ON HIGHER ORDER RULES

JOSEPH M. SCANDURA
University of Pennsylvania

ABSTRACT

In the literature, there are two senses of the term "higher order rule." One sense refers to the level of a rule in a fixed hierarchy. The other sense refers to rules which operate on classes of other rules. Relationships between the two senses and advantages of the latter are discussed.

In reading several recent reviews, it is my impression that some educational researchers do not understand an important difference in the way the term "higher order rules" is used. The most prominent use of the term is closely related to task hierarchies. Rules higher in a hierarchy (more accurately, the rules underlying higher level tasks) are referred to as being of higher order. Consistent with this interpretation is Gagné's (1965) view that higher order rules may be viewed as chains of principles (rules). Rules which are more general than given rules frequently are also termed higher order.

A less familiar use stems largely from my own research over the past decade. In this view, higher order rules are rules which operate on classes of rules and generate new rules. So defined, higher order rules are not chains of rules, nor are they more general rules. Rather, they are rules, for example, which may operate on pairs of rules to generate chains of rules or which may operate on specific rules to generate more general ones. Higher order rules correspond to the "instructions" necessary for moving from one level in a hierarchy to the next. In this regard, it is important to emphasize that higher order rules operate not just on the rules in one hierarchy but they may operate on rules in a (potentially infinite) class of hierarchies.

The nature of higher order rules has been fully described, together with related research, in the context of a general theory of structural learning (Scandura, 1973a). Among other things, this research shows that higher order rules are critical in moving from one level of a hierarchy to the next. If a subject has all of the prerequisites indicated in a hierarchy, then the question of whether or not he can solve a higher level task (in the former sense) depends precisely on whether or not he has already mastered (or been taught) a requisite higher order rule. I might note in this regard that the high degree of upward transfer evident in "good" hierarchies is evidence that requisite higher order rules are commonly available to the subject population.

Although a brief note is not the place to enter into the matter, I should perhaps mention that an extension of the above concerns has led me to seriously question the

1 Requests for reprints should be sent to Joseph M. Scandura, Graduate School of Education, University of Pennsylvania, Philadelphia, PA 19104.
general adequacy of fixed hierarchies of any sort as a viable model of human memory and cognition—and by implication as a viable model for characterizing instruction and curricula. Central to my argument is the important, but often misunderstood, idea that any given rule may act either as a state or as an operator, depending on the particular role it is playing at the time in question. Thus, when a rule acts on other rules it acts in a higher order fashion relative to that rule. In other cases, the rule may be operated upon, in which case it plays a lower order role. In short, order is not a property of rules but of the use to which one is being put. In contrast, the notion of a hierarchy assigns a fixed level to each rule.

Details of the complete argument, which includes other matters not touched on here, are given in Scandura (1973b).

REFERENCES

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160