
Some Reflections on Postformal Stage

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After having reviewed the most important conceptualizations on post-formal knowledge and described the characteristics of this level, the author criticizes some of them, analyzes whether it is possible to speak of a fifth stage of development beyond formal operations, and makes some considerations about the models of development underlying studies of adult behavior.

For decades, the terms *human development* and *psychological development* were seen as related to childhood and adolescence, that is, to the first twenty years of life. Traditionally, experts in developmental psychology analyzed the growth of the child and of the adolescent, holding that development ends before adult life begins. One of the authors who defended this position was Piaget. According to Inhelder and Piaget (1955) formal operations are due to (a) the unlimited expansion of its scope; (b) its increasing mobility and, simultaneously, stability; (c) its total deductiveness; (d) its total operational reversibility, and (e) its total logical necessity; this manifests a complete and final equilibrium and represents the end of the operational development of intelligence, "which in no way rules out the new integrations and continuous surpassing proper to adult thought" (p. 3). Fifteen years later Piaget maintains, "[formal operations] constitutes the essence of the logic of educated adults, as well as the basis of the elementary forms of scientific thought" (Piaget, 1970/72, p. 6). These statements, widely criticized, compelled a group of authors to raise the hypothesis that there could be a stage (or stages) beyond formal operations that would better represent adult behavior. According to these authors (cf. Arlin, 1975; Basseches, 1980, 1984; Commons, Richards & Armon, 1984, Commons, Sinnott, Richards & Armon, 1989; Kramer, 1983, 1990; Labouvie-Vief, 1980, 1984, 1990, 1992; Pascual-Leone, 1984; Riegel, 1973; Sinnott, 1981, 1984, 1989, 1993, among others), cognition, owing to the broadening of social experience and the continuous need for new competencies (cf. Labouvie-Vief, 1980, 1992; Kramer, 1983, 1990), continues to develop during adult life, assuming forms that are more complex and less directly dependent than adolescent cognition upon the logic of truth *versus* falsity. In Labouvie-Vief's words (1992), in Piaget's theory:

...mature thinking is described primarily in terms of the noncontradictory thinking of formal operations . . . Piaget's adolescent is de-

scribed almost exclusively in terms of idealized structures of mathematical and scientific thinking. But this offers only a partial account of mature thought, which needs to embrace contradiction and tension as well (p.202).

With the aim of expanding the Piagetian view of formal operations, various theories arose (cf. Arlin, 1975; Basseches, 1980; Commons, Richards & Armon, 1984; Commons, Sinnott, Richards & Armon, 1989; Kramer, 1983; Pascual-Leone, 1984; Riegel, 1973; Sinnott, 1981, 1984, 1989, among others) which were based on the assumption that the distinctive characteristic of adult behavior was the acceptance and integration of various, and at times incompatible, truths that are highly dependent upon context and upon the way in which the subject perceives them, without the subject needing, as the adolescent does, to look for and to find a single truth. Such theories provoked great enthusiasm in the scientific community. According to Sinnott (1993), we were in the presence of a "new area" of development, called "post-formal".

The Underlying Theoretical Conceptions of Development

Although critical of the Piagetian theory of formal operations in particular and of some aspects of his theory of development in general, most researchers at first attempted to apply core assumptions of the Piagetian model of development to the study of adulthood (Labouvie-Vief, 1992). Most formulations of post-formal thought have taken the form of one general stage; development is seen as progressing from absolute, dichotomous modes of thinking, which characterize formal operations, to levels in which individuals expand their knowledge. For instance, Arlin (1975) speaks about a fifth stage, named "problem finding" as opposed to the fourth stage (Piaget's formal stage) which she calls "problem solving." Commons et al. (1982) portray their stages as third- and fourth-order operations in continuity with the second-order operations of the formal operations stage. Although the Piagetian model of development underlies most conceptualizations of post-formal behavior (the term itself is inspired by the Piagetian designation of formal operations), it has been the target of various criticisms. For most adult development scholars, the Piagetian conceptualization fails because of: (a) its claim that the stage of formal operations constitutes the last stage of psychogenesis; (b) the excessive value it gives to the structural dimension, to the detriment of the dialectical dimensions; (c) the model of formal operations, which appeals excessively to the logic of the truth tables; (d) the

