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

By

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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.

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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.

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