Procedures in Scientific Research and in Language Understanding

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Summary

Pluralism and monism are the two current views concerning scientific research and language understanding. Between them there is a third, intermediate, view. We take a "procedural methodology of science" as exemplified in the work of L. Tondl, and "procedural linguistics", as exemplified in the work of B. Harrison, to be representative of this third possibility. Procedures are cognitive, linguistic, and physical processes which, through their hierarchical interconnections can generate fruitful "mechanisms". These "mechanisms" are sensitive to context and operate in heuristic and algorithmic ways. Their similar logical structure points towards a profound unified basis for scientific and linguistic activities, thus providing an interesting bridge between what is achieved by a little child talking to his parents, and a creative scientist struggling to interpret the results of his experiments.

"Variety of rules with unity of principles is a requirement of reason ..., such a requirement however, prescribes no law to the objects themselves. It is merely a subjective law of economy ..., namely a logical form, a faculty whereby the cognitions of the understanding are arranged among themselves only, and lower rules under higher ones."

Kant, Critique of Pure Reason

"We can conceive of the invention of new metaphors as a process of discovery, with definite criteria of success attached to it rather than as a matter of arbitrary caprice."

Harrison B., Meaning and Structure

1. INTRODUCTION

Approaches to human knowledge were traditionally of two different kinds. On the one hand there were the methodological monists, either "rationalists" like Descartes or "empiricists" like Bacon. At the opposite extreme, the sceptics, who denied the possibility of any sure method for attaining knowledge, and the methodological "anarchists", who at best preferred a plurality of methods. Others can be regarded as holding an intermediate position (e. g., Kant), but the opposition between methodological monism and pluralism has been quite typical of western thought.

The same kind of opposition can be found in present day philosophy of science and philosophy of language. This claim can be illustrated by the following table:

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<th>science</th>
<th>language</th>
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<tbody>
<tr>
<td>monism – unity</td>
<td>Tractatus-Wittgenstein</td>
<td>Saussure – Frege</td>
</tr>
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<td></td>
<td>Carnap – Popper</td>
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<td>pluralism – variety</td>
<td>Feyerabend – Kuhn</td>
<td>later Wittgenstein</td>
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The unity approach can be further divided into two kinds – the deductivists and the inductivists. Both emphasized the process of validation and hypothesis testing, and looked for a logical skeleton (inductive or deductive) of the procedure of testing. They tended to put aside the study of the cognitive process of discovery, as irrelevant for the methodology of science. Popper, for example, argued that “there is no such thing as a logical method of having new ideas” and that “every discovery contains ‘an irrational element’ or ‘creative intuition’ in Bergson’s sense.” (1959: 32) In opposition to Popper and the justificationist approach, Simon (1977: 3) argued that “the process of validation and the process of discovery cannot be separated as they have been in the classical treatment.” Even with respect to justification monistic methods were not universally accepted. Tondl (1973), for one, argued that the procedures of scientific explanation are less rigid than either induction or deduction. They are more flexible and take into account not only probabilities but also game situations like those which are discussed, in the wider context of human activities, by Von Neumann and Morgenstern (1953). Similar arguments were put forward by Lakatos (1970) who emphasized the role of negative and positive heuristics in scientific research, and by Stegmüller (1976) who stressed the plurality of elements in scientific research and their context dependency.

In language we can find a parallel situation. According to Grice (1975), underlying certain kinds of “implicature”, there is a certain deductive argument involving several references to maxims. One of Grice’s examples is this:

A: “Smith doesn’t seem to have a girl friend these days.”
B: “He has been paying a lot of visits to New York lately.”

Implicature: B implicates that Smith has, or may have, a girl friend in New York.

Grice tried to present the “computation” of the implicature contained in a given utterance in context, as a valid deductive argument. Dascal (1977) followed Davidson’s (1973: 315) remark to the effect that in the process of interpretation of an utterance “no part can be assumed to be complete before the rest is.” Dascal argued against the strict separation between the validation of the hypothesis about the speaker’s intention to convey an implicature and the discovery by the hearer of such an implicature. According to him (1979: 167), the generating of an implicature “cannot be expected to be obtained by the application of some neat algorithm, which the theory of implicature, i.e. the ‘logic of conversation’ in Grice’s phrase, is supposed to discover;” it is “neither a deductive nor an inductive problem but precisely an abductive one . . . . Such a procedure must be heuristic.” In the same way as Tondl pointed to the need of a general theory of action as a foundation for the methodology of science, so did Dascal suggest to take as a basis for an analysis of conversational logic a theory of action. Harrison’s (1972) theory of generating speech acts, as we shall see later on, partly fulfills this demand. We can thus see that, beyond sheer pluralism, a third option is now gaining weight. It is characterized by