separation of thought from the processes of the self, of context, and of history; (e) the lack of parsimony and of empirical adequacy of the Piagetian tasks employed in the evaluation of adult subjects; and (f) in not showing that stages *exist* as anything more than *ad hoc* descriptions of sequential changes in human behavior. To overcome such limitations, specific tasks were proposed to evaluate adult development; descriptions of adult behavior were made in which diverse dimensions (cognitive, subjective, intuitive, imaginative, interpersonal) were integrated; and other models were used, namely the dialectical model (cf. Basseches, 1984; Kramer, 1983; Riegel, 1973) and the relativistic model (cf. Sinnott, 1984, 1991). The dialectical model, divulged by Riegel (1973, 1975, 1976), claims that development consists of continuous and constant changes in which contradictions would be the motor of advances, there being--contrary to what Piaget postulated--no stable levels of equilibrium. The subject does not necessarily effect, as was postulated by Piaget, an equilibration of conflicts. On the contrary, dialectical thought that characterizes maturity consists of living with contradictions.

The relativistic model, based on axioms and properties of the relativistic model of Einstein, exerted (just as the dialectical model did) a great influence on the majority of the conceptualizations of post-formal behavior. According to Sinnott (1981, 1984, 1989, 1993), the pre-relativistic model of Newton and the relativistic model of Einstein reveal different assumptions regarding knowledge: absolutistic assumptions, in the case of Newton's model and relativistic, in the case of the more recent models. In her view, the Piagetian analysis of formal operations was inspired by the Newtonian. For Sinnott (1984), the "soft," relativist model, by containing the "strong" Newtonian logic in a broader system of relationships among elements, would be a more adequate model for representing post-formal behavior than the bivalent-logic model of propositions.

Most descriptions of post-formal thought are based on a dialectical epistemology and on an epistemology of relativity (e.g., notions such as dialectical operations, logical relativism, contextualism, self-reference, and acceptance of contradiction).

In a line of study that differs from that of most post-formal researchers in its view of post-formal level as more logical and operative than experiential, Commons et al. (1998), considering the various criticisms of traditional stage theory for not showing that stages exist as anything more than *ad hoc* descriptions of sequential changes in human behavior, have come up with alternatives to the Piagetian model of stages (the Model of Hierarchical Complexity and, more recently, the Behavioral Model of Development Stage) in which, as will be pointed out further on, stages are no longer means of classifying instances of thinking shown while working on some tasks but become "the highest order of hierarchical complexity on which there is successful task performance" (p.237-238).

References to a Stage beyond Formal Operations

The first references to the eventual existence of a stage beyond the formal were made by Bruner (1959) in his critique of Inhelder and Piaget's description of formal operations (1955). In Bruner's opinion--and, later, in the opinion of Gruber and Vonèche (1976) and of Commons and Richards (1984a,b)--such a stage would not be universal, as only a few scientists (e.g. Piaget) would manifest such a level of development. Years later Riegel (1973), one of the first authors to postulate the existence of a fifth stage of development, characterized adult creativity by dialectical operations. Arlin (1975;1984), for one, proposed a fifth stage of development characterized by the progressive substitution of *problem solving* (the dominant activity, in his opinion, of adolescent behavior) by *problem finding* (an activity which is, according to this author, constant in, and distinctive to, adult behavior). Labouvie-Vief (1984, 1992) described adult development by logical relativism and by progressive reference to the Self. Kitchener et al. (cf. Kitchener & Brenner, 1990; Kitchener & King, 1981, 1990a,b) claimed, in their reflective judgment model, that there existed higher stages, in which knowledge is conceived of as relative, circumscribed, and resulting from a constant evolution that is susceptible to being evaluated and re-evaluated. For Kramer (1983) post-formal thought, which is of a relativistic and dialectical nature, is independent from bipolar logic (i.e., from the true/false dichotomy), allowing the subjects to become conscious of the existence of mutually incompatible systems arising from the subjective and arbitrary nature of knowledge (Kramer, 1983, 1990). Commons and his colleagues (cf. Commons, Richards & Armon, 1984; Commons, Richards & Khun, 1982; Richards & Commons, 1984, 1990) describe stages of development qualitatively distinct from and logically more complex than that of formal operations (the systematic, the metasytematic, the paradigmatic and the cross-paradigmatic stage), in which subjects become progressively capable of analyzing and of coordinating diverse systems, creating supersystems of a metatheoretical nature.

