

## **The Need for Methodologies: from Minimum-pluralistic Perspectives**

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(1) Chomsky once remarked that method or methodology (a system of claims about methods) has not been much talked about, and not needed in real science such as physics, so generative grammar doesn't need it (Chomsky 1988). I found his remark to be misguided for two reasons. First there have been heated discussions on method or methodology in the history of physics particularly when a new method was introduced in the field such as algebraic equations, statistical technology, probabilistic ideas, and computer simulations. Secondly, most, not all, of scientific methods have been invented in physics, and then exported to other areas of research including biology, medicine, economics, psychology and linguistics. Most methods are exotic for other branches of science than physics. So it is quite understandable that scientists in those branches dispute over whether they should adopt one or another physics-born method and how they should modify such a method to make it suitable for their own research interests while the dust of debates on it has long been settled down in physics.

Indeed some generative grammarians have talked about methodology and especially experimental method for detecting speakers' grammaticality judgements from their acceptability judgements. As a philosopher of scientific methodology, I endorse and welcome their methodological talks. Generative grammar needs justly and deservedly method or methodology for their empirical inquiries.

(2) But, at the same time, I'd like to emphasize that there is no single 'correct' or 'proper' method or methodology for generative grammar and in fact for any other field of science. In other words, one cannot judge single-handedly one or another research in generative grammar as genuine empirical inquiry or bad (or pseudo) scientific activity according to whether it is in accord with a particular 'correct' method or methodology, say Popperian one. There is no method or methodology that can serve as a demarcation criterion between good and bad science. Proper method for generative grammar is not singular but plural. What we need is methodologies rather than methodology.

(3) Nevertheless, I don't follow Fayerabend's 'anything goes'. I believe that there are minimum requirements or desiderata for method or methodology for any successful scientific

research. The following is a tentative list of these minimum requirements.

- Methods should be effective to attain the aim of research, and feasible in a given condition. (The effectiveness and feasibility requirement)
- Methods or techniques should be standardized as far as possible in order that other researchers can use them and reproduce experimental results obtained from them. (Standardization requirement)
- All assumptions that are used for a method should be made as explicit as possible so that others can examine critically and/or test them empirically. (Making explicit requirement)
- Experimental settings in which methods or techniques are used should be made public as far as possible so that outsiders can inspect the setting if necessary. (Public access requirement)

This list is not complete. But, like any other lists, what is to be excluded is crucially important here. I don't include into the list the requirement that method should be quantitative, mathematical or statistical, for example.

Each of these minimum requirements is quite general so that many methods or methodologies can meet it in one way or another and to some or other extent. Also it is too vague to be a demarcation criterion. But it can still serve as referential frame according to which any method or methodology can be assessed, I think.

(4) In the light of this pluralistic view with minimum requirements, I'd like to evaluate ongoing methods and methodologies for empirical study in generative grammar, and make some methodological proposals. The main points to be discussed are as follows.

- I'd like to point out the need for phenomenology, that is, mathematical and non-mathematical models of how and to what extent speaker's acceptability judgements are affected by their grammaticality judgements, and interfered by other extra/non-grammatical factors. I propose a linear model; e.g.  $Y = X_1 - X_2 + X_3 + \epsilon$ . (Y is the degree of acceptability, and takes any value between 1 and 0. X1 is the factor of grammaticality, and takes 1 or 0 if a sentence is judged as grammatical or ungrammatical respectively. X2 and X3 are interfering factors, and take any value between 1 and 0.  $\epsilon$  represents probable error.) If one takes some non-linear model that has such terms as XZ or XX, mathematical and statistical analyses based on it will become intractably difficult. So in almost all fields of science where statistical techniques are applied, one or another linear model is used. So the feasibility condition above strongly supports the adoption of a linear model. Based on the linear phenomenology, I would argue, by appealing to the making explicit condition, that there is symmetry in the methodological viewpoint between grammatical and

ungrammatical predictions, contrary to the ideas in Hoji (2003) and Hoji (2006).

- I will also examine which is more appropriate as methodology for generative grammar between Popper's falsificationism and Lakatos' ideas of scientific research program. By using the feasibility requirement, I will conclude that Lakatosian methodology is more suitable to generative grammar than Popperian ones.
- I will seek the possibility to formulate Ueyama/Hoji's idea of 'licensed generalization' in terms of statistical techniques. It seems me that the idea is very worth considering because it challenges a deep rooted and widely prevailing dichotomy in methodology between the context of discovery and that of verification.