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A CRITICAL STUDY OF H. A. SIMON'S PHILOSOPHY OF THE SOCIAL SCIENCES

by

Naoki Watanabe

I

It has been one of the most popular contentions among the social scientists and economists, that the method of the social sciences should be different from that of physics and other natural sciences. This is because the material which the social sciences deal is quite different from that of the natural sciences.

In the 1950s and '60s many economists learned their methodology from K. Popper's falsificationism. At one time they frequently invoked his name and paid considerable attention to his principles of empirical testability and falsifiability. But they became reluctant to accept its prescription or criteria, when it was discovered that falsificationism is too restrictive and destructive, in the light of the distinct character of the social sciences. According to them, because 'The parameter in these theories are in the most important cases quickly changing variables, and there are no reliable laws but only historical trends or patterns on which to base predictions'¹⁾, the strongly anti-inductive emphasis in Popper's methodology is not relevant to the social sciences.

H.A. Simon, a Nobel prize winner for economics in 1978, is one of those who criticize Popper's views and propose alternative methods which are more suitable to the social sciences. Simon has written many articles on the philosophy of science which are critical of anti-psychologism and deductivism, which he sees as affecting many economists and social scientists.

In this area his primary concern is with the problem of a 'logic of discovery', because he thinks this subject is the most essential for the social sciences. He says, 'Much more often scientists are faced with a set of phenomena and no theory that explains them in even a minimally acceptable way. In this more typical situation, the scientific task is not to verify or falsify theories, or not to choose between alternative theories, but to discover candidate theories that might help explain the facts'²⁾, and he adds that the social sciences are faced with just such problem.

1) T. W. Hutchison, 'On the History and Philosophy of Science and Economics', S. Latsis(ed.), *Method and Appraisal of in Economics*, 1976, pp.188-189.

2) H. A. Simon, *Models of Discovery*, pp.xi-xii.

Simon begins by contrasting Popper's and Hanson's views on this matter, and insists that scientific discovery has a logic, denying Popper's anti-inventionism stance as expressed in his charge of 'psychologism', and adopting Hanson's (and Pierce's) term 'retroduction' for the envisaged logic of invention.

His key contention in this matter is that a 'law discovery process' is not inductive. He attempts to avoid the problem of inductive logic, by offering some definitions. But it seems that his programme is not only philosophically pointless but also unnecessarily restrictive of his social-science methodology — particularly in relation to the explanatory power of social-scientific theories.

In this paper, first I will deal with his position concerning a logic of discovery. Secondly I will take up his methodology of social sciences in order to explain how his anti-deductive and psychological position affects it. I will also deal with what I have referred to above as the 'unnecessarily restrictive' view of the social sciences. And finally I shall discuss the logical adequacy of his assertions concerning the philosophy, or methodology of the social sciences.

II

'Scientific discovery' means, according to Simon, 'pattern discovery' which is a matter of recording economically a finite portion of a data-sequence. He proceeds to explain that 'scientific discovery' is a form of problem solving, and the process whereby science is carried on can be explained in the terms that have been used to explain the process of problem solving³⁾, and in simple cases automatic algorism is available for this pattern search — a selective trial-and-error strategy⁴⁾. Then he insists that the scientific discovery process has a logic.

Simon's contention is essentially concerned with two problems which Popper raises in his book 'the Logic of Scientific Discovery': one is that of 'psychologism', and the other is that of 'inductive inference'. Therefore the most important thing for Simon is to criticize and avoid these two problems respectively in order to defend his account of a 'logic of discovery'.

Popper insists that: '... there is no such thing as a logical method of having new ideas, or a logical reconstruction of this process . . . The question how it happens that a new idea occurs to man may be of great interest to empirical psychology; but it is irrelevant to the logical analysis of scientific knowledge'⁵⁾. This well-known view of Popper's means that the problem of discovery is taken to be an empirical matter (Kant's *quid faci?*), in the province of empirical disciplines; while that of justification or validity is taken to be a logical and epistemological one (Kant's *quid juris?*). Therefore, according to Popper, it follows that to speak of a logic of discovery is to confuse categories.

