

Models in Natural and Social Sciences

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In this paper I will discuss the hypothesis that remoteness between subject and object of theorizing determines our attitude toward a particular theory. The closer subject and object are to identity, the more the subject hesitates to accept the hypothesized laws. It will be further argued that, in this sense, introspective acts serve as a permanent challenge to theories of human behavior.

No doubt, laypersons as well as scientists believe in the models of natural science. Individuals believe that gravity works, that the planets follow their course around the sun, that the hydrogen atom is built out of one proton, one electron, plus some alphas and betas; likewise we believe that when two hydrogen atoms mingle with one atom of oxygen there will exist one molecule of water. Naturally, the list could run on endlessly. Most of us studied the respective models as part of our university training—but even more interesting than the models themselves is the fact that we yet hold these models in our minds when viewing the world of nature.

Individuals trust in such models whenever an explanation about the world of nature is sought, or whenever one wishes to project the effects of one's actions in and upon the world of matter. Paradoxically, even the mistrust that many individuals have of our technological civilization is to a large extent based on models which explain to us how the world of matter works. All the more, I wonder why people hesitate so much to believe in the models of the social sciences. I have been teaching economics for seven years and I can say there is hardly one student who believes in the model, for example, of the rational decision-making consumer, or the profit maximizing entrepreneur.

Although most economists claim they *do* believe in the models they espouse, they hesitate to use these models in their non-academic lives when deciding on their own behavior or when looking for explanations for behavior of their neighbors or colleagues. Ideally, their manner of looking for an explanation is shaped to a large extent by the models which they were taught. However, this explanatory process seems to work only subconsciously. If we ask a professor of economics whether ordering a steak with fried potatoes balances his/her decision equilibrium, so that the marginal rates of substitution correspond to the relative prices of the other goods one buys (bought, or

is going to buy), the individual would think that we are kidding. Good joke indeed!

Even economists smile when they read an article on the economics of brushing teeth or the economics of getting married. But why do we not laugh at physics from which we take the theory of the technique which makes our electric toothbrush work? The answer might be found in the following idea: human beings do not see, taste, feel, or hear the laws of the world of matter in their daily lives. One needs “instruments” to measure natural phenomena—we do not *see* the earth moving around the sun; on the contrary, we see the sun rising in the east and setting in the west. It takes a series of observations, a glass to look through, and strong imagination to find out about the movements of the planets and stars. The sad story of the life of Galileo shows how contradictory the outcome of research might be when compared with our nonscientific observations. Yet, once accepted as law, the implied model cannot be checked by everyday observation.

Introspective Everyday Testing

No one can see gravity tearing on a stone pulling it down. Nevertheless, the stone falls to the ground unless some other power pushes it somewhere else. This is quite distinctive from human laws—the social, economic, psychological, historical, or anthropological forces that supposedly guide our behavior. Such laws have to pass the everyday test of the individual if they are to be accepted. And, invariably, they fail! The consuming individual knows best that he or she does not do the rationality calculation on the basis of marginal rates of substitution. Entrepreneurs tend to claim that they are not maximizing profits as widely assumed in economic theory. Instead, they contend that they assure the stability of the firm, the well-being of the employees, the productivity, efficiency, etc. Although some do claim that they maximize profits, further inquiries show that they either do not know what their costs and revenues are, or that they maximize something quite different from that defined in the models which were created to explain their behavior in the first place.

Analogously, most people do not believe in their own subconscious, or in their superego, or id; they accept that someone else might show behavior indicative of these constructs, but they do not feel that they themselves are influenced by such forces. By our own virtue, every individual serves as his or her own testperson to human laws. It seems inherent in the idea of free will that we possess a bias against the functionality of human laws: we simply do not see them as working on ourselves. It is not necessary at this time to enter into discussions of free will concepts (e.g., Rychlak, 1980)—however, it appears that individuals make more concessions regarding counter-theoretical behavior in *others* (strangers), as opposed to people we know, or even

when examining our own behaviors and motives. Since most people think they know themselves best, they are inclined to see themselves free from law-like behavior as described by the human-law models.

The more remote human beings are from a given behavior, the more a law-like explanation of behavior seems acceptable, since the testability by introspective analysis is reduced by the distance. This holds true whether we are speaking about material laws, or our views on tribes in Central Africa or on forgotten islands in the middle of the ocean. The laws which we might accept for describing the behavior of an individual of ancient Greece, we do not trust when describing our own behaviors or other members of our society. We just do not *feel* the laws which determine our behavior. Certainly, we might accept God or Fate as a governing force directing our behaviors — but we do not see non-transcendental laws working on us. Only because God or Fate *is* transcendental can we accept them as causes of our actions without the necessity of *feeling* them when, for example, we believe they are leading our hand when writing a poem. Naturally, if the poem is not going well, it is easy to testify that we are misled, or unlucky. If, however, there are non-transcendental laws working in and on us, then we *ought* to know about them when they are governing our hands, fingers, and thoughts. However, we still do not feel them. We are aware of the physical restrictions of our body only. These restrictions are about the only non-transcendental factors which we *feel* determine our behavior.

