STAGES IN TRANSITION: A BIO-SOCIAL ANALYSIS OF ADULT BEHAVIOR[1]

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Introduction

There has been considerable recent interest in departures from continuity models of life-span development for both the cognitive and personality trait domains. This interest has spawned a limited amount of research which attempts to extend Piagetian models into adulthood (e.g. Papalia, 1972; Rubin et.al., 1973; Tomlinson-Keasey, 1972). Such research clearly raises the question whether new stages develop in adulthood (cf. Erikson, 1963), whether there is regression to earlier stages (Hooper, Fitzgerald & Papalia, 1971), or whether we are simply dealing with transformations of content dealt with throughout adulthood at the level of formal operations (Piaget, 1972).

Although the question of systematic transformation in adulthood of the neural substructures which mediate behavior is most problematic, there is no question that it may be possible to identify experiential transformations which may have universal characteristics. In fact personality researchers have begun to identify and describe commonly occuring life events as transition points (e.g. Lowenthal et.al., 1975), which by implications may lead to transformations in life style and personality trait organization, as well as having possible implications, at least, for styles of cognitive function. Within a given culture, furthermore, there may be more or less regular transformations in values (Kohlberg, 1973),

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which can occur even though they are not accompanied by changes in logical modes of thought.

In a paper given at the recent International Congress of Gerontology, (Schaie, 1975) the senior author, examined the issue whether acceptance of developmental stages in childhood either implied or contraindicated further stages of development over the life span. He concluded that further stages were indeed required and proceeded to outline a tentative model for such stages. He suggested that the essentially acquisitive period of development up to and including the development of formal operations in the Piagetian schema (Flavell, 1963), is followed first by an "achieving", next by a "responsible", then by an "executive" and finally, by a "re-integrative" stage. Such stages were seen to involve the application of formal operations at increasingly more complex levels of integration. It was suggested further that there may be psychological development which is not isomorphic with accompanying structural changes in the central nervous system, but that such development rather is directly responsive to experiential and motivational stimuli.

It is the purpose of this paper to show that further stages of adult development are indeed compatible with a Piagetian approach to cognitive development. Such demonstration will require that a formal case be made for transitions in adult development. Further, we shall provide a detailed analysis of the concepts of equilibration (see Riegel, 1973, for a contrary position) and of formal operations (particularly relating to Piaget's most recent formulations (1972)) as they might be applied to the issue of experientially moderated transformations in adult development.

The Case for Transitions in Adult Development

At least tacitly, it has generally been assumed by most developmental

psychologists that a transition in behavior which implies saltatory or step-wise change must require the biological underpinning of parallel change in neural structure. Since known biological changes are confined to early childhood, adolescence and advanced old age, stage models of development have traditionally been assumed to hold little promise for understanding the extensive remaining portion of the life span. As a consequence, no attempts have thus far been made to develop a general cognitive-structural stage theory of adult development and aging. A reevaluation of this traditional posture, however, is warranted on two accounts. First, because, as suggested by Wohlwill (1973), stage-like concepts are a promising means of efficiently summarizing behavior, and second, because, as we shall show, a closer scrutiny of the necessary prerequisites for the occurrence of adult transitions support their feasibility.

Behavioral change is systematic rather than erratic, and the inference that some constraining process determines transitions in development is based on the notion of universal similarities in the sequencing of stages and perhaps also in their time of onset. In considering the nature of the process which constrains developmental change, whether biologically based, experientially determined, or the result of some interaction of these factors, it has been argued that biological change is at least necessary, if not sufficient, for inducing stage-like change. An illustration of a strong statement of this position in the context of Piagetian theory is provided by Flavell's comments that ".....much of what is interesting and distinctive about preadulthood intellectual changes result from their being guaranteed in fact and significantly constrained in form by biological-maturational factors," and that, "there

are however, certain characteristic properties of childhood intellectual changes which I believe no theory that considers only environmental inputs can ever satisfactorily explain (1970, p. 248)."

