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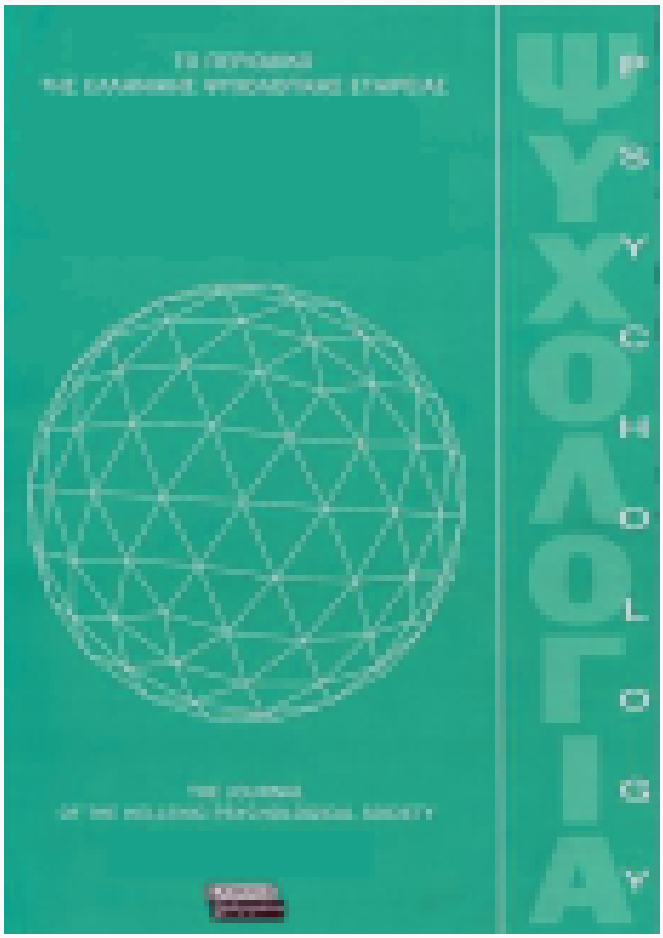

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Change and continuity in child development

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ABSTRACT This paper tackles the issue of the shape of development, i.e., whether human development is continuous. First, definitions of development are presented, and the content of the issue of continuity is described. A brief account of the stands taken by major developmental theories on this issue suggests that both continuity and discontinuity may co-exist in the developmental course, much like the way heredity and environment cooperate to bring about the developmental outcome. Evidence supporting this suggestion is offered, which comes from Werner's and Kagan's views on the issue. Finally, the paper takes the position that the continuity element should be put forward in a more explicit way than it has been the case so far. In addition to some theoretical and practical reasons, empirical evidence is cited showing that human development should be viewed as a continuous process, which is weaved around the same individual.

Key words: Change, development, stage

The study of human development and, even more so, of child development raises a variety of issues and questions to be answered. These are questions about the *nature* and the *rate* of development, the importance of *age*, the *process* which guides development, and critical issues such as *individual differences*, and *methodology*. A major question posed in this field has been the issue of the *shape* of development, i.e., whether development is smooth and *continuous* or abrupt and *discontinuous*, an issue that is dealt with in this paper.

A first rough answer to our question is given by the very definition of the concept of child development, according to which child development is a progressive series of changes that occur in a predictable pattern during the first two decades of human life. These changes, as will be noted later in this paper, are the result of an interaction between genetic and environmental factors. One can readily note that, essentially, *change* and *development* may represent the same phenomenon, as far as changes are progressive and *predictable*.

Thus, on the one hand, the very content of development, which is a series of changes, may lead one to view development as either continuous (if changes are smooth) or discontinuous (if changes are abrupt); on the other hand, the fact that these changes are predictable necessitates a continuity view of development, an issue which will be elaborated later on in this paper.

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Continuous vs. discontinuous development

Let us first present the essence of the issue which is being discussed. As Salkind (1985) stated, development is considered to be a *continuous process* if: (1) changes occur in small, gradual steps; (2) the outcomes of development are similar to, and not qualitatively different from, what existed earlier, and (3) the same general laws underlie the process at all points along the developmental continuum.

Alternatively, development is viewed as discontinuous if: (1) changes are abrupt and qualitatively different from what existed before, and (2) different general laws characterize the developmental process.