Simon defends his position against Popper's criticisms, by supporting Hanson's con-

3) H. A. Simon, 'Scientific Discovery and Psychology of problem Solving', in R. Colony(ed.), *Mind and Cosmos*, 1966, pp.22.

4) Cf. H. A. Simon, 'Thinking by Computer', R. Colony(ed.) 1966, pp.3-21.

5) K. R. Popper, *The Logic of Scientific Discovery*, 1959, p.31.

tention that: '... The initial suggestion of an hypothesis is very often a reasonable affair. It is not often affected by intuition, insight, hunches, or other imponderables as biographers or scientists suggest. Disciples of the H-D account often dismiss the dawning of an hypothesis as being of psychological interest only, or else claim it to be the province solely of genius and not of logic. They are wrong. If establishing an hypothesis through its predictions has a logic, so has the conceiving of an hypothesis'⁶⁾. So Simon adopts the term 'retroduction' which Pierce and Hanson coined for the systematic process leading to discovery, and insists that a retroductive (rather than deductive) law discovery process, from empirical data, is a matter of 'logical analysis'.

Simon's argument is that the law-discovery process is just one form of the problem-solving process. In order to give a reason why such a process has a logic, Simon makes clear what might be meant by the term 'logic' in this context. According to Simon, the term 'logic' is defined thus: 'We commonly call a process 'logical' when it satisfies norms we have established for it; and these norms derive from our concern that the process be efficacious or efficient for accomplishing the purpose for which it was established. A logic of scientific method, then, is a set of normative standards for judging the processes used to discover or test scientific theories, or the formal structure of the theories themselves'⁷⁾.

Simon goes on to maintain, with reference to the term 'logic': 'The use of the term 'logical' suggests that the norm can be derived from the goals of the scientific activity. That is to say, a normative theory rests on contingent propositions like this; "If process X is to be efficacious for attaining goal Y, then it should have properties A, B, C,"'⁸⁾.

Thus, it is obvious that for Simon, a logic of discovery consists of a process based on such a normative theory. Simon maintains that a chess strategy might be analogous to a normative theory. One example might be a proposition like this; 'In a position where the player has greater mobility than his opponent, he examine moves that attack the position of the opponent's king directly'⁹⁾.

He adds that a normative theory is an empirical rule based on the accumulated experience of decision makers (e.g. of chess players), and cannot be deduced from any single premise.

In this context, the most important assertion for him is that the law discovery process is not inductive. The process of law or pattern discovery in empirical data, is apparently similar to so-called inductive inferences.

Popper's well-known anti-inductivism argument is as follows; 'It is usual to call an inference "inductive" if it passes from singular statements (sometimes also called "particular" statements), such as accounts of the results of observations or experiments, to universal statements, such as hypotheses or theories. Now it is far from obvious, from the logical point of view, that we are justified in inferring universal statements from singular

6) N. R. Hanson, *Patterns of Discovery*, 1958, p.71.

7) H.A. Simon, 'Does Scientific Discovery have a Logic?', *Philosophy of Science*, Vol.40, No.4, 1973, p.473.

8) Ibid., p.473.

9) Ibid., p.473.

ones, no matter how numerous'¹⁰⁾.

As to this debate, Simon proceeds to avoid the problem by definition. He says, 'law-discovery means only finding pattern in the data that have been observed'¹¹⁾. According to him, this process does not, of itself, involve any extrapolation or generalisation i.e. — it is not inductive.

Simon maintains with reference to this problem: 'To provide a logical justification for the extrapolation, we need to appeal to some principles of the uniformity of nature, or some premise of induction. However, the difficulty with which we are confronted here is illusory. It does not arise at all in connection with discovering a pattern — recording parsimoniously the portion of the sequence that was presented explicitly. It arises only if we wish to predict and test whether this same pattern will continue to govern the sequence when it is extrapolated'¹²⁾.

Then Simon proceeds to offer the following definitions: 'A law discovery process is a process for recording, in parsimonious fashion, sets of empirical data.' 'A normative theory of scientific discovery is a set of criteria for evaluating law-discovery processes'¹³⁾.

