

SUNY Upstate Medical Univ. - NYUSSY / VYQ

ILLiad TN: 83823



Borrower: ZGM

OCLC/Docline no.:

Lending String: *VYQ,YGM

Patron:

Journal Title: Human Development

ISSN:

Volume: 21 Issue: 2

Month/Year: 1978 Pages: 92-

Article Author:

Article Title: ; Mechanisms of cognitive and social development; One psychology or two?

Imprint:

ILL Number: 63386292



Call #:

Location:

Need before: 04/02/2010

ARIEL

Charge

Maxcost: .01IFM

Shipping Address:

CUNY Grad School Library / ILL

365 Fifth Ave.

New York, N.Y. 10016

HUB - TET

Bill to:

Library group: Lending83823.0

Ship via: Ariel

Billing Cat.: Exempt

Billing method:

Copyright comp.: CCL

Fax: 212-817-1604

Odyssey: 206.107.43.174

Ariel: 146.96.107.251

Email: ill@gc.cuny.edu

Borrowing Notes; ZGM IS A FREE
LENDER/SUPPLIER. WE BELONG TO IDS,
METRO, SUNY LAND, AND LVIS.

Mechanisms of Cognitive and Social Development: One Psychology or Two?

Deanna Kuhn

Harvard University, Cambridge, Mass.

Key Words. Paradigms · Mechanistic · Organismic · Social · Cognitive · Structure · Environment · Research · Alternatives · Synthesis

Abstract. The mechanistic and organismic paradigms in developmental psychology have tended to be narrowly applied to the particular phenomena they handle best: the development of social behavior in the case of the mechanistic paradigm and cognitive development in the case of the organismic paradigm. The study of moral development offers a potential point of intersection between the two traditions, but a survey of the pertinent literature indicates that this promise has failed to be fulfilled. Furthermore, the critical limitations that presently characterize each paradigm suggest that each potentially can enhance its own explanatory power by attempting to incorporate the alternatives it has heretofore ignored — alternatives encompassed by the opposing paradigm. While social learning theory at present has no theoretical structure in terms of which to conceptualize the intervening cognitive processes it is now beginning to acknowledge are important, cognitive-developmental theory has not incorporated any account of the complex interplay between the developing individual and the specific cultural-historical environment in which this development takes place. While at the moment both paradigms have deficiencies in critical areas making it impossible for either to supply a satisfactory remedy for the shortcomings of the other, it is precisely this incorporation of antitheses that will be necessary if each paradigm is to enhance its own explanatory power, as well as further our progress toward the synthesis of alternatives that ultimately is needed for the construction of a new, more satisfactory paradigm.

This paper is concerned with (a) the mechanisms in terms of which one can account for developmental change, and (b) the relation between cognitive and social development. The specific question to be addressed is whether the mechanisms of cognitive development and the mechanisms of social development are common ones. Though the question has not been specifically addressed, the

existence of communalities in logical and social reasoning is a now very popular theme, and the immediate, intuitive answer to the present question is 'Yes, of course'. Indeed, the opposite answer entails a commitment to a compartmentalization (of developmental processes) within the individual which within current psychological thought has become difficult to defend.

But let us consider the question for the moment from the perspective of the current empirical literature in developmental psychology. Inspection of a representative issue of the journal *Child Development* over the past several years reveals that, excluding a lead review article, the first three articles in fact present empirical investigations dealing with mechanisms of developmental change. One study involves an acquisition in the cognitive domain, multiple seriation. The other two involve the acquisition of social behaviors, 'hostility' (operationally defined in this case as yelling, whining, and disapproving) in one study and social interaction with peers in the other.

What theoretical mechanisms are involved in each case to explain acquisition of the behavior in question? In the first study (Steiner, 1974), the author uses a synthesis of Piaget's and Bruner's theories as a point of departure and tests the hypothesis that it is the *mobility* (defined as ability to realize numerous actions in quick succession) of interiorized (mental) actions which is responsible for their reorganization into a more advanced structure; his experimental procedure thus consists of attempting to 'mobilize', or make flexible, a variety of different mental actions exhibited by his subjects in different 'representational media' (e.g., ikonic, symbolic). The second study (Patterson, 1974) is based on the theory that behaviors appear in an organism's repertoire as a function of the stimuli which precede and follow them. Using a single-subject design, the author identifies certain discriminative stimuli (S^F) which facilitated and others (S^I) which inhibited the response class of hostile behaviors, as well as stimuli (Acc and De) following these behaviors which increased or decreased the conditional probability of recurrence. In the third study (Keller and Carlson, 1974), the authors focus on modeling of social interaction as a mechanism for inducing social interaction behavior in preschool children. The experimental treatment consisted of presentation of videotaped models, but the authors draw on the stimulus control mechanisms indicated above as well as modeling theory in accounting for their results.

The point I wish to make in citing these studies is that while there is some communality in the mechanisms invoked in the two studies dealing with social development, there is no similarity at all in the mechanisms invoked to explain development in the social domain and those invoked to explain development in the cognitive domain. Indeed, the model of 'parallel processes' (of development within a single individual) appears more appropriate based on this sampling of current empirical approaches: behaviorist mechanisms of imitation and conditioning explain social development, while 'cognitive' mechanisms (e.g., mobility, reversibility, integration, reorganization, equilibration) explain development in the cognitive domain.

The immediate objection can be made, however, that this analysis confuses theoretical perspectives with domains of application: we have contrasted a study of cognitive development carried out within an organismic world-view to studies of social development carried out within a behavioristic, or mechanistic, world-view (*Reese and Overton, 1970*). While the organismic and mechanistic paradigms, or world-views, have been compared and contrasted in detail by a number of writers (*Kaplan, 1964; Langer, 1969; Looft, 1973; Reese and Overton, 1970; Riegel, 1973a*), one might summarize the essential parameters in terms of which they differ as follows (with other differences in effect subsumable under these three).

Mechanistic: (1) The focus of analysis is on overt behavior; (2) behavioral elements are discrete and autonomous, and (3) behavioral elements are under stimulus control.

Organismic: (1) the focus of analysis is on processes internal to the organism; (2) elements are organized into wholes (structures) which define their significance, and (3) the organism selectively activates interactions with the environment as a means of constructing its own psychological structure and knowledge of the world.

The *Steiner (1974)* study clearly deals with the internal organization of mental schemes and the dynamic processes of interaction with the environment by means of which they become restructured. The *Patterson (1974)* and *Keller and Carlson (1974)* studies, on the other hand, deal with discrete, observable behaviors which are regarded as under the control of external stimuli. Perhaps, then, we have merely compared a study which is derived from an organismic theory and which happens to deal with cognitive development to two studies which are derived from a mechanistic theory and which happen to deal with social development. In support of this interpretation, one can point to the fact that in this same issue of *Child Development* there exists an example of a study of cognitive development undertaken from a mechanistic perspective (*Zimmerman, 1974*) and an example of a study of social development undertaken from an organismic perspective (*West, 1974*). If we accept this point of view, furthermore, it is not surprising that we found no similarity between the theoretical mechanisms of change invoked in the *Steiner (1974)* study and those invoked in the other two studies. Organismic and mechanistic theories, according to *Reese and Overton (1970)*, represent two world-views which are fundamentally incompatible, and to look for communalities only yields confusion, miscommunication, and distortion of one or both views.

It may be, however, that the matter warrants some further contemplation. It was not by chance that we associated cognitive development with organismic theory and social development with behavioristic theory. In spite of the two counter examples just mentioned, the observer of child development research over the past 15 years will agree that with few exceptions, which have begun to

occur only in recent years, social development has been studied predominantly from a behavioristic viewpoint while the study of cognitive development, influenced by the Piaget and Werner traditions, has been undertaken predominantly from an organismic viewpoint.

This trend within child development research is more than historical accident. A world-view, or paradigm, as discussed by *Reese and Overton (1970)*, *Overton and Reese (1973)* and *Kuhn (1962)*, is a very general model of the essential characteristics of man and of reality, a model so general that it is capable of incorporating and explaining *any* phenomenon. As such, a paradigm is neither true nor false, but rather more or less *useful* as a scheme by means of which one can interpret reality. We can argue further that there are two ways in which a paradigm may be useful. It may be useful because it enables one to conceptualize some particular segment of reality very clearly. On the other hand, a paradigm may be useful because it enables one to conceptualize a very wide range of phenomena at least adequately. I would make the assertion that the mechanistic and organismic paradigms within psychology have gained their utility on the former account. A phenomenon like the familiar one of conservation development does seem to call for a conceptualization involving internal mental schemes which undergo a dynamic process of reorganization. It is more difficult (though not impossible, as some have demonstrated) to conceptualize the conservation concept as a verbal response under external stimulus control. Social development, in contrast, as it has been studied by American developmental psychologists within the past two decades, has tended to focus on the acquisition of certain observable social behaviors, e.g., aggression, and the external stimuli which appear to influence such behaviors are particularly observable and compelling. Accordingly, the behavioristic model of external stimulus control (through modeling and/or conditioning) has been a particularly appropriate and powerful one.