In spite of the above statements, however, Flavell eliminates the role of experiential factors in inducing or constraining stage-like change not because he considers experience to be theoretically precluded from attaining stage-inducing status, but because he assumes that, "while many of the major occasions and settings for change-making experiences are encountered by the vast majority of adults (marriage and parenthood, for example), the altered psychologically defined experiences undergone in these "normative" settings must vary widely from individual to individual (1970, p. 251)."

The all too ready willingness to accept the necessity of a biological-maturational substrate to underly transitions in development seems to us to stem more from the presumed inadequacy of an experiential stage model than from any logical necessity for the biological model. For example, the onset of menarche and menopause is at least as variable both across and within genetically differing populations than is the occurrence of experiential universals such as marriage or parenthood!

Support for the position that biological change may be correlated with rather than causally related to psychological change is given also by evidence for wide inter-individual differences in the age of attainment of formal operational thinking, Piaget's final stage of cognitive development. If Piaget is correct in hypothesizing that all normal individuals attain the stage of formal operations, then under these circumstances, his theory retains its viability even though, at the same time, the significance of the biological substrate is diminished. The

finding of wide latitude in the time of onset of formal operational thinking does not rule out the necessity for some basic level of nervous system maturation prior to the possible attainment of Piaget's fourth stage, but it strongly supports the contention that the attainment of the biological substrate will neither lead to the expression of the behavior, nor that such biological change must occur temporally concurrent with the onset of intellectual change. Moreover, if it is possible for the fourth stage of development to be reached in the absence of concurrent biological change, it then becomes at least theoretically possible to conceive of the development of further adult stages.

Regardless of the role of biological substrates during childhood and adolescence, there does not seem to be any evidence for step-wise biological change during adulthood. The issue remains therefore, whether it is possible to render viable the notion of significant transitions during adulthood and aging. This is exactly what we shall attempt to do by extending the utility of certain Piagetian constructs to this life period.

The Role of Equilibration in Adult Development

Piaget assumes that an individual is innately programmed to adapt to his environment. As he attempts to integrate external events into his own evolving or completed structures (the process of assimilation), his structures are transformed simultaneously by the events being assimilated. Piaget believes that cognitive adaptation consists of equilibrium between these processes. He has made it clear on many occasions, however, that his concept of equilibrium does not imply a static balance between opposite forces or a fixed state because new problems will always disturb the system and there will be a continual need for further

adaptation, a need to strive for a better equilibrium.

According to Piaget, both the experience of the environment and the effects of maturation are important in cognitive development, but neither factor by itself is sufficient to determine the course of development. The experience of the physical environment and the action of the social environment are not sufficient by themselves to accout for the invariant sequencing of developmental stages and maturational factors are viewed as opening up new possibilities for novel development, rather than providing a complete program. Therefore, there is necessarily an interaction between these factors and some process to coordinate them into a consistent, noncontradictory totality. Piaget calls this process equilibration and it is the core of his theory of developmental transitions. Equilibration is the sequence of self-regulatory processes involved in the search for a better and better equilibrium. It is the process by which the individual copes with conflicts, imbalances or disturbances to the system.

In Piaget's system states of equilibrium may differ in degree of stability and a high degree of equilibrium is attained during formal operational thinking when no further major structural changes of a logical nature are deemed necessary, although even this system is considered to be "wide open to limitless elaborations and particular applications (cf. Furth, 1968, p. 219)." Piaget, therefore, has devised a limited system only because the essential operational structures for logical thinking have been attained during his fourth stage, in spite of his having postulated a mechanism for going beyond that stage.

