Developments in Statistics and Methodology
A. Ferligoj and A. Kramberger (Editors)
Metodološki zvezki, 9, Ljubljana: FDV 1993

Problem and Solutions of Problem in the Functional Analysis of Equivalence

Franc Mali[1]

Abstract

The article deals with the epistemological dimensions of the method of functional analysis of equivalence. This more general epistemological discussion enables the discovery of common heuristic grounds in the quantitative (explanation) and qualitative (understanding) methodologies in the social sciences. There are three main topics of interest. First, theoretical reasons for the formulation of the functional analysis of equivalence. Second, the recursive use of the analytical figure "problem and solutions of problem" in the method of equivalent functionalism. And finally, the analogy between the method of equivalent functionalism and the situational logic in critical rationalism.

Keywords: Functional analysis; Causality; Deductive-nomological model of explanation; Objective hermeneutics; Situational logic; Method of explanation; Method of understanding.

1.

In recent social-systems theory, the interpretation of the relation between the systems and their environment plays a key role. Systems theory ascribes to the relation between the category of the system and its environment the characteristic of flexibility and dynamicism. With the newest theoretical concept of an autopoetic, self-determining and recursively-closed system, the assumption of flexibility and dynamicism is even more emphasized. Modern social systems theory has been confronted, from the very beginning of its existence, with the need to formulate an adequate methodological approach. The new methodological approach, in accordance with the modern systems paradigm, has been developed by Niklas Luhmann. It has been defined as the method of the functional analysis of equivalence.

---

1 Faculty of Social Science, University of Ljubljana, Kardeljeva pl. 5, 61109 Ljubljana, Slovenia

In the present treatise, some epistemological dimensions of the method of functional analysis of equivalence will be studied. Primarily, three main topics are the focus of our interest:

1) the question of the more general conscious-theoretical reasons for the formulation of the functional analysis of equivalence (the criticism of the causal-deterministic interpretation of the category of function);

2) the questions of the recursive use of the analytical figure "problem - solutions of problem" in the method of equivalent functionalism;

3) the question of analogy in the heuristics of methodological approaches (systemic functional analysis, objective hermeneutics, situational logic in critical rationalism), which seem to be very different at first glance.[2]

2.

At the very beginning, it might be helpful to briefly present the systemic method of the functional analysis of equivalence. The author of equivalent functionalism has on different occasions illustrated the main characteristics of the new methodological approach. Nevertheless, let us take into consideration his definition of functional analysis in the work "Soziale Systeme", not only on account of the basic role of this work in modern systems theory, but also because of the succintness of the definition of functional analysis in this work.

The method of functional analysis is described here as the procedure for the acquiring (explanation) of (scientific) information. The emphasis is on the functional relations of information: "Die funktionale Analyse benutzt Relationierungen mit dem Ziel, vorhandenes als kontingent und Verschiedenartiges als vergleichbar zu erfassen. Sie bezieht Gegebenes, seien es Zustaende, seien es Ereignisse, auf Problemgesichtspunkte, und sucht verstaendlich und nachvollziehbar zu machen, dass das Problem so oder auch anders geloest werden kann. Die Relation von Problem und Problemloesungen wird dabei nicht um ihrer selbst willen erfasst; sie dient vielmehr als Leitfaden der Frage nach anderen Moeglichkeiten, als Leitfaden der Suche nach funktionalen Aequivalenten" (N.Luhmann,1985, 84).

The conclusion that can be drawn from the preceding quotation is that the heuristic and explanatory "fertility" of the method of functional analysis is based upon its capacity to specify the relation between the problem and the possible solutions of the problem. But here we do not mean relations in the sense of causality. For a complete understanding of this question, a short digression into the nomological explanation of classical causal-deterministic functionalism must be made.