It is being suggested, then, that the main streams of research in both cognitive and social development have tended to rely on the theoretical paradigms they have because these paradigms have been particularly useful and powerful in providing a conceptualization of particular phenomena within that domain. The two paradigms, in turn, have tended to be rather narrowly applied, inasmuch as researchers have tended to limit their study to those types of phenomena (such as conservation and aggression) that their preferred paradigms handle particularly well. Indeed, we shall discover in reviewing the major lines of empirical research pertaining to mechanisms of developmental change that the most revealing studies are those which attempt to extend the traditional theoretical paradigms to or beyond the borders of their characteristic domains of application. These studies often reveal particularly well the limitations of the theoretical paradigm being applied as well as the difficulties inherent within the content domain to which it is being applied.

It is an open question whether either the mechanistic or organismic paradigm ultimately has the capacity to account for the totality of human development. *Baer* (1973) and *Baer and Wright* (1974) have expressed considerable enthusiasm for the possibility of reducing all developmental phenomena to sequentially acquired stimulus-controlled operant behaviors. Piaget and many of his followers, on the other hand, repeatedly have asserted that cognitive and affective development proceed in an interdependent fashion, implying that a single set of organismic mechanisms accounts for both kinds of development. But, clearly, the psychological theories deriving from the mechanistic and organismic world-views are both a very long way from the ultimate development each would need to achieve in order to accomplish this feat.

As matters stand, then, it would appear that a 'complete' psychology of development, which incorporates an account of all aspects of the individual's development in all domains, is at present an impossibility. To formulate a complete account would require resorting to two different world-views, and as both *Kuhn* (1962) and *Reese and Overton* (1970) argue, different world-views are fundamentally incompatible. They are not verifiable by resort to empirical data, they employ different criteria for truth, and they do not permit genuine dialogue between one another.

There exists another point of view with respect to this matter, however, one that is suggested by *Riegel's* (1973b) discussion of the dialectic logic of philosophers such as Hegel. Dialectic logic, *Riegel* states, synthesizes early philosophical positions by renouncing the principles of identity and noncontradiction.

'Dialectic interpenetration of subject and object and of contradictory theories is not only possible but positively necessary for science and knowledge ... Contradictions, in Hegel's dialectic theory, are not conditions of error and insufficiencies, but are the most basic property of nature and mind. *Rational thinking* (in distinction from reason) separates different attributes and, then, by connecting them in a systematic manner, tries to reconstruct the phenomena (such as those of optics or mechanics, learning or cognition) in an unequivocal manner. The concurrent acceptance of alternative theories reduces the unequivocality. But contradiction is not only a principle applicable to show the supplementary nature of such abstract theories, it is a necessary condition of all thought ... only when we conceive all properties in their complementary dependencies do we reach an appropriate concrete comprehension ... Dialectic thinking comprehends itself, the world, and each concrete object in its multitude of contradictory relations' (*Riegel*, 1973b, pp. 349-351).

The dialectic interpretation is particularly applicable to the two world-views discussed by *Reese and Overton* (1970), as well as by *Riegel* (1973a) himself, as these respective world-views are defined in terms of a set of contradictory alternatives: external-internal, passive-active, elementarism-holism, continuity-discontinuity, etc.

It is this latter, dialectic point of view that I shall adopt in the present paper. Mechanistic and organismic theories represent paradigms, or world-views, that are neither true nor false but rather more or less useful in constructing a conception of reality. As such, the virtues and capabilities of both are needed to

arrive at the fullest, most complete conceptual understanding of which we are at present capable. What is being proposed, however, is not a simple combination or incorporation of the two viewpoints (as is entailed in a position such as the one proposed earlier — that behaviorist mechanisms of imitation and conditioning explain social development while organismic mechanisms such as differentiation, integration, and equilibration explain cognitive development). This is the sort of pseudosynthesis that leads to the confusion and nondialogue *Reese and Overton* (1970) caution against. Rather, it will be suggested that in attempting to comprehend reality within their chosen paradigms, theorists and researchers can enhance their own explanatory power by considering and attempting to deal with what their own paradigms have consciously ignored — the contradictory elements, or antitheses, posed by the alternative paradigm. In so doing, the theorists or researchers continue to enjoy the explanatory utility of those postulates which make up their own paradigm, while at the same time enhancing its explanatory power and furthering our progress towards the synthesis of alternatives that will be necessary ultimately in the construction of yet another, new, more satisfactory paradigm.

The Mechanistic Model of Mechanisms of Social Development

In this section we shall briefly review the major mechanisms of social development as they have been conceptualized by theorists of social development over the past two decades. We have noted that the world-view of these theorists has been predominantly mechanistic.

The fundamental axioms which underlie and unite mechanistic models of the mechanisms of social development, as I see them, are the three listed in the preceding section: (a) an agreement to study overt behaviors (rather than 'hypothetical internal agencies', as they have been described by behaviorists), (b) the assumption that behavior is reducible to discrete units, which (c) are under external stimulus control. Modern social learning theory, which may be considered a 'submodel' within the more general mechanistic model, was born with the observation of *Bandura and Walters* (1963) that the prevailing model of operant conditioning as the sole mechanism of social development was inadequate; while operant conditioning can account for the facilitation, inhibition, and shaping of responses, the operant conditioning model does not contain within it a mechanism to account for the acquisition of responses, and *Bandura and Walters* proposed imitation as a mechanism to explain response acquisition. Social learning theory has since flourished as an approach to the study of social development; it draws principally on the mechanism of imitation, with operant conditioning either a mechanism necessary to account for imitation (*Gewirtz and Stingle*, 1968) or a mechanism which supplements imitation in accounting for the acquisition of social behavior (*Aronfreed*, 1969a; *Bandura*, 1969).

In an earlier paper (*Kuhn*, 1973), I criticized the social learning theory formulation and the early research based on it (*Aronfreed*, 1969a; *Bandura*, 1969), from an organismic perspective, arguing that the theory, focusing as it did on the influence of modeling stimuli

in shaping the child's behavior, ignored the meaning that the child imposes on what he or she attends to. This meaning, it was contended, constitutes an indispensable 'intervening variable' in accounting for the relation between stimulus and response.

In its development subsequent to the original theoretical formulations, social learning theory, as espoused by major proponents such as *Bandura* and *Aronfreed*, has in fact moved in a 'cognitive' direction, in the sense that internal processes mediating between stimulus and response are now given significant mention. It is interesting to consider this development in an historical sense. It has a parallel in the history of an older topic within psychology, discrimination learning. Discrimination learning had been traditionally interpreted in terms of a mechanistic S-R paradigm, and it was precisely because this paradigm could not account for increasingly discrepant developmental data that *Kendler and Kendler* (1962) proposed verbal mediation theory. Presenting bright 5-year-olds a set of stimuli identical to those that had been presented to rats yielded response patterns both different to those produced by rats and discrepant from S-R theory predictions. Clearly, some events must be 'mediating' between the external stimuli and the otherwise unaccountable responses. In proposing such a theory, *Kendler and Kendler* violated one of the essential tenets of strict behaviorism (limiting analysis to observable behavior and its observable stimulus antecedents) and thus separated themselves from that tradition.

Although not revealed as vividly in experimental data, it is this same inability to account directly for relationships between overt stimuli and responses, it can be argued, that has led social learning theory to its present 'cognitive' stance. In a most interesting memorial symposium in honor of Richard Walters, both *Bandura* and *Aronfreed*, as well as several other theorists, presented papers on new directions within social learning theory. 'Observational learning', *Bandura* (1972, p. 44) asserted, in striking contrast to his earlier formulations, 'is better understood in terms of information processing than in terms of overt enactment of responses'. He cites the following critical subprocesses in this 'information processing' account of imitation: attention to the modeling stimulus, encoding and storage of a symbolic representation of the external stimulus, and possible internal rehearsal of the encoded material, all of which occur prior to the final subprocess called 'motor reproduction'. In focusing his attention on these 'information processing' subprocesses, however, *Bandura* (1972, p. 45) hastens to make clear that he has not fallen into the fatal trap behaviorists warn against - attributing behavior to 'hypothetical internal agencies having only a tenuous relationship to antecedent events and to the behavior that they supposedly explain'. Thus he makes clear that the internal events to which he refers are clearly tied to external antecedent stimuli, rather than inferred from behavior. In other words, they are an internal 'representation', or copy, of external events, and it is the external stimuli which thus have the ultimate causal influence on behavior. While *Bandura* (1972) thus makes his position explicit in this regard, it is a position hard to reconcile with the later parts of his discussion, dealing with the reinforcement control of motor reproduction. For example: '... there is a growing body of evidence ... that human behavior is extensively under self-reinforcement control. In this type of self-regulatory system, people set themselves certain performance standards and respond to their own behavior in self-rewarding and self-punishing ways in accordance with their self-imposed demands' (p. 59). Note that there is a serious lack of clarity in conceptualizing behavior as simultaneously controlled by external stimuli and the individual's own 'self-regulatory system'. We shall return to this issue momentarily. First let us compare *Aronfreed's* theoretical position to *Bandura's*.