Generally speaking, theories that reserve a critical role to environmental factors in the developmental process, favor a continuity notion of child development, while theories that describe development as a series of independent, qualitatively different stages, support a discontinuous concept of development.

Figure 1 presents graphically the difference between continuous and discontinuous changes: Behavior A leads to behavior A1, in a smooth, continuous manner, and/or to behavior B in a step-wise, stage-like pattern.

Quantitative vs. qualitative changes

In defining continuous and discontinuous development earlier, I used the term qualitative changes from age to age, or from stage to stage. This is another way of looking at our issue. In other words, a behavioral change can be either quantitative or qualitative. A specific behavior is different from a previous one either in *quantity*, e.g. the child does *more* things, or in *quality*, in *kind:* e.g., the child does *different*, not more, things. Accordingly, quantitative changes constitute a more or less continuous developmental process (where things are added «on top» of each other), while changes in quality are connected with a discontinuity notion of development.

The emphasis on underlying structures

Still another way of dealing with the issue

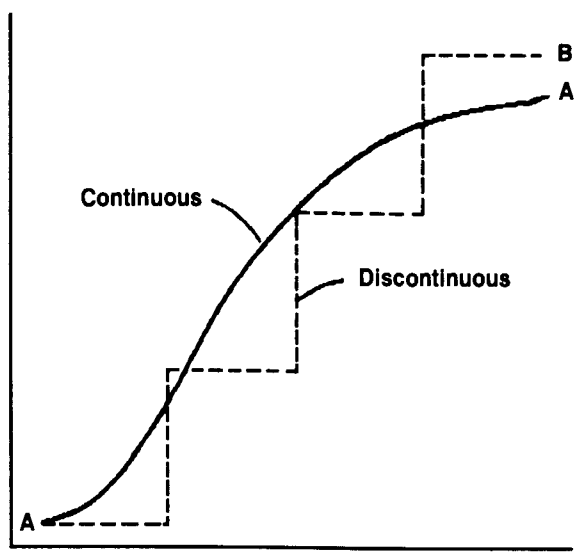

Figure 1. Continuous and discontinuous change

under consideration is evident in theories which emphasize the existence of *underlying stuctures* in development (cognitive-developmental and Freudian theories would be an example of such theories). Theorists of this stream believe that changes in behavior are accompanied by changes in underlying psychological structures. Such a structure would be, for instance, the physical/ neurological stucture necessary for the child to grasp, or the psychological stucture necessary for a child to understand language. This is not to say that there are no changes in *quantity* (e.g., a child can say more and more words), but quantity alone cannot account for the change of the nature of development.

Contrary to the above, other developmentalists - mainly, of behavioristic conviction - believe that there is no underlying structure responsible for the developmental course; rather, they claim that behavior is the structure of development itself and it constitutes the functional nature of the individual, and not the operation of an inner mechanism. This leads to the assertion that developmental changes are continuous in nature. An example of the above would be the differences in school achievement, which are considered to be *not structural,* but *functional,* i.e., due to social learning and to the differential desire to fulfill expectations.

Continuity vs. discontinuity and the main developmental theories

After having presented the content of our issue and presented the alternative ways of looking at it, let us move on to discuss briefly the stands taken by major developmental theories on the continuity/discontinuity issue.

The maturational approach

It is one of the oldest theoretical and empirical directions in developmental psychology, its main proponent being Arnold Gesell (1928). The maturational view of development is to a considerable extent characterized by abrupt transitions from one level to the next; the child demonstrates rather different behaviors (on a specific aspect of development, e.g., locomotion) during a relatively short period of time. Moreover, according to Gesell, different underlying structures operate at different times to produce the behavior we observe. Thus, the shape of development tends to be cyclically erratic, but not random, and finally *discontinuous:* the behavior of a five-year old child is not an outgrowth of the same child's behavior at the age of 3 (Salkind, 1985).

The psychoanalytic theory

This branch of theories is represented not only by its founder, S. Freud (1964), but also by the theory of E. Erikson (1950) and others. These theories, by definition, as stage theories, i.e., as proposing qualitative changes from stage to stage, put forward a discontinuous notion of development. This is based on two elements: First, in these theories the concept of stage plays a central role in delineating personality development. Thus, a child's behavior at age 5 (phallic stage in Freudian terms or initiative vs. guilt in Erikson's formulation) is qualitatively different from that of a child at 3 (anal stage and autonomy vs. doubt for Freud and Erikson, respectively). Second, Freud's belief in internal mechanisms or structures is also a strong indication of discontinuity in his concept of development.