In elaborating upon his hypothesis of equilibration, Piaget (1971) has delineated two kinds of equilibrium in addition to that which exists

in the relationship between the processes of assimilation and accomodation. First, he has discussed an equilibrium among the subsystems of the subjects' assimilatory schemes, those partial systems (e.g. subsystems of logico-mathematical operations and spatial operations) in relation to the totality of the subject's knowledge. Secondly, he has also discussed an equilibrium between the parts of a subject's knowledge and the totality of his knowledge at any given moment. This latter form of equilibrium must result from the ongoing attempt to reintegrate subsystems back into the whole following their differentiation or from some modification of the definition of the whole. These aspects of Piagetian theory would seem to provide a framework within which any state of cognitive equilibrium may be viewed as temporary, and thus continued development across the life span becomes quite plausible.

Equilibration as a self-regulatory motivational mechanism which is an intrinsic aspect of the functioning of any cognitive system provides a means for creating better adaptation in the presence of disturbances resulting from new inputs into the system without regard to the presence or absence of external forces of reinforcement. Although continuous change becomes the rule, the magnitude of resultant change must be predicated upon the extent and significance of the disturbance. Should the disturbance to the cognitive system originate in a major life event, such as marriage or retirement, the change in the system may then be expected to be great and possibly of a qualitative nature.

The equilibration process, however, while it can account for continuous development and even changes of great magnitude, is inadequate by itself as a basis for predicting commonality among individuals with regard to the nature of this change. But the concept of universality

of stages has been considered of cardinal importance in the description of child and adolescent development and has probably been the sole reason for the great attention payed to the role of biological maturation. The search for a similar (non-biological) constraining factor in adult development to fulfill the role parelleling that of physical maturation in childhood must lead us to a finer analysis of the nature of the functioning of cognitive systems.

It seems likely (cf. Furth, 1969) that each successive reorganization of a cognitive system will reduce the alternatives for further development, at the same time that the probability of the attainment of the next stage is increased by such reorganization. There must be commonalities among individuals with regard to the nature of their repective cognitive organization as they enter adulthood. And, there must also be commonalities with regard to the major occasions for change-inducing experiences which these individuals will encounter. Consideration of the constraining factors inherent to the nature of the functioning of cognitive systems would then predict that there be commonalities in the way such individuals would continue to progress. Even though heterogeneity in adult behavior may previously seem to have been more salient than homogeneity, such apparent increased variability is no doubt an artifact of the behavior facts researchers have elected for study:

Formal Operation in Adulthood

Piaget has given us a stage theory for the development of logico-mathematical operations. During his final stage of formal operational thought, the system of mental operations has reached a high degree of equilibrium and therefore, as mentioned previously, no further structural changes with regard to logico-mathematical development are necessary.

It is only when cognitive functioning is conceptualized more broadly and decision-making processes are viewed as involving these operations, but not fully accounted for by them, that additional stage-like formulations are indicated. Theoreticians have at the most been able to suggest one stage beyond formal operational thinking because they limited themselves to the logico-mathematical aspect of thought.

We would like to consider the possibility of a hierarchical organization of the task-related subsystems which have unfolded in response to new environmental presses. Such a system would have many features in common with the Piagetian cognitive-structural framework, but would predict the evolution of additional stages of development following an individual's confrontation with successive environmental presses in the form of the "major occasions for change-making experiences." During each major transition, we would expect to observe the creation of a subsystem related to the new life-task (possibly involving the interrelationship of a new body of information with new rules and new habits). This new task-related subsystem would be expected to conflict with the subsystems of the old organization which in turn would have become nonadaptive in the presence of the new environmental demands. The new subsystem would be integrated with the old through the creation of new principles of increasingly higher orders of abstraction.

An analogy may be helpful at this point. If we were to conceptualize the neural substrate necessary for formal operational thinking as a highly sophisticated high-speed computer with large (although finite) memory, we would then characterize adult development not only as the process by which increasingly complex programs are generated, but more important for our argument here, the process by which monitoring programs

are developed, and when necessary, radically altered, to permit the smooth operation of ever increasing complexity of the total demand made upon the computer hardware. The analogy seems clear: When too many competing programs are required (i.e., the increasing number of content areas for which internal equilibrium might be reached) the efficiency of the system can be increased by providing a monitoring principle which regulates the timing sequences, access routes, and shared information storage. In addition, the system may be protected from overload, by including principles (e.g., motivational cues) which abort whole sequences which may otherwise be required, in the interest of permitting effective functioning under special conditions. The change of the computer monitoring program is quite analogous with the cognitive reorganization implicit in the development of new adult stages.