Historically speaking, functional analysis in its classical causal-deterministic form has emerged as a modification of teleological explanation, i.e., of explanation not by reference to the causes which "bring about" the event in question, but by reference to the ends which determine its course. Carl G. Hempel has subsumed the classical causal-deterministic form of functional analysis under the deductive-nomological model of explanation.[3]

According to Hempel's interpretation, functional analysis generally endeavors to show that some element or item (I) of the system (S), under certain internal and external conditions (Ci...n), has effects which satisfy some "need" or "functional

requirement" of the system, i.e., a condition (n) which is necessary for the system to remain in an adequate, effective, or proper working order. Hempel has put this basic pattern of classical functional analysis in the form of a general deductive-nomological model of explanation.[4]

On this basis he came to the conclusion that functional analysis in science could be fully accepted as a "weak" causal explanation. However, his suggestion in accordance with the preceding conclusion was that functional analysis is best viewed not as a developed methodological doctrine in the social sciences, which the classical functionalists believed[5], but "...rather as a program for research guided by certain heuristic maxims or working hypotheses." (C.G. Hempel, 1959, 301)

As has just been noted, Hempel has surveyed the classical causal-deterministic form of functional analysis with regard to the nomological model of scientific explanation. Luhmann has taken the opposite approach. He reversed the relation between the categories of causality and function. Function does not appear as a particular kind of causal relation. Just the contrary: causal relation is a result of the application of functional order. In spite of the fact that the role of the category of causality in the process of (social) scientific recognition has not been denied by Luhmann, it has, in his view, merely taken the place of the analytical marginal-case.[6]

The demand for the explanation of causality by means of the category of function has deeper epistemological reasons. The ontological exposition of causality has lost its meaning with the emergence of modern science. It was based on the assumption of the causal relation as the invariant relation between a certain cause and a certain effect, which meant the exclusion of all other causes and effects. In opposition to this, the modern functional exposition of causality is connected with the problem of infinity. In modern science, every determination of causality leads towards the problem of infinity. There is abundant evidence for this statement: every effect has an immense number of causes, and inversely, every cause has an immense number of effects. It might equally hold that every cause can be combined with an immense number of other causes, from which ensue an immense multitude of different effects. And finally, every causal process itself can be divided infinitely, or can be extrapolated into infinity.

With regard to the problem of infinity in modern science, it is especially senseless to follow the classical deterministic interpretation of causality in the framework of complex social systems. The "ceteris paribus" clauses or probability calculus, which has been used by some authors, can not assume the role of corrector of causal determinism. A reassessment of the relation between the categories of causality and function is necessary. The modern systemic method of functional analysis does not assume a constant regularity between a certain cause and a certain effect. Instead of such an assumption, it takes into consideration only one point (the cause or the effect), investigating its functional equivalences.

The role of the "problem under consideration" ("Bezugsproblem") has been heavily emphasized by Luhmann: "Methode der funktionalen Analyse verwendet diejenigen Ursachen oder Wirkungen, die aus lebenspraktischen oder theoretischen Gruenden einen Brennpunkt des Interesses bilden, als funktionle Bezugsgesichtspunkte...Als funktionle Bezugsgesichtspunkte verwendet, sind die Stationen des Kausalprozesses, sei es Ursache oder Wirkung, nicht in ihrer ontischen Faktizitaet, sondern als Probleme gemeint...Die Bezugseinheit wird als Problem gesehen. Das kann nur heissen: Die Gueltigkeit funktionalistischer Analysen haengt nicht davon ab, ob im

Eizelfall das Problem geloest wird, die Wirkung eintritt, das System fortbesteht. Und das muss dann heissen: Die funktionlistische Aussage betrifft nicht eine Beziehung von Ursache und Wirkung, sondern ein Verheltnis mehrerer Ursachen zueinander bzw. mehrerer Wirkungen zueinander, also die Feststellung funktionaler Aequivalenzen." (N. Luhmann, 1974, 18)