The behavioristic view

The behavioristic model does not clearly imply a continuity notion, but it certainly excludes a discontinuity shape in development. In other words, behaviorists do not describe the developmental process in terms of stages, nor do they rely on the existence of internal psychological structures tc account for behavioral changes. Therefore, their view of

development cannot be a discontinuous one. On the other hand, if there is some continuity, it can be probably identified in the quantitative form of transitions in the environments surrounding the individual. Also, even if one concedes to the existence of structures, they are the results of *learning* and not an internal mechanism controlling it.

The cognitive - developmental approach

Going back to the stage theories, naturally we must mention one of the most influential developmental models, the cognitive-developmental approach. Most, if not all, of us know details of this approach and the names of Piaget (1952) and Bruner (1966) sound more than familiar. Theories of this group probably represent the clearest position for the discontinuity of development. This is attested to by the fact that one of the essential characteristics of the cognitive-developmental model is the existence of qualitative different structures which are reflected in overt behavior. An example of this is the progression, for instance, from concrete to formal operations stage, which implies an abrupt change, one that parallels the shift from a period of equilibrium to one of disequilibrium.

Does it have to be an «either - or» answer after all?

Is development continuous or discontinuous? According to the theoretical viewpoints discussed so far, *discontinuity* of development seems to be supported by a greater number of theorists as well as by every-day life observations of a child's life. As Kagan & Moss (1962) state, many childhood behaviors have short lives, and are replaced or dropped long before maturity. Such behaviors would be, for instance, fear of dark, which is associated with a specific period in the development of the child, and nobody is surprised to observe - later on - this fear vanishing from the behavioral scene. On the other hand, however, there is no doubt that quite a few adult behaviors, motives, and attitudes originate in childhood, and, once established, they become permanent parts of an individual's repertoire.

So, a decision as to whether development is continuous or discontinuous is hard to reach. But, does this have to be an «either - or» answer? The author of this paper believes that the answer cannot be a straight «yes» or «no». The next chapters offer evidence supporting this position.

Heinz werner's view

Generally speaking, Werner's organismic theory of development (Werner, 1957) belongs to the stream which favors a discontinuity notion, as it proposes, much like Piaget, qualitatively different stages of cognitive development. However, it is the same theorist, who takes a more complex position on the issue: According to Werner, developmental change can assume one of two characteristics. First, it can be *quantitative* in nature, with change occurring along a dimension, such as frequency of words spelled correctly or height. Second, it can be *qualitative*, with change occurring along a dimension that deals with substantive differences between levels, such as transition from babbling to one-word phrases. Moreover, Werner viewed quantitative changes as either gradual or abrupt, i.e., development can take place abruptly and suddenly with little forewarning, or it can be a gradual and continuous process that occurs smoothly without apparent shifts from one level to the next. Qualitative changes are described as having one of two different attributes: *emergence*, (this has to do with the possibility that later stages of development be reduced to earlier ones) and *intermediacy* (this has to do with the nature of the transition from one level to the next). So, Werner would never claim that developmental change is characterized by either continuity or discontinuity, by qualitativeness or quantitativeness. He believed instead that the best representation of development is that it is «*the result of quantitative changes, which are either gradual or abrupt, and*

qualitative changes, which by their nature are discontinuous» (Werner, 1957, p.137).

Jerome Kagan's view

An interesting point has been also put forward by J. Kagan in his 1971 paper on change and continuity in infancy (Kagan, 1971). According to this view, continuity and discontinuity occupy the two extremes of a continuum which ranges from complete continuity, to complete discontinuity with gradual changes along the way. So, if two behaviors at two different time points are identical, and, at the same time, the respective underlying processes are identical, you have the case of complete continuity. When the two behaviors are different but the underlying process is identical, the continuity is no longer complete, and so on, until you reach the case where both the behaviors and the processes are different, where you have complete discontinuity.

An example: An aggressive act by a child who knows that by being aggressive he/she can cope with frustration. If you have the same form of aggression by the same person in adulthood and the process is a reaction to being threatened (i.e., different from that in the past), the development is no longer continuous but it approaches discontinuity.