As yet, I have not mentioned differences in the preciseness of natural science versus human law explanation and prediction. It is often claimed that the social sciences are less precise than natural sciences. In his book *Economics*, Nobel-prize winner Paul Samuelson (1976) stated that there is an important difference between an exact science like physics and a less exact science like political economy “inasmuch as the laws of political economy hold only ‘on the average,’ with considerable dispersion of expectation around the average” (p. 12). Astronomy is, however, very imprecise on dimensions of time and distance. Yet, we still believe. Meteorology, another offshoot of physics, derives its laws from very small samples as well. This outcome might be encouraging to all human researchers who suffer from the inaccuracy of their predictions. Thus, we can see from these few examples that the possibility of experimentation is not the differentiating property of either the natural or the human sciences. There are, in fact, areas within the human sciences which offer larger possibilities of experimentation than either astronomy or meteorology.

Human beings can hear and read, and therefore are able to react to human laws and predictions. This includes the problem of self-fulfilling and self-destroying prophecies which is not substantial to the natural sciences. Thus, it is not likely that the planets move differently just because Kepler described their ellipses. Stones fell in the manner described by Galileo long before his

theory of gravity was posited. On the other hand, it may be likely that the economy has worked differently since Adam Smith and Sir John Maynard Keynes. People began to believe in the idea that the “invisible hand” of self interest would increase “wealth of nations.” They then objected to government interference, even at the cost of starvation and Malthusian death. Andrew Ures’ self-help ideology became the “philosophy of the manufacturers,” as well as for “go-west” fortune seekers. The closer human behavior and social institutions grew to one particular ideology, the more awkward became the failure of the invisible hand in overcoming unemployment and stagnation. The experience of the Great Depression thus became the prelude for the reformulation of human economic behavior. The Keynesian revolution (Klein, 1950) broke out. An ideology was born which favors the deficit spending and pump priming of the government. The success of this ideology as experienced in the years during the second world war and shortly after was accompanied by the fading of confidence in individualistic actions. In consequence, people became more and more dependent on the government and its bureaucracy. The entrepreneurial animal spirit was, to a large extent, paralyzed. However, the more individuals accepted Keynesian ideas, the more these ideas lost their power and competence to solve the problem of stagflation which troubled the sixties and seventies and which is still the major economic problem for the eighties.

Milton Friedman (1981) and his neo-neoclassic Chicago School are working hard to convince people to turn back to a “Free To Choose” economic, social, and political system. We may be experiencing the beginning of the renaissance of the self-help ideology and the invisible hand; and people are most likely to change their behavior accordingly. History shows that economic theory determines human behavior.

So, it *is* logical to ask, how would Reagan’s economic approach look without the supply-side economic model? Yet, it is no more than doubtful that these economic models are correct. Although they in some manner govern our behavior, most people believe in them only to a certain extent, and others, not at all. Some think that human beings are very different from what these models assume they are, thereby short-circuiting the model at its base. This group of individuals seems to grow—particularly when people cannot identify the fiction of the models with their own reasoning and experience.

The Strange Loop

An interesting version of the interdependence between human behavior and theory-modelling of that same behavior is implied in the rational expectation model, currently finding its way into many standard economic texts (cf., Sargent, 1979; Varian, 1978). The rational expectation approach pre-

supposes that individuals know the theory applying to their behavior and interaction, and thereby, the theory itself is self-referential.

This "Strange Loop," to use Hofstadter's (1979) term for the characterization of self-referential systems, has its tradition in economic model-building. The theory of general economic equilibrium, which "constitutes the pride of theoretical economics" (Morgenstern, 1976, p. 169), is generally discussed under the assumption of "full foresight" or "perfect foresight" of the economic actors. This, however, presupposes that a participant of the modeled market economy knows the decisions of his or her fellow participants, as well as the result of the interacting decisions. This implies that he or she knows the theory of general equilibrium, or as Morgenstern states:

In consequence of the interdependence of all economic processes and given conditions on one another and this with all other facts, no instance could be given of a sector, however small, of the event, the foresight of which would not mean, at the same time, the foresight of all the rest. Should any residue be neglected, perhaps because it be regarded as too insignificant for practical behavior, then, it would have to be foreseen exactly, in order to be neglected even directly as *unimportant*. Consequently, nothing is changed regarding implicit determination in the case of "full" foresight. As long as this condition is granted, it is a practical matter which has nothing to do with the theoretical problem. It is fundamental to point out here that the foresight of complex economic magnitudes, such as, for example, prices, the volume of money, costs, profits, etc. postulate, just because of the perfection of this foresight, that the constituents of these complex magnitudes also be foreseen. The most important and final elements of this kind are the *individual acts* out of which the complex magnitudes arise. The individual exercising foresight must thus not only know exactly the influence of his own transactions on prices but also the influence of every other individual, and of his own future behavior on that of the others, especially of those relevant for him personally.

