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Dear Dr. Scandura:

Your above mentioned publication has been identified as one of the most cited items in its field, according to data from the Science Citation Index® (SCI®) and the Social Sciences Citation Index® (SSCI®). As a result, we would like to invite you and/or your colleagues to prepare a brief commentary and abstract on your work for publication in the Citation Classics® section of Current Contents® (CC®).

The commentary may describe how the research was conceived, any obstacles you encountered, and why you think your publication is so frequently cited. The commentary will enable you to share with colleagues and students some personal aspects of the research. These experiences rarely appear in formal scientific publications.

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Scandura, J. Deterministic Theorizing in Structural Learning: Three levels of Empiricism
Journal of Structural Learning, 3, 21-53, 1971
Instructional Systems, University of Pennsylvania, Philadelphia, PA

This article describes a deterministic theory of structural learning designed to explain and predict the behavior of individuals in specific situations.

It includes three increasingly precise partial theories: (1) structured knowledge--tested via generative adequacy, (2) idealized behavior--tested under memory-free conditions, and (3) non-idealized behavior--including memory and processing capacity.

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"Deterministic theorizing in structural learning" grew out of a long-term concern: specifically, the inability of then current theory and methods to accommodate both generalized psychological considerations and specific knowledge. Moreover, my own empirical research kept showing that predicting human behavior on complex tasks was primarily a matter of knowing exactly what it was that the learner did and did not know.

My theoretical concerns, initially, were with how to represent human knowledge (something which since has become the cornerstone of both cognitive psychology and Artificial Intelligence) and how to assess it (i.e., how to find out what the individual knows). In several papers, for example, I had challenged the use of S-R representations (and hence theories) as inadequate.

At an invited meeting in Philadelphia in 1968, Jim Greeno and Merle Wittrock argued contrarily that the rule construct itself was inadequate--that unlike S-R theory, there was no theory behind my conceptualizations. This motivated me to deal with these issues in presentations shortly thereafter at Psychonomics and APA.
In 1970, I gave an invited address at AERA based on a draft of the above cited reference with Wittrock as discussant. It covered everything from rationale and methodology to comprehensive theory and empirical data, my first overall presentation of what has come to be known as the "Structural Learning Theory." I felt it was a "tour de force" and I had put a tremendous amount of working energy into it.

Nonetheless, both Wittrock's formal reaction and the following questions were sobering: the significance of what I was trying to say simply was not getting across. Subsequent submission of the formal paper to the Psychological Review fared no better. "What the hell is Scandura talking about?" is a reasonable paraphrase.

Happily (for me), reaction at one of our first Structural Learning conferences (including philosophers, mathematicians, computer scientists (AI), and linguists, as well as cognitive and instructional psychologists) differed sharply. Rejected by the establishment, and given the obvious enthusiasm at the conference, I submitted my "tour de force" to the then new, relatively low circulation Journal of Structural Learning (JSL). Founded by the gifted mathematician and mathematics educator, Z. P. Dienes, this journal fortunately stressed ideas over orthodoxy. (Ironically, today the journal has a staff of editors and I serve as editor-in-chief.)


Nonetheless, "Deterministic theorizing..." remains perhaps the most widely cited. Why? I really don't know since some of the later works include major advances. Perhaps it was the freshness of the article at a
time when the behavioral and information sciences generally were only beginning to sense their theoretical and methodological inadequacies. In any case, it still represents a good introduction to the field as it anticipates and in some respects is still at the forefront of current developments in the cognitive sciences.