The heredity/environment controversy

H. Werner's and J. Kagan's views discussed earlier have shown in a convicing way, I believe. that continuity and discontinuity are not necessarily mutually exclusive but they may co-exist in an individual's development, depending on what aspect of behavior one is looking at. In other words, the continuity/discontinuity issue may be an artifact or a pseudo-dilemma, much like the well known heredity vs. environment controversy, which fruitlessly prevailed in the scientific endeavors of past decades.

It is widely accepted now that there is an *interaction* between genetic and environmental factors which promotes development, an interaction which is represented by the concepts of *range of reaction* (Gottesman, 1963) and *canalization* (Waddington, 1957). If genetic factors are more connected with discontinuous and environmental forces with continuous development, then the interaction between heredity and environment can explain, to a great extent, an interaction or a co-existence between continuous and discontinuous developmental changes. It is my opinion, moreover, that both of these forms of interaction are best represented by the notion of *correlation* between heredity and environment which was proposed by Scarr & McCartney (1983). They talk about *passive* correlation, in infancy, where parents provide rearing conditions that are compatible with their own genotypes. Since they share genes in common with their offspring, the environments are also likely to be congruent with their children's genetic predispositions. The second type of genetic/environment correlation is *evocative,* which means that children evoke responses from others that are influenced by children's genotyges, and these responses strengthen their original predispositions. Finally, Scarr and McCartney talk about *active* correlation, where children, at older ages, play an increasingly active role in seeking out environments that are compatible with their genetic inclinations.

What this notion of correlation teaches us, I believe, is that, while genetic factors and/or predispositions may account for qualitative, i.e., *discontinuous* changes in development, these same predispositions permit the developing individual to establish, what I would call a *basic sense of continuity,* by selecting - passively or evocatively, or actively - all along his/her developmental course, contiguous stimuli for his/her transactions with the environment.

Some points on the continuity element of development

So far, this paper has taken a position, according to which neither continuity nor

discontinuity alone can exclusively represent the shape of development. The author of this paper, however, is convinced that human development is more continuous than is has been hypothesized or, put it another way, discontinuity has been given more attention to than its share, both theoretically and empirically. The following chapters offer evidence supporting this view, in order not to diminish the discontinuous element but to make a better case for continuity in development.

Abrupt changes, transition, and transitional periods

Let us first start with the terms «abrupt» and «transition», which have been used earlier in referring to changes between stages of development. The question is how abrupt is an abrupt, a sudden change? Is it so abrupt that one cannot recognize an old behavior within the context of a new one? Or, in Werner's terms, does a change have such a degree of emergence, that it cannot be reduced to an earlier behavior, or, is it because we have failed to invent methodological ways in order to detect intermediate forms of a behavior? If you study a child at the age of 4 and then at 8, you are bound to find, not only quantitative but also, and probably mainly, qualitative differences; whereas, I am not sure how impressed one can feel by changes in a child's behavior that one has closely followed for a whole year: I have not yet met a child who went to bed at night as a fully egocentric creature, and who woke up the following morning as a non-egocentric individual.

This leads us to the concept of *transition* and *transitional periods.* The importance, if not the existence, of such periods has been rather neglected by stage theories. It is as if one tries, for instance, to delineate the course of an adolescent from her being a high-school pupil to becoming a college student, without giving any credit to a preparation phase between the two states.

Using a more relevant example: I am sure we all know that a lot is happening after a child has stopped employing exclusively concrete objects for his mental enterprises and before he is fully competent at handling purely abstract material.

Still another example of a kind of transitional period can be derived from the process of problem solving. This process, has been described, among other things, as consisting of stages or phases. One of these phases is *incubation,* which is perceived of as a period of relative inactivity, with no obvious progress made toward the desired end. It is inferred, however, that a lot of mental activity is taking place during this period, and this makes possible the realization of the next phase, which is *inspiration.*

Continuity and the concept/ of epigenesis

The concept of *epigenesis,* one of the basic principles in child development, has been used in a somewhat different way by two of the authors mentioned earlier in this pager.

Erikson (1950) defined epigenesis as «a ground plan, according to which anything that grows acquires parts, each part having its time of special ascendancy, untill all parts have arisen to form a functional whole» (p. 52). Let me remind the reader that Erikson's psychosocial model provides for qualitatively different stages, which means that development is viewed as discontinuous. But keep in mind, also, that epigenesis is for Erikson a kind of developmental *plan,* and I think there is no doubt that if a plan is to be realized, there has to be some degree of continuity between the different phases of development.

