

## Piaget for Dance Educators: A Theoretical Study

By: Susan W. Stinson

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### Article:

#### I. INTRODUCTION

Most individuals who spend serious time with children recognize that children are not simply small versions of adults. Not only are their bodies different, but they also think differently. The dance educator, just like other educators, must attempt to see the world from the child's point of view if the teaching-learning process is to be successful.

One framework for conceiving the world from the child's point of view comes from Jean Piaget, a scientist who was interested in the development of cognitive skills used in science — ordering, classifying, inferring, thinking in propositions, and hypothesizing. Such skills are important not only in science, but in any logical use of the intellect. Inasmuch as dance educators claim interest in the child's intellectual as well as emotional and physical self, an understanding of Piaget's theories may generate valuable insight. Yet neither Piaget nor his many followers who have applied his theories to specific areas of education have examined dance education through this lens.

The major purpose of this paper is to “translate” Piaget's findings into situations encountered by the dance educator, and to demonstrate the usefulness of this framework in making sense of children's behavior in the dance setting. Sections I-III are designed as much for the practitioner as the researcher in dance education; I submit apologies to those for whom a review of Piaget's theory is tiresome. It will be noted that this is not an empirical study, but I hope it may direct empirically minded researchers into fruitful areas of study in dance education.

It must also be noted that many of Piaget's conclusions have been questioned by more recent researchers using different kinds of situations for observation. My own concerns regarding Piagetian theory relate less to the validity of specific observations than to larger limitations of this framework in relation to dance education. A second purpose of this paper is to briefly explore those limitations.

#### II. THE DEVELOPMENT OF COGNITIVE SKILLS; THE PIAGETIAN FRAMEWORK\*

Piaget described two basic tendencies of the human organism which facilitate intellectual capacity. One is *assimilation*— the tendency to organize processes into coherent systems, physical or psychological; we cluster movements or events into “schemas,” seeing them in relation, rather than in isolation.

For example, the actions of picking up a sandwich, biting it, chewing it, and swallowing become organized as “eating”; red, blue, green, and yellow become organized psychologically as colors, not as unrelated sensory experiences. In our tendency to assimilate, we may actually modify reality so that a perception will fit into our

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\* The explanation of Piaget's theory throughout this paper has been synthesized from the writings of Cowan (1978), Furth (1970), and Wadsworth (1971), as well as Piaget's own work (1929, 1962, 1972).

previously existing conceptions. For example, if we believe that boys are more disruptive than girls, we may interpret a boy's response to a problem as misbehavior, even though the same response from a girl might be viewed as "creative."

The second tendency is *accommodation*, the modification of schemes of knowing to adapt to external reality. For example, we modify eye movement into a left to right, top to bottom pattern to accommodate reading a printed page; we as educators often modify our original ideas about children in response to the experiences we have with them.

Accommodation and assimilation are found in all activities, but the balance between them varies. Accommodation is emphasized in those activities which Piaget defined as work, including problem-solving and imitation. In the arts we regard these two experiences as very different and involving different skills, but in Piaget's view both involve adapting to external reality, whether that reality is a picture to copy or a set of verbal instructions to follow. Assimilation, on the other hand, is emphasized in activities involving practice, mastery, and play.

Piaget notes that the individual likes to keep these two tendencies in balance, so when one gets ahead of the other, a state called *disequilibrium*, the other must catch up. The state of disequilibrium stimulates intellectual growth. For example, we may have accommodated eye movement to read print, and assimilated the movement to practice reading. When we face a Labanotation score, however, we must readjust our idea of reading, and learn a new pattern of eye movement, to go from bottom to top. Similarly, many entering college dance majors have assimilated a particular style of movement, but they must accommodate and eventually assimilate many others if they are to be educated in dance.

These processes—of accommodation and assimilation—go on throughout life. Through extensive observation of children, however, Piaget concluded that there are recognizable stages in the process of intellectual growth. He labeled these the sensori-motor stage, the pre-operational stage, the stage of concrete operations, and the stage of formal operations. Each of these stages represents a different structure of knowing, a different way of perceiving and understanding the world.

