

A Semiotic Interpretation of Indian Logic

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Matilal's constant endeavour to make ancient Indian philosophy a living tradition has significantly influenced many philosophers. One way to do what Matilal so effectively did is to take the traditions outside their strict historical and cultural boundaries, and engage them in a dialogue with other, new philosophical traditions. This paper attempts to do something similar with a generally ignored theme in Indian logic, the theme of semiotics. One of Matilal's essays on Indian logic has the word semiotics in its title but he does not seem to have explored this relation in detail.¹

This paper argues that Indian logic can be usefully interpreted through the concerns of semiotics, a tradition that has a long history in western thought. At one level, the connection is obvious. The centrality of the idea of "sign" as the most significant entity in Indian logic must alert us to the potential semiotic world of this logic. By tracing the concerns of Indian logic along the contours of semiotics we can understand this logic not necessarily in terms of formal logic or in contrast to Aristotelian logic but in entirely new terms. Both the early Nyāya as well as the Buddhist systems were essentially engaged with questions of signs and their interpretation. Western traditions too have engaged seriously with the relation between signs and logic. Moving from Aristotle to Augustine and then on to Bacon, Ockham, Leibniz and later on to Peirce, we notice a sustained engagement with the idea of sign and its relation to logic by these thinkers. These attempts to understand logic through semiotics share some striking similarities with ancient Indian logic, including the emphasis placed by both Indian and western traditions on epistemology and cognition as part of the logical enterprise.

When Indian logical systems were available to the scholars in the West, the earliest and most common responses to them were dismissive in nature.² There are two issues that were influential in such responses to Indian logic. The claim that Indian logic was not logic was based on the observation that the use of empirical examples as part of the deductive structure negated the

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¹In his [24], Matilal has a short essay on the semiotic conception in Indian logic, all of which is part of the material in his paper [26]. Unfortunately, he does not expand on the possible semiotic interpretation of Indian logic.

²For a brief summary of such responses, cf. [14, pp. 13–15].

universality associated with logic and that the logical process was described in terms of cognition and cognitive episodes. Keeping the empirical as an element of the logical seemingly went against the basic tenet of western logic and understanding the logical in terms of cognition suggested that the distinction between the psychological and the logical—a distinction around which some of the most influential debates on logic have occurred—had not been accomplished in Indian logic. Matilal and Mohanty have responded effectively to the charge of psychologising.³ I have elsewhere discussed a different interpretation of the use of the example as exemplifying a particular structure of scientific explanation, namely, the deductive-nomological model of scientific explanation [36, pp. 194–208].

There are typically two different ways of responding to the charge that Indian logic is not logic at all. One is to understand what the structure of Indian logic *really* is and the other is to approach the problem from the perspectives of western logic. There has been much written from the former perspective and Matilal has been instrumental in generating a nuanced understanding of Indian logical systems. The latter approach is more problematic. Where such an approach exists, it largely consists in trying to rewrite Indian logic in formal terms.⁴ Matilal has himself illustrated this possibility but such rewriting only generates more questions, particularly as to what such a rewriting accomplishes. If we grant that we can rewrite statements in Indian logic in formal terms with formal operations defined on them does it mean that Indian logic is formal? Or could it be that there is something in Indian logic that resists such formalisation?

What I shall do in this paper is to approach Indian logic from a specific western perspective. I shall not do this by attempting to show how Indian logical systems can be formalised and/or rewritten in symbolic form. There are two distinct strands in my approach in this paper. One, I shall illustrate how western logic, particularly in medieval times, shared a conceptual space with Indian logic, especially as far as the relations between logic and empiricism, as well as with cognition, are concerned. Two, I shall draw upon the semiotic understanding of logic in the West in order to exhibit the similarities with Indian logic.

Modern logic is fundamentally concerned with symbols and the actions performed on them. Although Indian logic was not traditionally presented in terms of symbolic writing, there is a fundamental relation between this

³Cf. [26, pp. 14–18] and [28, pp. 100–132].

