THE EVALUATIVE RESEARCH AS A BRIDGE BETWEEN SCIENCE AND PROFESSION

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http://dx.doi.org/10.17060/ijodaep.2016.n1.v2.284

Fecha de Recepción: 1 Febrero 2016
Fecha de Admisión: 15 Febrero 2016

ABSTRACT

The evaluative research can support an evidence-based profession, in many fields of application of psychology. This kind of research is characterized by complexity, and requires methods, measurement instruments, and statistics different from the traditional ones based on strategies suitable for laboratory studies.

Some methodological issues will be presented in the article, e.g., the need of action-research approaches and of multidimensional techniques and/or cumulative analyses of data. Innovative strategies and techniques have to be proposed for studying the efficacy and efficiency of psychological applications.

KEYWORDS: Evaluative research, Methodology, Complexity, Action-research.

The evaluative research is an important goal of applied research in psychology, and can constitute a link between scientific research and the definition of an evidence-based profession, in many fields of psychology: e.g., educational, social, work, clinical psychology.

But to make a good evaluative research some methodological considerations are needed. First of all, the complexity of this field of study overwhelms the traditional methods based on laboratory research, which defines and manages variables, sampling, and statistical analyses in a reductive way.

The main question I will address is: *How it possible to approach complexity in psychological applied (e.g., evaluative) research?*

To approach complexity in evaluative research we need appropriate methods, choosing variables, measurement instruments, statistics suitable to monitor directly the whole action object of study allowing the 'sense' of the studied event to emerge.

Variables and their measurement (or 'assessment'), their quantitative statistical analyses, as well as deductions strictly based on data, do not let us grasp the whole story about the sense of the

research, i.e. about the meaning of the relations about variables. This story would be said by a 'hermeneutic' approach, grounded on the data but not 'reduced' to them.

It is not possible to think that the variables – particularly the variables in evaluative studies - represent entirely and exclusively a phenomenon or event, and that the collection and summing of variables reflects reality in its complexity, as in composing a puzzle. Through variables we can only approximate a portion of that event considered as object of our empirical study, and the only method that science knows to make the best approximation is to select in the best way the variable(s) representing that event.

But each variable can be misleading if used in a misleading way: e.g., in the use of the variable 'sex' to compare the performance of genders in a task or in a questionnaire:

It is not possible to presume that all the components of gender (genetic, hormonal, physiological, social, etc.) are taken into account by coding 1=male, 2=female.

Gender as demographic variable is only considered, and in the deductions from the data, we will not go beyond this, surely reductive, consideration.

For a more complex research design, more subtle differences can be studied, but more and more articulations of the gender factor in specific variables are needed.

Complexity in evaluative research can be reached in other ways, e.g., by multidimensional techniques and/or by cumulative analyses, as in 'meta-analytical' approaches (Cooper, 1984; Rosenthal, 1987; Hunter & Schmidt, 1990; Cooper & Hedges, 1994; Di Nuovo, 1995; Schulze, 2004). Meta-analyses can confirm or disconfirm the efficacy of psychological, educational, and social interventions (for an early synthesis: Lipsey & Wilson, 1993), contributing to an evaluative research grounded on evidence.

Otherwise, in a more direct way, complexity may be searched for by approaching the whole action object of study, as in the *action-research* approach (Lewin, 1951). The aim is not to contrast 'laboratory' research against 'field' research. The problem is not *where* the study is conducted, but *how* it can control the variables, and the degree of complexity represented without reducing it, as happens when some variables are isolated when others are maintained in the background. Some examples of evaluative research in very complex fields, where the articulation of variables is at all impossible, are:

problem-solving techniques to improve the social adjustment of children with intellectual disability;

intervention projects aimed to integrate immigrate pupils in the common school;

career guidance services in the school;

trainings aimed to reduce stress, to be implemented in a working context;

new diagnostic tools for organizational contexts;

efficacy and efficiency of psychotherapeutic techniques.

