DOCUMENT RESUME

ED 130 773 PS 008 893

AUTHOR Kaufman, Barry A.; Banet, Bernard
TITLE Will the Real Jean Piaget Please Stand Up: A Critique of Three Piaget-Based Curricula, and a Rejoinder.
INSTITUTION ERIC Clearinghouse on Early Childhood Education, Urbana, Ill.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C.
PUB DATE Sep 76
NOTE 42p.
AVAILABLE FROM Publications Office, I.C.B.D., College of Education, University of Illinois, 805 West Pennsylvania Avenue, Urbana, Illinois 61801 (Catalog No. 151, $2.10)

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS *Abstract Reasoning; Cognitive Development; Comparative Analysis; Developmental Stages; *Early Childhood Education; Educational Change; Educational Innovation; Educational Theories; *Elementary School Curriculum; Experimental Curriculum; *Learning Processes; *Learning Theories; Logical Thinking; *Preschool Curriculum; Preschool Education; Semiotics
IDENTIFIERS Epistemology; *Piaget (Jean)

ABSTRACT

The relationship between Piagetian theory and its application in three early childhood programs is discussed in two papers with differing points of view. The first paper discusses Piaget's epistemology and presents a critical analysis of the three programs, concluding that only one of them is consistent with Piaget's epistemology. A rejoinder, challenging the first paper's analysis, suggests an alternative approach to examining the relevance of Piaget to early childhood education. The programs under discussions are: (1) Weikart's Cognitively Oriented Curriculum, (2) Lavatelli's Early Childhood Curriculum: A Piaget Approach, and (3) Kamii and DeVries' Piaget for Early Education. The programs are examined in the first paper in relation to (1) nature of subject-object relationship, (2) construction of operations, (3) nature of physical and logico-mathematical knowledge, and (4) representation of knowledge. Conclusions emphasize the conflict between constructionalist epistemology and empiricist tradition. The second paper questions whether sophisticated knowledge of Piaget's epistemological theory is necessary for teachers and criticizes the distinction made in the first paper between psychological and epistemological perspectives. Recognition of what Flavell calls Piaget's stage-independent and stage-dependent theories is urged, with emphasis on the latter to provide a specific framework for teachers and parents. Questions to be addressed by teachers and researchers in early childhood education are proposed. (BF)

WILL THE REAL JEAN PIAGET PLEASE STAND UP: A CRITIQUE OF THREE PIAGET-BASED CURRICULA, AND A REJOINDER

Barry A. Kaufman

Bernard Banet

Available from:

Publications Office/ICBD
College of Education/University of Illinois
805 West Pennsylvania Avenue
Urbana, Illinois 61801

Price: $2.10 Catalog # 151

September 1976

The material in this publication was prepared pursuant to a contract with the National Institute of Education, U.S. Department of Health, Education and Welfare. Contractors undertaking such projects under government sponsorship are encouraged to express freely their judgement in professional and technical matters. Prior to publication, the manuscript was submitted to the Area Committee for Early Childhood Education at the University of Illinois for critical review and determination of professional competence. This publication has met such standards. Points of view or opinions, however, do not necessarily represent the official view or opinions of either the Area Committee or the National Institute of Education.

Introduction

The work of Swiss psychologist Jean Piaget has been interpreted and applied to early childhood curricula by many American educators. But have the resulting "Piaget-based" curricula always faithfully represented the perspective of Piaget? That question is debated in the two essays presented here.

These papers express differing points of view concerning the relationship between Piagetian theory and three early childhood programs: David Weikart's Cognitively Oriented Curriculum, Celia S. Lavatelli's Early Childhood Curriculum: A Piaget Approach, and Constance Kamii and Rheta DeVries' Piaget for Early Education. In the first paper, Barry Kaufman critiques the three programs and concludes that only one of them is consistent with Piaget's epistemology. In a rejoinder, Bernard Banet challenges Kaufman's analysis and suggests an alternative approach to examining the relevance of Piaget to early childhood education.

Contents

Will the Real Jean Piaget Please Stand Up:

An Epistemological Critique of Three Piaget-Based Early Childhood Curricula

Barry A. Kaufman, Ed.D.
Washington University
Graduate Institute of Education
St. Louis, Missouri

During the past few years, the name Piaget has become the "Good Housekeeping Seal of Approval" for a number of preschool curricula and innovations in classroom organization (Lavatelli, 1970; Weikart, et al, 1971; Furth and Wachs, 1974; Kamii and DeVries, 1975). The "American" Piaget has been constructed by early childhood educators to provide a psychological rationale that seems to be relevant to contemporary educational trends. His work has been dissected, digested, and assimilated in this country to fit the traditional mold of American education. Typically this psychological rationale includes the notion of stages, the use of concrete and manipulative objects, the learner as an active organism, and the acquisition of specific logical-mathematical concepts.

In any discussion of Piaget and the field of education, it is essential to realize that Piaget is an epistemologist and as such is primarily concerned with the nature and acquisition of knowledge. As an epistemologist, Piaget has directed his research toward an elucidation of two basic questions: What is the nature of knowledge, and how does man come to know? In a previous paper (Kaufman and Konicek, 1974), it was argued that the Piagetian theory concerning the nature of knowledge and how man acquires knowledge has little applicability to contemporary education. It was suggested that the empiricist tradition of schooling was mutually exclusive to the constructivist epistemology formulated by Piaget.

To design early childhood programs within Piaget's psychological perspective limits the revolutionary nature of the theory and can only

result in gross misinterpretations and misapplications. Piaget's psychological perspective provides unique insight into the developmental nature of cognitive functioning; however, if the Piagetian rationale is to have any direct bearing on curriculum reform in early education, it must be through an epistemological framework. In reference to this orientation, Furth (1969) has indicated that "...revolutionary changes in the whole field of education and human relations seem to be a direct consequence of a deeper understanding of Piaget's theory. Who dares to guess how our primary education would change if teachers really took seriously Piaget's proposition that knowledge is an operation that constructs its objects?" (p. 7)

It is essential that early childhood educators make the distinction between the actual contributions of Piaget in regard to specific epistemological questions and how these contributions have been reinterpreted to provide a basis for what appears to be relevant in the area of early childhood curriculum reform. To this end, the following study will critique three Piaget-based programs to ascertain the degree to which they reflect the epistemological foundations of Piaget. The critique will focus on the dual aspects of interpretation and application. The programs analyzed are: (1) David Weikart's Cognitively Oriented Curriculum, (2) Celia S. Lavatelli's Early Childhood Curriculum: A Piaget Approach, and (3) Constance Kamii and Rheta DeVries' Piaget for Early Education.