Each new adult stage has specific cognitive implications both for the range of factors which must be brought into any decision-making process and for the breadth of optimal factors which could enter any decision-making process. In other words, it is assumed that each successive stage of cognitive complexity requires a base level of prior confrontations with qualitatively dissimilar major life tasks. The failure to demonstrate formal operational thought in all individuals of an appropriate age, has suggested that some individuals may have been asked to perform on tasks which were not relevant to their vital interests. Formal operational thought, then, may be far less general than has been assumed previously, or it may be, as Piaget (1972) has suggested, that formal operational thought is universally attained, but revealed by some individuals only in content areas of vital interest to them. If the latter notion has merit, it would then be predicted, on the basis

of the theory outlined above, that formal operational thought in itself may require experience with several content domains in order for its form to become completely dissociated from content and before it becomes generalizable across diverse content domains.

A second implication from our theoretical formulation suggests that performance will be optimal on those tasks requiring a level of complexity which is congruent with the complexity of the total cognitive organization. Cognitive complexity would therefore be expected to increase in a more or less linear manner with age; hence, older individuals would be predicted to perform better than other age groups on desision-making tasks of great complexity, but these same individuals would have greatest difficulty with the most simple tasks. Individuals of advanced age may well have evolved a cognitive organization, however, that is inefficient in its application to the tasks of the level of complexity which are ordinarily encountered, while the organizational-complexity/task-complexity relationship may be optimal during middle age (the "executive" stage previously referred to). But some older individuals may be quite adept, and more so than others, at developing new strategies which can circumvent the excessive structural complexity and reduce it to a manageable level.

A Footnote on the Role of Motivation

In the process of attempting to create a balance among the subsystems and in order to resolve conflict, it is quite possible that additional motivational systems may have to be called upon. To the extent that this will be true, the occurrence of further developmental stages will then no longer be inevitable. The structuring of logico-mathematical operations in the Piagetian sense may unfold as the result of factors intrinsic

to the system itself, because as a logical structure becomes capable of analyzing events in a new way it may become simply impossible not to do so. This is, of course, the notion that there is a logical necessity to the solutions made possible by new structures which make it impossible to avoid them; hence, logico-mathematical operational structures remain abstractly remote from individual concerns.

The cognitive restructuring made necessary by the performance of new life tasks may indeed be directed by logico-mathematical operations. But the resulting solutions are optional and lack the same sort of logical necessity inherent in the process of the evolution of the operations in themselves. For example, a businessman may chose to give high priority to finding solutions that are optimal in regard to environmental concerns, or solutions that address society's energy needs, or he may choose to ignore altogether any societal implications of his actions. The point here is that the particular decision made is not forced upon the adult individual in the same manner that a conserving decision is forced upon a child once he becomes capable of conserving on a Piagetian task. Thus, what may be inevitable within the developmental framework outlined in this paper is the possibility of further stage-like growth, but not its universal occurrence.

Some Concluding Thoughts

The present paper obviously falls short in providing a formal extension of Piagetian theory of adult development, nor does it provide the full exposition of a stage theory of adult development *de novo*. But it does show in some detail, we hope, that Piagetian concepts are not irreconcilable with a stage theory of adult development. It further shows how the concepts of equilibration and formal operations may enter into

the discussion of adult development, and hints at some of the consequences for theory construction. Although much work remains to be done to explicate our theoretical position more fully, we believe that operationalization of constructs leading to a program of empirical research is close at hand. These matters, of course, must await further exposition on another occasion.

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