With these definitions, Simon concludes, 'By separating the question of pattern detection from the question of prediction, we can construct a true normative theory of discovery — a logic of discover'¹⁴⁾.

However, he seems not to be able to solve the problems which he sets himself with regard to Popper's anti-inductivism contention. One is the problem of the category mistake — i.e., the problem whether 'discovery' is taken to be a matter of logic. The other is that of induction.

As to the first problem, Simon insists that a law discovery process is a matter of logical analysis, by giving such a definition of 'logical' that we call a process 'logical' when it satisfies the norms we have established for it. But this contention, concerning a logic, is philosophically pointless. Strictly speaking, what he calls 'logic' does not mean a "logic" as used in the normal sense of the term at all, but simply the fitness to the norm which we have set for evaluating the law discovery process.

We might be able to call any process 'logical' in this case, by setting or altering the criteria arbitrarily.

For his term "norm" has the same characteristic as the strategies in the game of chess, which can be neither deduced from any premises nor justified a priori as mentioned before. Therefore the relation between the process and the norm is vague.

However Simon defines a 'logic' in this context, it only means the subjective adequacy between a law discovery process and a normative theory of scientific discovery. This problem is not taken to be logical and epistemological in character, but an empirical matter, which is the province of such empirical disciplines as psychology and history. At

10) Popper, op. cit., p.27.

11) Simon, op. cit., 1973, p.475.

12) Ibid., p.475.

13) Ibid., p.475.

14) Ibid., p.479.

this point he makes a category mistake which Popper criticizes¹⁵⁾.

Simon intends to establish a 'logic of invention' (which is different from that of justification or falsification) from the point of view of psychologism. His attempt, in one sense, might be too interesting to dismiss as a mere category mistake. However, he entirely fails to explain the significance of this area of research. In the light of this, his contention about a 'logic of discovery' seems to be pointless.

As to the second problem with which Simon sets himself, he intends to avoid the problem of inductive inferences by definition.

When law discovery is regarded as a process combining pattern discovery with generalization or extrapolation, it is inductive. But Simon shifts the demarcation point between invention and appraisal (justification). He says that what is discovered by means of his law discovery process is simply a more economical re-description of the same data. Then he defines invention as coinciding with pattern discovery.

It is not clear in this context whether Simon regards the pattern, the product of discovery process, as one which should be generalized (induced) into a law in the more usual sense of the term. This problem is a very interesting one to which I shall return later.

However, it seems that Simon cannot avoid the problem of induction merely by definition. As McLaughlin also points out, in his paper about invention and induction¹⁶⁾, Simon tacitly adopts the inductive inference in his argument.

Simon emphasizes the qualifying phrase 'in parsimonious fashion' in his definition of law discovery process. Parsimony seems to be recognized by him as a desideratum in plausible laws (hypotheses)¹⁷⁾: the more parsimonious the pattern the better it is for the law discovery process. Parsimony, for Simon, is a plausibility-consideration in the process of appraisal, justified by inductive (e.g., analogical) inference from past successes of other parsimonious laws. Obviously Simon is invoking inductive plausibility principles from the context of appraisal when he chooses the constraints to apply to the law discovery process.

Simon also fails to avoid the problem of induction in other areas. As mentioned before, Simon holds that a normative theory of scientific discovery is a set of criteria for evaluating the efficacy of various law discovery processes with respect to the goal of discovering a plausible law. Some patterns will be taken to be better than others, according to criteria specified by the normative theory. And to establish the normative theory is seen by Simon as the most interesting enterprise for the inventionist.

But a normative theory shares the empirical characteristic of a strategy in chess¹⁸⁾. To justify it, we should have to assume, in turn, other norm of a higher order, and so on. Thus the attempt to base the normative theory on experience must lead to an infinite

15) With regard to the problem, Simon's understanding of Popper's criticism seems to be inappropriate.

16) R. McLaughlin, 'Invention and Induction: Laudan, Simon and the Logic of Discovery', *Philosophy of Science*, 49, 1982.

17) Cf. *ibid.*, p.208.