Piaget's Epistemology

1. Subject - Object Relationship:

Central to Piaget's theory of knowledge is the relationship between the subject and the object, or the organism and the environment. Deeply rooted in a biological perspective, Piaget's theory is "essentially a theory of adaptation of thoughts to reality, even if this adaptation at last reveals, as does every adaptation, the existence of an inextricable interaction between subjects and objects." (1968, p. 24) Viewing knowledge as a biological adaptation, the epistemology of Piaget rejects any form of subject-object dualism. For Piaget (1970a) "knowledge...neither arises from objects nor from the subject, for from interactions...between the subject and those objects." (p. 704) The theory of knowledge posited by Piaget (1970a) reduces itself to "analyzing how the subject becomes progressively able to know objects adequately, that is, how he becomes capable of objectivity." (p. 704)

Piaget rejects the dualistic perspective found in empiricism and rationalism. The empiricist epistemology (Locke, Berkeley, Hume, and the Vienna Circle) views knowledge as external to the subject and objectivity is simply the result of perceptual data, linguistic labels and motoric associations. Such an epistemological perspective produces what Piaget terms a figurative copy of objects. Figurative copies of objects are merely imitations of states and are therefore static in nature. Within the empiricist view, the "function of intelligence is systematically to file, correct, etc., these various sets of information..."

(Piaget 1970, p. 703) Examples of an empiricist epistemology within a psychological context can be found in the work of Skinner (1974), Bandura (1965), and Premack (1959).

The rationalist epistemology (Descartes, Kant, Chomsky, and Freud) posits a view of knowledge that is innate in man consisting of an unfolding of structures performed within the subject. According to the rationalist perspective "the 'categories' of knowledge are biologically preformed as the antecedent conditions of all experience..." (Piaget 1972, p. 56) Apriorism allows the organism to respond to every situation by actualizing its potential structures. The rationalist epistemology views knowledge as preformed and becoming manifest in the course of maturational development. Within the psychological perspective, the rationalist epistemology can be seen in Chomsky's Language Acquisition System (1965) and traditional psychoanalytic theory (Hall and Lindzey, 1970).

The Piagetian epistemological perspective sees the genesis of knowledge neither in objects nor from subjects but from interactions between the two. In order to know objects, the subject must act upon them and transform them. In every action the subject and the objects are joined. A transformation consists of actions that displace, connect, combine, take apart and reassemble objects.

> To my way of thinking, knowing an object does not mean copying it--it means acting upon it. It means constructing systems of transformations that can be carried out on or with this object. Knowing reality means constructing systems of transformations that can be carried out on or with the object... The transformational structures on which knowledge consists are not copies of the transformations in reality; they are simply possible isomorphic models among which experience can enable us to choose. Knowledge, then, is a system of transformations that become progressively adequate. (Piaget 1970b, p. 15)

2. Knowledge as a Construction:

During his lifetime, Piaget has primarily been concerned with a single, yet global epistemological question: What is the nature of knowledge? As previously state, the Piagetian epistemology does not view the genesis of knowledge in objects or in subjects, but from an inextricable interaction between the two. The natural consequence of this interaction is an individual's construction of knowledge. The construction of knowledge is a biologically oriented process in which a subject evolves his own objective sense of reality. Objectivity is not an initial property, but is invented by the subject. Therefore objectivity is highly individualistic and relativistic--not, as the empiricists believe, a faithful copy of reality.

Since objective knowledge is not acquired by perceptual recordings of external data but has its genesis in interactions, Piaget posits two types of activity in the construction of knowledge: (a) the coordination of actions, and (b) the interrelations between objects. The two activities are interdependent and it is through action that the relations originate. The structures of action are constructed "and are not given in objects, since they are dependent on action, nor in the subject, since the subject must learn how to coordinate his actions." (Piaget 1970a, p. 704)

An example of such a coordination of action is described by Piaget in the child's acquisition of number. The development of the notion of number is based on a coordination of two distinct operations: classification and ordering relationships. One type of operation is not sufficient for a child to acquire the concept of number; there must be a coordinated

synthesis of classification and relationships of order.

Central to the Piagetian epistemology of constructivism is the notion of the action or operation. In this context, knowledge is not obtained from objects but from the action itself.

> The living organism itself is not a mere mirror image of the properties of its environment. It evolves a structure which is constructed step by step in the course of epigenesis, and which is not entirely preformed. (Piaget 1970a, p. 705)

Unless the subject has acted on objects and internalized his action, he has not constructed knowledge. Piaget, as previously indicated, makes a distinction between two types of actions. The first type of action consists primarily of sensorimotor activities such as pushing, pulling, or touching. These individual actions give rise to what Piaget terms figurative aspects of knowing. Figurative knowing is momentary and perception bound. The second type of action is based on coordinated actions and is termed operational knowing. Operational knowing can be equated to the Anglo-Saxon notion of "thinking."

The root of all logical thought is found in the coordination of actions and forms the basis of reflective abstraction. The origin of logical thinking is constructed by the subject and is found in the actions of the subject and more specifically in the coordination of his actions.

Summarizing the constructionalist notion of knowledge, Piaget (1970b) states:

> ...knowledge results from continuous construction, since in each act of understanding, some degree of invention is involved; in development, the passage from one stage to the next is always characterized by the formation of new structures which did not exist before, either in the external world or in the subject's mind. (p. 77)

3. Types of Knowledge:

Piaget identifies two types of knowledge: physical knowledge and logico-mathematical knowledge. Physical knowledge is abstracted by the subject from objects themselves. For example, a child can lift objects in his hand and realize they have different weights. He finds this out experimentially, and his knowledge is extracted from the objects. It is the physical experience that allows the child to discover weight. Physical knowledge gives rise to figurative aspects of knowing, because the subject attempts to represent reality as it appears without transforming it.