Aronfreed, in his discussion at the same symposium, eliminates the ambiguity just mentioned by endorsing the second and third tenets of the organismic view (see above) as well as the first one, which *Bandura* acknowledges. A few quotes from *Aronfreed's* (1972) discussion make his position clear: 'We need to give more attention to the transformation

which children become capable of working in the process of representation (pp. 97-98). ... specific external stimulus values are not a powerfully reliable medium of control over the child's behavior. We should therefore be willing to dare to ask whether the behavior may not be more usefully thought of as being controlled by the child - in which case we are both fortunate and informed when we can find some forms of external stimulus display or information which do appear to enter into the behavioral control. We might then use such observations to construct a model of the child's intrinsic psychological structure' (p. 99). Thus *Aronfreed* makes clear that he sympathizes with the organismic world-view in which internal mental activity is regarded as having some intrinsic organization and playing a causal role in the organism's encounters with the environment. But note, then, that this leads to a most interesting paradox. *Aronfreed*, in substantially shifting his perspective towards an organismic one yet remaining within the mechanistic tradition, has in effect left himself without any explanatory power. He recognizes that we might potentially '... construct a model of the child's intrinsic psychological structure', but he in fact has no framework within which to begin doing so; his own mechanistic model has nothing to offer in this regard, and while he has indicated his sympathy with major assumptions underlying the organismic world-view, he has not directed his attention to any of the specific psychological research or theory within it which might be of use in this regard. Without some such theoretical structure, *Aronfreed's* 'cognitive' imitation theory in fact promptly reduces to *Bandura's* theory in which internal events simply mirror external ones. And, as such, an 'information processing' theory of imitation is in reality quite an empty one. While it acknowledges that stimuli are attended to, encoded, internally represented, and perhaps rehearsed, prior to performance, there is no theoretical formulation which is of any assistance in explaining, for example, which stimuli are selected for attention, the mechanism enabling the individual to internally encode and represent them, the nature and organization of the internal representation, or the mechanism enabling decoding into overt behavior.

Given social learning theory's own more recent proclamations as to the central importance of the internal representations mediating between stimulus and overt behavior, then, has it not (for the moment, at least) left itself without a theoretical framework in which to fruitfully conceptualize and explore such mediational processes? One indication that this is the case is the fact that since the formulations discussed above, no further significant theoretical elaborations of 'information processing' imitation theory have appeared, elaborations which would begin to provide an account of any of the mechanisms or processes that have been proposed.

One possibility for social learning theory might be to adopt the solution *Kendler and Kendler* (1962) originated and use as a working model for the functioning of internal mental processes, the external model of overt stimuli and responses. Internal covert responses may produce internal stimuli which in turn may function as self-produced reinforcers or as discriminative stimuli for other responses, and we might work at devising experiments which would establish that these internal *ss* and *rs* obey the same laws as external *Ss* and *Rs*. While such a model may eventually prove its utility, however, it has yet to do so, and to those not already committed to a conceptualization of psychological phenomena

in terms of stimuli and responses, it does not appear to have a great deal to recommend it. The categorization of mental phenomena into 'stimuli' and 'responses' is not an obvious one, and the S-R model does not lend itself to a characterization of what social learning theorists such as *Aronfreed* are beginning to acknowledge as the crucial aspect of mental phenomena – their organization, or structure.

A second possibility is one which *Bandura* (1974) shows some indication of favoring in his most recent comments about social learning theory. *Bandura* now clearly attributes the causal role to 'internal agencies' which he earlier denied: 'With growing evidence that cognition has causal influence on behavior, the arguments against cognitive determinants are losing their force' (p. 865). The function of internal processes, he implies, is to produce and maintain external stimulus-response relationships: '... (people) rely extensively on their own self-demands and self-approval as guides for conduct (p. 863) ... people are able to regulate their own behavior in preferred directions by arranging environmental conditions most likely to elicit it and administering self-reinforcing consequences to sustain it' (p. 867).

The problem with this sort of formulation, however, is that it invokes an homunculus which quickly becomes superfluous. Cast in the S-R framework, what is being proposed is that once a person 'decides' that they wish to perform some behavior, they arrange the necessary discriminative stimulus, emit the behavior, and, to increase its probability of recurrence, administer themselves a reinforcer. Why don't they just go ahead and behave that way if they have decided it is a desirable way to behave? There is no justification for dividing the person into an executor who establishes evaluative standards for conduct and arranges conditions for its occurrence and an actor whose actions are influenced by these standards and conditions. We all of course can appreciate the behavior of the person who sets the clock 10 minutes fast as a means of getting to work on time, but it is not this specialized sort of instance *Bandura* is attempting to account for.

We have argued, then, that in conceptualizing mechanisms of developmental change, social learning theory, while rooted in a mechanistic world-view, has begun to pay attention to some of the antitheses posed by an alternative world-view. But it has not yet either borrowed or generated itself a theoretical framework for conceptualizing the organization of 'mediational', or cognitive, processes, and such a theoretical structure will be necessary before it can significantly enhance its own explanatory power. Can the specific research on cognitive processes and cognitive development which has been carried out within the organismic framework be of value to social learning theory in this regard? Before being able to address this question, we must examine the strengths and limitations of research in cognitive development, as it has been carried out largely within the organismic tradition.

The Organismic Model of Mechanisms of Cognitive Development

The study of cognitive development, we maintained in the introductory section, has been approached predominantly from an organismic perspective. As such, it has been influenced primarily by the theories of *Werner* (1957) and *Piaget* (1950, 1971). The focus of attention in American cognitive developmental research has been on the cognitive structures, or stages, postulated by *Piaget*, rather than on mechanisms of change. Also note that, within *Piaget's* system in particular, it is only a particular kind of cognitive structure that receives attention. *Piaget* has focused his attention on those cognitions that are (a) general, in the sense of applying to all objects (e.g., classification, seriation); (b) universal, i.e., do not depend on any specific exposure or experience for their formation and hence are exhibited by all individuals, and (c) universally developmental, i.e., follow certain developmental sequences of reorganization which are universal across individuals.

What are the mechanisms underlying these universal stage transitions? A degree of mystery and a substantial amount of confusion have always surrounded this question. Implicit in much of *Piaget's* writing, especially his discussions of imitation (*Piaget*, 1951), is the concept of 'optimal mismatch'. This concept has been elaborated by theorists in education and psychology (e.g., *Hunt*, 1961) into an explicit theory of developmental change. 'Optimally mismatched' stimuli have been regarded as those which reflect a stage one stage more advanced than an individual's existing stage, and it has been suggested that (a) individuals find optimally mismatched stimuli most interesting; (b) they differentially attend to such stimuli; (c) they most readily imitate such stimuli, and (d) attention to optimally mismatched stimuli facilitates development. These assertions, in fact, have been very broadly applied so as to provide the basis for a great deal of current educational theory and curriculum design.

Piaget's own discussions of the process of developmental change, however, suggest a somewhat different conceptualization of underlying mechanisms. Each individual in the course of his or her development literally constructs anew each higher stage, as a result of discrepant feedback produced by those actions generated by the existing stage. Each new stage appears because it is the most probable equilibrium to emerge from the disequilibrium produced by actions at the lower stage. Though '+ 1' structures may be present in the environment, they are not a necessary part of the process (*Piaget*, 1971).