The functionality of "the problem under consideration" depends upon a limited number of its possible solutions. Too many possible solutions to the problem indicate a poor definition of the problem. In the assumption of the functionality of the problem, the principle of "planned solutions of problem" is included. In the process of formulation of the problem, the conditions of the solutions are already proposed. As Luhmann has stressed in one of his latest theoretical-methodological writings, the idea of the constructed limitation would be at work also in science: "Man kann, aus welchen Anlaessen immer, Situationen problematisieren und wird dann in der Abstraktion der Problemstellung nur so weit gehen, wie es erforderlich ist, um Loesungsvarianten zu finden. Auch in der Wissenschaft ist das nicht anders. Hier dienen vorgefundenen Theorien als Problementdeckungshilfen. Man fuehrt dann in theoretischen Aussagen die Differenz von Problem und Problemloesungen ein, geht aber auch hier in der Abstraktion der Problemstellungen nur so weit, wie es noetig ist, um funktional aeqvivalente Problemloesungen zu finden." (N.Luhmnn,1990, 425)

3.

The principle of limitation in the method of functional analysis can appear in the form of the hierarchical order of problems. But this is not necessary. In the sphere of science, a hierarchical order of problems is also present. In both cases, the problem under consideration can turn in various directions: in the direction of increased generalisation or in the direction of increased specificity.

In both cases, a functional analysis can not be concluded with the ascertaining of the primary solutions to the problem. It can be repeated on the next lower (or higher) level. On this secondary level, additional problems can arise. The idea of the hierarchical order of problems under consideration and the equivalent series of problem-solutions leads to relevant conclusions. Its function in the correction of the partiality of the starting-point problem has also been stated: "Die Einseitigkeit des Ausgangsproblems diente lediglich dazu, die funktionale Alternativen der Primaerebenen vergleichbar zu machen. Wird eine dieser Alternative gewaehlt bzw. in konkreten Systemen vorgefunden, so beginnt damit eine neue Abstraktion, die eine andere Serie von Aequivalenzen konstituiert." (N.Luhmann,1974, 20)

The procedure of abstraction in the functional concept of the hierarchical order of problems is, in essence, very different from the statistical-inductive procedure of abstraction. It does not derive from the subsumption of single units (cases) under general categories or laws. Here, in place of generalisation through quantification, one obtains generalisation through the abstraction of structures. In this type of abstraction, the statistical frequency of single units is not relevant, but the order of the series of functional equivalent units is (as solutions to the problem at hand).

The evident difference in both types of procedures of generalisation has been perceived by Wolfgang Ludwig Schneider: "Werden Einzelfaelle - dem Vorgehen eines

Biologen vergleichbar - als phaenotypische Auspraegung eines allgemeinen Strukturtyps analysiert, dann wird damit gleichzeitig ein Bereich moeglicher Variation fuer weitere Exemplare abgesteckt, in dem individuelle Unterschiede keinen Unterschied machen fuer die Geltung von theoretischen Verallgemeinerungen. Die Operation der 'Struktur- generalisierung' kann also ansetzen an der Rekonstruktion von Einzelfaellen, ohne auf statistische Repraesentavitaet bedacht sein zu muessen. Sie eroeffnet die Moeglichkeit der Theoriebildung am Einzelfall" (W. L. Schneider, 1991, 202).

4.

In the process of structural generalisation, there is an open possibility for theory-building on the basis of individual cases. This type of methodological procedure shows some likeness to the manner of recognition in the method of hermeneutic interpretation. Here the focus of our interest can not be the whole complex of questions regarding the hermeneutic provenance of the method of the functional analysis of equivalence. In spite of that, we have to mention at the end of the present discussion that the functional concept of the hierarchical order of problems has, in general, a lot of analogies with the methodology of objective hermeneutics, and even more with the epistemological idea of objective knowledge in the theory of critical rationalism.