Logico-mathematical knowledge is derived from the knowing activity itself and therefore is constructed by the subject. In logico-mathematical knowledge, the subject reflects on his own coordinating activity to give rise to what Piaget terms reflective abstraction. Reflective abstraction is a cognitive process consisting of an internal feedback mechanism where the subject reflects on his own coordinating activities. The reflecting is not a passive or introspective process, but a coordinated system of actions that progressively expands the internal structure. Piaget notes (1970a)

> ...we can speak of logico-mathematical experiments, which extract information from the properties of actions applied to objects, and not from the objects themselves... (p. 728)

In reflective abstraction, the subject abstracts logical relationships among objects. For example, if a child lifts objects each of a different weight, physical knowledge can be abstracted to allow the child to indicate the heaviest. However to have the child place the objects in a serial relationship from the heaviest to the lightest requires reflective

abstraction, i.e., ordering relationships are not to be found in the objects themselves but must be constructed by the child as a result of his coordinated actions. The serial relationship is a form of logico-mathematical knowledge and is constructed by the child, not from the physical knowledge of the objects.

The revolutionary aspect of Piaget's epistemological notion of logico-mathematical knowledge rests in the fact that such knowledge is not directly teachable because it is constructed out of reflective abstraction giving rise to object relationships the subject has invented himself. It is extremely difficult for those of us schooled in an empiricist tradition, but the Piagetian epistemology related to the origin of logico-mathematical knowledge clearly supports the notion that no one taught us how to perform arithmetic operations such as addition and multiplication, or even the class inclusion relationship necessary to understand the nature of a state to a state capital. Every logico-mathematical relationship is constructed and every subsequent relationship is a relationship among relationships. The process of forming such relationships is reflective abstraction. Because Piaget views the process of reflective abstraction as any biological function, all normal children will acquire logico-mathematical knowledge without the need of didactic teaching. Once acquired, logico-mathematical knowledge becomes part of the subject and therefore cannot be forgotten but only used as additional structures for future reflective abstraction in the formation of new logico-mathematical knowledge.

4. Representation of Knowledge:

To obtain a complete picture of Piaget's epistemological foundation it is essential to examine how knowledge is represented in the form of symbolic functioning. For Piaget, the operative aspects by which the subject constructs logico-mathematical knowledge and the symbolic process by which the subject re-represents actions are functionally different.

To comprehend Piaget's position on symbolic representation, one must understand the dual notions of signifier and significate. A signifier is any object or event within a subject-object interaction that provides some knowledge to the subject about another object or event. A signifier is an object or event that is beyond itself. The event or object about which the signifier provides information in termed a significate. The relationship of signifier to the significate is its signification.

Perhaps an example would be helpful in distinguishing signifier and significate. A young child sees his father turning on the hot water in the bathroom and says, "Daddy going to shave?" The father replies, "No, I am running the water to wash my hands." The hot running water is the signifier. The act of shaving is the significate. The relationship of the hot running water (signifier) to the father shaving (significate) is the signification.

Piaget indicates three types of signifiers. The first is termed an index. An index representation involves a direct relationship between an object and the representation of that object. For example, a child hearing a dog bark without the dog in view and responding "doggy" is an index representation of a dog (barking is the signifier for the significate dog). The bark is an index of the dog's presence.

The second signifier is termed a symbol. A symbol is differentiated from an object, but retains a degree of similarity to objects. Symbolic representation is the subject's ability to construct a symbol to represent that which the subject knows and yet which is not present. For example, in symbolic play, a child represents an airplane with a pencil. The pencil (signifier) is symbolically representing an airplane (significate). Symbolic representation presupposes the constructive activity of a coordinated set of actions or operational thinking.

The third signifier is termed a sign. A sign is also differentiated from its significates but is conventional and often arbitrary. Signs are therefore always social. Piaget restricts the meaning of the term sign to linguistic or other agreed upon representations. For example, the letters D O G form a sign (signifier) for the object dog (significate).

The symbol and sign levels of representation Piaget terms semiotic functions. Semiotic functions represent objects or events which are absent. Semiotic functions include play, images, imitation, and language. Index levels of representation are figurative in nature, whereas semiotic functions (symbols and signs) are operational. Symbols and signs are constructed and therefore not empirically taught.

Perhaps the most central issue related to Piaget's epistemology in the area of representative functioning is that he does not see language as a necessary element of operational thinking. Language for Piaget is acquired and used like any other semiotic function and is only a manifestation of sign behavior. Furth (1969) states:

> The formation of thinking as conceptual "representation" assuredly goes hand and hand in the child with the acquisition of language; but one should not see in conceptual representation a simple causal result of language, for both processes are linked to a more general process which is the symbolic (semiotic) function. In fact, language appears at the same level of development as symbolic play, deferred imitation, and probably the mental image insofar as it is internalized imitation. The characteristic of the symbolic (semiotic) function is its various aspects is the differentiation or signifiers and significates, and the capacity to evoke, by means of these differentiated signifiers, significates that are not actually perceived. These two characteristics oppose verbal signs and the symbols used in play, gesture, or images to sensory-motor indices, or signals that are not differentiated from their significates and therefore cannot evoke objects or events not actually perceived. The transition between sensory-motor behavior and symbolic or representational behavior is probably tied to the presence of imitation.... It is noteworthy that language is acquired in a context of imitation and this imitative factor seems to constitute an essential support. If language acquisition were only due to conditioning it should take place at a much earlier age. But if the development of imitation is itself linked to the development of intelligent behavior in its totality, it is apparent that one can legitimately consider language as playing a central role in the formation of thinking only insofar as language is one of the manifestations of symbolic (semiotic) function. The development of the symbolic (semiotic) function in turn is dominated by intelligence in its total functioning. (p. 126)

The basic Piagetian epistemology can be summarized as follows:

1. Knowledge has origin neither in objects nor subjects, but from an inextricable interaction between the subjects and objects;

2. Knowledge is a construction which is a natural consequence of the subject-object interactions;

3. Knowledge that is abstracted directly from objects is physical knowledge while knowledge that is a result of coordinated actions is termed logical-mathematical knowledge; and

4. Knowledge can be represented at three levels, i.e., index, symbol and sign.

An Epistemological Critique of Three Piaget-Based Early Childhood Curricula

Evans (1975), and Kamii and DeVries (1973) have provided critiques of Piaget-based early education programs. As Evans indicates, data about measurable outcomes of Piaget-based early childhood curricula are sparse. What evidence does exist is primarily evaluative in nature and was conducted by the model builders themselves. Consequently, the available critiques are mainly conceptual arguments that focus on the psychological and pedagogical aspects of the program.

