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POPPER'S HUMANIZATION OF THEORY AND METHOD

ABSTRACT

Popper melihat induksi mengandung tiga prinsip yang saling bertentangan. Pertama, ketidakmungkinan membenarkan suatu hukum berdasarkan observasi dan eksperimen semata. Kedua, dalam kenyataan hukum-hukum itu tetap saja dipakai secara universal di dalam sains. Ketiga, ukuran untuk menerima sains adalah observasi dan eksperimen. Popper lantas mengusulkan untuk menganggap hukum-hukum dan teori sebagai bersifat tentatif namun mengandung kemungkinan ke arah akurasi dan ketepatan apabila kelak didukung oleh evidensi baru. Pengetahuan atau teori absolut tak akan pernah tercapai.

Key Words:

Induction • deduction • the art of midwifery • tautology • logical justification • the principle of transference • falsifiability • absolute truth

What is Induction?

There are several methods of argument used by science as well as by philosophy. One of the most conventional methods is induction. Along with deduction, induction is considered as a source of knowledge. Induction and deduction are regarded as two forms of argument which were developed by Aristotle in relation with the syllogistic reasoning.¹

Aristotle often makes a contrast between induction and deduction as the methods that are moving in opposite directions.² Induction is a method of gaining conclusion from individuals to universals, while deduction is that of reasoning from universals to individuals. Aristotle convinces that all arguments using induction have essentially the same structure, i.e., from instances to generalization.³ In a narrow sense induction is considered as "the operation of discovering and proving general propositions",⁴ while in a broad sense it is thought as "a method for reasoning from some observed fact to a different fact not involved in the former".⁵ This means that "we generalize from a number of cases of which something is true, and infer that the same thing is true of a whole class. Or, where we find a certain thing to be true of a certain proportion of cases and infer that it is true of the same proportion of the whole class."⁶

He takes induction as a better method of inference to get a true and right conclusion. It is a more convincing and intelligible method than deductions.⁷ Robin Smith writes that "In the theory of demonstrative science, induction plays an epistemic role as the source of knowledge of the first premises of sciences which (Aristotle argues) cannot be known by deduction from other principles."⁸ Even Reichenbach as written by Popper says that induction is a supreme important principle for scientific method that determines the truth of scientific theories.⁹

It is not Aristotle who for the first time coins the method of inductive argument. Induction is put forward initially by Socrates on which Aristotle gives testimony in *Metaphysics M 4*, 1078 b 27-30.¹⁰ Popper believes that the famous Socratic method in the *Theaetetus*, called the art of midwifery or maieutic, is that of induction because the aims of maieutic and induction are the same.¹¹ Aristotle alluded the Socratic method when he says (*Metaphysics*, 078b17-33; see also 987b1) "that Socrates was the inventor of the method of induction."¹²

The Problem of Induction

In distinguishing the principle of induction from causality, Max Born writes that "Induction allows one to generalize a number of observations into a general rule: that night follows day and day follows night, or that in spring the trees grow green leaves, are inductions, but they contain no causal relation, no statement of dependence."¹³ For Born, the concept of induction is more general than that of causality. Inductive thinking is used in everyday life as a matter of course. It also applies in science to the descriptive and experimental branches. But the problem of induction would rise soon because "while everyday life has no definite criterion for the validity of an induction and relies more or less on intuition, science has worked out a code, or rule of craft, for its application. This code has been entirely successful, and I think that is the only justification for it--just as the rules of the craft of classical music are only justified by full audiences and applause"¹⁴ Smith has a good formulation related to the problem of induction of which Aristotle is not really aware as follows:

"A critical issue for the modern philosophy of science has therefore been just the problem of induction: what is the nature of the inference from a finite number of instances to a universal generalization, and when are such inductive arguments good ones ('inductively valid')? From this modern viewpoint, what Aristotle has to say about induction is disappointing. Though he distinguishes between induction and deduction, he does not really recognize a 'problem' of induction. Since he practically defines 'deduction' as 'argument in which the premisses necessitate the conclusion', and since he says that inductions are not deductions, it would seem to follow that the conclusions of inductions are not necessitated by their premisses."¹⁵

