted to accurate description and prediction, and that is all that science can ever hope to do. For further details on Pearson's epistemology, see Stern (2017c). Surprisingly, though, I can find encouragement in my hope for understanding in no other than Professor McCubbins himself, who in 2012 wrote with Mark Turner a paper with the very suggestive title – *Going Cognitive: Tools for Rebuilding the Social Sciences*, where the authors state one of our opening quotations.

In asking for understanding I am not alone. In fact, I stand on the shoulders of giants, like Max Weber (1864–1920). According to Weber, collective behaviors and social processes should be explained by the actions, attitudes, and beliefs of participating individuals, and those, in turn, should be understood (*verstanden*) by their meaning, as perceived and attributed by the same individuals (see Boudon, 2001, p. 54). In this critique, I will make some further comments on the need for understanding, focusing on how and why I think it is relevant in the fields of empirical studies in law and other human sciences.

Before ending this introductory section, I need to distance myself from the position of *methodological incompatibility* of *Verstehen* and *Erklären*. This position states that methods used for *Verstehen* (i.e., interpretative understanding, which is often specific, flexible, analogical, and qualitative) and methods used for *Erklären* (i.e., law-governed explanation, which is often general, rigorous, computational, and quantitative) are, by their very nature, intrinsically incompatible (see Bransen, 2001). In several already published and forthcoming articles, I have argued against such methodological incompatibility (see Stern, 2015, 2017b). On the contrary, I hold the position that *Verstehen* and *Erklären* are complementary and mutually supportive approaches to science and synergic ways of comprehension.

Section 2 exemplifies the aforementioned position of synergic complementarity of *Verstehen* and *Erklären* in an applied consulting project. Section 3 presents some arguments to expand this position to the general scope of empirical legal studies, based on the theoretical framework of Niklas Luhmann's *Sociological Theory of Law*. Section 4 returns to Katz and McCubbins's (2018) paper, and presents our final remarks.

2   *Getting REAL in the Brazilian Stock Exchange*

In the early '90s I was involved in a consulting project aiming to detect opportunities for profitable trading on BOVESPA – the São Paulo Stock Exchange. At that time, orders were still executed by open outcry on the trading floor, delays were measured in minutes, not milliseconds, and operations could still be inspected and supervised in real time by human beings. The software system developed in this project had the task of automatically constructing, selecting, and suggesting intraday operation strategies for a trading desk.

The first version of this software was based on hybrid polynomial networks (see Lauretto et al., 2009, for a similar model). This system was able to suggest specific operation strategies defined by an asset to be bought or sold at its current market price, plus boundary conditions for closing an intraday operation defined by (a) lower and upper limits on the asset's price, and (b) the strategy expiration limit defined by the trading day's closing time plus auxiliary liquidity conditions. This first version of the software also presented condensed statistical analyses based on the suggested strategies' past performance under similar market conditions.

The system was programmed to only suggest operation strategies with expected performance exceeding the trading desk's historical benchmarks. However, to our astonishment, the supervising human traders were very hesitant in accepting the suggested operations, even if they had excellent statistical prospects. When asked the reason for their hesitation, the traders complained that the software did not help them to *understand why* a given operation strategy should work, that is, the system was unable to provide any *insight* or *intuition* about the process at hand. Without such an understanding, the traders declared they did not have the necessary conviction to take the implied risk; they lacked enough confidence to act. The software team was astonished and disappointed, for the initial system specifications never included giving (causal) explanations for why a given operation should work the way it does. Moreover, the technological tools and statistical methods used to develop this system were chosen for maximum predictive power, not contemplating the purpose of generating causal (i.e., answering a "why" question) explanations.

Nevertheless, since a (well-paying) customer is always right, we decided to reengineer the project, restarting from scratch if necessary. The first step in this reengineering process was to research what constituted a *good explanation* in the case at hand. After some interviews, it became clear that these traders were very familiar with the so-called "technical indicators" (see Colby and Mayers, 1988). Moreover, a short explanation based on having some significant key indicators with values in meaningful ranges was the traders' preferred way of accessing the market behavior. Hence, we opted to implement the second version of this decision support system based on REAL – an algorithm for constructing classification trees (see Stern et al., 1998, Breiman et al., 1984, and Unger and Wysotzki, 1981). In the new system, the pertinent branch of the classification tree built by REAL could be used to offer a good (that is, interpretable and intuitive) explanation for the suggested strategy, encouraging the traders to take the required action, and making the project a success for all involved partners.

The figure presents a diagram describing the information flow in the trading system. Operational activities depicted on the right side of the diagram take place at the trading desk or at the stock exchange, while the modeling tasks on the left take place in the back office of the investment bank or at the consulting company. A distinctive property of the theoretical model used for this project is its capacity to produce interpretable causal explanations, saying how and why a given strategy is selected, and prompting effective action, as depicted at the top of the diagram.