The great diversity of theories, and of methodologies presented by authors who postulate the existence of stages of development beyond the formal operations stage, makes it difficult, if not impossible, to get a unified view of the characteristics of this level of thought. However, it is possible to identify in the diverse descriptions of post-formal knowledge (cf. Kramer, 1983, 1989) some features which would be specific to this level: (a) the recognition and understanding of the *relativistic*, non-absolutist, *nature* of knowledge; (b) the *acceptance of contradiction* to the extent that it is part of reality; and (c) the *integration of contradiction into comprehensive systems*, i.e., into a dialectical whole (Kramer, 1989).

Relativistic knowledge, which develops in young adulthood, is characterized by two features: (a) the *acceptance of incompatible systems of knowledge* (Kramer, 1983; Labouvie-Vief, 1980; Riegel, 1973; Sinnott, 1984, 1993) and (b) the *recognition of the subjective and arbitrary nature of knowledge* (Kramer, 1983, 1990; Riegel, 1973; Sinnott, 1984, 1993). In a relativistic view of the world, contradictory and incompatible phenomena or systems can co-exist, since their meaning depends upon context and upon separate points of view, unrelated to each other (Kramer, 1989). Thus, relativistic thought can, if contradiction

is not integrated into comprehensive systems, lead ultimately to immobility, and even to chaos (cf. Kitchener & King, 1981; Kramer, 1990).

Acceptance and integration of contradiction, which develop mostly in middle age, though there are great individual differences, are the most distinctive and salient features of adult knowledge (cf. Arlin, 1984; Basseches, 1984; Kramer, 1983; Labouvie-Vief, 1980; Sinnott, 1984; Riegel, 1973). Although the post-formal theorists might not differentiate between conceptualizations and contradiction, Kramer (1989) distinguishes contradiction which is postulated according to a relativistic conceptualization (based upon contextualistic assumptions) from contradiction postulated according to a dialectical conceptualization (deriving from organismic assumptions). In organismic assumptions, contrary to contextualistic ones, change occurs in a systematic (and non random) manner, results from the resolution of conflicts (and not from their coexistence), and leads to greater unity and coherence (and not to extreme multiplicity). Thus, to avoid falling into immobility, to which extreme relativism can lead, it becomes necessary to integrate contradiction into more inclusive systems constituted by two or more formal systems. Integration of contradiction is found in the highest levels by Kitchener and King (1981), in the autonomous level by Labouvie-Vief (1980; 1984; 1990), and in the metaformal schemata of Basseches (1984; 1989), to mention a few authors.

Reflections on Characteristics of Post-formal Reasoning

As mentioned above, various authors, based on Einstein's theory of relativity, contrast absolutistic reasoning with relativistic reasoning, the latter generally seen as being characterized by the acceptance of incompatible systems of knowledge, and by the recognition of the subjective and arbitrary nature of knowledge and of its dependence upon context. This characterization of relativistic thought raises various questions, the first of which is whether it reflects what Einstein meant by relativism. The theory of relativity (cf. Holton, 1998) doesn't reach the conclusion that truth depends upon the observer's point of view. According to this theory, the most important truths of science are independent of varying points of view. The laws of physics are formulated such that they are valid for all observers, independently of the way in which the observer is moving or of where he is located. This being the case, it doesn't seem legitimate to invoke Einstein to claim that knowledge depends upon diverse systems of reference, upon different points of view, or upon different contexts. Relativity in physics, on the contrary, teaches us that we can extract from different systems of reference all the laws of physics, these being invariant. In Holton's words (op. cit., p. 154), "it is for this reason that, in contrast with classical physics, modern relativity is simple, universal, and, we can even say, 'absolute'. The cliché in fashion is, erroneously, "everything is relative," when the important point is that, out of the vast

flux of all events; we can extract exactly the opposite: some things are consistent.¹