The next sections of this paper will explore the stages of development defined by Piaget, examining aspects which relate to learning in dance. Before doing so, it is important to remind the reader that the characteristics presented should never be used as a rigid framework in determining what and how we teach children. The stages of development represent only ideal types. I believe it essential that all educators plan for and respond to their immediate experience with real, individual children, rather than preconceived ideas of what children are like.

### **Sensori-Motor Stage**

In the sensori-motor stage, the child deals with reality, and learns about it, entirely through the senses and motor activity. During this stage, which extends from birth to approximately two years, the child becomes able to explore movement, imitate it, invent it, solve problems using it, and organize and form it—all the basic processes used in dance. Early in infancy, at about one to four months, the child begins to connect sensori-motor pleasure with movement—moving just because it feels good—as a kind of play, or assimilation. Such pleasure in movement is a motivating force for dance at all ages.

While most of the infant's movement is random, attempts at repetition also occur during this period. Repetition may be accompanied by smiles and even laughter, as the particular movement becomes identifiable as a "thing in itself" (Piaget, 1962). This process is similar to that of the choreographer who, while improvising, finds something he/she likes, works to re-create it, and repeats it for pleasure; it then becomes identifiable as a variation, a combination, or a phrase. Curiosity also makes its appearance during this time, as the infant focuses particular attention on objects or events which are new but somewhat related to those previously experienced. Piaget even described the appearance of imitation during this period, in the forms of vocal contagion (in which

a model stimulates widespread vocal activity in the infant) and mutual imitation (when the model makes a sound the infant is currently producing, stimulating the child to repeat the same sound). I have also observed both contagion and mutual imitation involving movement in the very young infant.

These behaviors are expanded in successive periods of infancy, and are joined by others which are significant for dance. The four-to-ten-month-old may bounce his or her whole self in response to music. Pure sensori-motor pleasure is undoubtedly responsible for much of the repetition of this activity; the action of bouncing or pulsing to a beat remains internalized throughout the lifespan, even though it may be reduced to a tapping of the foot. However, the child this age also enjoys being the cause of interesting results, and the attention and even applause of admiring parents probably further stimulate this activity.

The child's ability to imitate continues to expand, so that by about ten to twelve months, he or she can approximately reproduce a new movement or sound made by another person, even if unable to see himself/herself performing the action. This would seem to indicate a great development in the kinesthetic sense, and makes possible a much more rapid expansion of the movement repertoire.

Movement is also used for problem-solving, through an external trial and error approach. If the child cannot reach a desired object, for example, he or she experiments until discovering how to accomplish the desired task.

By approximately twelve to eighteen months, we see a development of particular interest to dance educators: the combination of unrelated gestures, not just when trying to experiment, but making a motor game or ritual. These combinations are new, not borrowed from adapted schemes, and almost immediately look like play. Dance or dance-like behavior, especially in response to music, seems common at this age and on through the sensori-motor stage. Parents not infrequently consult me regarding the availability of a dance class for their eighteen-month-old who "loves to dance." The spontaneous dancing includes movements such as bouncing, swaying, shaking, turning, and falling down; the child may imitate others as well as invent new movement.

During the last months of this stage, we see the transition to symbolic representation. Piaget explained that symbols are created by internalizing sensori-motor activity. For example, the infant cannot think about or say "bye-bye" without actually performing the waving movement. Gradually the child becomes able to think about and say "bye-bye" even though the movement is reduced. Eventually the movement is no longer visible; only the internal kinesthetic sensation remains. It is this internal sensation which allows the child to think about "bye-bye" without going through the external movement.

This use of symbolic representation, even limited to the sensori-motor level, greatly expands the child's capabilities. It initiates the beginnings of thought; the child can now imagine objects and actions in order to solve problems without using external trial and error. In addition, the child can now recall the movement of a model previously observed. With this ability, a new kind of play also becomes possible: symbolic play, in which the child represents someone or something else, as a way of assimilating or modifying reality to fit his or her own conception of the world.

