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# Overcoming 'Physics Envy'

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HOW scientific are the social sciences?

Economists, political scientists and sociologists have long suffered from an academic inferiority complex: physics envy. They often feel that their disciplines should be on a par with the “real” sciences and self-consciously model their work on them, using language (“theory,” “experiment,” “law”) evocative of physics and chemistry.

This might seem like a worthy aspiration. Many social scientists contend that science has a method, and if you want to be scientific, you should adopt it. The method requires you to devise a theoretical model, deduce a testable hypothesis from the model and then test the hypothesis against the world. If the hypothesis is confirmed, the theoretical model holds; if the hypothesis is not confirmed, the theoretical model does not hold. If your discipline does not operate by this method — known as hypothetico-deductivism — then in the minds of many, it’s not scientific.

Such reasoning dominates the social sciences today. Over the last decade, the National Science Foundation has spent many millions of dollars supporting an initiative called Empirical Implications of Theoretical Models, which espouses the importance of hypothetico-deductivism in political science research. For a time, The American Journal of Political Science explicitly refused to review theoretical models that weren’t tested. In some of our own published work, we have invoked the language of model testing, yielding to the pressure of this way of thinking.

But we believe that this way of thinking is badly mistaken and detrimental to social research. For the sake of everyone who stands to gain from a better knowledge of politics, economics and society, the social sciences need to overcome their inferiority complex, reject hypothetico-deductivism and embrace the fact that they are mature disciplines with no need to emulate other sciences.

The ideal of hypothetico-deductivism is flawed for many reasons. For one thing, it’s not even a good description of how the “hard” sciences work. It’s a high school textbook version of science, with everything messy and chaotic about scientific inquiry safely ignored.

A more important criticism is that theoretical models can be of great value even if they are never supported by empirical testing. In the 1950s, for instance, the economist Anthony Downs offered an elegant explanation for why rival political parties might adopt identical platforms during an election campaign. His model relied on the same strategic logic that explains why two competing gas stations or fast-food restaurants locate across the street from each other — if you don't move to a central location but your opponent does, your opponent will nab those voters (customers). The best move is for competitors to mimic each other.

This framework has proven useful to generations of political scientists even though Mr. Downs did not empirically test it and despite the fact that its main prediction, that candidates will take *identical* positions in elections, is clearly false. The model offered insight into why candidates move toward the center in competitive elections, and it proved easily adaptable to studying other aspects of candidate strategies. But Mr. Downs would have had a hard time publishing this model today.

Or consider the famous “impossibility theorem,” developed by the economist Kenneth Arrow, which shows that no single voting system can simultaneously satisfy several important principles of fairness. There is no need to test this model with data — in fact, there is no way to test it — and yet the result offers policy makers a powerful lesson: there are unavoidable trade-offs in the design of voting systems.

To borrow a metaphor from the philosopher of science Ronald Giere, theories are like maps: the test of a map lies not in arbitrarily checking random points but in whether people find it useful to get somewhere.

Likewise, the analysis of empirical data can be valuable even in the absence of a grand theoretical model. Did the welfare reform championed by Bill Clinton in the 1990s reduce poverty? Are teenage employees adversely affected by increases in the minimum wage? Do voter identification laws disproportionately reduce turnout among the poor and minorities? Answering such questions about the effects of public policies does not require sweeping theoretical claims, just careful attention to the data.

Unfortunately, the belief that every theory must have its empirical support (and vice versa) now constrains the kinds of social science projects that are undertaken, alters the trajectory of academic careers and drives graduate training. Rather than attempt to imitate the hard sciences, social scientists would be better off doing what they do best: thinking deeply about what prompts human beings to behave the way they do.

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