Holton's interpretation of Einstein's theory of relativity reminds us more of Piaget than of certain post-formal theorists.² It is true that some post-formal theorists identify different levels of relativism, the first levels being of a more radical character, but in the higher levels, besides the assumption of idiosyncratic and contextual variables, more valid epistemological justifications are sought. However, considering that these higher levels, in which contradiction is integrated into more inclusive frameworks, are not universal (i.e., few adults display them), it can be said that adult could manifest an immobilizing and, eventually, chaotic relativism, which has little or nothing to do with Einsteinian relativism. Another question concerns the findings of studies which don't support the hypothesis that relativity represents a postformal development (see Kramer & Woodruff, 1986).

As to *acceptance of contradiction*, and its *integration into inclusive systems*, it is important to see whether these two behaviors aren't ever manifested in the highest level (level B) of formal operations. Let us take, for example, the INRC group (cf. Inhelder & Piaget, 1955), the structure that is subjacent to formal operations. Upon resolving problems that presuppose the co-ordination of an initial operation with its inverse, its reciprocal, and its correlative, subjects not only are confronted with contradictory situations, but will also integrate this contradiction. If it must be admitted that at the beginning of formal operations such co-ordination is seen to be difficult, it is legitimate to suppose that at the consolidated level (level B) of formal operations, this co-ordination is accomplished, generalized, and applied in an increasingly greater number of possible instances. The following statement of Piaget and Inhelder and (1966/1971) clarifies this:

...the beauty of the new (INRC) system, which is now established and which demonstrates the character of synthesis or of consolidation (waiting, naturally, to be integrated into more encompassing systems), is that there is not simply juxtaposition of inversions and of reciprocities, but operatory fusion into a unified whole, in the sense in which each operation will be from now on simultaneously the inverse of another and the reciprocal of a third, this last being at the same time the correlative (...) of the first" (Piaget & Inhelder, 1966/1971, p. 110).

This being the case, these two characteristics considered to be distinctive of post-formal operations can already be manifest at the level of formal operations. The failure of certain post-formal theorists to consider the levels of development (from genesis to consolidation) within formal operations constitutes a significant

¹ It is notable that Einstein seemed to like the term "*Invariantentheorie*" better than "theory of relativity", the title first given to Einstein's theory by Plank and Abraham in 1906.

² As a matter of fact, Piaget knew Einstein personally and sometimes referred to him in his books, for example, in *A Child's Conception of Time*, in which, according to Piaget, he attempted to answer a series of questions raised by Einstein.

lacuna which can lead to the undervaluing of the potentialities these operations.

Can We Speak of a Fifth Stage of Development beyond Formal Operations?

Everything leads us to believe that there can be development during adult life. Then it is important to know whether the fifth stage of development, which the bulk of theorists propose as being beyond the formal, actually reveals a structural change of a level above that of formal operations. Alternatively it is not more than a group of competencies of a practical and contextual nature, relating to specific realms (cf. Labouvie-Vief, 1992).