The capacity for symbolic representation is the basis for use of movement as the material of an art form. However, the two-year-old is still not ready for instruction in a dance class, due to lack of social skills and limitations of language ability. In place of a dance class, a shared dance time between adult and child may extend the child's skills as well as reinforce the sense of dance as pleasurable activity (Stinson, 1977). Such a time may largely consist of the child's improvisatory dancing while the adult responds by watching intently, smiling, imitating the child, and naming the movements and/or the body parts performing them. The naming can be done in a simple improvised chant or song used as accompaniment for the movement. This labeling of movement and body parts is just as important as labeling of objects in the environment in aiding the development of verbal language. Positive feelings about the self and about movement can also be enhanced through this kind of adult/child interaction.

## Pre-Operational Stage

The child is now ready to enter the pre-operational stage, which extends through approximately age seven. There will be many accomplishments during this period—the child develops language, forms concepts, begins mental reasoning, and constructs magical belief systems. However, the child still differs from the adult in terms of viewing reality and using language.

Pre-operational children do not think logically due to four major obstacles, and these have significant implications for the teaching of dance. The first of these is *egocentrism in the thinking process*. The child cannot see the viewpoint of another, even though by age three or so he/she is aware that others may have different viewpoints. The child does not question his or her own thinking. Children during this period do not do much adjusting to others, and the rules they follow are private and fluctuating (even though five-to-seven-year-olds may insist upon rules). Rules established by the teacher in the dance setting should be kept to the essential minimum, and teachers should be followers as much as leaders in determining the direction of the class. Egocentrism also has implications for evaluation: comparing children to each other or to an outside ideal standard is meaningless; feedback should be descriptive instead (i.e., “You pushed hard with your legs when you jumped”; “You held that shape a long time”).

Piaget also notes that the speech of these children is egocentric; they talk to themselves with little regard for others, do not listen to others, and repeat vocal responses purely for pleasure. While this characteristic certainly affects verbal interaction in the dance class, it is also interesting that the same kind of behavior occurs in terms of movement. For example, children will repeat a particular movement or shape over and over again, often for longer than the teacher's interest span. Teachers are wise to respect this pleasure in repetition, rather than always demanding a “new way.” It is also apparent that children's dancing is more for expression than for communication—the child as performer gives no indication of understanding any perspective or preference other than his or her own. “Turn around so the audience can see” is an essentially meaningless direction to these children, even though they may delight in having an appreciative audience (“Look at me!").

The *centration* of the pre-operational child is a second major obstacle to logical thought. The child fixes attention on a limited perceptual aspect of an experience, and is unable to see the “whole picture.” A group of three-year-olds cannot form themselves into a circle without guidance, because children cannot sense themselves as individuals and part of a circle at the same time. There is also a real limitation to the child's ability to accurately imitate a movement or shape involving more than one part of the body. If children are taught ballet positions, for example, they may be able to imitate placement of the feet, but will be unable to simultaneously see the position of the knee, hip joints, and spine, and thus may perform incorrectly.

The child's *inability to use transformation* is also significant; the child does not focus on process, but only on each in-between state as it occurs. The child can produce only static shapes with any degree of accuracy, and these are far from perfect, as discussed in the previous paragraph. This means that the child can imitate one position and then another, but not how the change occurs (the in-between states); the individual will not remember how he or she got there, or where he/she went along the way. If we give them in-between points, they will stop there. It is important to recall at this juncture that Piaget's testing of these skills involved things outside the self; the child observed a ball circling an object, for example, and was asked to point to pictures demonstrating intermediate positions of the ball”. I feel that use of transformation, as well as many other skills, begins earlier when the whole body is involved; this point would be an interesting one to examine empirically.