The ambiguity regarding the role played by the external environment in the process of change can in fact be regarded as symptomatic of the present limitations of the entire organismic perspective on cognitive development. The universal structural transformations or reorganizations of cognitive operations which *Piaget* discusses do not occur in a vacuum, regardless of the extent to which they are self-generated. Individuals in fact carry out their development in very specific and complex intellectual, social, historical, and cultural environments. Social learning theory, we argued, was formulated within the mechanistic tradition, which emphasizes the active, causal role of environmental stimuli in

shaping the individual, but soon had to turn its attention to the antitheses of this tradition because of the severe constraints it imposed on itself in attempting to explain behavior in terms of external stimulus control without reference to the organism's own intervention in the process. Cognitive-developmental theory, on the other hand, is in this regard a 'less-developed' theory: it has found itself sufficiently occupied with conceptualizing the structure, organization, and dynamics of the individual's own internally generated mental actions to not as yet have had either the time or inclination to look outside the organism in order to investigate its interactions with a specific environmental milieu. Cognitive-developmental theory thus can rightly be accused of regarding the environment in the same 'passive' way that mechanistic theorists have been accused of regarding the individual: the environment is merely a neutral 'setting' in which individuals initiate and carry out the activities that accomplish their development.

The fact that *Piaget's* theoretical formulations have dealt with the most general of all cognitive concepts has both made possible and contributed to this tendency to ignore the specific environmental contexts in which development occurs. The very generality of concepts such as classification and seriation makes it possible to both theoretically conceptualize and empirically study their emergence without considering the specific environment in which the development is occurring. Another factor that has reinforced this tendency to ignore the environmental context of development has been the tendency of American cognitive developmental researchers in studying Piagetian concepts to regard *Piaget's* tremendously important structure-content distinction much less flexibly than *Piaget* intended. In his account of structuralism, *Piaget* (1970) makes it clear that in his view there is no absolute 'structure' or absolute 'content'. Rather, the structure-content distinction is a relative one: what is 'content' in relation to a given structure in turn becomes structure in relation to another more subordinate level of content. American researchers within the cognitive-developmental tradition have tended not to view it this way. *Piaget's* most general developmental structures, or stages, have been viewed as sacrosanct 'structure' and any other aspect of the individual's cognition dismissed as relatively unimportant 'content'. Some simple reflection, irrespective of *Piaget's* analysis, tells us that this is incorrect and at best a temporary solution. *Piaget's* concepts of classification, seriation, or causality, when they are viewed, as is customary, in abstraction are in fact completely general and not tied to any particular content. But, on the other hand, they only come to have *psychological* reality when applied by an individual mind to some specific phenomena within that individual's realm of experience. Children have concepts of the mechanisms which cause their bicycles or an airplane to operate, and a classification hierarchy to which they assimilate the specific people, events, and objects they know. A classification 'operation', on the other hand, is only a conceptual

abstraction.¹ We at this point know almost nothing about the nature and organization of these specific, content-defined conceptual networks, or 'cognitive maps', that individuals form of their particular worlds. But our knowledge thus far suggests precisely this one characteristic — that they are *organized*, or, in other words, constitute a structure. This structure in turn organizes further content, and hence the same structure-content conceptual device that *Piaget* has employed so fruitfully can again be employed at this new level.

Observers are probably correct in suggesting that *Piaget* has been wise in focusing his study on cognitive structures which have the characteristics of being completely general and universal. It is likely to be more difficult to apply a structural analysis to cognitive structures which are not completely general and universal; to do so will entail becoming concerned with the relationship a particular individual has with a particular set of environmental circumstances, in order to begin to understand the particular network of concepts which this individual has constructed.

When we turn to the dynamic rather than the static aspect of cognitive developmental research, however, i.e., the mechanisms of change, ironically the task may well become easier. It may be difficult to isolate the mechanisms involved in universal cognitive developmental changes precisely because of their tremendous generality. These are concepts which are constructed by all human minds in all environments, regardless of the presence or absence of specific environmental features. When we turn to less general concepts, in contrast, the analyses of specific individual-environment interactions which then become necessary are likely to be of substantial value in providing clues as to the mechanisms that govern construction of these concepts.

In this brief overview of the mechanistic model as it has been employed in conceptualizing mechanisms of social development and the organismic model as it has been employed in conceptualizing mechanisms of cognitive development, I have attempted to highlight the strengths of each approach, and how these strengths have been utilized in applying the approach to those phenomena it is

¹ It is thus necessary for us to reject on several grounds a proposal offered by a number of writers (e.g., *Kohlberg*, 1968): the acquisition of information, or 'content', according to this proposal, is best explained in terms of mechanistic, S-R principles of association and conditioning, while attainment of the logical operations described in a theory like *Piaget's* must be explained in terms of organismic principles, such as equilibration. Such a proposition, while providing a neat working hypothesis which permits several diverse research traditions to proceed in apparent harmony, is unsatisfactory on at least two serious grounds. First, it necessitates a strict compartmentalization of functions within the organism which ultimately is not tenable. Second, it treats the structure-function distinction as an absolute classification system with profound consequences (classification of mental phenomena into one category or the other determines whether they obey psychological law X or Y), rather than as a useful conceptual device without psychological reality of its own.

particularly well-equipped to handle. In addition, I have attempted to point to the present limits of each model's utility, as I see them. Earlier it was suggested that each model might enhance its own explanatory power by focusing attention on the antitheses posed by the alternative model. Before attempting to bring together this issue of how the two traditions already have offered or potentially might offer enhancement to one another, it will be useful to examine application of the two models in one further, and unique, context: the boundary areas between cognitive and social development which they have in common.

*Mechanistic and Organismic Models in the Boundary Areas between
Cognitive and Social Development*

The major and most notable content area to receive substantial attention by both organismic and mechanistic theorists has been that of moral development: moral phenomena have been conceptualized primarily as a category of social behavior within the mechanistic tradition and as a specialized kind of cognitive concept within the organismic tradition. And thus it is here that the prospects for achieving insight into the interrelation and potential synthesis of the mechanistic and organismic world-views should be most promising. In the previous sections we examined cognitive phenomena as they have been studied from an organismic perspective and social phenomena as they have been studied from a mechanistic perspective, and points of contact between the two areas of endeavor were understandably few. In contrast, in the study of moral development, both theoretical traditions are ostensibly addressing themselves to the same psychological phenomena; thus if their differences, and, in turn, their potential for synthesis, are ever to be clearly illuminated, it should be here.

A brief survey of the substantial amount of work in moral development, however, indicates that this promise has not been fulfilled. It appears, rather, that each theoretical tradition has chosen for study those aspects of morality that are ideally suited to its own paradigm, and dealt only cursorily or not at all with other aspects. Thus, theorists and researchers working within the two theoretical traditions may not be talking about the same phenomena any more than they have been in the traditional cognitive and social domains we have already surveyed.

Let us briefly consider the study of moral development within the mechanistic tradition first. Approaches have ranged from the radical behavioral (*Goldiamond, 1970*), in which moral behavior is regarded as made up of discrete behavioral units under external stimulus control, to the approach of theorists such as *Aronfreed*, who hypothesize intervening cognitive mechanisms which play an influential role. *Aronfreed's* (1968, 1969b) early theoretical formulations regarding the mechanisms of acquisition of moral behavior relied on the

concept of 'internalization'. Certain behaviors during the course of the child's socialization come to be associated with external negative reinforcers. As children grow older and their cognitive capacities increase, they become able to 'internalize' these moral labels and in turn use them as a means of inhibiting their overt behavior. In view of *Aronfreed's* more recent discussion of social learning theory, from which we quoted earlier, it is unlikely that *Aronfreed* continues to view the child's cognitions as merely mirroring, or internalizing, external events. And, thus, the severe limitations of the 'cognitive' reformulation of social learning theory, which we discussed at some length earlier, remain exactly the same in the case of this special 'moral' domain of social behavior. If cognitions, in this case moral cognitions, are merely internalized copies of external events, they do indeed play the superfluous, hypothetical role attributed to them by behaviorists; clearly, they do not help explain overt behavior. If, on the other hand, as we suspect *Aronfreed* would want to claim, they play a causal role of their own, there is no theoretical formulation available to explain how these cognitions are formed, internally organized, or how they influence overt behavior.²

As the major spokesman for the organismic, or 'cognitive-developmental', approach to moral development, in marked contrast, *Kohlberg* (1969, 1971, 1973) has focused squarely on individuals' cognitions about morality, and, specifically, the structure and organization of these cognitions. In so doing, he has followed closely *Piaget's* strategy, i.e., he has devoted his attention to discovering those aspects of moral cognitions which are completely general (apply to all objects of moral evaluation, irrespective of particular content or context) and developmentally universal (i.e., go through transformations which are universal to all individuals). Quite appropriately, *Kohlberg's* attention has been focused on the structural characteristics of the stages which make up his sequence and in gathering support for his claim of sequentiality, i.e., the claim that each stage in the sequence is a necessary condition for emergence of the next higher stage.