To study this question presupposes an analysis of what the authors understand by "stage". To be able to speak, in a Piagetian perspective, of structural changes, it is necessary to keep in mind the various criteria postulated by this author (Piaget & Inhelder, 1971, p. 121), namely, (a) each stage is characterized by a structure in reference to which the principle individual reactions can be explained; (b) the order of succession of the stages is constant; (c) the structures are integrative: each new structure results from the preceding one, integrating it as a subordinate structure, and prepares the next one by integrating itself into it; and (d) any one stage has a level of preparation and a level of attainment. The passage from an inferior, less general structure to a superior, more general structure presupposes, according to the Piagetian conception, an increase in abstraction. This generalizing abstraction obeys the laws of equilibration, i.e., it reconstructs the operations of the inferior structure into a system that is more balanced, more mobile, and more encompassing. The majority of authors who postulate levels beyond the formal operations are not explicit about what they mean by "stage," or about what criteria the hypothetical fifth stage obeys (see Monnier & Wells, 1980). Some of them have very restricted conceptualizations. For example, Arlin (1984) characterizes the fifth stage of development by the change in the way formal operations are used, which would be manifested as the progressive substitution of "problem solving" by "problem finding."³ Others, like Kitchener and King (1990) defend a statistical conception of stage, and base their theories on psychometric methods, yet never following "a clearly delineated *a priori* logic of stages" (Commons et al., 1998, p. 245). Commons and colleagues are among those authors of the post-formal movement who have done the most to analyze questions regarding both the nature of stages and the criteria used to

³ It is not confirmed that "problem finding" is specific to a level of development superior to the formal, or that it might not be manifested in the formal stage. When Inhelder and Piaget (1955) speak of the capacity that youngsters come to have to formulate hypotheses, to construct theories and systems, or, further, to elaborate life plans, they show that in formal operations the subjects can display high levels of "problem discovery." According to some authors (Gruber & Vonèche, 1976; Monnier & Wells, 1980), "problem solving" and "problem discovery" constitute two dimensions of formal operational thought.

evaluate them. In a first phase of their work (Commons, Richards & Kuhn, 1982) they justified the existence of a new stage beyond the formal by the elevated levels of abstraction that in their opinion, were not manifested in formal operations. For Commons et al., in the systematic, metasystematic, paradigmatic and cross-paradigmatic levels (contrary to the level of formal operations), subjects became capable of analyzing and coordinating complex logical systems with each other, creating supersystems of a metatheoretical nature. In theoretical terms, all this suggests that we are in the presence of a conception of abstraction similar to that postulated by Piaget (i.e., reconstruction of the operations of the previous system into a more balanced, more mobile, and more encompassing system). The results obtained by Commons, et al. (1982) confirm such reconstructions relating to the systematic and metasystematic stages. However, these results were not confirmed in studies carried out by various researchers (cf. Demetriou, 1990; Kallio, 1995; Kallio & Helkama, 1991; Kohlberg, 1990). For these authors, systematic operations would be identical to that designated by Piaget as "consolidated formal operations" (i.e., Formal B) and, thus, could not be considered post-formal.

More recently, in an appreciable effort to clarify the central question of what is meant by a stage, Commons et al. (1998) propose a notion of stage based on the hierarchical complexity of tasks and on the performance of subjects as they carry out these tasks. In the authors' words, "the resultant definition of stage is that it is the highest order of hierarchical complexity on which there is successful task performance" (p.238). Such a notion of stage does not presuppose, in the opinion of Commons et al. (1998), the abrupt emergence of the new performance and disappearance of the previous performance; but it does presuppose the organization and transformation of the actions of the previous level, these organizations being characterized both by being new (in the sense that they cannot be carried out by lower-level actions) and by being carried out in a non-arbitrary manner. According to these authors, the results, when evaluated for tasks that are proper to a specific notional domain and are presented according to a hierarchical order of complexity (cf. Commons et al., 1995)--and not for tasks corresponding to diverse notional domains--confirm the sequence that they had postulated and already verified previously.