The fourth major obstacle is the child's *inability to reverse mental operations*. For Piaget, the term “reversibility” means more than just going backwards. Reversibility refers to the possibility of making mental experiments—doing and undoing, going in one direction and compensating for it, regarding a thing as belonging to one class (such as movements on a low level) and at the same time to another class (such as locomotor movements), relating classes to each other, and coordinating one perspective to another. The inability to reverse operations means that at this stage we would not expect the child to be able to follow any one of a

number of directions to vary a movement, without trial and error. We would not expect the child who has created a “movement sentence” such as *run-turn-shake* to be able to automatically take it apart and recombine the parts in a new order and then return it to its original form, although children in the latter part of this stage would be able to experiment with the movement, using trial and error, to solve the problem.

The inability to think logically is responsible for what artistically-oriented adults consider a charming characteristic of this age group: the imaginative responses to questions of causality. The child applies his or her own concept of reality in explaining, for example why the moon sometimes disappears: “perhaps it goes to see the rain in the clouds, or perhaps it’s cold”(Piaget, 1929, p. 210). In this case, the child's egocentrism has led her to ascribe human characteristics to the moon. We must note that the child likely does not consider this a creative, clever answer—to the child, it is a perfectly logical explanation, based on her understanding of reality. Much of what cannot be explained is considered to be a result of magic, and magic is an accepted part of the world of the pre-operational child.

At the beginning of the pre-operational period, the child has “pre-concepts” - a general sense of things, but the concept is still private and fluctuating. Symbolic play becomes an important way of making sense of the external world, and rich fantasy and make-believe evolve. Such play serves an intellectual purpose, as children practice “trying on” the movement and shapes of objects and people they observe, building their understanding of the symbol. It also serves an emotional purpose, helping the child handle the frustrations of dealing with an arbitrary world he/she does not understand. In make-believe, the child can manipulate reality so he/she comes out a winner.

Pretending, or transformed identity, occurs frequently and spontaneously during this age; I recall how my own daughter, in watching dance performances, always picked out an individual dancer and claimed “I’m her.” Make-believe is delightfully unavoidable as part of the dance experience for the two to-four-year-old. The three-year-old who is crawling automatically “becomes” another creature without any request from the teacher.

An appropriate format for teacher-initiated dance experiences during this age is a thematic development based upon familiar yet somewhat novel objects. For example, a teacher might bring in a balloon and have children observe it floating. The children could then try on the floating movement; for most of the children that would involve pretending to be the balloon. Other movements, if observed, could also be performed, such as expanding into a rounded shape, jerking (as when a string is pulled), popping, rapid indirect traveling ending on the floor (as when air is released), and lying limp and relaxed. These experiences not only will expand the meaning of the symbol of balloon, but also build understanding of the movement and shape words (symbols) involved. Once the symbol is established, it is no longer necessary to have the object present. However, children at the pre-operational stage cannot imagine what will happen to the balloon when the air comes out if they have not experienced this before.

By the latter part of the pre-operational stage, approximately five to seven years, the child's concept of things is more constant and less private. As previously discussed, he/she can coordinate two dimensions, but only through trial and error, not mental operations. The child, for example, can locate the place “forward low” through experimentation, but will not find the place purely by thinking about it.

Symbolic play declines after age four, and in their make-believe children imitate reality more exactly. Pretending to be something else becomes less appropriate as a process to use in facilitating dance experiences. The five-to-six-year-old, for example, knows that once a balloon pops it cannot inflate again; this insistence on reality can limit rather than extend movement possibilities in make-believe play. Familiar objects can still be used as a stimulus for dance activities, but in a framework of moving *like* the object, rather than *becoming* it. We can say “cats walk lightly; can you walk lightly?” without having all of the children suddenly fall to their knees and meow. Images of magical objects and states can also be used as stimuli: a magic balloon has all sorts of possibilities unavailable to the real thing.

## **Stage of Concrete Operations**

The four major obstacles to logical thought—ego-centrism, centration, inability to use transformation, and inability to reverse mental operations—disappear by the stage of concrete operations, which lasts from approximately eight to eleven. The child loses the form of ego-centrism found in the younger child, and becomes able to consider the viewpoint of others. The child's move to non-egocentric communication allows for the use of language to ask questions and exchange information; learning about dance can thus move beyond the intuitive level to include much more cognitive content.