⁴Cf. the papers [7, 5, 25] in [13]. I do not intend to negate the importance of formalization of Indian logic. However, prior to formalisation there is a philosophical problem related to the very nature of symbolic reduction. When seen through the semiotic enterprise, we can see that the problem confronting the Indian logician is precisely the conditions under which a symbol can come to stand for something else. The concluding paragraphs of this paper addresses this issue in more detail.

logic and the notion of a sign/symbol. In fact, as I shall argue later on, the concerns about the nature of the sign dictates the structure of this logic. The relation between logic and sign in the Indian tradition is quite clear. Inferring the presence of fire from seeing smoke is a common example not only in Indian philosophy but also in ancient Greek philosophy. An analysis of inference of fire from seeing smoke is based on the recognition that smoke is a *sign* that actually indicates the presence of something else. The Indian logicians extend this standing-for relation to include non-material signs. Thus, we have reason (for a particular inference) itself being understood as a sign. This relation between sign and logic matures in the Buddhist formulation as propounded by Dignāga (c. 400–480 AD).⁵ In this formulation, the idea of logical sign plays a central role.

Dignāga turns the question of logic into a question of semiotics. Inference by its very nature is related to signs. Thus, logic primarily becomes an attempt to clarify what kinds of valid signs are possible and how justified inferences are possible from consideration of these signs. There is yet another peculiarity in his formulation, and this has to do with the use of “sign”, “reason” and “evidence” as synonyms. Smoke is the sign which indicates the presence of fire. Smoke is the evidence for believing that there is fire and smoke is also the reason for coming to the conclusion that there is fire. Thus, as Matilal notes, sign, reason and evidence are terms that are often used interchangeably in Indian logic [26, p. 5]. Dignāga’s theory of inference sets out a structure of inference based on the nature of the sign, thereby defining when a sign can properly stand for another [18]. He formulated the “triple nature of the sign”, three conditions which a sign must fulfil in order that it leads to valid inference [26, p. 6].

1. It should be present in the case (object) under consideration.
2. It should be present in a *similar* case or a homologue.
3. It should not be present in any *dissimilar* case, any heterologue.

To summarize the meaning of the above conditions: a sign which is present in a locus signifies another property of the locus. To have a degree of certainty about this signification, we need to find similar cases where the sign and the signified occur and also dissimilar cases. The occurrence of the sign and signified together is seen as illustrating a relation between them, the relation of invariable concomitance or pervasion.

As mentioned earlier, the sign is not only a material sign like smoke. For the Indian logicians, “reason” is also a “sign”. For example, the fact that a pot is produced is reason enough to infer that it is non-eternal. Production is a sign which stands for something else, namely, non-eternality. How

⁵Cf. [26] and [18] for a comprehensive discussion on these topics.

justified are we in believing that this sign 'being produced' indeed stands for "non-eternality"? This question is at the heart of Indian logic: how can we be certain that a particular sign indeed stands (and will continue to do so) for a particular signified? Answering this question is the task of logic as far as these logicians were concerned.

This method of formulating logic is essentially concerned with understanding the nature of signs and the relation between a sign and its signified, thus placing Indian logic firmly within the tradition of semiotics. Moreover, viewing logic through the perspective of semiotics negates many of the pseudo-problems afflicting the study of Indian logic: the question as to whether Indian logic is inductive or deductive, the problematic role of the example in Indian "syllogisms", the claim that Indian logic mixes logic and epistemology, and so on.

Understanding logic through semiotics is not uncommon. In fact, it can be argued that without engaging with semiotics it is impossible to understand the special characteristics of logic, particularly modern logic. Invoking semiotics also allows us to explore the relation between mathematics and logic by analyzing the way symbols are used in both these disciplines [38]. Most importantly, western logic itself has had a long and sustained relation between logic and semiotics, a relation often overlooked in contemporary readings of logic. Thus, to understand the relation between Indian and western logic, it is useful to first begin with the common ground that both of them share — the semiotic impulse.

