NONMETRIC TEMPORAL PATH ANALYSIS (NTPA):
AN ALTERNATIVE TO THE LINEAR MODELS APPROACH FOR
VERIFICATION OF STOCHASTIC EDUCATIONAL RELATIONS

By

Theodore Wayne Frick

Submitted to the faculty of the Graduate School
in partial fulfillment of the requirements
for the degree Doctor of Philosophy
in the School of Education
Indiana University
December 1983
Accepted by the faculty of the Graduate School, Indiana University, in partial fulfillment of the requirements for the Doctor of Philosophy Degree.

Director of Thesis

Doctoral Committee:  

Chairperson


December 8, 1983
ABSTRACT

Extant statistical models commonly used in educational research are primarily linear and therefore deterministic. The linear models approach (LMA) is exemplified by correlational analysis, analysis of variance (ANOVA) and their extensions (path analysis, discriminate analysis, etc.). An alternative approach to verifying educational relations, developed by the author and termed, 'nonmetric temporal path analysis' (NTPA), is not constrained by the deterministic assumptions of the LMA and consequences thereof. NTPA is based on set, probability, information and general systems theory.

The major question addressed is: Is NTPA more adequate than the LMA in the verification of stochastic educational relations? Using data from an observational study of the academic learning time of mildly handicapped students, NTPA was compared to correlational analysis and ANOVA. It was concluded that NTPA is more complete than the LMA, inclusive of the LMA and a strong alternative to the LMA, since: 1) the LMA is derivable from NTPA; 2) NTPA describes relations not describable in the LMA, 3) NTPA can be reduced to the LMA, but not the converse; 4) NTPA and the LMA are empirically inconsistent given the same data; and 5) NTPA has higher empirical content than the LMA.

Given these criteria, NTPA is more adequate than the LMA for verification of stochastic educational relations. The fruitfulness of NTPA is patent, since a more adequate research methodology is likely to result in an increase in the rate of development of knowledge about educational systems processes and system-environment transactions.
ACKNOWLEDGEMENTS

I remember clearly one evening in the late winter of 1976 when Dr. George Maccia explained to me the essential difference between a linear and information theoretic mapping of variables. While I had known of the difference, it was not until then that I became truly aware of the significance of the implications of this difference for educational inquiry methodology. The seed had been planted which eventually grew into the methodological verification procedure that I have developed, termed 'nonmetric temporal path analysis' (NTPA). I want to thank Dr. Maccia for that conversation in 1976 and for his continued support and encouragement, particularly when the idea of NTPA has been opposed, dismissed as trivial, or simply ignored by traditional research methodologists who are firmly entrenched in the linear models approach.

I want to thank Dr. Elizabeth Steiner for sparking my interest in educational inquiry methodology and introducing me to the SIGGS theory model. I continue to be impressed by her ability to get to the essence of an issue. The clarity of her insights, her persistence in questioning what is often taken for granted, the logic of her thinking, and most of all, her respect for persons as unique human beings have all been invaluable to my education.

It would have been difficult, if not impossible, to develop and test NTPA without the resources and support of the Center for Innovation in Teaching the Handicapped (CITH), School of Education, Indiana University. Dr. Melvyn I. Semmel, former director of CITH, now at the University
of California at Santa Barbara, created an environment where it was possible for me and others to explore individual research interests while at the same time working on a variety of research and development projects at CITH.

Dr. Herbert J. Rieth, present director of CITH, has continued to support this atmosphere for growth and development. In particular, it was he who gave me the opportunity to test NTPA in the context of a research study of the academic learning time of mildly handicapped students. His assistance, encouragement and provision of resources at CITH helped to make the dissertation a meaningful and satisfying experience.

Dr. Richard Pugh taught me many of the details of the linear models approach. Without knowing that research tradition, I would have been unable to discern the important differences between the linear models approach and NTPA. His open-mindedness, advice and support for completing this dissertation are greatly appreciated.

Finally, as always, my wife Kathy has provided the love and encouragement for me to pursue what I need to do and become.
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