Inference and Explanation: An Indian Perspective

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In the development of the basic ideas related to the theory of knowledge, attempts to explain and understand the variegated concepts that describe and analyze the nature of knowledge have been evolved in time. Science is primarily concerned with the knowledge of the physical universe and it's activities that are mediated by the evaluative desire to know to nature of the universe. Two alternatives may pragmatically be considered here – the scientific and the philosophical. The nature of scientific knowledge is an important part of philosophy of science. The idea of knowledge is central to science. Since the knowledge is committed to the belief that its descriptions and explanation of the world are not only different from other possible descriptions but also they capture the way nature really is, meaning there by that its knowledge statements are true of the world. These two alternatives may be evaluated in the Indian perspective.

The philosophical knowledge seeks to know the unity of knowledge knower and the known. More importantly, in Indian philosophy, knowledge has been classified into valid knowledge or *pramā*, and non –valid / invalid knowledge or apramā. It is not a single definition of any concept here because each school defines the concepts in accordance with its own philosophical conceptualizations. Therefore, one cannot discuss any definition of knowledge which is

common to all schools of Indian philosophy. However, all the schools unanimously agree that truth is one of the essential characteristics of *pramā*. The Naiyāyikas, being realists, claim that the truth consists in the loyalty maintained by the knowledge in revealing its object. True knowledge is that which tells us about the existence of a thing in a place where it really is, or which tells us about such a quality of an object which is actually possessed by it.

The interpretation of Indian logic as exemplifying models of explanation is due to a mistaken reading of inference as explanation. But this is only possible though inference and explanation share in nothing common. A common sharing can be found if one is focused on explanations that are basically arguments. Arguments only share a common space with inference. Most of us subsume explanations under logic but not logic under explanation. The arguments about the nature of Indian logic might suggest that the central principle of Indian logic were as much concerned with structures of explanation as with structures of valid argument.

The structure of Indian logic and argumentation is employed constantly in commentarial writing. Incidentally the intensive study of logic and an intriguing version of the Buddhist practice of public debate can be traceable to Diṅnāga and Dharmakīrti. For Naiyāyikas, inference is indirect or mediate Knowledge which is inferred on the basis of another type of knowledge. For example, upon perceiving smoke on the hill, we infer that there is fire on the hill on the basis of our previous knowledge that there is a universal relation between smoke and fire. Given the syllogistic structure of inference, there is at least three terms in a minimum of three propositions in it.

In inference we arrive at the knowledge of something (fire in the hill) via the knowledge of some mark (smoke in the hill) and the

knowledge of the universal relation between the mark and the inferred thing (relation of invariable concomitance of vyāpti between smoke and fire). Thus, in Indian logic, we have the three terms, viz. the *pakṣa* (minor term), which is the hill as it is subject of consideration; the *sādhya* (major term), which is fire as it is something to be established with reference to the hill; and the liṅga or hetu (middle term), which is the smoke as it is the mark indicating fire.

The classical *Nyāya* inferential syllogism has five members. In abstract terms, the significance of each of these members has been expressed as follows:

1. Statement of the position;
2. Citing of the evidence;
3. Invoking the general principle with an example;
4. subsuming the present case under the general rule;
5. Statement of the position as proved there by.

The following is a typical Nyāya syllogism:

1. The hill has fire (pratijñā)
2. Because it has smoke (hetu)
3. Whatever has smoke has fire, eg., an oven (udāharaṇa).
4. The hill has smoke which is invariably associated with fire (upanaya).
5. Therefore this hill has fire *(Nigamana)*.

In this syllogism the first is called *pratijñā* or proposition. It is the logical statement which is to be proved. The second is Hetu or 'reason' which states the reason for the establishment of the proposition. The third is called *udāharaṇa* which gives the universal concomitance together with an example. The fourth is *upanaya* or

the application of the universal concomitance to the present case. And the fifth is *Nigamana* or conclusion drawn from the preceding propositions.

In the definition of explanation, philosophers call whatever is being explained the *explanandum*; this might be a particular event, for examples a solar eclipse, or a general class of phenomena, for instance the planets having elliptical orbits or the scattering of light by prisms or water droplets. That which does the explaining is the explanans. For example, if the *explanandum* is the occurrence of high tide once a month, then the explanans would be the low of gravitation, and details of the mass of water in the oceans, and the mass and the position of the Moon. Then we deduce from the law of gravitation that the moon will exert a gravitational effect on the water and on the Earth sufficient to cause high and low tides in various places depending on their position relative to the Moon. Considering the deductive – nomological model of explanation, the explanandum must be deduced from a law or laws of nature, plus *background facts and initial conditions.*

Schematically:

Laws L1, L2, ---------- Ln

Initial

Condition C1, C2, ---------- Cn

Explanandum O1, O2, ---------- Op.