18) For better understanding of a normative theory, see Simon, 'The Logic of Heuristic decision Making', rescher(ed.), *The Logic of Decision and Action*, 1967.

regress. Eventually, in order to avoid it, we have to introduce a logic of induction, which Simon wishes to avoid at all costs. It is obvious that Simon fails to solve all the problems he addresses himself to. But for a better understanding of his philosophy, we must refer to his methodology of the social sciences, and in particular to what sort of propositions he adopts as the laws or hypotheses of the social sciences; also to how he converts a pattern, discovered in law discovery process, into a law.

III

Simon's methodology of the social sciences, based on psychologism and anti-deductivism, is a very distinct one. Latsis, a prominent economist and philosopher of science, presided over the Economics Session of the Nafplion Colloquium on Research Programmes in Physics and Economics held at Nafplion, Greece in 1974¹⁹⁾. Latsis discussed Simon's methodology at the colloquium, and named it 'economic behaviouralism'. According to Latsis, 'economic behaviouralism' proposes that; 'Instead of attempting to explain the behaviour of economic agents as best decisions in a constraining situation we should attempt to explain them as more or less good (or possibly disastrously bad) solutions in fluid and partially known or even completely misunderstood situations'²⁰⁾. In Latsis's account, this research programme is completely different from what he calls 'situational determinism', which has been the dominant research programme of orthodox economic theories (neo-classical economic theories). Latsis defines 'situational determinism' as the method according to which we explain an action by means of constructing situations 'where the actor's choice is uniquely determined by situational considerations'²¹⁾. He says that each programme is characterized by different bases. 'Situational determinism' is based on such principles as: (1) individualism (2) the psychological anonymous type (3) the rationality principle²²⁾ – in short, the principles underlying the 'logic of situation' by Popper. 'Economic behaviouralism' grounded in such disciplines as: cybernetics, the psychologies of learning, of attention and of motivation – i.e., the behavioural sciences.

19) The idea of holding this colloquium was first conceived by Imre Lakatos. Its central purpose was a synoptic examination of Lakatos's methodology of scientific research programmes (M.S.R.P.) to developments in the physical sciences and in economic theory. About Lakatos, see Lakatos, 'Falsification and Methodology of Scientific Research Programmes', Lakatos and Musgrave(eds.), *Criticism and the Growth of Knowledge*, 1970.

20) S. Latsis, 'Situational Determinism in Economics', *British Journal for Philosophy of Science*, 23, 1972, p.229. In Latsis's account, 'economic behaviouralism' is different from 'behaviourism' in psychology.

21) S. Latsis, 'A Research Programme in Economics', in Latsis(ed.) *Method and Appraisal in Economics*, 1976, p.16.

22) (1) Phenomena of market behaviour are explained in terms of individual human agents acting in a social situation. (2) The rational choices of the individual agents are so constrained by their situation that only minimal psychological assumption are required to explain their actions. (3) Behaviour is animated by the principle that rational agents are appropriately to the 'Logic of situation'. Cf. Latsis, 1972, pp.208-209.

Latsis goes on to say that 'economic behaviouralism' has a potential to deal with problems which 'situational determinism' is, a priori, unsuited to – even though the former programme is a relatively recent development. For the agent's internal environment, according to him, becomes one of the central components in the explanation, in the situations where the actor's choice is not narrowly delimited by situational considerations – e.g., decision making under conditions of uncertainty²³⁾.

Responding to Latsis's argument, Simon criticizes 'situational determinism', in his paper also submitted to the colloquium²⁴⁾, saying: 'It is illusory to describe a decision as "situationally determined" when a part of the situation that determines it is the mind of the decision maker – i.e., large quantities of stored information and previously learned decision procedure'²⁵⁾.

Simon argues that economics must take into consideration the decision maker's inner environment, in other words it needs to be "psychologized" in order to do justice to the complexity of the situation. Hence, Simon maintains: 'Economics . . . is inevitably culture- and history-bound Decision processes, like all other aspects of economic institutions, exists inside human heads. They are subject to change with every change in what human beings know, and with every change in their means of calculation. For this reason the attempt to predict and prescribe human economic behaviour by deductive inference from a small set of unchallengeable premises must fail and has failed'²⁶⁾. Eventually he says, 'An empirical science cannot remake the world to its fancy: it can only describe and explain the world as it is'²⁷⁾, and he insists on 'the basic shift in scientific style in economics from an emphasis on deductive reasoning to an emphasis on empirical exploration of complex algorithm of thought'²⁸⁾.