When we turn to the equally important question of the mechanisms of progression through this sequence, however, all of the same problems and ambiguities which we discussed in connection with mechanisms of progression

² The empirical studies by *Mischel* (1966) and *Mischel and Underwood* (1974) are interesting in this regard in suggesting ways in which attempted experimental manipulations of cognitive activity, especially as they interact with prior dispositions the child brings with him or her to the situation (e.g., internal-external locus of control), may influence behavior. But thus far these studies have involved only the *timing* (e.g., delayed or immediate) rather than the *form* of behavior and similarly have not probed the form, or organization, of the child's cognitions. Also, and most seriously, as we shall discuss further in an examination of research strategies, the child's cognitions may have relevance narrowly limited to the immediate experimental context.

within *Piaget's* stage system arise, plus some additional problems unique to the domain of moral judgment. The same ambiguity with respect to 'optimal mismatch' versus 'equilibration' theories of change is present; *Kohlberg* on occasions speaks in terms of a genuinely constructive process like *Piaget's* while at other times he appears to endorse the 'optimal mismatch' concept of exposure to the next higher stage as a critical part of the process.³ The empirical reality is made more difficult to conceptualize by the fact that the environment plays a potentially more complex role than it does in the case of cognitive development. Over the extended number of years during which individuals' moral judgments undergo transformation, they are in fact exposed to a tremendous number and variety of explicit and implicit moral judgments; specific parental teaching is a major source of these judgments, but in addition children and adolescents are exposed to moral judgments as they are reflected in behavior within the family, peer group, school system, and larger society. The presence of higher (and lower) stage models typically does not exist in this same sense in the case of cognitive development. The concept of seriation, for example, may be a universally present concept within the minds of individuals who have passed their sixth or seventh year of life. But, yet, children below this age typically are not exposed to this concept in any explicit or intentional ways. Adults typically are not concerned about imposing their concepts of seriation (or classes or conservation) on their children. (And, in any case, those societies or segments of societies in which such concepts might be explicitly modeled or 'taught' are certainly a minority of all societies.) The idea that children in effect construct the seriation concept themselves, then, is at least intuitively acceptable, and this acceptability is more difficult to grant with respect to moral concepts. This is not to suggest that children internalize any of the vast amounts of moralization to which they are exposed in any direct, simple way. But, rather, and this is the essential point, a theory of mechanisms of moral development must provide a conceptualization of the undoubtedly intricate process of interaction which takes place between these environmental phenomena and the developing individual's own internal cognitive structure. Experimental data have suggested that higher stage environmental models do not play any directly necessary or facilitative role in the process of moral change; *Colby's* (1972) subjects showed comparable amounts of progress towards a higher stage whether or not peer models at this higher stage took part in series of weekly moral discussion sessions. But, yet, it is certain that discrepant (as well as same) stage judgments are assimilated and comprehended in *some* manner by the child; it is most unlikely that they are systematically ignored. Thus, a theoretical model must include a conceptualiza-

³ In interpreting results of an intervention study, *Colby et al.* (1976, p. 103) state, 'this conforms with developmental theory which postulates that conflict between stages of reasoning and exposure to the next stage up is necessary for movement to occur.'

tion of this process of interaction between the individual's structure and the multiplicity of structures present in the society.

A second problem that a theory of mechanisms of moral development faces is likewise one that is potentially not as complex in the domain of cognitive development. This is the much debated and unavoidable problem of the relation between cognition and behavior. For psychologists working in the purely cognitive domain it is not the perplexing problem it has always been for social psychologists. We do not need to worry very much whether a child's seriation judgments correspond to his or her seriation behavior. To the extent that deviations in the latter are observed, they are typically interpreted as deviations of 'performance' from true 'competence'. In the moral as well as all other areas bordering on or within social psychology, the situation is just the opposite. Correspondence between cognitions (attitudes, judgments) and behaviors is a much studied and debated matter, and to the extent deviations are observed, cognitions are regarded as the less trustworthy, less 'valid', and less interesting and important of the two.

We can certainly sympathize with *Kohlberg's* (1973) contention that the ultimate test of the relevance of his stages of moral cognition for moral 'behavior' entails the assessment of significant moral behaviors as they actually occur within people's lives, and the data are thus at the moment only fragmentary. But, granting the need to focus on 'real' moral behavior, the problem of the relation between cognition and behavior remains, and the traditional social psychological manner of regarding this problem may not be the optimal one. If behavior is observed to be at variance with a person's professed judgments or beliefs, that behavior nevertheless is a reflection of some sort of antecedent determinants. Barring external, physical coercion as a determinant of behavior, this determinant or determinants can be regarded as having both an external, environmental aspect and an internal, cognitive aspect. External events influence people's behavior, but these events are interpreted by a complex human cognitive system which gives them their meaning and hence at least partially determines the nature of the influence they will have.

This suggests, then, the ultimate limitation of a system of universal stages of moral cognition, like *Kohlberg's*, in accounting for moral behavior. In conceptualizing the influence a person's cognitions about morality have on moral behavior, we must include more than those completely general, universal structural aspects of moral cognition that *Kohlberg's* system has devoted itself to. The remaining aspects of moral cognition, those which are likely to be specific to the individual and be applied only to a specific domain of people or events, significantly influence behavior. To dismiss such aspects as not genuinely belonging to the domain of moral judgment is to restrict this domain so severely as to seriously limit its importance and explanatory utility.

Ultimately, then, it seems that what will be required is the same sort of increased flexibility in the employment of the 'structure-content' distinction which we advocated with respect to the study of cognitive development. Moral cognitions which are not completely general and do not form part of a universal sequence of development can also be usefully conceptualized in terms of their structure and content. *Kohlberg*, like *Piaget*, has quite appropriately chosen to focus his work on first discovering those aspects of individuals' cognitions about morality which are the most general and hence most likely to have universal developmental characteristics. But the remaining aspects of moral cognition must eventually be studied by both cognitive and social psychologists. Such

study holds the promise of providing a link between the organismic and mechanistic approaches to moral development as well as linking the study of moral judgment and moral behavior. In addition, it should make possible the construction of a more complete and adequate model of the mechanisms of moral development.

Summary: Paradigms, Theories, and Reality

We have argued that the study of social development within the mechanistic tradition as represented by current social learning theory, despite its new, more 'cognitive' outlook, is seriously in need of a theoretical framework in terms of which to conceptualize the internal cognitive processes which mediate between the environment and behavior. We also argued that the study of cognitive development within the organismic tradition, as represented by current cognitive-developmental theory, has ignored the specific environmental context in which an individual develops. And, furthermore, we claimed the above to be true whether the respective theories are addressing phenomena within their own preferred domains of application or ostensibly common phenomena at the boundary of these domains (i.e., moral development).

In view of these, in a certain sense, complementary deficiencies, let us first ask whether cognitive-developmental theory has anything to offer social learning theory, notably in terms of supplying a theoretical framework for conceptualizing cognitive processes. The appropriate answer to this question at the moment is probably no. Social learning theory potentially might benefit, of course, by considering some of *Piaget's* most general theoretical notions, e.g., that cognitions are *actions* generated by the individual (rather than sensations or pictures of the external world), and that it is useful to attempt to specify the organizational parameters of these actions. But the major thrust of what social learning theorists at the present time want and need to know — the nature and organization of the representations people formulate of the particular social environments they interact with — the organismic cognitive-developmental theory is not yet sufficiently developed to significantly contribute to. As we argued, cognitive-developmental theory must begin to utilize the structure-content distinction more flexibly; it must begin to explore the organization, i.e., the 'structure', of those cognitions that are not completely general and not part of a universal developmental sequence; and it clearly must do this before it can usefully collaborate with social learning theory in understanding the cognitions of their particular social environments that individuals construct. The study of moral development within the organismic tradition has come closest to potentially making this contribution, but, to the extent it has incorporated within its theory only the completely general and universal aspects of moral cognition, it has ultimately not yet done so.

To what extent, conversely, might social learning theory make a contribution to our understanding of the mechanisms of cognitive development, traditionally studied within an organismic framework? Clearly, as we have already suggested, social learning theory has made its major contribution to all areas of both cognitive and social psychology by pointing to the powerful role played by an individual's social environment. In addition, it has pointed to the fact that this immediate environment has a powerful affective as well as an informational component. People comprehend their social environments not simply as neutral objects of knowledge; they comprehend them in terms of their own personal roles in these environments and the pleasure or pain they have brought and are anticipated to bring in the future. But can social learning theory make a specific contribution to our understanding of the mechanisms by which cognitive development is achieved? Beyond serving as a reminder to the cognitive-developmental theorist that one cannot ignore this powerful, very specific environment, the answer, again, is probably no. As we have argued, what the cognitive-developmental theorist must now begin to conceptualize is the complex, delicate interaction between the developing individual and the rich and variable environmental situations in which this development is accomplished. To argue simply for 'observational learning' as the mechanism of cognitive development, as do for example *Zimmerman and Rosenthal* (1974), represents little progress towards elucidation of this delicate interactive process. Clearly, the environment is powerful, but, just as clearly, understanding the nature of its influence ultimately requires an interactive, rather than a unidirectional, model.