The model of research needed in these cases of evaluative research is different from the studies which explore the spontaneous evolution (i.e., not induced by the researcher), and it is very far from the model widespread at the beginnings of experimental psychology. When the research is linked to the daily work in applied fields - as rehabilitative services, school counseling, penitentiary institutions, and formation in farms - it has to be at the same time *scientific knowledge* of the reality and *active changing* of the reality itself. The aim is therefore to study, without lacking of methodological strictness, how the changing happens, in what measure, why it does not happen as hypothesized, which factors obstacle it, what techniques are suitable to overcome these obstacles. In the already quoted model of action-research suggested by Kurt Lewin (1951), the way to integrate meaningfully experimental trials with changing aims is to 'make research about an object, alongside intervening on it'. In the action-research, particularly when it regards evaluative goals:

The researcher has to provide an evidence-based explanation for the mechanisms through which the intervention operate, that is, *how* or *why* the treatment produces change. In the field of psychotherapy research, we have to discover 'mediators' of change (Kazdin, 2007).

The variables cannot be separated as in laboratory research, simplifying complexity, but have to be taken into account and analyzed as a whole. Consequently, the main interest of the researcher is not to eliminate the 'disturbing' variables, as the researcher itself who is not an aseptic observer but is fully involved in the studied process, since the change is provoked by his/her active interventions. The aim of research is not to control all the potential intervening variables, but to go beyond the ' basic noise', testing if the effect obtained is great enough to overcome it (Rosenthal, 1987; Di Nuovo & Hichy, 2007).

The changing processes have to be studied not in a point of the evolution and after in another (pre-post model to test *efficacy*) but monitored and analyzed 'in itinere' (inspection of growth curve to test *efficiency*). Longitudinal methods and sequential or time-series analyses, suitable also for single-case studies, are useful for this approach (Gregson, 1983; Bakeman & Gottman, 1986; Magnusson, Bergman, Rudinger, & Torestad, 1991; Menard, 1991; Hedeker & Gibbons, 2006). Also ecological and contextual influences in longitudinal processes have been pointed out (Little, Bovair & Card, 2007).

The significance criteria have to be changed. The focus is not on the probability to refuse the *null* hypothesis (i.e., the effects are not different from those obtained by chance), to accept the *alternative* hypothesis (the effect is due to the treatment). As already said, we have not to know if the effect can be considered as casual, but if it is big enough to fulfill the proposed aims (according to the 'effect analysis', Cohen, 1988).

The main problems are to assume quantitative or qualitative analyses as appropriate to the nature of the data, and to choice which analysis is more appropriate to manage the collected data (Denzin & Lincoln 2000).

Quantitative analyses, based on linear causality and probabilistic inference, pose many problems, but *some alternative approaches* arose just to cope with these problems:

Non probabilistic approaches, as significance based on effect sizes, i.e. the evaluation of how big is a result to fulfil the aim of the study, overcoming the spurious intervening variables and the 'noise effects' (Rosnow & Rosenthal, 1989; Cohen, 1988).

Nonlinear techniques suitable for dynamic systems, also in idiographic perspective (Van Geert, 1994; Hayes, Laurenceau, Feldman, Strauss, & Cardaciotto, 2007; Salvatore & Valsiner, 2008). Nonlinear techniques are often the best approach to assess the therapeutic change (Chamberlain & Bütz (1998).

Techniques of complex longitudinal analyses, as the 'Growth Mixture Model' that allow to study conjointly the individual evolution and the comparison among individuals. (Laurenceau, Hayes, & Feldman, 2007)

Analyses based on neural networks and 'fuzzy logic' (Baldwin, 1996): The 'pattern classification' is an analysis linking statistical and neural approaches (Schuermann, 1996). The fuzzy logic provides interesting tools for data mining, mainly because of its ability to represent imperfect information, which is of crucial importance when databases are complex, and contain heterogeneous, imprecise, uncertain or incomplete data (Bouchon-Meunier, Detyniecki, Lesot, Marsala, & Rifqi, 2007).

Quantitative and statistic approaches say only a portion of the knowledge needed. The scientist should use this information to build up knowledge about his scientific hypothesis, or discovering. This knowledge, to be truly and not only statistically significant, has to be constructed by means of a logical and cumulative approach.

The hermeneutic approach is based on the constructivist ground of our knowledge that is aware about the limits of defining variables and trying to measure them. This approach *includes* the analysis of empirical data, obtained by observing selected variables, or an action as a whole in its development, analyzing quantitative and qualitative data based on techniques of assessment suitable to the aims of the study (e.g., *dynamic assessment*: Haywood, 1992; Grigorenko & Sternberg, 1998). But the hermeneutic approach goes beyond these simple and single analyses, connecting these data with others and exploring the topic of the research in a cumulative way, as recent statistical techniques allow making.

The psychological methods should be aimed at showing how innovative strategies and techniques can be used for studying the efficacy and efficiency of psychological applications. Based on an appropriate evaluative research, the psychological profession can respond to the social needs with full scientific validity.