Thus, Simon attempts to propose a methodology of economics from the view point of 'psychologism' and 'anti-deductivism'. His key contention seems to be that empirical sciences can only describe and explain the world as it is. This assertion means that a theory (of the social sciences) remains only a description of phenomena or a low level empirical generalisation (empirical rule). In other words, a theory (of the social sciences) is nothing more than an economical re-description of empirical data, which includes no generalisation or extrapolation – in a strict sense.

It is obvious that his 'theory' in this area is similar to a 'pattern' which is derived from a law-discovery process. This is inevitable considering his philosophy of science.

Simon is sympathetic toward inductivism, and has been influenced by it throughout his academic career, but is aware of its limitations²⁹⁾. He is primarily interested in finding a theory to explain phenomena 'in even a minimally acceptable way', therefore he defines a law discovery process as coinciding with pattern discovery. He also defines a 'theory' of

23) Cf. Latsis, 1976, pp.16-18.

24) H. A. Simon, 'From Substantial to Procedural Rationality', in Latsis(ed.), *Method and Appraisal in Economics*, 1976.

25) Ibid., p.147.

26) Ibid., p.146.

27) Ibid., p.144.

28) Ibid., p.147.

29) Cf. Simon, *Administrative Behaviour*, 1947.

the social sciences as an economical description of phenomena — i.e., low level behavioural generalisation.

However, such a 'theory' is unnecessarily restrictive as a scientific theory. It is no more than a collection of statements of observation, and has the characteristic of a singular statement or a set of singular statements — i.e., a numerical universal statement at the best, not that of a strictly universal statement³⁰⁾.

Such a 'theory(law)' cannot give a causal explanation or prediction or test of an event, because it refers only to a finite class of specific elements within a finite, particular, spatio — temporal region.

Without a universal statement, no causal explanation is possible. For to give a causal explanation of an event means to deduce a statement which describes it, using as premises of the deduction one or more universal laws, together with certain singular statements, which constitute the initial condition. And it is from universal statements in conjunction with initial conditions (the cause), that we deduce the singular statement (the effect). A theory consisting only of singular statements has no more significance than a heuristic one in a correlation between phenomena — so it is very restrictive as a scientific theory³¹⁾.

IV

Simon attempts to analyze the process of retrodution — i.e., law discovery process. But he fails to give a logically consistent account of how a law discovery process is a matter of logical analysis. His attempt to solve the central problems which inhibit the establishment of a logic of retrodution is unsuccessful. Simon poses the problems in order to protect his 'induction oriented' methods from Popper's severe criticism of psychologism and inductivism.

At first sight it might appear that Simon's failure is due to the adoption of an inadequate epistemology, but it is also his reluctance to ask the really fundamental questions which diminishes his argument. Simon persistently fails to come to grips with two crucial problems which beset his argument (as referred to in the course of this paper), and this, in turn, increases his difficulties in dealing with the problems he poses.

The main weakness of his defence of psychologism is that it is not necessarily relevant to Popper's criticism that discovery process may be of great interest to empirical psychology, but is irrelevant to the logical analysis of scientific knowledge. However, Simon attempts to establish a 'logic' from the view point of psychology. But, even if he succeeds in it, this does not refute Popper's assertion, but leaves a more serious problem — i.e., the problem of induction in justifying a normative theory of scientific discovery.

His argument concerning induction is somewhat irrelevant. He only manages to evade the problem by definition. But this stratagem seems to limit his methodology of the social sciences to a considerable extent. When faced with a problem, Simon habitually addresses himself to the more trivial or less fruitful aspect of it. This is merely a 'regressive problem shift', which is bound to lead nowhere — at least only to an infinite regress.

30) Cf. Popper, 1959, pp.62-65.

31) Cf. Popper, 1959, chapter 3, and C. Hempel, *Aspects of Scientific Explanation*, 1965.