The following critique will be an epistemological analysis of three Piaget-based early childhood education curricula. Each program will be critiqued according to the following Piagetian epistemological foundations previously discussed:

1. The nature of subject-object relationship
2. The construction of operations
3. The nature of physical and logico-mathematical knowledge
4. The respresentation of knowledge

The psychological perspective of Piaget's theory--stages of development, and equilibration--will not be used as a basis for the critique. It is clear that the psychological significance of Piaget's theory is a point of general agreement among all three curricula. All model builders agree that the preschool child is in the stage of pre-operations and exhibits the basic preoperational characteristics described by Piaget (1967). Other points of psychological agreement focus on the value of play to cognition, the need for unstructured learning opportunities, the notion that telling is not teaching, the critical role of mental activity, and the active involvement of the child in learning.

As previously indicated, the real power of Piaget's theory lies not in the psychological perspective, for which there is general agreement, but rather in the epistemological foundations. An early education curriculum should be internally consistent in its epistemology, psychology, and pedagogy. Misinterpretations in the epistemological foundations will certainly lead to misapplications on the pedagogical level.

Celia S. Lavatelli's
Early Childhood Curriculum: A Piaget Approach

The source for the critique of Lavatelli's curriculum will be the companion text fot the program, Piaget's Theory Applied to an Early Childhood Curriculum (1970).

1. The Nature of Subject-Object Relationship:

Within an epistemological framework, it is clear that Lavatelli's program does not view the child in unity with his environment. Many of the activities and directions provided by the teacher reflect an empiricist epistemology in which the genesis of knowledge is to be found in objects.

> No daily ten minute periods of mental gymnastics is going to work miracles in developing intellectual competence, but when the teacher knows how to reinforce [underling for emphasis] the directed periods throughout the day...she increases the likelihood that generalization of the concept will occur and transfer of training will be possible. (p. 47)

The terms reinforce, generalization and transfer of training are behaviorist in orientation and seem to reflect Thorndike's Law of Effect rather than Piaget's notion of subject-object unity.

The Lavatelli curriculum is a packaged program broken down into three components: (1) classification, (2) number, measurement, and space,

and (3) seriation. All of the activities related to these components are highly structured and do not allow for the transformation of objects. Lavatelli labels the learning opportunities for the curriculum a "training program" and this is exactly what it is--a training program with little opportunity for the children to construct a system of transformations on the objects. Although Lavatelli provides a strong argument that training in perceptual skills will not lead to logical thinking, practically the entire curriculum is based on figurative knowing with little opportunity for the child to engage in operational thinking.

2. The Construction of Operations:

Within the Piagetian epistemology, unless the child has acted on objects and internalized his actions, he has not constructed knowledge. Operations are always internal and not an external function. Any external manifestation of an operation is a unique and specific act and does not represent the totality of an operation. An operation is a thinking action constructed by the child and not subject to empirical verification.

All of Lavatelli's program is based on empiricist assumptions about the acquisition of an operation. The program recommends giving verbal rules, having the child give the correct answer, giving strong teacher direction, and providing for teacher modeling behavior.(p. 88-93) entire package misinterprets the heart of Piaget's epistemological notion of the construction of an operation.

3. The Nature of Physical and Logico-Mathematical Knowledge:

Although the Lavatelli curriculum focuses on the acquisition of certain

mathematical concepts, these concepts do not reflect Piaget's epistemological notion of logico-mathematical knowledge. A critical examination of the program will reveal that the overriding objective is one of attempting to teach operations such as classification, spacial relationships, or seriation. For example, in the Lavatelli program, teachers are instructed that children learn through self-activity and the manipulation of objects.(p. 43) Few would argue with this basic Piagetian psychological principle; however, on an epistemological level it assumes an empiricist view that children absorb logico-mathematical knowledge through their manipulations. It should be recalled that logico-mathematical knowledge is derived from the knowing act itself and not from the manipulation of objects. What is actually taking place in the Lavatelli program is the acquisition of "concepts" and not logico-mathematical knowledge.

Lavatelli considers the all-some relation found in the operation of classification. (p. 93-95) The training program related to class inclusion "is to have children carry out many activities where they combine subclasses to make a class and break a class down into its subclasses." (p. 94) In such a class inclusion activity, whether there are more of a subclass or the class itself cannot be determined by observation or manipulation. The objects exist but the relationship of all to some exists in the child's mind. The child structures the class relationship by reflective abstraction and not from the objects. Logico-mathematical knowledge is structured by reflective abstraction, not through manipulation.

Lavatelli emphasizes that the teachers should provide direct feedback and the making of models for the children to copy (p. 88-89) In logico-

mathematical knowledge, the teacher should instead facilitate reflective abstraction. If the teacher imposes his authority to provide feedback in a logical relationship, the child has not invented for himself and therefore does not engage in reflective abstraction. What the child is learning in such a situation is social conformity which prevents what Duckworth (1972) terms the "having of wonderful ideas."

4. The Representation of Knowledge:

The singularly most important component of the Lavatelli program that is in total opposition to Piaget's epistemological foundation is the area of language development and the growth of logical intelligence. In all of Chapter 3 (p. 53-78), Lavatelli attempts to build a rationale for language training and intellectual competence that is consistent with Piaget's view of language development.

Lavatelli draws upon the research of Vygotsky, Bellugi, and Bernstein to support her position that language development can make children better thinkers. A critical examination of Vygotsky's (1962) position on language and thought reveals it is in opposition to Piaget's epistemology. Vygotsky states:

> He (the child) has the concept but is not conscious of his own act of thought. The development of a scientific concept, on the other hand, usually begins with its verbal definition and its use in non-spontaneous operations... (p. 108)

For Piaget, language is one of a number of semiotic functions (imitation, play, or images). Logical thinking occurs in children without langauge and is only represented by various semiotic functions. The decisive argument against the position that logico-mathematical structures are derived uniquely

from linguistic forms is that in the course of intellectual development in any given individual, logico-mathematical structures exist before the appearance of language. Logico-mathematical knowledge has it genesis in actions, and actions can be represented in a number of different ways, of which language is only one. It is Piaget's basic contention that logico-mathematical knowledge gives rise to semiotic functions, and not vice versa.