With the growing awareness that others can come to different conclusions, group sharing and evaluating solutions to problems become significant parts of dance classes. The child becomes able to look at himself/herself from the outside, and evaluate his or her own work in terms of its relation to concrete goals. Children can also sense the viewpoint of others when they perform, including awareness of what the audience sees from where they are sitting, and the desirability of keeping the attention of the audience. (Using the term "audience" here does not imply that the audience should be other than members of the class.)

Because these children become less ego-centric, they are able to cooperate, allowing a set of rules to govern their behavior. Games with rules become the most frequent form of play, replacing symbolic play. However, there is frequent conflict because children have not yet mastered rules, making group problem-solving possible, although not easy. The wise dance educator will structure problems for students so that their choices are limited, and will frequently give assistance to the process.

Children in the stage of concrete operations have also become able to decenter, that is, to be able to see more than one aspect of a situation at a time, and to sense individual parts in relation to a whole. They can reproduce still shapes more successfully, imitating increasingly complex shapes. By the end of the pre-operational stage, as we recall, children were able to coordinate two spatial or temporal dimensions through trial and error. In the early concrete stage they become able to mentally coordinate two dimensions, and can quickly solve a problem such as "Travel fast forward; now change both your direction and your speed." Not until the late concrete stage, however, can they manipulate without experimentation a third element of the problem, such as level or kind of movement.

Piaget noted that children now become able to use external reference points, thereby demonstrating spatial perspective. In one test to determine whether a child had a sense of horizontality, the individual observed while a clear pitcher was lifted from a table, and then liquid was poured from it. The child then was asked to indicate on a drawing what kind of line the top of the water in the pitcher made as it was being poured. (See Figure 1.) Not until this stage did children sense the horizontal line of the table as an external reference point, and draw a corresponding horizontal line to indicate the top of the water. While it seems likely that children might demonstrate an understanding of horizontality somewhat sooner when only body adjustments are being called for, we should nevertheless understand that even a body level sense of the horizontal is a perspective which must develop. Attainment of correct "line," so important in ballet, is based upon spatial perspective, including use of external reference points. (See Figure 2.) Before concrete operations develop, we cannot expect a child to look at a demonstration such as second position of the arms, and notice that a body line is parallel to the floor. This often results in incorrect reproduction of line.

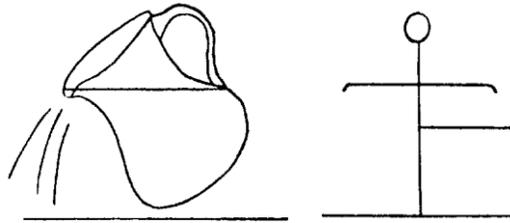


Figure 1

Figure 2

According to Piaget, *decentration* results from interaction, specifically, talking to peers. While it is practically impossible to have aesthetic experience occur during ongoing conversation, it is important to allow time for children to talk to others. The “times to talk about it” and “times to give all of your energy to moving and sensing” must be made clear.

Children during this age become able to attend to *transformations*—to reproduce and anticipate images. They can imitate and anticipate movement between shapes, and sense how they might get from “here to there.” Children become able to look at a floor pattern and anticipate where in the room they will be at different points.

With the ability to reverse operations, children can manipulate a phrase or sequence, rearrange it or reverse it, and then put it back into its original form. The cognitive skill of *conservation* also appears at this time. In Piaget's studies, this skill was indicated by a child's ability to recognize that a given quantity had not changed, even though its shape might be different; if one pours water from a short, wide glass into a tall thin one, the quantity of water does not change. The skills of reversing operations and conservation make it possible for children to compose a theme and variations, in which they can manipulate a phrase without losing the overall sense of it. However, they understand the term (theme and variations) only in a concrete sense of the movement at hand, not as abstract universal term. The child in the stage of concrete operations can solve problems presented verbally, but these must be in concrete rather than in abstract terms. For example, rather than directing children to “create a study of theme and variations,” one would work on the problem as a concrete structure. The class might first select a movement sequence. As a group, they would propose and try out different variations of the sequence according to the teacher's directions, perhaps doing it faster, then slower, then while travelling. Then they might find other ways to manipulate the movement, and eventually select several to create a composition.