With reference to such problem, John Shand writes as follows. "The universal generalization "All A is B" and the necessary causal connection "If A occurs, then B must occur", where A and B describe matters of fact, cannot be known to hold, or the beliefs rationally justified, through the evidence of experience or by deductive reasoning; thus they cannot be known or rationally justified at all; this is the logical problem of induction and causation."¹⁶ This is the problem Popper also sees. For Popper, how is it

possible to establish the truth of universal statements which are based on experience and experiment in which the statements are regarded as the hypotheses and theoretical systems of the empirical sciences and considered as tautology as well.¹⁷ Popper is very sure that the principle of induction cannot be a pure tautology. If it were a pure tautology, there would be no problem of induction. "A principle of induction would be a statement with the help of which we could put inductive inferences into a logically acceptable form."¹⁸ Then, why do we have to accept such a principle and how can we justify its acceptance on rational grounds?¹⁹ Therefore Popper writes that "The problem of induction consists in asking for a logical justification of universal statements about reality . . . We recognize, with Hume, that there is no such logical justification: there can be none, simply because they are not genuine statements."²⁰

The logical problem of induction derives from three principles which clash each other, i.e., Firstly, the impossibility to make a justification of a law by observation or experiment;²¹ secondly, the fact of the universal usage of laws in science; and thirdly, the most qualified measure for accepting science is observation and experiment. How is it possible that the first principle is rejected by the third one? Seeing this, Popper suggests that laws and theories should be considered only as tentative having possibility to get a more accurate and adequate theory or law when new evidence will be found in the future. We would never have an absolute theory as Born says that "Absolute values are ideals never reached."²²

Popper thinks that there is no example to justify that inductive inference is valid. How is it possible to justify an unobserved instance from the observed one or a certain theory? Popper, as Born believes, thinks that any theory and law transcend experience. Therefore, Popper refuses the statement saying that induction is logically and inductively valid and has no need for justification. It should be justified in the sense that it must be falsified. In this case Popper agrees with Hume because Hume also thinks that the so-called inductive inference is logically and inductively invalid. However, Popper does not agree with him when Hume holds the belief in the psychological power of induction as a procedure used by animal and man and saying that induction is a fact and in any case needed. For Popper, "Induction simply does not exist."²³ On the same track, Born thinks that induction is a metaphysical principle, namely something beyond physics.²⁴ Therefore, Popper suggests that we would better use the method of trial and error's elimination, instead of the so-called inductive argument either in logical or psychological sense.

Popper's Rejection and Solution

Popper's central point of rejection to induction is found in his conviction that the character of human knowledge is conjectural for which inductive thinking seems to have no place. He takes an example of scientific knowledge as the best example of human knowledge. He finds that the hardcore of scientific knowledge is essentially conjectural and hypothetical.²⁵ Hypothesis is a quite new method offered by Charles Sanders Peirce beside two conventional existing methods of reasoning. Above all other logicians in his time, Sanders emphasized the role of hypothesis in scientific method. He calls it abduction as the construction of such possible explanations of puzzling phenomena.²⁶

For Popper, there is no valid conclusion gained from observation. Validity cannot be derived from repeated observation and habitual daily experience. Popper gives us an example of Newton's theory as the best one at that time but now it is superseded by Einstein's theory and quantum theory. Therefore, the current theory we hold is only the best hypothesis of and good approximation to the truth. Perhaps, one day there will be another hypothesis which is much better than the former one we have right now. However, Popper understands well that the concept of commonsense theory of human knowledge or the bucket theory of the human mind coming from Hume makes it difficult to accept the concept of the conjectural character of human knowledge.²⁷

Solving this problem, Popper distinguishes two concepts of commonsense that clash each other.²⁸ The first concept is commonsense realism holding that there is a real world outside of the subject. The second is the commonsense theory of knowledge held by Hume saying that the problem is that of how to get knowledge about the world. Popper regards the latter as thoroughly mistaken because it only relies on the senses to get the true knowledge. If the only source for true knowledge is senses, the world as it is convinced by realism should be rejected. This leads Hume to be anti-realism. Hume would say that "all that exist are sensations, impression, and memory images"²⁹ because the reality is nothing but a bundle of different perceptions which are in perpetual flux.³⁰ This is Hume's idealism as a strict refutation of commonsense realism though Hume himself could not have a good explanation of his refutation against realism. Instead, he takes it as a mere consequence of irrational habits.