Lavatelli draws heavily from the research of Bellugi to identify the syntactical and semantic forms that are necessary to help children form logical thinking patterns. Lavatelli indicates that teachers should deliberately model the correct syntax and encourage the child to use it. What Lavatelli fails to realize is that a child's syntactical structure is not a reflection of the child's logical thinking. The logic of action preceeds any semiotic function and therefore is not an indication of how a child is thinking.

David Weikart's Cognitively Oriented Curriculum

The source for the critique of Weikart's program will be the companion text, The Cognitively Oriented Curriculum (1970).

1. The Nature of Subject-Object Relationship:

Weikart's Cognitively Oriented Curriculum is designed along a three-sided framework:

1. Cognitive content consisting of classification, seriation, temporal relations, and spacial relations.
2. Levels of representation consisting of index, symbol, and sign.
3. Levels of operations consisting of motoric and verbal activities.

The Cognitively Oriented Curriculum, with its emphasis on the acquisition of cognitive skills, reflects a basic empiricist position that separates process from content or subject from object. Throughout the program, Weikart emphasizes that teachers must have certain goals in mind selected from the four content areas, must decide which levels of representation should be utilized to sequence activities, and finally must choose between motoric and verbal levels of operation to implement the cognitive goals.

This represents a false interpretation of Piaget's epistemology as it relates to subject-object unity. The Weikart rationale is essentially empiricist in nature and emphasizes that which is external to the child. The basic teaching methodology implied in the Cognitively Oriented Curriculum can only be characterized by the external manipulation of the child's environment.

For Piaget, thinking does not exist apart from content. Cognitive content (classification, seriation, etc.) is not an object or piece of information. It represents logical structures about what to do with objects. Objects should be manipulated, but as a means of transforming reality. Since knowledge is constructed by transformation, children must deal with reality itself.

2. <u>The Construction of Operation:</u>

Throughout the Cognitively Oriented Curriculum, no direct reference is made to the constructive nature of operations. The only statement Weikart makes regarding operations is that they "are representational acts which have been organized into a functional whole and are related to other such systems." (p. 4)

Clearly this is not Piaget's notion of an operation. An operation according to Piaget (1970b) "is an action that can be internalized; that is, it can be carried out in thought as well as executed materially." (p. 21) Piaget uses the term operation to refer to the thinking act itself and it need not be exhibited by external action.

When Weikart does use the term operation, it is associated with motoric and verbal levels of operations. Nowhere in the Piagetian literature can the notions of motoric and verbal levels of operations be found. Piaget refers to sensory-motor intelligence in which the form of knowledge is tied to the content of specific sensory input or motoric action. However sensory-motor intelligence refers to external acts while an operation is an internal act. Furth (1969) notes that "a sensory-motor scheme is manifest in an external act." (p 56) The term verbal level of operation is totally alien to the Piagetian epistemology and therefore unique to the Cognitively Oriented Curriculum.

3. The Nature of Physical and Logico-Mathematical Knowledge:

Similar to the Lavatelli program, the Cognitively Oriented Curriculum uses the acquisition of a few mathematics content areas to represent Piaget's epistemological notion of logico-mathematical knowledge. All of the activities suggested in the activity guide (p. 89-145) are organized around the four content areas. What Weikart fails to realize is that logico-mathematical knowledge is what children use when they think; it is the structure of logical thought. The framework of the Cognitively Oriented Curriculum is an empiricist interpretation of logico-mathematical knowledge, not a constructivist position.

4. The Representation of Knowledge:

Weikart's basic interpretation of Piaget's notion of representation is essentially correct. The Cognitively Oriented Curriculum clearly delineates the three levels of representation, i.e., index, symbol, and sign. However the major flaw in the Cognitively Oriented Curriculum is that the program as implemented places the levels of representation as external to the child. In Piaget's epistemology, it is the child, based on internal structures, that constructs representational symbols (play, images, language).

According to Furth (1969) to state that "the external world is known through symbols" is to "effectively demolish the basic structure of Piaget's operative theory..." (p. 92) Furth continues:

> Once symbols are endowed with the power to represent so as to take the place of things outside, the temptation to treat them as functional objects is almost irresistible... With this the ultimate explanation of knowledge is taken way from the constructive and representing activity of the intelligent knower and delegated to these symbols as so-called mediators or objects of knowledge... A symbol as a representation needs a living person who constructs the representation... (p. 93)

Only through constructed operational structure is the relation of knower and representation assured. Symbolic function is indissociable from children's cognition, and any product of symbolic functions (play, imitation, language) is supportive but not an element of the operational act itself. Symbolic representations are external manifestations of internal acts.

In addition to the basic misunderstanding of the levels of representation, the Cognitively Oirented Curriculum also equates the representational levels to the operational stages, i.e., index to sensory-motor, symbol to preoperational, and sign to concrete and formal operations. Piaget makes no reference to such an equated relationship.

Constance Kamii and Rheta DeVries'
Piaget for Early Education

The source for the critique of the Kamii and DeVries program will be the companion text, Piaget for Early Education (1975).

1. The Nature of Subject-Object Relationship:

It is clear from the basic philosophical orientation stated by Kamii and DeVries that their curriculum is directed toward the development of the young child. Their "conviction is based on the fact that if children are autonomous, curious, and alert in Piaget's stage 1, they will inevitably end up in stage 2, and if they continue to be autonomous, curious, and alert in stage 2, they will inevitably end up in stage 3, etc." (p. 37)

In contrast to the Lavatelli and Weikart programs, Kamii and DeVries indicate only two loosely defined cognitive objectives:

1. To come up with interesting ideas, problems, and questions.
2. To put things into relationships and notice similarities and differences.

The choice of these objectives is directly related to Piaget's epistemology of a subject-object unity. Kamii and DeVries feel that central to Piaget's theory is the notion that intelligence develops as a whole and cannot be compartmentalized into objectives of classification, seriation, spacial logic, etc. The objectives are directly related to Duckworth's (1972) notion of "the having of wonderful ideas."

