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Is the French Connection Neo-Piagetian? Not Nearly Enough!

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Some general-causal assumptions of current neo-Piagetian research are discussed and compared with those of French European developmentalists. Developmental theory problems for the millennium are highlighted.

INTRODUCTION

The review by Larivee, Normandeau, and Parent (2000) is an excellent rational reconstruction of the late (already liberalized) Piagetian research in France and in Geneva. Piaget's Kantian-flavored style of theorizing and data gathering has been replaced, in the "French connection" school, by a more refined statistical treatment of data and a dialectical, multifactorial approach. This change in epistemology and methods of inquiry (which Reuchlin demanded) tacitly exposes a major theoretical paradox in the classic work of Piaget: the paradox of claiming that a single canonical course of cognitive growth is followed throughout development (i.e., his theory of stages) and yet simultaneously claiming that development occurs as a result of *equilibration processes* that serve to resolve competitive contradictions or conflicts among schemes elicited by situations. This claim is a paradox because growth driven by competitive scheme processes normally should not have a single ("unidimensional") canonical course; rather, conflicts among schemes should change with the subjects' varied experiences, thereby leading to multiple courses of cognitive growth.

The French connection researchers tacitly address this paradox by showing empirically that alternative courses of growth can be found in different types of subjects and vis-à-vis different situations. Yet they maintain Piaget's claim that some general intellectual factor exists. Piaget equates this general factor with the "psycho-logic" of unfolding stages, but French connection researchers wisely leave it undefined. In this theoretical position they might be following Reuchlin's ideas, concluding that Piaget's operativity (i.e., the stage level at which a subject can confidently operate) is related to a general psychometric factor of intelligence. To explicate both this central factor and the alternative courses of cognitive growth tied to individual differences, they propose various modes/dimensions of processing, whose strength could vary from one subject (or task) to another. These innovations (which some neo-Piagetian work may have anticipated, for example, Pascual-Leone, 1969; Pascual-Leone & Goodman, 1979) bring the Piagetian research program in line with that of neo-Piagetians.

Are the members of the French connection school neo-Piagetian? They share with neo-Piagetians a good number of conclusions: They emphasize individual differences; they recognize that universal stages of development do not really exist—even if Piaget may have claimed otherwise (they believe with neo-Piagetians that stages are found only in suitable situations!); and they consider that common organismic characteristics across children of a certain age (which might justify distinguishing development from learning) are related more to the level of mental-processing complexity that subjects can handle than to the structure of children's logic (this structure changes considerably with prior learning experience). The concept of mental-processing capacity could be used to explain processing-complexity growth and thus developmental stages; however, in the French connection school, as for many other researchers, the concept of processing complexity (usually labeled "working memory") remains unexplicated. Finally, the European researchers recommend a method of dimensional task analysis to assess this complexity, as neo-Piagetians often do. Are stages caused by mental-attentional growth that results from prior cognitive/structural learning, as Piaget and classic developmentalists in fact believed? Or do stages index the endogenous growth of maturationally driven mental-attention mechanisms (as I have suggested: Pascual-Leone, 1969, 1970, 1978, 1980; Pascual-Leone & Smith, 1969)? The French connection school does not seem clear in this regard; like many neo-Piagetians and most experimental scientists, they appear to suspend judgment.

Commentary on Larivée, Normandeau, & Parent, "The French Connection: Some Contributions of French-Language Research in the Post-Piagetian Era."

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MENTAL ATTENTION AND DEVELOPMENT

I wish to argue for the second alternative: the developmental unfolding of mental-attentional mechanisms. When properly defined as a general-causal construct, mental-attentional capacity appears as a set of innate resources growing in power with chronological age until adolescence. The power of mental attention is indexed by the number of organismically distinct aspects or dimensions that the person simultaneously can entertain in misleading situations. Notice that mental capacity should be defined as innate because otherwise it becomes a local-descriptive construct. Indeed, if both innate resources and prior learning could increase mental capacity, then this concept would be just a descriptor of the subjects' level of performance in chosen situations because learning is necessarily situation specific. In practice, developmental psychology already has a name for this sort of local-descriptive concept: It is "working memory" (Baddeley, however, would disagree). Mental attentional capacity should be used to denote central innate mechanisms that enable the processing of complexity and thus increase working memory as learning also does. Some innate functional mechanisms ("hardware" constructive operators, I call them) must exist that both enable and limit the learning potential of people, species, or both. To confound these mechanisms with cognitive learning and refer to them as "g factor," or "working memory," or central inhibitory mechanisms, or speed of processing, or interactions between "propositional" and "analogical" modes of processing does not clarify their nature—unless the hypothesized factors have an adequate, general organismic theory behind them.