REFERENCES

Bakeman R., Gottman J. M. (1986). *Observing interaction: an introduction to sequential analysis*. Cambridge University Press, London.

Baldwin J. F. (Ed.) (1996). *Fuzzy logic*. Wiley, New York.

Bouchon-Meunier B., Detyniecki M., Lesot M.J., Marsala C., Rifqi M. (2007). Real world fuzzy logic applications in data mining and information retrieval. In: P.P. Wang, D. Ruan, E.E. Kerre (eds.) *Fuzzy logic - A spectrum of theoretical and practical issues, studies in fuzziness*. Springer, Heidelberg (pp. 219–247).

Chamberlain L., Bütz M.R. (1998). *Clinical chaos. A therapist's guide to nonlinear dynamics and therapeutic change*. Taylor & Francis, Washington.

Cohen J. (1988). *Statistical power analysis for the behavioral sciences.* 2nd ed., Erlbaum, Hillsdale.

Cooper H. M., Hedges L.V. (Eds). (1994). *The handbook of research synthesis.* Russell Sage Foundation, New York.

Cooper H.M. (1984). *The integrative research review: a systematic approach.* Sage, Beverly Hills.

Denzin N. K., Lincoln Y. S. (2000). *Handbook of qualitative research.* Sage, Thousand Oaks.

Di Nuovo S. (1995). *La meta-analisi.* Borla, Roma.

Di Nuovo S., Hichy Z. (2007). *Metodologia della ricerca psicosociale.* Il Mulino, Bologna.

Gregson R. A. M. (1983). *Time series in psychology.* Erlbaum, Hillsdale.

Grigorenko E. L., Sternberg R. J. (1998). Dynamic testing. *Psychological Bulletin*, 124, 75-111.

Hayes A. M., Laurenceau J. P., Feldman G., Strauss J. L., Cardaciotto L. A. (2007). Change is not always linear: The study of nonlinear and discontinuous patterns of change in psychotherapy. *Clinical Psychology Review,* 27, 715-723.

Haywood H. C. (1992). Special focus section on dynamic assessment. *Journal of Special Education*, 26, 3.

Hedeker D., Gibbons R. D. (2006). *Longitudinal data analysis.* Wiley, Hoboken, NJ.

Hunter J. E., Schmidt F. L. (1990). *Methods of meta-analysis. Correcting error and bias in research findings.* Sage, Beverly Hills.

Kazdin A. E. (2007) Mediators and mechanisms of change in psychotherapy research. *Annual Review of Clinical Psychology*, 3, 1-27.

Laurenceau, J. P., Hayes, A. M., Feldman, G. C. (2007). Statistical and methodological issues in the study of change in psychotherapy. *Clinical Psychology Review,* 27, 715-723.

Lewin K. (1951). *Field theory in social science.* Harper, New York.

Lipsey M.W., Wilson, D.B. (1993). The efficacy of psychological, educational, and behavioral treatment: confirmation from meta-analysis. *American Psychologist,* 48, 1181-1209.

Little T. D., Bovaird, C. A., Card N.A. (2007). *Modeling ecological and contextual effects in longitudinal studies.* Erlbaum, Mahwah NJ.

Magnusson D., Bergman L., Rudinger G., Torestad B. (1991). *Problems and methods in longitudinal research. Stability and change.* Cambridge University Press, Cambridge.

Menard S. (1991). *Longitudinal research.* Sage, Newbury Park.

Rosenthal R. (1987). *Judgment studies: design, analysis, and meta-analysis.* Cambridge University Press, New York.

Rosnow R.L., Rosenthal R. (1989). Statistical procedures and the justification of knowledge in psychological science. *American Psychologist,* 44, 1276-1284.

Salvatore S., Valsiner J. (2008) Idiographic science on its way: towards making sense of psychology. In J. Valsiner, S. Salvatore, S. Strout, J. Clegg (eds). *Yearbook of Idiographic Science*. *Vol. 1*, Firera Publishing Group, Rome.

Schuermann J. (1996). *Pattern classification: a unified view of statistical and neural approaches*, Wiley&Sons, New York.

Schulze R. (2004). *Meta-Analysis. A comparison of approaches,* Hogrefe & Huber, Bern.

Van Geert P. (1994). Dynamic systems of development. Change between complexity and chaos. Harvester Wheatsheaf, Hempstead.