Kagan and his colleagues (Mussen, Konger, & Kagan, 1975) by epigenesis meant the relation between a set of processes or performances at one time and a successive set of behaviors at some time in the future. For example, some developmentalists believe that an infant who is closely attached to her mother at age 3 will be highly attached on her at age 5. So, epigenesis, in this sense, is one kind of continuity. They refer to two more kinds of continuity: rank-order and ipstative continuity.

According to *rank-order* continuity, which is a relative continuity, a child retains her relative rank for a particular attribute within a particular cohort over a particular period of time. Statements about continuity based on maintenance of a rank, are always relative to the reference group with which the child is being compared. The stability of IQ, and achievement-test scores from early primary school through high school are examples of rank-order continuity. A child who lives in Athens, for instance, and who scores in the twentieth percentile for reading comprehension, will probably remain somewhere between the 15th and the 25th percentile, if he/she remains in Athens or in some major Greek city for the next 10 years. But, if he/she moves to a rural, isolated school in the country, he/she will probably move to another percentile (maybe higher) and there will be a discontinuity in his/her relative ability, although his absolute competence has not changed.

The third kind of continuity is called *ipsative*. This is a kind of stability measurement, in the sense that it evaluates the tendency of a child to display the same behavior over time, with no comparison to a reference group. An example of this would be the tendency of a 4-year child to consistently withdraw when threatened by a peer, as long as this disposition will remain stable over the next 5 or 10 years. Her rank for the tendency to withdraw may change radically, for example if she joins a group of children who withdraw even more frequently. But we talk of an ipsative continuity, as long as the child's tendency to display this attribute remains stable.

Empirical evidence on the continuity of development

Moving on - from theories and observations - to empirical research findings, one realizes that significant evidence is accumulating which shows that development is more continuous - or less discontinuous - than it has been considered or stage theories would imply. As Caprara (1996) points out, it becomes more and more a general feeling that «successful development is no longer conceived as the reffex of fixed structures or processes able to meet the requirements of predetermined *stages*, but as the result of the *active role* of the individual in selecting environments with which to interact...». A similar point, concerning the interaction between environment and the developing child, was made earlier in this paper.

It must be noted here that relatively little work has directly tackled the issue of continuity, the major reason being that most of the time one needs longitudiual data to accomplish this aim. Most of the empirical research deals indirectly with the issue of continuity, and this is done in various ways, e.g., by *correlating* same or similar sets of behaviors at two different times, by challenging the notion of *stage*, or by *cross-sectional* work, where researchers look for similar behavior patterns in subjects of different ages.

What follows is but a small sample indicative of the relevant evidence from various areas of development.

Development of movement patterns

This piece of evidence concerns the question whether there is a relation in movement patterns between pre-natal and post-natal life, i.e., between two phases which may be not only far apart in terms of time, but also qualitatively different.

Butterworth & Harris (1994) cite evidence suggesting that it is likely that there is a continuous relationship between some fetal movement patterns and later forms of behavior, across the transition brought about by birth. Such a continuity is evident in the case of the universal behavior of yawning and stretching which was traced in a yawn and stretch pattern at 10 weeks fetal age.

It is also possible that there is some relationship between fetal rotation in the womb, crawling and stepping movements in the first year of life. This suggestion is made despite the fact that the so-called «stepping reflex» disappears as

the baby matures, because, as Thelen (1984) argues the disappearance of stepping is illusory, and there is a relationship between stepping and later crawling and walking. She suggests that the patterning of walking movement is innate but that babies must gain sufficient strength to support their own weight before upright locomotion becomes possible.

Cognitive development

A good part of contemporary research in cognitive development entails attempts to modify, redefine, or even refute the concept of *stage,* at least the way it was formulated in cognitive-developmental tradition.