Popper then puts forward Hume's two problems of induction like this. The first is the logical problem: "*Are we rationally justified in reasoning from*

repeated instances of which we have had experience to instances of which we have had no experience?"³¹ Hume's answer would be "no". The knowledge is not certain and the theory gained from repeated observations is logically untenable. It should always be probable. Here Popper agrees well with Hume. The second is the psychological problem: "How is it that nevertheless all reasonable people expect and believe that instances of which they have had no experience will conform to those of which they have had experience?"³² Hume's answer is that we are conditioned by necessary repetition or irrational habit so we have to accept induction in psychological sense. Though accepts Hume's first answer, Popper regards the second one as a mistake. For Popper, however, both lead to an irrationalist conclusion. Then, he offers a solution to this conclusion by giving "the principle of transference".

Popper thinks that in order to avoid Hume's irrationalist consequence, firstly we have to change Hume's term 'instance' into 'a regularities' or 'a law' and secondly we must widen the scope of reasoning from instances to laws so that we can also think about counter-instances.³³ Then he reformulates the question mentioned above. "Are we rationally justified in reasoning from instances or from counterinstances of which we have had experience to the truth or falsity of the corresponding laws, or to instances of which we have had no experience?"³⁴ For Popper, any counter-instance has a significant role in reasoning because it can lead us to find the falsity of the corresponding universal laws. When we accept any single counter-instance, we must reject the theory however most proved and successful. Therefore, induction is logically invalid, but refutation or falsification is a logically valid way of reasoning.³⁵

Then, Popper offers a logical theory of preference saying that since a knowledge is conjectural so that some conjectures with a great informative content or with a so-called truth content are preferable to hold and then to improve and grow to be better from time to time, of course, by discussing them critically and by testing them severely. The theory of preference can be applied not only to the logical problem of induction but also to the psychological one by selecting a most reasonable belief. By doing this, Popper does the transference of the logical solution to the psychological fields which can avoid irrationalist consequence that Hume cannot inevitably avoid.

After elaborating knowledge in the theoretical perspective, Popper put it forward to the pragmatic one. He suggests us not to rely on any theory for no theory is absolutely true. Popper suggests us that "we should prefer the best tested theory as a basis for action."³⁶ Even if a theory is the most reliable, it is still not fully reliable in the sense that it might be wrong; it might

be found invalid someday.

With regard to the problem of induction and the process of justification which Popper refuses, let us quote Popper's answer from *Conjectures and Refutations: The Growth of Scientific Knowledge* when in the Winter 1919-1920 he wrote a conclusion consisting of 7 points as follows:

1. It is easy to obtain confirmations, or verifications, for nearly every theory--if we look for confirmations.
2. Confirmations should count only if they are the result of *risky predictions*; that is to say, if, unenlightened by the theory in question, we should have expected an event which was incompatible with the theory--an event which would have refuted the theory.
3. Every 'good' scientific theory is a prohibition: it forbids certain things to happen. The more a theory forbids, the better it is.
4. A theory which is not refutable by any conceivable event is nonscientific. Irrefutability is not a virtue of a theory (as people often think) but a vice.
5. Every genuine *test* of a theory is an attempt to falsify it, or to refute it. Testability is falsifiability; but there are degrees of testability: some theories are more testable, more exposed to refutation, than others; they take, as it were, greater risks.
6. Confirming evidence should not count *except when it is the result of a genuine test of the theory*; and this means that it can be presented as a serious but unsuccessful attempt to falsify the theory. (I now speak in such cases of 'corroborating evidence'.).
7. Some genuinely testable theories, when found to be false, are still upheld by their admirers--for example by introducing *ad hoc* some auxiliary assumption, or by re-interpreting the theory *ad hoc* in such a way that it escapes refutation. Such a procedure is always possible, but it rescues the theory from refutation only at the price of destroying, or at least lowering, its scientific status. (I later described such a rescuing operation as a '*conventionalist twist*' or a '*conventionalist stratagem*'.)"³⁷