Where *m, n,* and *p* are natural numbers, and there are *m* laws, *n* initial conditions and the explanandum is a series of p observations:

The D- N model imposes the following logical conditions on explanation:

1.The explanans must deductively entail the explanandum.

2.The deduction must make essential use of general laws.

3.The explanans must have empirical content.[1]

The Buddhist model of logical statement illustrates an attempt to explain the system of logic as a mode of explanation that tries to clarify pervasion, concomitance or *Vyāpti.* They explain why smoke is always pervaded by fire by saying that we have the given example, we have similar examples as in the kitchen. If we note that the Buddhist argument as an explanation of why concomitance occurs, or as explanation of a law, then we can see why the examples are an integral part of the reasoning process. It is also deals with explanations which are offered for both why questions as well as how questions.

Next, by looking briefly into the expositions on Dharmakīrti's three types of inference, that are - 1. Own- nature 2. Causal relations and 3. Non- perception, and their relation to explanation it can be argued that these three types can also answer why questions. According to Dharmakīrti, inference is of two kinds: (1) inference for oneself (svārthānumana), and (2) inference for others *(parārthānumana).* Inference for oneself is the cognition of the object to be inferred by means of a middle term, which possesses three characteristics.

a. That it should be present in the object denoted by a minor term *(anumeyasattvam).*

b. That it should be present only in such objects as are of the same nature as that denoted by the major term *(sapakṣa eva sattvam).*

c. That it should be absent from such objects as are of a different nature from that denoted by the major term *(asapakṣe ca sattvam eva).*

For example, in the following argument :

The hill has fire on it,

Because it has smoke on it,

Like a kitchen, but unlike a lake. The inference is based upon (a) the presence of smoke on the hill; (b) the presence of smoke only at such places, like kitchen, where there is fire, and (c) the absence of smoke from such places, as a lake where there is no fire.

Matilal discusses the relation between Dharmakīrti's formulation and prediction. Dharmakīrti's model can be written as 'G (a) because F (a),' ie, inferences described statements of the kind, ' a is G because a is F'. For example, 'this is oak because this is a tree' or 'hill is fire because hill is smoky'. Thus, Dharmakīrti's type is predicative and not explanatory. Because 'for it does not explain why must it be the case that G (a) rather than not. Rather it states why it is the case that G (a) given that it is the case that F (a)[2]. Clearly, Dharmkīrti's model is doing some explanation. In the above example identity is the explanation for this. It is explaining why we make a particular inference. It is explaining why there is a particular inference among all other possible inferences one can make.

In this context we need to discuss two points that is the distinction between inference and explanation, and the other is the notion of contrastive explanation. Here one question arises: why would we think that there is some common factor between inference and explanation? We consider an inferential statement: if smoke,

then fire; It can if we identify what is to be explained. This inference explains the belief that there is fire at a particular location. It is an answer to the why question, why do we believe that there is fire there? This is an explanation seeking question that is answered - we see smoke, and we know that where there is smoke, there is fire and therefore we believe that there is fire there.

Wesley Salmon suggested that there is a distinction between inference and explanation. The Deductive- nomological model is an example of explanation of an argument. A consequence of the view of explanations as arguments is that there is symmetry between explanation and prediction. [3] They are arguments where the premises state laws of nature and initial conditions. The explanans should be those that predict the fact to be explained. For instance, suppose we know all the factors that allow us to predict an eclipse at a particular place. Before the eclipse occurs one can predict the eclipse based on all these factors and after the intersection.[4] He suggests that there is a link between causality and explanation. For all these, Salmon argues that explanations cannot essentially be arguments.

Salmon took a "cause" to be an event that triggers a mechanism by which structure is produced and propagated. In Salmon's view, an adequate analysis of causation must account for both the propagation of structure and the production of structure. New structure is produced whenever two or more causal processes intersect in such away that they undergo modifications that persist after the intersection[5]. He suggests that there is a strong links between causality and explanation. Hence in the constitutive sense, salmon argues that explanations cannot essentially be arguments.

Salmon's critique is not a substantial one, especially in the connection between explanation and inference in the context of Indian logic. Salmon maintains that the critique argues in order to motivate a causal theory of explanation. He wants to explicitly have the causal relation in explanation. In Buddhist logic causal relation in explanation is already present in their inferential model. Furthermore, the counter examples declaredly with probabilistic case, are those which are really not in the framework of Indian logic. Thus Indian logic makes no commitment to empty terms. But their logic is always logic of the empirical and this brings inference and explanation naturally together.

Notes and References

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