Peter Eimas (1994) challenges Mandler's and others' view that the earliest categorical structures of infants, which are *perceptual* in nature, are qualitatively different - i.e., they imply different internal mechanism - from conceptual representations of older children and adults. He presents, instead, the idea that the non-perceptual knowledge that is taken to mark concepts, as opposed to perceptual categories, finds its origins and basis in the same processes of perception and categorization that make possible the initial perceptually driven categorical representations. Thus, it is perceptually based, too. This makes a strong point that *conceptual development is continous in nature.*

Quite a few cognitive developmentalists have attempted - successfully sometimes - to directly refute the stage concept of Piagetian theory. For example, Donaldson (as cited by Kagan, 1989, p. 93) and others have discovered that preschool children possess some of the competences that Piaget claimed were not possible, such as *nonegocentric attitude,* and the concrete operations of *conservation* and *class inclusion,* if standard Piagetian procedures are altered. Rochel Gelman's work also is well known on the *conservation of number* (1972), and, on *egocentrism* (Massey & Gelman, 1988), with similar results.

Kagan (1989) also cites evidence showing that some 2-year olds (sensori-motor period) use and understand words like *you, is, like,* and *why,* which have little relation to overt action and cannot easily be explained as a fucntion of the growth of sensori-motor period schemes.

This kind of empirical work shows, at least to me, a kind of continuity, basically because it proves that an ability, an attribute, exists long before (e.g., at age 3) it is regularly discovered by a standard method (e.g., age 7). So, the ability is there, but we have failed to spot it, probably because of methodological reasons.

Psychosocial and personality development

An example of relative developmental continuity in this domain comes from the classic Fels Research Institute Study. Kagan & Moss (1962) showed that, if a behavior was congruent with the sex-role stereotypes of the culture, it showed continuity, specifically, *rank-order continuity.* But, if it deviated from this sex-role stereotype, it showed no rank-order continuity from childhood through young adulthood. Thus, aggressive behavior was moderately stable from age 10 to adulthood for males but not for females, while passive and dependent behavior was moderately stable from childhood to adulthood for females but not for males.

Another classic longitudinal study of personality continuity is the one carried out at the Institute of Child Development in Berkeley. Macfarlane (1975) suggested that investigators tended to give insufficient emphasis to the *resilience* of the individual to recover from an early trauma. In her own studies she found that predictions of later development were often incorrect because too much weight had been given to those processes that were conducive to growth.

Finally, some important evidence on personality continuity comes from studies of temperament using the Five-Factor Model (Extraversion, Agreeableness, Conscientiousness, Emotional Stability, Intellect - Openess to Experience). There are quite a few studies which

showed that the five-factor structure of adult personality has been recovered in adults' *ratings* of school children (Costa & McCrae, 1994).

What is even more important is that this continuity in personality has been found in recent studies, one of which is our own at the University of Athens, which used free descriptions of children's personality. The free descriptions were made by parents of children 3, 6, 9, and 12-years old. The impressive finding was that more than 80% of the parental descriptors for all 4 ages belong conceptually to the same five-factors which describe adult personality (Besevegis, 1995).

Last but not least: Recent work of our own (Besevegis, Giannitsas, & Georgas, 1996), where student's and teachers' attitudes to, expectations, and experiences from the educational process were investigated, an impressive stability was evident in factors related to individuals' self-concept and identity formation from adolescence to age 60.

Conclusions

This paper attempted to tackle one of the most difficult issues in developmental psychology, i.e., whether development is continuous or discontinuous, an issue with obvious theoretical, empirical and methodological implications. After describing the content of this issue, the paper presented briefly the positions taken on this problem by major developmental theories.

It became evident that the question under discussion could not be really given an «either - or» answer; rather, it seemed that both continuity and discontinuity may co-exist in the developmental course, much like the way heredity and environment cooperate in bringing about the developmental outcome.

However, the author of this paper felt that the continuity of development should be put forward in a more explicit way than it has been the case so far. Both theoretical and empirical evidence was presented which showed that the continuity element of development deserves a closer attention.

This stance should not be taken as an intention to erase or even minimize the discontinuity in development. Discontinuous elements in human development are more than obvious: It only takes common sense to realize that a child of 5 and an adolescent of 15 demonstrate qualitatively different behaviors. But - and this is the main reason for «favoring» continuity - if one views literally development as discontinuous, one loses the picture of a developing individual as a whole. Human development can not be fragmentary; it is rather a continuous process weaved around - or inbuilt in - the same individual. This view makes two scientific functions possible: *interpretation,* i.e., how one can account for a present behavior on the basis of what existed before, and *prediction,* i.e., how one can go about foreseeing what will come next on the basis of present behavior.

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