Then he writes that "One can sum up all this by saying that the criterion of the scientific status of a theory is its falsifiability, or refutability, or testability."³⁸ Popper's project related to the concept of (scientific) knowledge seems to promote the concept of falsification as a concrete way of the trial and error method. "Referring to himself as an agnostic and an advocate of critical realism, Popper gained an early reputation as the chief exponent of the principle of falsification rather than verification."³⁹ In

verification, scientific experiment tries to seek evidence to support the proposed theory while in falsification it seeks evidence to refute the existing theory. Then the real task of scientific experiment is to seek for the weaknesses and counter-instances of the proposed theory. This is considered as the major contribution made to science by Popper.⁴⁰ Born is on the same track with Popper when he is saying that falsification is necessary if we are speaking about verification.⁴¹

No Absolute Truth

In reality we find that our world to be that of knowledge, including beliefs, theories, and laws, of many various aspects of life. We inevitably hold a certain scientific, social, political, theological, or philosophical theory or law as guidance for our lives which functions as a help in the practical life. We hold some of them because we trust them as something true. Some people even stick to them tightly and fanatically and considering them as an absolute truth while condemning others as evil, doing violence, and violating human dignity for the sake of the so-called absolute truth.⁴²

We can learn much from Popper that "there is no 'absolute reliance'"⁴³; there is no such a thing as absolute truth.⁴⁴ There is no complete true knowledge, theory, and law however successful it is, even when it has been gained by way of the most reliable observations and experiments through the so-called inductive procedure. Induction is both logically and inductively invalid as we have seen above because human knowledge is absolutely conjectural. This doesn't mean that we should not hold any knowledge, belief, theory, and law. In this case we must use a theory of logical preference so that if we hold certain knowledge, it means we hold the most preferable knowledge with a great informative content and best tested true content while being mindful that there might be a new invention leading to a new and better knowledge. Popper proposes to use a method of trial and error and falsification instead of inductive procedure that had been debunked. He also insists that we have to test all the most reliable, but still temporary, knowledge we believe by the process of falsification since our goal in all experiments is to generate better theories.⁴⁵

Let us close this by saying that we should never claim ourselves as having any absolute truth. We should be more open to find a better knowledge and philosophical concept as well rather than being satisfied with what we have already had by applying a method of using trial and eliminating error. This method is like the art of midwifery or maieutic done

by Socrates through which he takes away prejudices to arrive at the truth. This is the way-out of three prisoners in Platonic cave to the light of Sun finding the truth and replacing the previous belief in the images or the shadow on the cave's wall. This pushes us to have an ongoing learning in academic pursue and philosophical reflection to get a good approximation to the truth. We must be more humble to give tolerance and respect for other beliefs, theories, and laws which also have a certain degree of truth. This is a kind of humanization of theory and method from Popper.⁴⁶

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End Notes:

1. Aristotle, *Topics* trans. Robin Smith, vol. 8, (Oxford, UK: Clarendon Press, 1997), p. 85. Syllogistic reasoning is a certain typical forms of making classification done by logicians as their chief business. Charles Sanders Peirce, and John Dewey, *Philosophical Essays Philosophical Essays* ed. Cohen, Morris Raphael, (Lincoln, NE: University of Nebraska Press, 1998), p. 131.
2. Aristotle, *Topics* trans. Robin Smith, vol. 8, (Oxford, UK: Clarendon Press, 1997), p. 85.
3. *Ibid.* p. 86.
4. Kisor Kumar Chakrabarti, *Definition and Induction: A Historical and Comparative Study* (Honolulu, HI: University of Hawaii Press, 1995), p. 1. "Aristotle meant by 'induction' (*epagōgē*) at least two different things which he sometimes links together. One is a method by which we are 'led to intuit the general principle' (*Anal. Priora* 67a 22 f., referring to the *Meno* and to *anamnēsis*). The other (*Topics* 105a 13, 156a 4; a 34; *Anal. Posteriora* 78a 35; 81 b 5 ff.) is a method of *adducing* (particular) *evidence-positive* evidence rather than *critical* evidence or counter-examples. The first method seems to me the older one, and the one which can