TOWARD AN ORGANISMIC THEORY

Two main questions thus arise: What are these mental attentional mechanisms? and Are these attentional mechanisms fully developed at birth, or do they unfold slowly across development until adolescence? An innate mental attentional capacity, which unfolds along development within the organism, can bring about an increase in learning potential that leads to the emergence of Piagetian stages—at least within the sort of misleading situations in which stages can be found (this is the alternative I introduced in the literature: Pascual-Leone, 1969, 1970, 1980; Pascual-Leone & Smith, 1969). A *misleading situation* is one in which schemes that are salient (either as a result of perceptual features or past learning/habits) are in fact inconvenient for correct task solution.

With regard to the first question, I will suggest only that a central attentional mechanism must contain four different sorts of processes, or "hardware"/"software" operators, in dynamic (systemic) interaction (e.g., Pascual-Leone & Baillargeon, 1994). It must contain a central activatory "mental energy" mechanism (which I call *M*); a central inhibitory "attentional interrupt" (which I call *I*); a central mechanism for bringing about attentional closure, perhaps by means of cortical lateral inhibition processes that can reduce, according to some "Minimum Principle," the neural Field of activation created by the mental-attentional "beam" (Crick, 1984; Newman, 1995; Pascual-Leone, in press; Pascual-Leone & Baillargeon, 1994). Finally, there must exist a set of executive processes ("software," planning and monitoring schemes) that mobilize, control, and suitably allocate these resources. The *M* (or activatory) mechanism is needed because without it we fail to explain the sudden and recurrent emergence, across tasks and context domains, of greater capacity for coping with task complexity, even in tasks where the prior learning experience might be misleading; this is a reliable landmark of developmental-stage transitions. With just the assumption of a central inhibitory mechanism (or of an enhanced speed of processing), one cannot explain these data without falling under a *learning paradox* (Juckes, 1991; Pascual-Leone, 1987, 1996). Likewise, learning mechanisms (which I assume, but did not mention—Pascual-Leone, 1995; Pascual-Leone & Goodman, 1979), together with the *M* operator, cannot explain the sudden change in performance of children who have reached the age of a stage transition; for instance, their sudden progress toward solutions, at suitable ages, in misleading tasks they had not faced before (e.g., Piaget's Water Level Task, the conservation of horizontality experiment; Pascual-Leone & Morra, 1991). In such cases, a central inhibitory mechanism is needed to explain why, all of a sudden, the child can both put together the correct inferential response (possibly as a result of executive processes that monitor the *M* mechanism to activate task-relevant schemes) and also override the habitual, overlearned wrong responses that constitute misleading factors in the situation.

The second question asks whether there is a long developmental unfolding of the mental-attention mechanism (a hypothesis that easily explains developmental stages) or whether mental capacity is fully unfolded soon after birth. In favor of the first hypothesis is the argument that this alternative works better for the acquisition of very complex, temporally structured skills, which have a rich hierarchical/componential organization; examples are human language, music, complex rational (symbolic but intuitive) knowledge, etc. The important work on language ac-

quisition of Newport and collaborators (Johnson & Newport, 1989; Newport, 1990) can serve as illustration. They show that the linguistic inadequacy of late second-language learning increases with the age of acquisition in childhood, in particular when language is acquired before adolescence. Newport argues (1990) that a limited (but slowly growing) information-processing capacity is an advantage in learning tasks that require componential analysis. She shows that with early-age acquisition the linguistic components first learned are simpler, situationally salient structural components of the cognitive activity in question, which permits the more refined (hierarchically higher) components to be learned later on, in stages—as the mental attentional capacity develops.

PENDING RESEARCH ISSUES

The French connection in developmental psychology has helped to open a research task for the new millennium: The process modeling of "Piagetian" children and that of mental-attention mechanisms so as to bring understanding of how higher cognitive functions emerge developmentally from lower cognitive functions (Pascual-Leone, 1996). Because attentional resources are multiple, general purpose, and very abstract (dynamically interacting in nonlinear ways with other resources such as learning), experimental methods may not suffice. Theory-guided forms of developmental task analysis are therefore necessary—a conclusion that our French-connection colleagues clearly share.

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