Instead of structuring specific learning activities to achieve cognitive objectives, the Piaget for Early Education Curriculum emphasizes daily living to stimulate children to develop. For example, snack time is used

as a unique curriculum vehicle for the child to "anticipate, make judgement, and compare his anticipation with the outcome." (p. 46)

The Piaget for Early Education program is organized by the children because children are constantly trying to make sense out of the world. There is a minimal amount of adult imposition. Children use the majority of the day in free choice activities and are free from a regular routine. Kamii and DeVries emphasize that the important thing in organizing a curriculum is to maximize "each child's independence, initiative, alertness, curiosity and involvement." (p. 60)

2. The Construction of Operations:

Kamii and DeVries indicate that their curriculum is not derived from an attempt to teach Piagetian protocols nor to move children through the various developmental stages. Similarly to Piaget, they see knowledge as being constructed as an organized whole. Keeping within Piaget's biological perspective, the construction is from a less differentiated whole to a more differentiated organization. Given this perspective, they view their curriculum as providing a rich environment "by which individuals can become more intelligent, autonomous, mentally healthy, and moral." (p. 39)

The curriculum reflects a deep concern for the horizontal development as a precursor to any vertical movement. Central to the curriculum is the Piagetian assumption that operations are constructed out of "wrong" answers. The goal is not to accelerate stage progression, but to be concerned with "the extent to which past construction (even if "wrong") enables the child to construct knowledge in the future at ages ten, fifteen, and beyond." (p. 74) A statement by Piaget (1970a) reflects the basic rationale for

the Kamii-DeVries program as it relates to an attempt to teach operations too early:

> ...each time one prematurely teaches a child something he could have discovered for himself, that child is kept from inventing it and consequently from understanding it completely. (p. 715)

3. The Nature of Physical and Logioc-Mathematical Knowledge:

The Kamii and DeVries curriculum is organized to facilitate physical and logico-mathematical knowledge. "In physical knowledge, the teacher encourages the child to find the answer directly from objects. In logico-mathematical knowledge, the teacher refrains from telling the right answer or reinforcing it, and, instead, encourages reflecting abstraction." (Kamii and DeVries, 1975, p. 67)

Because Kamii and DeVries see physical and logico-mathematical knowledge as actions rather than something to be acquired from outside the child, the curriculum is consistent with the basic epistemology of Piaget. It is clear from the activities in the curriculum that it is the child who constructs the coordinated relationships. The activities are designed to permit the child to engage in reflective abstraction, instead of just manipulating objects. Kamii and DeVries feel that "because there is nothing arbitrary in logico-mathematical knowledge, if the child constructs it at all, he will construct it toward more and more coherence." (p. 16) Teachers in the Kamii and DeVries curriculum are instructed to refrain from giving direct feedback but to encourage reflective abstraction. The importance of reflective abstraction is indicated by the cognitive objectives of the program--to come up with interesting ideas, problems, and questions, and to put things into relationships and notice similarities and differences.

4. The Representation of Knowledge:

The Kamii and DeVries curriculum has a firm grasp of Piaget's notion of representation.

> For purposes of teaching, it is important to recognize that it is not the index, symbol, or sign itself which represents an object. Representing is what the person does by giving meaning to indexes, symbols, and signs. Words, for example, are only as meaningful as the knowledge of the individual who uses them. Thus, teaching of representation does not consist of presenting a list of words to learn, but rather, it focuses on developing the ability to represent knowledge already constructed on the practical level. (p. 49)

In contrast to the Weikart program, the various levels of representation are things that children do rather than what is presented to them as representation. The activities in the curriculum are coded for symbol and sign but only as an indication of the child's action, not developmental benchmarks. Although Piaget's notion of symbolic representation is central to his epistemology, in a pedagogical context it should be used as a means of determining how a child is representing knowledge and not as an externally imposed modality of development.

Conclusions

An epistemological critique of the three Piaget-based early childhood programs leaves one with the impression that transforming a constructionalist epistemology for a society founded on empiricist tradition is indeed difficult. Although this analysis has been critical of the Lavatelli and Weikart curricula, these curricula most likely provide meaningful experiences for the young child. However, to label the programs as Piaget-based is somewhat dubious.

The many changes being made in the name of Piagetian philosophy in the hope of changing the educational system are totally inadequate. The programs

are commendable as far as they go, but they are working toward the attainment of an almost hopeless goal. These attempts can be, at the same time, dangerous if those who adopt them assume that their use is the major step in changing the educational system and bringing about the constructionalists' view of the education of children. The organization of the school is such that any attempt to change one part of the mechanism triggers a self-styled homeostatic reaction resulting in the formation of institutional scar tissue and negating the intended change. What we really need is a change in our view of children and teachers across the board. It will take a revolution of mind to bring such a change, not curriculum innovation or reform.

BIBLIOGRAPHY

Bandura, A. "Influence of Models' Reinforcement Contingencies on the Acquisition of Imitative Responses" Journal of Personality and Social Pyschology, 1965, Vol. 1, pp. 589-595.

Chomsky, N. Aspects of a Theory of Syntax. Cambridge: M.I.T. Press, 1965.

Duckworth, E. "The Having of Wonderful Ideas," Harvard Education Review, 1972.

Evans, Ellis, D. Contemporary Influences in Early Childhood Education. New York: Holt, Rinehart & Winston, Inc., 1975.

Furth, H. G. Piaget and Knowledge. Englewood Cliffs, N.J.: Prentice-Hall,1969.

Furth, H. G. and H. Wachs. Thinking Goes to School. New York: Oxford University Press, 1974.

Hall, C. S. and G. Lindley, Theories of Personality, 2nd Ed. New York: John Wiley and Sons, Inc., 1970.

Kamii, C. and R. DeVries, "Piaget-Based Curricula for Early Childhood Education: Three Different Approaches." S.R.C.D. Philadelphia, April, 1973.

Kamii, C. and R. DeVries. Piaget for Early Education. Unpublished Manuscript, 1975.

Kaufman, B. and B. Konicek, "The Applicability of Piaget to Contemporary Curriculum Reform?" ERIC. ED 091 196, 1974.

Lavatelli, C. S. Piaget's Theory Applied to an Early Childhood Curriculum. Boston, Center for Media Development, 1970.

Piaget, J. "Piaget's Theory," ed. Mussen. Carmichael's Manual of Child Psychology. New York: John Wiley and Sons, 1970a, pp. 703-732.

Piaget, J. Six Psychological Studies. New York: Vintage Press, 1967.