Clearly, the recent conceptualization and methodology of evaluation proposed by Commons et al. (1998) constitutes a conceptual clarification and a rigorous methodological approach. What is of interest now is to develop studies that empirically validate this new vision of stages and that clarify the question of its sequence. For example, it still remains to be clarified whether the tasks pertaining to the systematic level that were successfully accomplished represent the first stage of post-formal operations, or whether they are no more than the expression of the consolidated formal operations; and, also, whether the metasystematic, paradigmatic and cross-paradigmatic levels represent structural reorganizations of formal operations, or whether they simply expand these operations. Expanding could mean merely the integration of formal operations into more extensive systems, a hypothesis considered by Inhelder and Piaget (1955): "...this general form of equilibrium can be conceived as final to the extent to which it does not change during the life of an individual (although it can be integrated into

more extensive systems.)" (p. 121). The reorganization of formal operations into higher structural levels presupposes the reconstruction of the operations of the previous structure (and not just of one operation, evaluated by means of one task, and presented with various levels of complexity, such as is proposed by Commons et al. [1998]) into a more balanced, more mobile, and more encompassing system. The results of Commons et al. (1998) suggest expansion more than reorganization. Be that as it may, further study is necessary, both of a longitudinal (above all) and of a transversal nature, to shed light on this question. Only the results of such studies will allow, or not, for the attribution of a truly structural and "hard stage" (cf. Kohlberg & Armon, 1984) status to post-formal behavior, as it is conceptualized by Commons and his colleagues.

As to the remaining conceptualizations that accent the contextual, self-referent, and pragmatic dimensions and propose a more integrative view of adult behavior, these do not seem to constitute stages beyond the formal operations, but rather developments parallel to formal level. In the words of Labouvie-Vief (1992), herself an author of the post-formal movement, "the term *postformal* may not imply a progression in formal complexity. Instead, it could mean that for some individuals, formal thinking forms a base from which thought branches out into more nonformal domains (p.221)." Along this same line, Kohlberg & Armon (1984), conclude that "soft" stage (in which development is conditioned by particular experiences arising from differences in personality, upbringing, social class, and age) would be the conceptualization more adequate to the particular features of adult development than "hard" stages (in which development occurs in an invariant and universal sequence, e.g., the Piagetian stages). To Gruber (1984), for one, the web of interactions between the adult and the environment is so complex that generalization is difficult, making the existence of a general structure beyond formal operations almost impossible.

Given the heterogeneity of theories and given the inconclusiveness of the research carried out so far, it is not possible, for now, to determine the true nature of the behavior referred to as post-formal. This being the case, and considering that any scientific and epistemological theory must be based on presuppositions such as conceptual clarification, parsimony, and simplicity, it seems preferable to abandon the term "post-formal" stage(s) (except, possibly, in the case of the conceptualization put forth by Commons and colleagues) and to speak simply of adult behavior.

Some Considerations about the Models of Development underlying Studies of Adult Behavior

Most of the approaches to the post-formal level have common roots in the cognitive-developmental approaches of Piaget and Kohlberg. The major concern of cognitive-developmental psychology has been behavioral change (what develops and in what sequence) and both a general explanation of change and the specific mechanisms that bring it about (see Gruber & Vonèche, 1995). According to

the cognitive developmental model (see Gruber & Vonèche, 1995; Lourenço & Machado, 1996) (a) what develops is the general competence to act upon and to think about the physical and logical-mathematical world; (b) this competence is general, structural and organized (stages or structures) and not specific and local; (c) the stages occur universally in a fixed order; (d) the stages are actively and continually constructed by the subject in interaction with the environment; and (e) the major factor in such construction is the equilibrium factor, whose origins go back to biological regulatory mechanisms. Among these claims, the third one, i.e., that there are stages of development that occur in a fixed order, has been the most criticized. One major criticism has been that stages are not subject to any form of empirical verification, but rather constitute a conceptual and *ad hoc* description of sequential changes in human behavior (see Commons et al., 1995; 1998). This fact has led some authors (Broughton, 1984; Gardner, 1985; Miller, 1983) to propose the abandonment of the search for universal stages (Peláez & Gewirtz, 1995). An alternative would be to concentrate on an approach that emphasizes behaviors and actions in context. The behavior-analytical approach to development, found in Skinner's work, (see Peláez-Nogueras & Gewirtz, 1992) (a) explains development in terms of functional interrelation between environmental contingencies and the subject's behavior in context; (b) claims that these interactions are sequential and reciprocal; (c) is contextualistic, holding to the underlying metaphor of the historical act in context; and (d) conceives behavioral development as a continuous process, moment-to-moment, rather than in terms of qualitatively distinct stages.