Figure

Trade System Production Diagram

Theoretical	—	*Verstehen*	—	Actual
Strategy selection	$\Rightarrow$	Causal explanation	$\Rightarrow$	Interpretative supervision
$\Uparrow$				$\Downarrow$
Predictive computing		Eigensolutions/ Reliable behaviors		Market execution
$\Uparrow$				$\Downarrow$
Parameter estimation	$\Leftarrow$	Statistical learning	$\Leftarrow$	Data acquisition
model	—	*Erklären*	—	operation
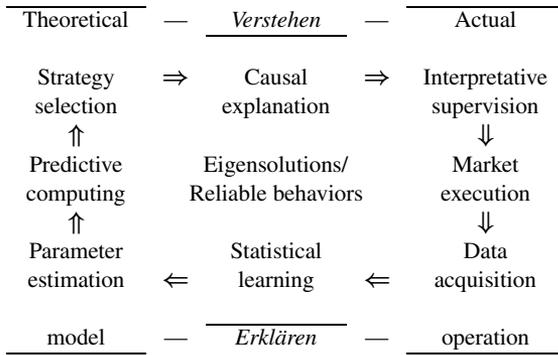
Meanwhile, continuous fine tuning of the model parameters by statistical learning is used to achieve efficient performance, as depicted at the bottom of the diagram.

Under favorable conditions, the system will converge to stable patterns of conduct or invariant forms of interaction, revealing reliable behaviors. In the jargon of systems theory, such stable patterns or invariant forms are known as *eigenbehaviors* or *eigensolutions*, and their associated quantities of interest are known as eigenfunctions, eigenvectors, eigenvalues, etc. Eigensolutions are characterized by the four essential properties of *precision*, *stability*, *separability*, and *composability*. For further comments on these four essential properties and their mathematical characterization, see von Foerster (2003, pp. 305–323), Segal (2001), Borges and Stern (2007), and Stern (2007a,b, 2011, 2014, 2017a).

The figure describes activities at a local level, that is, activities concerning a single agent in the market. At a global level, regulating authorities must establish and enforce fair-trade legislation leading to the so-called nonarbitrage conditions, which in turn allow multiple investment agents to engage in sustainable forms of interaction. Such sustainable trading markets are characterized by global (nonstationary, statistical) equilibria that, in turn, are reflected by equilibrium prices (eigenvalues) (see Cerezetti and Stern, 2012, Černý, 2009, Dothan, 1990, Ingrao and Israel, 1990).

Before ending this section, some last comments: This consulting project made me face for the first time the role of *statistics as principled argument* (see Abelson, 1995), as opposed to its standard and straightforward descriptive/predictive role. Moreover, the two roles proved to be complementary and synergic. For example, the final decision system based on the REAL decision-tree algorithm plus final scrutiny based on expert opinion (expert supervision) could better detect market anomalies and better screen high-risk situations, having overall better performance than the original unsupervised decision system.

3   Norms, Laws, Eigenbehaviors, and Social System

In the example discussed in the last section, human decision processes were mediated by an algorithmic decision support system. This situation was helpful in examining and making clear several important characteristics of behavioral patterns emerging in this process and how these behavioral patterns actually come to be. Nevertheless, I believe some of our general conclusions can be extrapolated to a much wider range. The emerging field of law and economics has plenty of tempting examples suggesting possible ways to transport economic eigensolutions (or equilibrium conditions) to the legal context. Nevertheless, in this section we follow a different route, investigating the importance of these concepts for empirical legal studies from a more fundamental perspective.

The goal of this section is to argue, strictly in the scope of the legal (autonomous/ autopoietic) system, for the need of both *Verstehen* and *Erklären*. As in the example presented in the last section, our discussion will be tied to the emergence of eigenbehaviors or eigensolutions, only this time in the legal context. Discussing these points involves core epistemological and ontological questions. Hence, in order to advance, we need to choose a theoretical framework of legal philosophy.

As theoretical framework we elect Niklas Luhmann's (1927–1998) *Sociological Theory of Law*, complemented by the more general frameworks of systems theory and cognitive constructivism, for they have already been used by Luhmann in the development of his sociological theories (see Luhmann, 1985, 1989, 1990a,b, and also Brier, 2005; Segal, 2001; von Foerster, 2003, pp. 305–323; Maturana and Varela, 1980; Rottleuthner, 1988; Rusch, 2007; Ost, 1988; and Varela, 1979). All these frameworks have been greatly developed in the current century, with the potential of further expanding the scope and increasing the power of Luhmann's original work.