Piaget, J. Genetic Epistemology. New York: W. W. Norton & Co., 1970b.

Piaget, J. Psychology and Epistemology. New York: Viking Press, 1971.

Piaget, J. The Principles of Genetic Epistemology. New York: Basic Book, 1972.

Premack, D. "Toward Empirical Behavior Laws" Psychology Review, 1959, 66, 219-233.

Skinner, B. F. About Behaviorism. New York: Alfred A. Knopf, 1974.

Vygotsky, S. L. Thought and Language. Cambridge: MIT Press, 1972.

Weikart, D., et. al. The Cognitively Oriented Curriculum. Washington, D.C.: A.E.Y.C., 1971.

Rejoinder to Kaufman

Bernard Banet
Director of the Preschool Department
High/Scope Educational Research Foundation
Ypsilanti, Michigan

Kaufman's central thesis in "Will the Real Jean Piaget Please Stand Up?" is that curriculum developers Lavatelli and Weikart have both based their programs on a "psychological perspective" steeped in the empiricist tradition. This perspective, according to Kaufman, has let them to misunderstand the constructivist epistemology of Piaget. Only Kamii and DeVries, says Kaufman, have used Piaget's epistemology and can therefore pass a Piagetian orthodoxy test.

Kaufman is correct in asserting that Piaget's life-long concern has been with the development of logical-mathematical understandings, an interest growing out of centuries of philosophical debate over the nature of "self-evident" logical truths. Piaget's research demonstrates that children construct logical and physical understandings over time in a gradual manner. The theoretical account of this process is indeed an epistemology, i.e., a theory of knowledge. When educators ignore this description of the process of the development of knowledge and still attempt to utilize Piagetian contributions, they do, as Kaufman claims, miss the essence of the theory.

Kaufman's analysis becomes muddled, however, when he attempts to distinguish between psychological and epistemological aspects of Piaget's theory and to employ that distinction to argue that:

> To design early childhood programs with Piaget's psychological perspective limits the revolutionary nature of the theory and can only result in gross minunderstanding and misapplications... If the Piagetian rationale is to have any direct bearing on curriculum reform in early education it must be through an epistemological framework. (p. 1 - 2)

Kaufman implies that the "equilibration model" of Piaget is somehow apart from the epistemology. That assertion puzzles this writer. Furthermore, the consequences of using "just" the so-called "psychological perspective" do not seem all that pernicious if they are as Kaufman lists them:

> It is clear that the psychological significance of Piaget's theory is a point of general agreement among all three curricula. All model builders agree that the preschool child is in the stage of pre-operations and exhibits the basic pre-operational characteristics described by Piaget (1967). Other points of psychological agreement focus on the value of play to cognition, the need for unrestrictive learning opportunities, the notion that telling is not teaching, the critical role of mental activity, and the active involvement of the child in learning. (p. 12)

This reader cannot discern any additional implications for teaching in Kaufman's paper which stem from the "epistemological" perspective as opposed to those described by Kaufman above which he claims derive from the psychological perspective on Piaget's theory. The "powerful" epistemology seems to give us only two broad objectives which seem entirely consistent and redundant with the "psychological" perspective. These two objectives, in Kamii's program, are (1) to come up with interesting ideas, problems, and questions, and (2) to put things into relationships and notice similarities and differences.

If schools and curriculum developers really put into effect the principles described by Kaufman as "psychological," the optimal climate for the development of logical-mathematical knowledge should be attained. It seems inconsistent for a "constructivist" to argue that a sophisticated knowledge of Piaget's epistemological theory is necessary or even useful to teachers. The point of Piaget's epistemology is that children abstract

underlying truths through active encounters with reality, not through active encounters with genetic epistemologists. Confusingly, Kaufman quotes himself as having said that the "Piagetian theory concerning knowledge and how man acquires knowledge has little applicability to contemporary education." This seems to contradict Kaufman's claim that "if the Piagetian rationale is to have any direct bearing on curriculum reform... it must be through an epistemological framework."

Instead of distinguishing between "psychological" and "epistemological" perspectives, Kaufman would have been on firmer ground if he had asserted that in attempting to assimilate Piaget's theory to our own (empiricist) epistemological assumptions, American educators have often attempted to use Piaget's description of developmental sequences and landmarks without considering the dynamics of the process of cognitive development as incorporated in his equilibration model. This has occurred despite the fact that everyone has acknowledged the importance of the equilibration model and has paid at least verbal homage to the theory.

Lavatelli and Weikart, in their pioneering work, seem to have been more inclined to utilize information about what children in the preschool years are (and are not) able to do than to explicitly articulate a pedagogy which reflects Piaget's equilibration model. As a matter of historical accuracy, Kamii's work during the same historical period (late 60's and early 1970's) stressed the content of development in the preschool years at the expense of the process just as much, if not more, than Weikart and Lavatelli. See for example her article, "Evaluation of Learning in Preschool

Education: Socio-Emotional, Perceptual-Motor, Cognitive Development."* In that article Kamii presents Piaget's theory as a tool for making fine-grained diagnostic observations of the developmental status of students on a number of dimensions. The overemphasis of Piagetian content and underemphasis of developmental processes were an almost universal phenomenon--a stage, as it were, that American psychologists and educators went through. To compare two investigators' 1960's work, published in 1970, with a third scholar's unpublished 1975 manuscript is misleading.

A more useful approach to examining the relevance of Piaget to early childhood education might be to recognize that there are two major facets to Piaget's contributions, those hypotheses which Flavell calls the stage-independent theory and those which can be called the stage-independent theory and those which can be called the stage-dependent theory. The stage-independent theory includes Piaget's theory of knowledge and his hypotheses about the dynamics of developmental change. The stage-dependent theory is the description of sequences of development within and across a variety of domains. Kaufman seems to be advocating abandoning the stage-dependent aspects of the theory; at least in the examples from Kamii's program he cites there is little use made of stage-related information.