- be better connected with Socrates and his maieutic method of criticism and counter-examples. The second method seems to originate in the attempt to systematize induction logically or, as Aristotle (*Anal. Priora*, 68b 15 ff.) puts it, to construct a valid 'syllogism which springs out of induction'; this, to be valid, must of course be a syllogism of perfect or complete induction (complete enumeration of instances); and ordinary induction in the sense of the second method here mentioned is just a weakened (and invalid) form of this valid syllogism." Aristotle, *Topics* trans. Robin Smith, vol. 8, (Oxford, UK: Clarendon Press, 1997), p. 85.
5. Kisor Kumar Chakrabarti, *Definition and Induction: A Historical and Comparative Study* (Honolulu, HI: University of Hawaii Press, 1995), p. 1.
 6. Charles Sanders Peirce, and John Dewey, *Philosophical Essays Philosophical Essays* ed. Cohen, Morris Raphael, (Lincoln, NE: University of Nebraska Press, 1998), p. 135.
 7. Aristotle, *Topics* trans. Robin Smith, vol. 8, (Oxford, UK: Clarendon Press, 1997), p. 163.
 8. *Ibid.*, p. 85.
 9. Karl R. Popper, *The Logic of Scientific Discovery* (New York: Basic Books, 1959), p. 28.
 10. "Aristotle credits Socrates with two advances in dialectic, one of which is inductive arguments." Aristotle, *Topics* trans. Robin Smith, vol. 8, (Oxford, UK: Clarendon Press, 1997), p. 85.
 11. "(Incidentally, Aristotle taught that the result of an induction --the intuition of the essence--was to be expressed by a definition of that essence.)" Karl R. Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge* (New York: Basic Books, 1962), p. 12.
 12. Karl R. Popper, *Ibid.*
 13. Max Born, *Natural Philosophy of Cause and Chance* (Oxford: Clarendon Press, 1949), p. 7.
 14. *Ibid.*
 15. Aristotle, *Topics* trans. Robin Smith, vol. 8, (Oxford, UK: Clarendon Press, 1997), p. 85.
 16. John Shand, *Philosophy and Philosophers: An Introduction to Western Philosophy* (London: UCL Press, 1993), p. 128.
 17. Karl R. Popper, *The Logic of Scientific Discovery* (New York: Basic Books, 1959), p. 28.
 18. *Ibid.*
 19. *Ibid.*
 20. *Ibid.*, p. 37.
 21. Karl R. Popper, *A Pocket Popper*, "The Problem of Induction (1953, 1974), David Miller, ed., (Oxford: Fortana Paperbacks, 1983), p. 101.
 22. Max Born, *Natural Philosophy of Cause and Chance* (Oxford: Clarendon Press, 1949), p. 7.
 23. Karl R. Popper, *A Pocket Popper*, "The Problem of Induction (1953, 1974), David Miller, ed., (Oxford: Fortana Paperbacks, 1983), p. 104.
 24. Max Born, *Natural Philosophy of Cause and Chance* (Oxford: Clarendon Press, 1949), p. 7.
 25. Karl R. Popper, *A Pocket Popper*, "The Problem of Induction (1953, 1974), David Miller, ed., (Oxford: Fortana Paperbacks, 1983), p. 104.
 26. His six essays in the *Popular Science Monthly* of 1876-1878, "Illustrations of the Logic of Science," show how he expounded the logical form and function of Deduction, Induction, and Abduction (sometimes called by Peirce Retroduction), and their interplay in actual problem solving. Philip P. Wiener, ed., *Values in a Universe of Chance: Selected Writings of Charles S. Peirce* 1st ed., (Garden City, NY: Doubleday, 1958), p. 230.
 27. Karl R. Popper, *A Pocket Popper*, "The Problem of Induction (1953, 1974), David Miller, ed., (Oxford: Fortana Paperbacks, 1983), 104. p. 105.
 28. *Ibid.*
 29. *Ibid.*, p. 106.
 30. David Hume, *A Treatise on Human Nature: Being an Attempt to Introduce the Experimental Method of Reasoning into Moral Subjects; And, Dialogues concerning Natural Religion* ed. Green, T. H. and T. H. Grose, vol. 1, (London: Longmans Green, 1882), p. 534.
 31. Karl R. Popper, *A Pocket Popper*, "The Problem of Induction (1953, 1974), David Miller, ed., (Oxford: Fortana Paperbacks, 1983), 104. p. 107.
 32. *Ibid.*
 33. *Ibid.*, p. 110.
 34. *Ibid.*
 35. *Ibid.*
 36. *Ibid.*, p. 114.
 37. Karl R. Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge* (New York: Basic Books, 1962), pp. 36-37.
 38. *Ibid.*, p. 37.
 39. Joe Barnhart, "Karl Popper: Philosopher of Critical Realism," *The Humanist*, July/August 1996, [cited 23 May 2005] [database on-line]; available from Questia, <http://www.questia.com/>.
 40. *Ibid.*
 41. "Under the influence of such examples, it would seem, a term like 'truth-value' has been coined to cover both truth and falsity of a statement, just as 'verification' is, prevalently, used to include falsification." Max Black, ed., *The Importance of Language*, (Englewood Cliffs, NJ: Prentice Hall, 1962), p. 110.
 42. This is one of the causes entailing violence in the world, unjust judgment in scientific field, theological realm, and among religions. One of the examples is the condemnation and punishment towards Galileo rendered by Catholic Church in 1633 when Galileo supported the Copernican theory that the Earth and the other planets revolved around the Sun. See Stillman Drake, "From Galileo: Conflicts with astronomers and theologians" Microsoft ®