In Luhmann's view, a *norm* does not concern cognition of factual reality; rather, it concerns an idealized model of how reality should be. Hence, a norm is initially only a projection, or a subjective model; see Luhmann (1985, p. 40). In Luhmann's theory of law, the function of the legal system is *congruent generalization of normative behavior expectations* (see Luhmann, 1985, pp. 77, 82). Legal codes and specific laws establish well-defined rules of behavior in a society, at the same time reflecting and inducing the adoption of well-defined behavioral patterns. Moreover, in this perspective, both norms and laws are essentially dynamic, coevolving with the behavioral patterns in the society that they simultaneously try to describe and regulate. Finally, the legal system has the role of providing remediation for frustrated expectations when the law is broken, either in the form of repair or compensation for victims, or in the form of punishment for offenders.

Ignorantia juris non excusat or *ignorantia legis neminem excusat* states the inexcusability-of-ignorance principle, according to which ignorance or lack of understanding is not a valid excuse for breaking the law. This principle is a logical necessity, for without it neither could laws be consistently enforced nor could cor-

rective measures be coherently applied. Nevertheless, wise legislators should not ignore the ways in which laws are known, perceived, and understood.

In Luhmann's theoretical framework, the legal system can only achieve its goal of congruent generalization of normative expectations – as they are coded in specific laws – if individuals (and other participating agents) comply; and compliance involves knowledge, understanding, and acceptance of the same laws. Moreover, social harmony depends on the establishment of reliable, stable, and sustainable forms of interaction. Hence, legislators should take into account the legal system's capacity to induce the emergence of eigenbehaviors. Consequently, when altering or disrupting a legal system, legislators should pay close attention to how such alterations are known, perceived, and understood by the participating agents of the affected society. Finally, preliminary and follow-up studies should track the process of convergence to (or divergence from) pertinent eigenbehaviors, also taking into account relevant second-order or higher-order effects.

4   Wishful Thinking or Ripe for the Picking?

As reviewed in the last sections, the idea of understanding social processes in terms of meanings attributed or concepts used (either explicitly or implicitly) by individual actors participating in the same processes has a long and respected tradition – see Feest (2010) for historical perspectives; see Engel et al. (2009), Engel (2013a,b, 2015), Levy and Mislevy (2016), and Pearl (2000) for recent overviews of useful statistical techniques; see Inhasz and Stern (2010) and Takada and Stern (2015) for some of our own work in developing interpretable models; see Blanc, Macrae, and Ottimofiore (2015) and Voermans (2011, 2014) for recent examples of work addressing individual agent understandings, causal explanations, individual or collective motivation, opinion change phenomena, and related matters in the field of legal studies.

Still (aside from the collateral or indirect route of law and economics), there has been relatively little work in statistical modeling of individual agents and collective behavior specifically linked to their causal motivations or the involved conceptual understandings in the field of empirical legal studies. Hence the question: Is the proliferation of research programs in accordance with the last paragraph of section 3 just wishful thinking? Or are there opportunities ripe for the picking?

I see good reasons for optimism, many opportunities to explore, and also some difficulties to overcome. I will focus on a few specific opportunities inspired by (once again) previous work of Professor McCubbins. However, before proceeding in this direction, I need to address an important issue raised by Niklas Luhmann, namely: who are the primary agents of interest in the social theory of law?

In the scope of legal studies, Luhmann redirects the spotlight of our attention away from individual human beings and towards systemic elements – including the whole legal system at the top level, and a great variety of institutions, organizations, and other participating legal entities at lower levels. Moreover, Luhmann

specifies (systemic) *communication* operations as the form of social interaction most suitable for theoretical (and hence also empirical) analysis (see Luhmann, 1985, 1989, 1990a,b; and Teubner, 1988). The last point is made clear in the following quotation:

> "The idea of system elements must be changed from substances (individuals) to self-referential operations that can be produced only within the system and with the help of a network of the same operations (autopoiesis). For social systems in general and the system of society in particular the operation of (self-referential) communication seems to be the most appropriate candidate." (Luhmann, 1989, p. 7)

I believe this framework to be amenable to many alternative and still little-explored ways of inquiry that may be helpful in overcoming traditional difficulties and bottlenecks. For example: On one hand, McCubbins, Turner, and Weller (2012, 2013) make clear how challenging it can be to access the "internal" states of individual human beings, either in the form of manifested motivations or in the form of elicited preferences, constraints, utility functions, etc. On the other hand, McCubbins, Paturi, and Weller (2009) and Enemark, McCubbins, and Weller (2014) have developed computational tools for the analysis of decision processes in communication networks, which could be immediately applied in the abstract context suggested by Luhmann's framework.

Furthermore, as the media of systemic communication in modern societies change from paper to digital, both structure and contents of systemic communication become readily available for empirical studies. Content (legal documents) can be processed using a variety of tools developed for automated text analysis, information extraction, and ontology construction (see, for example, Ferneda et al., 2012, Mika, 2005, and Sartor et al., 2011). This kind of information may allow empirical analyses of motivations and understandings of participating agents (as recognized by the system in which they interact, that is, as expressed and communicated in terms of the system's ontology), avoiding however the need of making cumbersome hypotheses concerning inaccessible internal states of individual human beings and overcoming consequent methodological difficulties.

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