The limitation of using only the dynamic aspect of the theory (the stage-independent hypotheses) is that it does not help teachers to make

*In Bloom, Hastings, and Madaus (eds.): Handbook on Formative and Summative Evaluation of Student Learning, New York, McGraw-Hill, 1971.

use of the wealth of information Piaget has contributed toward understanding what children in specific developmental epochs are all about. The equilibration model and assumptions about Man the Knower which go along with the model provide a fine rationale for discovery learning approaches using open learning environments, or possibly doing away with schools entirely. But teachers and parents are looking for a framework that is more specific than that described by Kaufman. Insisting on the orthodox incantation of buzz words like "reflective-abstraction," "interiorization," "logical-mathematical knowledge," while deriving few new practical implications of these concepts, will not advance education.

There is much room in Piaget's intellectual edifice for educators to take aspects of the theory and build their own more modest intellectual structures. Some of us, such as Dave Weikart's group here at High/Scope, are attempting to "decenter" our attention from only the stage-dependent or only the stage-independent contributions of the framework. We are attempting to build a model consistent with both, from infancy through adolescence. As we do this, some basic questions remain very much without a satisfactory resolution. It is our continuing goal to make it possible for teachers and researchers, working together, to explore the issues. They cannot be resolved by scriptural quotations from the Master. Some of these questions, with special reference to early childhood education, are:

1. To what extent should teachers attempt to use developmental information about children to create opportunities for activities that provide a "match" for individual children? Under what circumstances is it better to rely on the child to self-select activities which are at an optimal degree of intellectual challange?

2. How should a teacher go about striking a balance in the classroom between teacher-initiated and child-initiated activities? A balance among such things as stimulating discovery and problem solving, responding to children's interests, and supporting acquisition of specific concepts, skills and information?

3. When is it appropriate for teachers to select materials, plan activities and intervene in classroom interactions with the deliberate purpose of exercising children's developing operational schemes (comparing, grouping, combining, ordering, relating: objects, classes, events, locations)?

4. Under what circumstances can an adult's questions stimulate and support cognitive development?

5. When, if ever, do verbal labels for classes and relations, given to children by adults, assist intellectual development?

6. Since language and "figurative" knowledge are rapidly developing in the years befo e school entry, what kinds of supports should teachers in preschool programs be consciously trying to provide for the development of spoken language and other aspects of the "semiotic function" such as the development of mental imagery, imitation, pictorial representation, and the production and decoding of models, maps, charts, and written language?

7. Should the development of comprehension of logical-mathematical truths be seen as a major concern of early childhood programs? Since acceleration of logical-mathematical development is not an objective consistent with Piagetian theory, how can curriculum goals be formulated that are both useful to teachers and consistent with what we know about how children learn?

I propose that questions such as the above will guide curriculum developers to interesting discoveries and will be more productive than debating about who is a True Believer. As Piaget has said, "To the extent that there are Piagetians, to that extent have I failed."

Postscript

The Educational Resources Information Center/Early Childhood Education Clearinghouse (ERIC/ECE) is one of a system of 16 clearinghouses sponsored by the National Institute of Education to provide information about current research and developments in the field of education. The clearinghouses, each focusing on a specific area of education (such as early childhood, teacher education, language and linguistics), are located at universities and institutions throughout the United States.

The clearinghouses search systematically to acquire current, significant documents relevant to education. These research studies, speeches, conference proceedings, curriculum guides, and other publications are abstracted, indexed and published in Resources in Education (RIE), a monthly journal. RIE is available at libraries, or may be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Another ERIC publication is Current Index to Journals in Education (CIJE), a monthly guide to periodical literature which cites articles in more than 700 journals and magazines in the field of education. Articles are indexed by subject, author, and journal contents. CIJE is available at libraries, or by subscription from Macmillan Information, 909 Third Avenue, New York 10022.

The Early Childhood Education Clearinghouse (ERIC/ECE) distributes a quarterly newsletter ($2.00 - 4 issues) which reports on new programs and publications, and RIE documents of special interest. For a complete list of ERIC/ECE publications, or if you would like to subscribe to the Newsletter write: Publications Office/ICBD, College of Education, University of Illinois, 805 West Pennsylvania Avenue, Urbana, Illinois 61801. All orders must be accompanied by check or money order, payable to the University of Illinois. Sorry, we cannot bill.

ERIC CLEARINGHOUSE--CURRENT ADDRESSES

CAREER EDUCATION
Center for Vocational Education
Ohio State University
1960 Kenny Road
Columbus, Ohio 43210

COUNSELING AND PERSONNEL SERVICES
The University of Michigan
School of Education Building
Room 2108, East Univ. & South Univ.
Ann Arbor, Michigan 48104

*EARLY CHILDHOOD EDUCATION
University of Illinois
805 West Pennsylvania Avenue
Urbana, Illinois 61801

EDUCATIONAL MANAGEMENT
University of Oregon
Eugene, Oregon 97403

HANDICAPPED AND GIFTED
The Council for Exceptional Children
1920 Association Drive
Reston, Virginia 22091

HIGHER EDUCATION
George Washington University
1 Dupont Circle, Suite 630
Washington, D. C. 20036

INFORMATION RESOURCES
Stanford University
School of Education
Center for Research and Development in Teaching
Stanford, California 94305

JUNIOR COLLEGES
University of California
96 Powell Library Building
Los Angeles, California 90024

LANGUAGES AND LINGUISTICS
Center for Applied Linguistics
1611 North Kent Street
Arlington, Virginia 22209

READING AND COMMUNICATION SKILLS
1111 Kenyon Road
Urbana, Illinois 61801

RURAL EDUCATION AND SMALL SCHOOLS
New Mexico State University, Box 3AP
Las Cruces, New Mexico 88003

SCIENCE, MATHEMATICS, AND ENVIRONMENTAL EDUCATION
Ohio State University
1200 Chambers Road, Third Floor
Columbus, Ohio 43212

SOCIAL STUDIES/SOCIAL SCIENCE EDUCATION
855 Broadway
Boulder, Colorado 80302

TEACHER EDUCATION
1 Dupont Circle N.W., Suite 616
Washington, D. C. 20036

TESTS, MEASUREMENT AND EVALUATION
Educational Testing Service
Princeton, New Jersey 08540

URBAN EDUCATION
Teachers College, Box 40
Columbia University
New York, New York 10027

*ERIC/ECE is responsible for research documents on the social, psychological, physical, educational, and cultural development of children from the prenatal period through pre-adolescence (age 12). Theoretical and practical issues related to staff development, administration, curriculum, and parent/community factors affecting programs for children of this age group are also within the scope of the clearinghouse.