We have argued, then, that at the moment neither mechanistically based social learning theory nor organismically based cognitive-developmental theory has been itself sufficiently articulated to be able to offer any remedy for the shortcomings of the other, despite the fact, as we also argued, that each theory must eventually take account of and indeed incorporate the perspective emphasized by the other, if it is to enhance its own explanatory power. Both paradigms, then, must be elaborated, and, of course, ultimately, a new one constructed. We shall return to this point of view in the concluding section. Before doing so, it will be useful to examine these same issues from the point of view of methodology, as opposed to theory.

Research Strategies in the Study of Cognitive and Social Development

What are the specific methodological techniques that are or might be employed to study mechanisms of developmental change? While cross-sectional or longitudinal assessment may suggest the direction and sequence of development, by themselves they say nothing about the mechanisms which effect this development, and researchers interested in mechanisms of change have characteristically turned to some form of experimental method.

In earlier sections we emphasized the very different world-views which have been

drawn upon in postulating mechanisms of cognitive development and mechanisms of social development. When we turn to research paradigms, in contrast, the strategies that have been employed appear, at least at a superficial level, quite similar. In both cases, an experimental method is typically employed. One or more treatment conditions are administered for the purpose of inducing in subjects some more 'developmentally advanced' behavior. Subjects are assessed following the treatment, to ascertain its success, and inferences about the mechanisms of change are drawn.

Closer examination reveals, however, important conceptual and tactical differences. In this section we will make the arguments that (a) the research strategies that have been developed in each of the two areas implicitly incorporate many of the basic assumptions of the theoretical paradigm, or world-view, that predominates in that area, and (b) as we argued in the case of each respective theoretical tradition, each respective type of research strategy stands to benefit from an attempt to deal with the 'antitheses' represented by the alternative paradigm.

The technique used to study mechanisms of change within the organismic approach to cognitive development has tended to be the 'training study', and, until recently, all of these studies, for whatever historical reasons, have focused on conservation attainment. There are serious technical and conceptual problems that arise in interpreting the results of these studies. There are no unambiguous criteria for confirming that a subject has genuinely acquired the cognitive structure one is attempting to induce (Kuhn, 1974). More fundamentally, however, even if we grant that the attainment is genuine, how can we insure that the mechanism by means of which it was induced is or even faintly resembles the mechanism by means of which this transition is effected in the natural course of development? We can imagine a range of 'treatments' to get children to agree that a quantity is 'the same' after rearrangement, from standing over them with a stick, to 'telling' them the answer, to more 'cognitive' sorts of persuasions, but at what point in this continuum the assertion that one has approximated a natural mechanism of development becomes tenable is far from intuitively obvious.

The proliferation of studies within the 'training study' mold has led to this very ambiguous state of affairs in the empirical study of mechanisms of cognitive development. Why has this happened, and how might the training study paradigm be extended or modified in a way that will make it more useful and decisive? In some sense, the cause may be at least partly due to the tendency we have discussed for organismic theory to conceptualize the individual as busily constructing his or her own psychological structure in an environment regarded as empty, or at least passively neutral. In conceptualizing potential candidates for the experimental presentation aimed at inducing change, researchers have not devoted any attention to the natural environments in which children in fact accomplish the transition under consideration. What sorts of experiences do young children have in their natural environments that may be relevant to their development of the conservation concept? The actual exploratory work necessary to begin to obtain answers to such a question is difficult, to say the least, and the appropriate methodology has not yet been developed. But the failure to attend to such a question has resulted in serious 'external validity' sorts of problems for this whole, very prolific area of research.

When we turn now to experimental studies of social development, on the other hand, conceived as they have been from a mechanistic perspective, we find that although they bear some superficial similarity to the 'training studies' within cognitive development, and, as we shall see, have some of the same sorts of problems with respect to external validity, they are in certain fundamental respects quite different. First, the mechanisms assumed to effect developmental changes in social behavior are postulated quite clearly, namely, operant conditioning and/or imitation. Second, the intent is not to induce a permanent develop-

mental transition as it is in the case of the conservation training study. Typically, subjects are not pretested to assess their precise levels of development prior to the treatment, as they are in the conservation training study. Rather, the assumption is made that the differences in competence, disposition, and learning histories which subjects bring to the experiment will contribute to an uninteresting error variance, but over and above this error variance the power of the social learning mechanisms being studied will be evident. The intent, then, rather than to *induce* social development can be more accurately characterized as an attempt to *simulate* this development, by experimentally demonstrating the power and effectiveness of its mechanisms. To make clear this distinction, consider a recent study which we shall subsequently examine in some detail (*LaVoie, 1974*). The purpose of the study was to test the effectiveness of several operations on 'resistance to deviation', which was operationally defined as resisting the temptation to handle a toy sitting on a table in front of the child after the experimenter had stated one of a variety of reasons why the toy should not be played with. Clearly, the intent here was not to induce in children any permanent disposition towards resisting deviation, but rather to compare the effectiveness of various operations on this resistance behavior through an attempted simulation of the way these operations might function naturally.

In an earlier paper criticizing the early social learning imitation experiments (*Kuhn, 1973*), I argued that the experimental paradigm used to study imitation, founded as it was in the mechanistic tradition, had failed to consider precisely what had served as a starting point within the organismic tradition: the intelligence individuals bring to the situations they encounter. Stimulus variables do not operate mechanically in experimental situations. Their effects depend very much on the interpretation the subject imposes on them, and hence subjects' 'imitation' is in fact highly selective. Thus, for example, in a study of *Aronfreed's (1969a)*, analyzed in detail in this earlier paper, children closely imitated a model's unusual hand movements in dropping toys into a box, but they did not imitate the model's arbitrary reclassification of objects into a 'school' versus 'home' category (or vice versa) when the objects were in fact equally appropriate in either category.

Aronfreed attempted to explain the results of the study just referred to in terms of the classical conditioning of positive affect to the child's cognitive representation of the model's actions. More recently, few researchers, including *Aronfreed* himself (see our earlier discussion of *Aronfreed's* most recent theoretical views) have attempted to account for their findings in terms of mechanical processes such as classical conditioning, and their interpretations have taken on a more 'cognitive' cast. But, on the other hand, these researchers have continued to rely on the same experimental research paradigm they used earlier, and the problems and ambiguities connected with this paradigm have not been overcome. In the most general terms, the problem is one of external validity, or, put in other terms, whether the simulation has been a valid one. One major reason for thinking that it might not be is the fact that children who participate in experimental laboratory simulations of socialization bring with them to the situation not only their capacities for intelligent judgment but also the complex individual social learning histories which they have already acquired. They are not the 'blank slates' on whom we might try one mode of socialization versus another. For example, in a demonstration that explanation, or 'induction' (*Hoffman, 1970*) induces obedience, children who participate in such an experiment already have long personal learning histories in which they have received greater or lesser amounts and different kinds of 'induction', and this past history will have considerable influence on their behavior in the experimental situation, if it is true (a) that the induction variable is a relevant one in influencing obedience behavior, and (b) that the induction variable has been adequately simulated experimentally. And if either (a) or (b) is untrue, of course, the experiment is either irrelevant or invalid.

It may be countered that these individual differences simply 'cancel out' and become part of the error variance, relative to which a treatment effect is still highly visible. Recent studies, however, have begun to systematically assess these 'individual difference' variables which the child brings to the experiment, rather than ignoring them as has been done traditionally, and the consistent interaction effects that have been found suggest that children integrate both their past knowledge and attitudes and the information offered by the experimental presentation to formulate a judgment as to the appropriate behavior required.

As an illustration of the complexities in interpretation that arise, consider a recent study (*LaVoie*, 1974) which incorporates the fairly uncommon feature of assessing subjects' prior status on several 'individual difference' variables, including stage-developmental ones (e.g., moral judgment level), on the hypothesis that these variables are likely to 'mediate' relations between experimental treatments and behavior. The child was ushered into a mobile research trailer, seated at a table next to the experimenter, and told: 'I am going to place several pairs of toys in front of you, one pair at a time, and I want you to select one toy from each pair that you would like to play with. Do you understand what you are supposed to do?' The experimenter then placed randomly selected pairs of toys in front of the subject and asked the subject to make a choice. As soon as the subject had selected a toy, one of the following 'rationales' was given.