Sign and logic in western thought

It might not be an exaggeration to claim that the formulation of the idea of signs is common to human thought in all civilizations. The suggestion that humans are fundamentally semiotic animals is perhaps not misplaced.⁶ The basic idea of a sign lies in the possibility of something standing for another. Something is signified by a sign and there is also a relation of signification. Words constitute a simple example. A sign can be understood in many ways. For example, Eco points to the following ways: in opposition to *figurae* and *seme*, as difference, as identity, as inferential, as encoding and so on.⁷ The inferential model of signs has immediate correlation with logic but the other ways of understanding sign also figure in the way signs are used in logic.

⁶For a discussion on related topics, cf. [8].

⁷Cf. [11, Chapter 1]. (In the common usages of sign, including in Matilal's use of it in reference to Indian logic, the sign is on a par with the signifier. In this paper, in order to maintain continuity with the common usage of "sign", I use the word sign not only as a relation but also as a signifier.)

The word sign is derived from *signum*, originally *σημείον*, which was often a synonym of *τεκμήριον*, and was used to mean proof, clue and symptom [11, p. 26]. These meanings share a common semantic space with the ideas of sign, reason and evidence, which are, as we have seen earlier, used in various ways in Indian logic. In the western tradition, the Stoics had the "first and most thorough sign theory ever produced" and among the examples of inference, the smoke-fire inference was the "most elementary type of recollectable sign [11, pp. 213sq]". Eco notes that the Stoic model of sign is an inferential model of *p* implying *q*, "where the variables are neither physical realities nor events, but the propositions that express the events. A column of smoke is not a sign unless the interpreter sees the event as the true antecedent of a hypothetical reasoning (*if* there is smoke ...) which is related by inference (more or less necessary) to its consequent (... *then* there is fire) [11, p. 31]." The sign is not the material sign of a particular column of smoke but is a type standing for smoke. In comparison to Indian logic, we might say that this is a sign removed twice, since the type smoke stands for a particular column of smoke which is the sign for fire (as in Indian logic, although it should be noted that there are disagreements among different schools on what the object of inference could be⁸). Furthermore, the inferences studied by the Stoics were not concerned with the epistemological relation between the terms in the inference, although Aristotle distinguished between necessary and weak signs based on epistemological concerns.

This detour into history should remind us, as Bochenski [6] does so effectively, that the meaning of logic was not clearly specified even in Aristotle. Bochenski points out a difference between laws and rules, both of which are applicable in logic. Laws are those which can have a truth value whereas rules can only be correct but not true or false. The Stoics' formulation of the rule of *modus ponendo ponens* "allows for a complete translation of a logic stated in terms of laws into one formulated as a set of rules [6, p. 278]". For Bochenski, this possibility is important since laws are about ontology and logic, understood as a set of rules, claims independence from ontological concerns. He also notes that in Aristotle's writings, there are many logics which can be distinguished. For example, the "dialectical" mode in the *Topics* and the formal logical mode in the *Analytics* — the former is a set of rules while the latter is a system of laws. The Stoics however primarily viewed logic as dialectics, thereby not considering ontology in their logic. Even their logic of propositions, which should be an exemplar of formal logic, is still "conceived as being a set of rules for arguing [6, p. 282]".⁹ This view of logic as dialectics should remind us of Matilal's work on the tradition of debate and its influence on Indian logic [26]. Furthermore, Bochenski's ar-

⁸Cf. [23, pp. 58–68] on the "objects" of inference.

⁹Cf. also [22].

gument that logic and ontology cannot be mutually separated is supported by examples not only from the Greek tradition but also the Indian schools, particularly the Nyāya and the Buddhist schools.¹⁰

The relation between logic and ontology, hidden for the most part, is also indicative of the essential connection between logic and semiotics. In the western tradition, it is most clearly seen in the history of the development of logic, particularly as far as the analysis of signs is concerned.