Encarta ® Reference Library 2005. © 1993-2004 Microsoft Corporation. Fortunately the church realizes that the punishment was a mistake. "John Paul was not ignorant of Church history, and realized that various peoples had been wronged by the Church throughout the years. He publicly apologised for over 100 of these mistakes, including: On 31 October 1992, he apologised for the persecution of the Italian scientist and philosopher Galileo Galilei in the trial by the Roman Catholic Church in 1633." Quoted from http://www.everybase.com/Pope_John_Paul_II. All religions claim themselves as offering peace because of having the absolute truth by doing some violent actions. See some articles in *Religion as a Source of Violence*. Concilium, London: SCM Press, 1997/4., pp. 1-9; 81-142: [1] François Houtart, "The Cult of Violence in the Name of Religion: A Panorama"; [2] Hermann Häring, "Overcoming Violence in the Name of Religion (Christianity and Islam)"; [3] Hermann Häring, "Working Hard to Overcome Violence in the Name of Religion"; [4] Jean Pierre Wils "Violence as an Anthropological Constant? Towards a New Evaluation"; [5] Raymond Schwager, "Religion as the Foundation of an Ethic of Overcoming Violence"; [6] Edward Schillebeeckx, "Documentation: Religion and Violence."

43. Karl R. Popper, *A Pocket Popper*, "The Problem of Induction (1953, 1974), David Miller, ed., (Oxford: Fortana Paperbacks, 1983), 114.
44. Max Born, *Natural Philosophy of Cause and Chance* (Oxford: Clarendon Press, 1949), 7.
45. Joe Barnhart, "Karl Popper: Philosopher of Critical Realism," *The Humanist*, July/August 1996, [cited 23 May 2005] [database on-line]; available from Questia, <http://www.questia.com/>.
46. "Popper's humanism shines brightest when he urges us to seek out criticism of our theories. Intellectual courage and honesty in uncovering contradictions are thus essential to the search for both better explanations and better plans of action. If to err is human, then Popper's philosophy may be regarded as perhaps the most thoroughgoing attempt to humanize the learning process, for he regards all learning as trial and error" *Ibid*.

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6. Drake, Stillman, "From Galileo: Conflicts with astronomers and theologians" Microsoft ® Encarta ® Reference Library 2005. © 1993-2004 Microsoft Corporation.
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