(1) Consequence focus-object orientation: 'That toy is not to be played with because it might get broken or worn out from you playing with it. That toy is a very special toy, and I don't have another toy exactly like that toy to replace it.'

(2) Intention focus-object orientation: 'It is wrong for you to want to play with that toy or to think about playing with that toy. That toy is a very special toy and should not be played with.'

(3) Consequence focus-person orientation: 'That toy might get broken or worn out from you playing with it. Since that toy belongs to another boy (girl), how do you think he (she) would feel if you played with this toy when he (she) is not here?'

(4) Intention focus-person orientation: 'It is wrong for you to want to play with that toy or to think about playing with that toy because it belongs to another boy (girl). How do you think he (she) would feel about you playing with his (her) toy?'

All of the individual variables that were assessed did in fact interact with the experimental treatment in determining deviation (handling of the forbidden toys). For example:

Sex of child, as well as age, influenced the effect of rationale orientation on latency ... The effectiveness of object-oriented rationales increased with age for the girls. Latency to first deviation was significantly later for the 11-year-old girls who received an object-oriented rationale. Object-oriented rationales were not affected by age of the boy. The effectiveness of person-oriented rationales tended to increase with age for the boys but not for the girls ... Focus and orientation of the rationale were found to influence deviation only among the 9-year-olds. Deviation was significantly lower when rationale was person-oriented and focused on intentions. There were no significant differences among the rationales for the 11-year-olds (*LaVoie*, 1974, p. 398).

Regarding the moral judgment variable, it was found:

The effect of maturity of moral judgment on resistance to deviation also was influenced by sex of the child and focus and orientation of the rationale according to two three-way interactions ... The simple effects analysis showed that object-oriented rationales resulted in longer latencies to first deviation for the girls who scored high on total moral judgment than for the girls who scored low. The boys scoring high in total moral judgment who received a person-oriented rationale showed a greater increase in latency to first deviation than did the girls, but the high-moral-judgment girls had longer latencies than did

the boys. Deviation among high- and low-moral maturity children also appeared to be influenced by the Focus X Orientation of Rationale interaction, as noted in the analysis of average duration per deviation for expiatory punishment (*LaVoie*, 1974, p. 399).

This investigation examined only the three variables age, sex, and moral judgment level and they all interacted with the experimental treatments. It is likely that had other individual difference variables been assessed, they also would have interacted with the treatments. Before attempting the painstaking examination of how all of these individual characteristics subjects bring with them to the experimental situation interact with each other and with the experimental treatment to influence their behavior there, it is prudent to closely scrutinize the behavior whose complex determinants we are trying to understand. For if the experimental situation and the type of behavior it is likely to elicit are not reasonable enough approximations to real-life situations and behaviors, it is probably not worth the trouble to attempt to unravel their complex determinants.

In the particular study just discussed, this question is a serious one. A child as old as eleven is explicitly asked by an adult to select one of two toys to play with and immediately upon his or her choice is told, for one reason or another, that he or she should not play with that toy. It is probably safe to say that a child's primary reaction to this strange behavior of an adult's is surprise and confusion. The experiment demonstrated that the factors influencing behavior in the 15 minutes immediately following are numerous and complex. But unless it can be convincingly argued that how a child decides to behave in this unusual situation is important either intrinsically or because the situation approximates a real-life situation that is intrinsically important, then the effort involved in attempting to understand these complex interaction effects does not seem worthwhile.

Unfortunately, it can be argued, instead of beginning to devote increased concern to the external validity question, experimental socialization research, in its new 'cognitive' stance, has turned its effort toward devising increasingly more ingenious means for assessing subjects' thought processes while they are being exposed to the unusual situations which constitute laboratory socialization experiments. In one of a series of inventive studies by *Mischel and Underwood* (1974), for example, preschool children were asked to sit quietly and look at two objects in front of them (e.g., two marshmallows vs. a pretzel), one of which the child had just chosen as the more desired. The children were told they could have the preferred object if they waited until the experimenter came back by himself but 'if you don't want to wait, you can ring the bell and bring me back anytime you want to. But if you ring the bell you can't have the (more preferred) but you can have the (less preferred).'

In addition the subject was told:

While I'm gone you can think of the _____ and _____ (objects in front of the subject) as long as you want to, if you want to. And you can watch the _____ and _____ while you think about them. You can think about the _____ and _____ while you watch them. And do you know what will happen if you keep thinking about the _____ and the _____ and keep watching them? I bet I'll know and I'll come back sooner. I'm pretty good at telling what children are thinking about. I'm not always right, but I am right most of the time. I bet I'll know if you keep thinking about the _____ and _____ and keep watching them. If I think you are thinking about them and watching them enough, I'll come back sooner. Yes, I will; I'll come back quicker (*Mischel and Underwood*, 1974, p. 1085).

In contrast to this 'instrumental ideation' condition, there was another 'noninstrumental ideation' condition in which the instructions were identical except that all references to the experimenter's coming back sooner being contingent on the child's thinking about the objects were deleted.

This study can be regarded as successful in manipulating the child's 'ideation' during the delay period inasmuch as subjects in the instrumental condition on the average waited

longer than those in the noninstrumental condition. But even if we accept differences in ideational activity during the delay period as the cause of behavioral differences, this does not make any less serious the problem of how the child interprets the experimental situation, and a consideration of the latter is essential before we can really understand the cognitive processes mediating these behavioral effects. Children are certainly not accustomed to being told that their thoughts will control an adult's behavior, nor does it make any sense in this situation that they should. Why in the children's view were they being asked to 'think about' those objects? Did they believe that the adult could tell what they were thinking or that their thoughts were controlling the adult's behavior? What in their view was the purpose of waiting for the reward rather than having it immediately? Typically, no attempt is made in experimental socialization studies to obtain even informal evidence with respect to questions such as these, but it is exactly these sorts of questions that eventually must be addressed if it is to be established that the experimental simulation approach to the study of socialization is in fact able to achieve a reasonable simulation of the natural process.

Towards a 'Complete' Model

We have argued that experimental social development research characteristically has ignored the intelligence children bring to social situations, while experimental cognitive development research characteristically has ignored the complex environment in which development takes place. And in earlier sections we argued that the respective theoretical paradigms out of which these experimental paradigms developed traditionally have suffered parallel sorts of limitations, and that neither is presently sufficiently articulated to by itself accommodate all aspects of development.

We have alluded to some of the elements that a 'complete' model would need to encompass. Individuals interact with specific sets of environmental circumstances over a period of years, resulting in a complex set of cognitions, or expectations, they form regarding that environment and their own role in it. These cognitions, in turn, shape future interactions with these environments; thus, present behavior can only be understood in terms of the interaction of present circumstances with these complex cognitions based on the totality of past circumstances. For analytic purposes we may segment both the environment and the individual's cognitions into 'cognitive' and 'social' domains: individuals interact with the social, or human, portions of their environments on the basis of which they construct social concepts, and they interact with the nonsocial, or physical, portions of their environment on the basis of which they construct physical concepts. But, clearly, this division is arbitrary. Both the environments and the cognitions are overlapping, and most logical concepts (e.g., classification) are completely general and not limited by such boundaries. Furthermore, not only are the respective categories of cognitions overlapping, but there no doubt exist as well internal regulatory mechanisms which strive

towards coherence among the individual's cognitions in different content domains. Such regulatory mechanisms, of course, have been of critical interest to cognitive-developmental theorists.

The above model, however, remains incomplete on the primary grounds that it is static. To even begin to encompass the complexities of a single individual's development it must become dynamic in at least two different senses. First, individuals' interactions with their environments, and likewise their development, occur over time, and the process continues to be interactive rather than unidirectional throughout this period of time. A number of pseudo-controversies can be observed in the theoretical literature as a result primarily of failing to conceptualize this obvious, though frequently ignored, dynamic characteristic of development. Consider as an example the theoretical literature of the past decade on the mechanisms of sex-role development. In Maccoby's popular volume on this topic, *Mischel* (1966) and *Kohlberg* (1966) served respectively as spokesmen for the social learning and cognitive-developmental theories. *Mischel* presented a traditional exposition based on parental reinforcement and imitation of the like-sexed parent as mechanisms of sex-role development. *Kohlberg* argued that sex-role identity is a cognitive concept that a child acquires very early in life; attainment of this concept then produces identification with and attachment to the like-sexed parent, rather than being a product of it. *Kohlberg* thus argued that his proposed sequence is actually the reverse of the traditional social learning sequence. But this assertion comes about only as a result of regarding events as a unidirectional sequence. Children acquire concepts of 'maleness' and 'femaleness' very early in life. These concepts gradually become more elaborated, and they certainly influence the child's affective valuations and behavior, as *Kohlberg* suggests. But this does not mean that these affective phenomena (reinforcement by, attachment to, and identification with nurturant caretakers) do not begin to occur until after the relevant cognitive concepts are well-established and able to produce them. Indeed, a great deal of observational evidence suggests these phenomena begin at birth when parents begin to differentially treat children based on sex. Both processes (cognitive influences on affective valuations and affective influences on cognitions) are occurring simultaneously over a substantial period of time, and probably mutually reinforce one another. In the revision of this volume, quite interestingly, *Maccoby and Jacklin* (1974) acknowledge this contemporaneous influence, thereby synthesizing the thesis and antithesis posed earlier by *Mischel* and *Kohlberg*.