Although in the cognitive-developmental approach development implies change that occurs in a certain direction (Chapman, 1998)—a direction understood as toward greater differentiation and integration, better organization, and aiming for higher levels of equilibrium (Youniss, 1995)—and distinguishes the concept of development from change over time, seeing age as merely an indicator and not as a criterion of development, in the behavior-analytical approach, development is conceived of as a sequential accumulation of changes in an arbitrary process in which age, also, is irrelevant. In the words of Gewirtz & Peláez-Nogueras (1992), in this approach "it is difficult to have a reasonable operational concept of development because the specification of those behavior systems whose sequential changes are taken to reflect development is arbitrary (p. 1417)." If in functional terms there seem to exist some points of convergence between these two approaches (e.g. an emphasis on action, the conception of development as interrelation between the subject's behavior and the environment), the great divergence is in the conception of development itself: a unified process of development in the cognitive-developmental approach; sequences that are arbitrary and dependent on variations in context, in the behavior-analytical approach. Faced with some limitations in the cognitive-developmental approach for the study of the adult, several authors questioned whether they ought to exchange the vision of a unified process of development for one in which sequences are more dependant upon variations in context. According to Labouvie-Vief (1992):

Not all writers on the issue have agreed that we ought to exchange his broad vision of a unified process of development for one that reduces all

individual variability to variations in content or context. Rather, a growing body of work reflects the conviction that a structurally oriented—albeit more contextually open—theory can offer an important avenue to understanding adulthood" (p. 197).

Despite opting for a unified conception of development, some adult developmentalists have continued to be confronted with various difficulties raised by the Piagetian cognitive developmental approach, in particular the difficulty—or even impossibility—of empirically verifying the stages. This problem, for example, led Commons and his colleagues to successively review their methodology and to propose alternative models: first the Model of Hierarchical Complexity (Commons et al., 1998), and more recently (Commons & Miller, in press) the Quantitative Behavior Model of Developmental Stage, which is based upon the previous model. According to the authors, the Quantitative Behavior Model of Developmental Stage is a quantitative behavior-model of development that deals both with the sequences of development and with the development that takes place. It is behavioral because it makes only behavioral assumptions and avoids mentalistic explanations, and because it uses principles derived from quantitative analyses of behavior. The aim of these models, centered on task analysis, is to show that stages exist as more than *ad hoc* descriptions of sequential changes in human behavior, and to formalize key notions implicit in most stage theories. Although it is a very recent model in need of some conceptual clarification and more research for validation, it seems that task analysis could contribute to a more unified vision (and consequently a less arbitrary one) of the process of development, and could constitute a good instrument for studying development that would make it possible to clarify the distinctive characteristics of adult development.

This very recent proposal calls to mind the last work of Inhelder and her collaborators in which the focus of study shifted from macro-development to the changes that occur in the spontaneous action sequences of micro-formation (Karmiloff-Smith & Inhelder, 1975). Now the shift is to the changes in the tasks, defined as "sequences of contingencies, each presenting stimuli and requiring a behavior or a sequence of behaviors that must occur in some non-arbitrary fashion" (Commons & Miller, in press).

As to the remaining models, dialectical and relativist, they don't seem to be models of development properly speaking, to the extent that they do not respond to the two main questions dealt with by theories of development, specifically a) what behaviors develop and in what order, and b) why development takes place. Even though they might be considered as such, they don't seem to be a good alternative, or a good complement, to cognitive-developmental theory for two reasons: (a) As stated above, they transpose, in a questionable way, the Einsteinian concept of relativity belonging to physics to the domain of psychology; and (b) Riegel's criticism that Piaget has neglected the dialectical aspects seems to have no foundation. In effect, it is important to note that dialectics plays an important functional role in Piaget's theory. For Piaget, dialectics is a process and not a stage, as Riegel has pro-

posed. Dialectics is the inferential part of equilibration and plays an essential role in the construction of structures (see Morrien & Wells, 1980).

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