The circle of these relevant individuals is extraordinarily large, since, besides, all indirect effects would have to be considered accurately. Obviously, one will have to erect very narrow limits by a more reasonable definition of foresight and, as with the extension of time, here, too, with the pertinent breadth and depth. But, then again, it is not "perfect foresight." This, if it is not qualified, leads to the conclusion that the individuals would have to have complete insight into theoretical economics, for how else would they be able to foresee action at a distance?

The impossibly high claims which are attributed to the intellectual efficiency of the economic subject immediately indicate that there are included in this equilibrium system not ordinary men, but rather, at least to one another, exactly equal demi-gods, in case the claim of complete foresight is fulfilled. (1976, pp. 172-173)

However, the theory of general equilibrium is supposed to *describe* human behavior. In fact, social science theories have to refer to some kind of "demi-god" (known as *homo oeconomicus*, *homo politicus*, etc.) in order to avoid being caught in the Strange Loop created by the immanence of subject and object. Just as in Escher's *Drawing Hands* painting (see Hofstadter, 1980, p. 690), where a left hand is drawing a right hand, while simultaneously a right hand is drawing a left one, the researcher and subject hierarchy in the social sciences is a "tangled" one. Social science researchers and their subjects belong to identical systems and thus, they are on identical hierarchical levels.

The researcher is neither transcendent to the subject nor is the subject transcendent to the researcher. The researcher gains transcendence if the subject is remote either in terms of time, space, or social hierarchy. In other words, gaining knowledge, or the process of coming to know something, presupposes a certain degree of alienation between subject and object.

Remoteness, it can be maintained, breaks the identity ties between the scientist and the object. The world of matter is relatively remote to the scientist as long as there is not a kidney-stone ruining one's health. In the case of physical pain, we become aware of our earthy nature. Interestingly enough, medicine, as science, has difficulty making its theories accepted common knowledge. Although medicine was pioneered during the development of modern science, inspired by the ideas of Hermann Helmholtz, it still had to fight the introspective self-treating client, as well as the witch doctor (who introduced transcendence), as competitors. Human beings tend to lose faith in scientific medicine the closer pain and death comes to them.

The Norm Game

Because of the Strange Loop, social sciences can be used to influence subjects. I have discussed elsewhere (Holler, 1979) that the training of business students in economic theory (compulsory at German universities) can be understood in terms of making these students sensitive to economic policy. Thus, if government policy creates a budget deficit in order to increase demand, then the effect will be supported by considerable additional demand, if the students know about Keynesian theory and the idea of deficit spending; even more demand will be supplied if the students believe in it.

Indeed, not only will policy makers be more successful if they can rely on the supporting concepts in the minds of the economic decision makers, but economists will also improve the performance of their theories the more people act as described in the underlying models. This, of course, implies a certain standardization and consistency of theories. Obviously some social scientists work very hard on the first problem (e.g., Holler, 1981), and I wonder whether they will fail, since the second problem is far from adequately handled, as we can see from the above discussion of the theory of the general economic equilibrium. Maybe economists can convince people to behave as if they resided in a system of perfect competition, but we cannot make them demi-gods blessed with perfect foresight. Nevertheless, for the last two hundred years economic liberalism has tried hard to create an adequate environment for the decision-making of demi-gods. As Zeuthen (1968, p. 2) stated, "It was thought that if your theory was not universally true, it would become so when your political ideas had been realised."

The standardization of nature is obviously more successful than economic policy; this can be seen if we look at our cities as well as our factories. Trash,

sewage, garbage, and pollution are the residuals of the norm game which humankind plays on the fundamentals of natural science and the corresponding models and laws. The norm game can be identified as part of a larger game called the domination of nature by humankind (see Leiss, 1974). Although the world of matter still seems to be remote, it comes closer the more we suffer from the externalities of the norm game. Obviously, this is the way our beliefs in the natural sciences erode.

Conclusion

Since human beings are in the position to test theories about their behavior through introspective acts, social sciences suffer a permanent challenge and mistrust. By their very nature, introspective acts are far from neutral—they are actually a poor method of testing compared to the standards of science. However, people rely on them insofar as they consider themselves objects of social science theories. Since the world of matter is, in general, remote to modern human beings, individuals are more inclined to believe in natural laws than to trust in human laws. This challenges the rather common idea that “social scientists have an advantage over natural scientists . . . precisely because we are ourselves men” (Samuelson, 1976, p. 10). Of course, there is a difference between knowing something and believing in it. However, this is a subject I would like to discuss elsewhere. In this paper emphasis is upon *believing* in theories.

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