The method of functional analysis, as a recursive use of the analytical figure "problem - solutions of problem", can be traced back to the heuristic scheme "question - answer" in objective hermeneutics, however, by pointing out that functional analysis is oriented towards searching for more general (social) problems and that the hermeneutic interpretation is directed to the identification of individual phenomena. Luhmann himself illustrated the close link between the "question - answer" and "problem - solutions of problem" formulations when he stated: "Das Schema Problem/ Problemloesung knuepft an die soziale (logische) Unterscheidung von Frage und Antwort an, wird aber (wie auch 'Dialektik' im Laufa der Zeit von Ramus ueber Kant und Hegel bis Bachelard und Popper) de-sozialisiert." (N.Luhmann,1990, 422)

It should be noted that a somewhat similar use of the analytical figure "problem - solutions of problem" can also found in the writings on the epistemological acquisition of the objective mind by Karl R. Popper. The concept of objective understanding in critical rationalism can be conditionally placed in the position of a binding link between objective hermeneutics and modern systemic functionalism. From this point of view, "situational logic or situational analysis" (K.R.Popper,1972, 178), therefore means the consequent continuation of the objective hermeneutic discourse of thinking. If the main goal of objective hermeneutics is the reconstruction of the objective structure of the problem situation, apart from the intentions of the subjects of action (recognition), then situational logic (analysis) has emphasised even more the essential un-subjectivity of the connection between the problem and the solutions of the problem.[7]

On the other hand, this method of situational analysis represents the predecessor of the radical use of the analytical figure "problem - solutions of problem" in the systemic functional analysis of equivalence. From the general epistemological point of view, the analogy which might be disclosed in the heuristics of hermeneutics, critical rationalism and modern systemic functionalism, invokes again the reflection about the

well-known methodological principles developed by Max Weber. The fundamental "credo" of Weber's general methodological approach has been expressed in his saying that we will inevitably overcome the disjunction between the nomothetical and ideographical sciences.

On the level of social science research, the most important conclusion from this regulative methodological idea is the assertion that social phenomena cannot be merely causally explained, but they can also be understood according to sense. However, explanation (Erklaeren) and understanding (Verstehen) in the social sciences should be constantly interrelated, in spite of the fact that both methodological approaches could be launched from the opposite poles of research work.

The fact that explanation and understanding constitute a common objective of the various scientific disciplines is widely recognized today. However, it often still holds - having also had a negative repercussion on the controversies between quantitative and qualitative methodology in the social sciences - that fundamental differences exist between the explanatory methods appropriate for different fields of empirical science and those required for an adequate understanding of the behaviour of humans or other organisms, taken individually or in groups. Therefore, let us note at the end that more general epistemological discussions can also aid in the discovery of common "heuristic" grounds of different methodological approaches.

Footnotes

2 Generally speaking, in recent times such procedures, methods, principles are defined as heuristic, which could contribute to the extension of (scientific) recognition, without its justification in the strictly empirical sense.

3 The general form of the deductive nomological explanation is given by Hempel and Oppenheim in the following scheme (A.Ule,1984, 122):

L1,L2.....Lm
C1,C2.....Cn Explanans
E Explanandum

Here, L1, L2....Ln are general laws and C1, C2...Cn are statements of a particular fact; the horizontal line separating the conclusion E from the premises indicates that the former follows logically from the latter.

4 The functional analysis in the form of the general deductive-nomological model of explanation is offered in the following way (C.G. Hempel, 1959, 283):
A) At time (t), the system (s) functions adequately in a setting of kind (c) (characterized by specific internal and external conditions).
B) System (s) functions adequately in a setting of kind (c) only if a certain necessary condition (n) is satisfied.
C) If trait (i) were present in system (s) than, as an effect, condition (n) would be satisfied.
D) (Hence), at time (t), trait (i) is present in system (s).

5 In the analysis of causal-deterministic functionalism, Hempel has refered to the contemplations of functionalists, e.g. Radcliffe-Brown, Malinowski, Parsons and others.