The views of Augustine (354–430 AD) on signs and logic were most influential till medieval times. For Augustine a sign was “something that shows itself to the senses and something other than itself to the mind [27]”.¹¹ The relationship present in this description is triadic, relating “sign of something to some mind”. Note the explicit invocation of the mind in describing the action of signs, a presence that will manifest itself in different ways over the centuries. Augustine also classified signs into two: natural and given signs.¹² As an example of the natural sign, he uses the example of smoke and fire. An important contribution of Augustine was in making a distinction between natural signs (those which have in some sense a natural relation between the sign and signified) and conventional signs and yet placing them within a general category of signs. One can see a similar preoccupation among the Indian logicians. For Augustine, signs have a “fundamental epistemic function”. This view of signs has important consequences for our understanding of signs and their relation to logic. Augustine’s view of sign was central to his theory of language that goes back to the earlier Greeks.

It is also interesting to note that a constant ambiguity stalks the notion of sign: there is one understanding of sign as an argument—an enthymematic proposition—and another view of sign as “semiotic object”, a noun or a category that “subsumes nouns and other signs [9]”. It is the role of sign as an argument that was under attack and by the Renaissance one can notice the bringing together of these two descriptions.

One of the most important contributions in the western semiotic tradition is by Roger Bacon (1214–1293 AD).¹³ I mention his work also because of a curious similarity with the Indian logic tradition. Bacon classified signs in different ways such as those signifying through inference, concomitance and consequence. He also classified those signs which do so necessarily as follows: signifying something present, signifying something past and signifying something future. Here are some examples from his classification: from seeing large extremities we infer strength and this is the case of “signifying

something present”; from lactation we can infer birth of a child and this is the case of “signifying something past and so on [27]”.

Matilal’s detailed description of the Nyāya classification of signs allows us to note a similarity with Bacon’s three-fold classification. The early Nyāya also had a three-fold classification of signs.¹⁴ The first kind classifies inferences in which the effect is inferred from perceiving the cause [23, p. 30]. The idea of cause in this case is captured in the phrase “as before”. This kind of inference classifies inferences based on a prior nature. An example of this kind is the inference that it will rain because there is a cloud. One infers so because this is known from earlier instances. Here, the inference is of the effect from perception of a presumed cause.

The second kind of inference is based on “rest will be alike”. Matilal notes four different subtypes of inference under this category as classified by the Nyāya school. One example is the inference that all drops of seawater are salty from tasting just one drop of it. The second subtype is the inference of cause from effect and one example is the inference that it has rained because the river is full and flowing swiftly. The third subtype is “remainder”, namely, inference by “elimination of alternatives”. This explains inference which we reach by eliminating other possible alternatives rather than infer “directly”. And finally, the fourth subtype, gives the example of inferring the whole from the part; the example being the inference of a whole cow from seeing only its parts.

The third kind of inference deals with examples such as inference that there is water nearby because wild geese are present; inferring the taste of fruit from seeing its colour; inferring specific taste from specific smell. In all these examples, there is no cause-effect relationship.

Although we notice some similarity between the classifications of Bacon and the Indian schools (including Caraka), we should note that there is a fundamental difference in the reasons that catalysed such a classification. As for Augustine, the primary motivation for Bacon in analyzing signs was to provide “foundations for the semantics of spoken language [27]”. Such does not seem to be the primary motivation for the Indian logicians when they classify and analyse inference through the study of signs.

There are many reasons for this difference in orientation. Primary among them is the fact that complex theories of language were part of all the Indian philosophical schools. In the Indian philosophical traditions, philosophy of language was highly developed right from the beginning.¹⁵ Thus, Indian logic arose in a culture which already possessed complex philosophies of language. The question of arbitrariness of symbols is one such important issue. The relation between word and object can be natural or arbitrary. In the

¹⁰Cf. also [4].

¹¹Cf. also [19, 21] for more on Augustine’s theory of signs.

¹²Cf. [2], and for references within for Augustine’s theory of signs.

¹³E.g., cf. [20].

¹⁴For more on Indian logic, cf. [23, 42, 16, 30].

¹⁵E.g., cf. [40, 15].