A child's conception of what is appropriate behavior for a male or female will depend both upon what he sees males and females doing and upon the approval or disapproval that these actions elicit differentially from others. Both of these kinds of events constitute information the child can draw upon in building his concept of sex-appropriate behavior, but (in theory 3) neither modeling nor reinforcement is thought to operate in any automatic way to produce sex-typed behavior (*Maccoby and Jacklin*, 1974, pp. 1-2).

The second sense in which the model we outlined above must become dynamic rather than remain static has to do with the distinction that *Piaget* (1970) and others have drawn between the structural and energetic, or affective, parameters of psychological functioning. In the model we have just outlined, the focus has been on the individual's *cognitions* — physical cognitions, social cognitions, and the boundaries between them — in other words, the structural parameter, rather than the energetic one. Attending to the structural, rather than the energetic, parameter first has perhaps been the proper order of attack, for structures can be analyzed without examining their dynamic, or affective, aspects while the reverse is not true; affects cannot be studied except in the context of the cognitions in terms of which they are expressed. But the 'complete' theoretical model towards which we strive must encompass both of these aspects of psychological functioning and development.

References

- Aronfreed, J.*: Conduct and conscience. The socialization of internalized control over behavior (Academic Press, New York 1968).
- Aronfreed, J.*: The problem of imitation; in *Lipsitt and Reese* Advances in child development and behavior, vol. 4 (Academic Press, New York 1969a).
- Aronfreed, J.*: The concept of internalization; in *Goslin* Handbook of socialization theory and research (Rand McNally, Chicago 1969b).
- Aronfreed, J.*: A developmental memoir of 'social learning theory'; in *Parke* Recent trends in social learning theory (Academic Press, New York 1972).
- Baer, D.*: The control of developmental process. Why wait? in *Nesselroade and Reese* Life-span developmental psychology. Methodological issues (Academic Press, New York 1973).
- Baer, D. and Wright, J.*: Developmental psychology. A. Rev. Psychol. 25: 1-82 (1974).
- Bandura, A.*: Social-learning theory of identificatory processes; in *Goslin* Handbook of socialization theory and research (Rand McNally, Chicago 1969).
- Bandura, A.*: Modeling theory. Some traditions, trends, and disputes; in *Parke* Recent trends in social learning theory (Academic Press, New York 1972).
- Bandura, A.*: Behavior theory and the models of man. Am. Psychol. 29: 859-869 (1974).
- Bandura, A. and Walters, R.*: Social learning and personality development (Holt, Rinehart & Winston, New York 1963).
- Colby, A.*: Logical operational status as a predictor of moral judgment change; dissertation Columbia University, New York (unpublished, 1972).
- Colby, A., Kohlberg, L., Fenton, E., Speicher-Dubin, B., and Lieberman, M.*: Secondary school moral discussion programmes led by social studies teachers. J. moral Educat. 6: 90-111 (1976).
- Gewirtz, J. and Stingle, K.*: The learning of generalized imitation as the basis for identification. Psychol. Rev. 75: 374-397 (1968).
- Goldiamond, I.*: Moral behavior. A functional analysis; in Readings in developmental psychology today (CRM, Del Mar 1970).
- Hoffman, M.*: Moral development; in *Mussen* Carmichael's manual of child psychology, vol. 2 (Wiley, New York 1970).

- Hunt, J. McV.: Intelligence and experience (Ronald Press, New York 1961).
- Kaplan, A.: The conduct of inquiry (Chandler, San Francisco 1964).
- Keller, M. and Carlson, P.: The use of symbolic modeling to promote social skills in pre-school children with low levels of social responsiveness. *Child Dev.* 45: 912-919 (1974).
- Kendler, H. and Kendler, T.: Vertical and horizontal processes in problem-solving. *Psychol. Rev.* 69: 1-16 (1962).
- Kohlberg, L.: A cognitive-developmental analysis of children's sex-role concepts and attitudes; in *Maccoby* The development of sex differences (Stanford University Press, Stanford 1966).
- Kohlberg, L.: Early education. A cognitive-developmental view. *Child Dev.* 39: 1013-1062 (1968).
- Kohlberg, L.: Stage and sequence. The cognitive-developmental approach to socialization; in *Goslin* Handbook of socialization theory and research (Rand McNally, Chicago 1969).
- Kohlberg, L.: From is to ought. How to commit the naturalistic fallacy and get away with it in the study of moral development; in *Mischel* Cognitive development and epistemology (Academic Press, New York 1971).
- Kohlberg, L.: Continuities in childhood and adult moral development revisited; in *Baltes and Schaie* Life-span developmental psychology. Personality and socialization (Academic Press, New York 1973).
- Kuhn, D.: Imitation theory and research from a cognitive perspective. *Hum. Dev.* 16: 157-180 (1973).
- Kuhn, D.: Inducing development experimentally: Comments on a research paradigm. *Dev. Psych.* 10: 590-600 (1974).
- Kuhn, T.: The structure of scientific revolutions (University of Chicago Press, Chicago 1962).
- Langer, J.: Theories of development (Holt, Rinehart & Winston, New York 1969).
- LaVoie, J.: Cognitive determinants of resistance to deviation in seven-, nine-, and eleven-year-old children of low and high maturity of moral judgment. *Dev. Psych.* 10: 393-403 (1974).
- Loof, W.: Socialization and personality throughout the life span. An examination of contemporary psychological approaches; in *Baltes and Schaie* Life-span developmental psychology. Personality and socialization (Academic Press, New York 1973).
- Maccoby, E. and Jacklin, C.: The psychology of sex differences (Stanford University Press, Stanford 1974).
- Mischel, W.: A social-learning view of sex differences in behavior; in *Maccoby* The development of sex differences (Stanford University Press, Stanford 1966).
- Mischel, W. and Underwood, B.: Instrumental ideation in delay of gratification. *Child Dev.* 45: 1083-1088 (1974).
- Overton, W. and Reese, H.: Models of development. Methodological implications; in *Nesselroade and Reese* Life-span developmental psychology. Methodological issues (Academic Press, New York 1973).
- Patterson, G.: A basis for identifying stimuli which control behaviors in natural settings. *Child Dev.* 45: 900-911 (1974).
- Piaget, J.: The psychology of intelligence (Harcourt Brace, New York 1950).
- Piaget, J.: Play, dreams, and imitation in childhood (Norton, New York 1951).
- Piaget, J.: Structuralism (Basic Books, New York 1970).
- Piaget, J.: Biology and knowledge (University of Chicago Press, Chicago 1971).
- Reese, H. and Overton, W.: Models of development and theories of development; in *Goulet and Baltes* Life-span developmental psychology. Research and theory (Academic Press, New York 1970).

- Riegel, K.:* Developmental psychology and society. Some historical and ethical considerations; in *Nesselroade and Reese* Life-span developmental psychology. Methodological issues (Academic Press, New York 1973a).
- Riegel, K.:* Dialectic operations. The final period of cognitive development. *Hum. Dev. 16:* 346-370 (1973b).
- Steiner, G.:* On the psychological reality of cognitive structures. A tentative synthesis of Piaget's and Bruner's theories. *Child Dev. 45:* 891-899 (1974).
- Werner, H.:* The concept of development from a comparative and organismic point of view; in *Harris* The concept of development (University of Minnesota Press, Minneapolis 1957).
- West, H.:* Early peer-group interaction and role-taking skills. An investigation of Israeli children. *Child Dev. 45:* 1032-1041 (1974).
- Zimmerman, B.:* Modification of young children's grouping strategies. The effects of modeling, verbalization, incentives, and age. *Child Dev. 45:* 1032-1041 (1974).
- Zimmerman, B. and Rosenthal, T.:* Observational learning of rule-governed behavior by children. *Psychol. Bull. 81:* 29-42 (1974).