6 This type of argumentation is followed up by Luhmann from the very beginning: " Die funktionalistische Analyse kausaler Faktoren befasst sich demnach nicht nur mit der

Bezieuhng zwischen Ursachen und Wirkungen. Sie dient als methodisches Hilfsmittel, nicht aber als Gegenstand der Feststellung...Dass weder im Bereich der Ursachen noch im Bereich der Wirkungen andere Moeglichkeiten bestehen, ist denkbar als Grenzfall absolut reduzierter Aequivalenz. Der Sinn des kausalen Beziehens liegt aber nicht drin, diesen Grenzfall zu erreichen und andere Moeglichkeiten auszuschliessen, sondern darin, sie zu erfassen und zu ordnen." (N.Luhmann,1974, 17)

7 Apart from describing in detail the procedure of objective understanding in critical rationalism, it should be noted that by a situational analysis Popper meant a certain kind of conjectural explanation of some human action which appeals to the situation in which the agent finds himself. This method may be described as an application of the principle of rationality. Through this method, a (idealised) hypothetical reconstruction of the problem situation in which the agent finds himself, may be given: "It would be a task for the situational analysis to distinguish between the situation as the agent saw it, and the situation as it was (both of course, conjectured)." (K.R.Popper,1972, 179)

8 Consideration of this point has been given explicitly by Max Weber in his methodological writings: "Wogegen sich die Soziologie aber auflehnen wuerde, waere die Annahme: dass 'Verstehen' und kausales 'Erklaeren' keine Beziehung zueinander haetten, so richtig es ist, dass sie durchaus am entgegengesetzen Pol des Geschehen mit ihrer Arbeit beginnen, insbesondere die statistische Haeufigkeit eines Sichverhaltens dieses um keine Spur sinnhaft 'verstaendlicher' macht und optimale 'Verstaendlichkeit' als solche garnichts fuer die Haeufigkeit besagt, bei absoluter subjektiver Zweckrationalitaet sogar meist gegen sie spricht...'Sinnhafte' Deutungen konkreten Verhaltens rein als solche sind natuerlich auch fuer sie, selbst bei groesster 'Evidenz', zunaechst nur Hypothesen der Zurechnung. Sie beduerfen also der tunlichsten Verifikation mit prinzipiell genau den gleichen Mitteln wie jede andere Hypothese...Und umgekehrt sind statistische Daten, wo immer sie den Ablauf oder die Folgen eines Verhaltens angeben, welches irgend etwas verstaendlich Deutbares in sich schliesst, fuer uns erst dann 'erklaert', wenn sie auch wirklich in konkreten Fall sinnhaft gedeutet sind." (M.Weber, 1968, 437).

References

[1] Hempel C.G. (1959): The Logic of Functional Analysis. In: L. Gross (Ed.): *Symposium on Sociological Theory.* New York: Row Peterson and Company, 271-311.

[2] Luhmann N. (1990): *Wissenschaft der Gesellschaft.* Frankfurt/M.: Suhrkamp Verlag.

[3] Luhmann N. (1985): *Soziale Systeme.* Frankfurt/M.: Suhrkamp Verlag.

[4] Luhmann N. (1974): *Soziologische Aufklaerung 1 (4.Auflage).* Opladen: Westdeutscher Verlag GmbH.

[5] Popper K.R. (1972): *Objective Knowledge - An Evolutionary Approach.* Oxford: Oxford University Press.

[6] Schneider W.L. (1991): *Objektives Verstehen.* Opladen: Westdeutscher Verlag GmbH.

[7] Ule A. (1984): O znanstveni pojasnitvi in ideološkem samoopravičevanju. *Časopis za kritiko znanosti*, **14**, 121-183.

[8] Weber M. (1968): *Gesammelte Aufsaetze zur Wissenschaftslehre (Dritte Auflage)*. Tubingen: J.C.B.Mohr Paul Siebeck Verlag.