With the advances in logical thinking, the world of magic and make-believe has become of considerably less interest than what is “real.” In their drawings, children attempt to achieve greater reality, not more expression of feeling, and the child who at age six drew himself/herself as the largest in the family, reflecting a sense of importance, now is determined to show correct proportions. In stories they choose to read or to write, children are much less interested in pure fantasy and more interested in the true or the possible. Piaget notes that if a child at this stage is asked, “Suppose there were two dogs and each had three heads, how many heads would there be?” the child would be unable to reason, “because dogs can't have three heads” (Wadsworth, 1971). Certainly, children this age can and do pretend in a drama setting, but even there they find it easier to imagine situations which are similar to their world. At any rate, dance educators must be careful in using imagery in dance class, and will most often choose to deal with the concrete (“It feels like when you're on top of a roller coaster, suspended in the air before you come down and touch your seat”) rather than fantasy (“Pretend you're hanging on a cloud”).

### **Stage of Formal Operations**

When a child enters the stage of formal operations, he or she begins solving a problem not by observing or acting, but by thinking of possibilities. To begin by systematically thinking of all logical possibilities is often an advantage in some subjects, but not necessarily in the arts, where actual possibilities are limitless. In a dance class, creating movement logically and systematically tends to lead to what I call “advanced cheerleading” (Do it four times to the right and four times to the left; if you do it forward then do it backward). The most visually interesting combinations in dance are not created by such logical thinking.

Abstract and hypothetical thinking skills do make group composition a less cumbersome process at this stage and significantly reworking choreography to make improvements becomes a possibility. Students can create dance compositions and then ask “What would happen if . . .” The complexity of student creative work increases, as individuals are able to focus on four or more dimensions at once. This ability also has implications for skills in imitating movement; individuals can see many aspects of a movement at one time.

As students begin to understand categories as abstract concepts, their analytical and evaluative skills increase dramatically. Movement analysis of their own work and that of others becomes possible, and choreographic principles can be discussed in theoretical terms. Students can understand such concepts as unity and contrast, and apply them to their work, whereas in the previous stage these elements had to be described in concrete terms (“Do a strong movement; then do the same movement lightly”).

With the growing capacity to think in relation to ideals— what “should be”— adolescents easily become more critical of adults, including teachers. The teacher must now establish credibility through expertise; it does not come automatically. For teachers who are skillful performers, there is sometimes a fine line between establishing their own expertise and setting unrealistic standards.

Adolescents not only become more critical of others, but also of their own work, and they become more frustrated by their own inadequacies. As they have greater choice in curriculum selection, they frequently choose to avoid optional coursework such as dance if they feel they do not “measure up.” Yet while students are their own most critical judges, a caring teacher may have to struggle in order to be both honest and encouraging with students.

The ability to hypothesize, to imagine all sorts of possibilities that might exist, stimulates adolescents' dreams of utopias and experimentation with a variety of lifestyles. One would hope that this tendency to imagine and experiment would also flower in artistic endeavors, where it might be more fruitful and less hazardous. In many cases this is true, as adolescent poets and songwriters blossom. In typical United States high school dance classes, however, the avant garde does not flourish, although there is more experimentation than is apparent on the junior high school level. One possible explanation is that adolescent changes in the body make this a less comfortable medium for exploration. However, one could hardly claim that adolescents are disinclined to experiment with and on their bodies in all situations. It seems more likely that lack of an appropriate curriculum and models may be responsible.

While all adolescents undergo physiological changes, followers of Piaget have noted that only one third of young adolescents—two thirds at most of the college-age population— give consistent evidence of thinking at the level of formal operations. Piaget has noted that normal individuals by age 20 achieve formal operations only in those areas of thinking in which they have particular interest and experience. With this in mind, we would expect that young adults with interest and experience in dance would be able to think about dance in abstract and hypothetical terms, but we would not expect students without this kind of background to do so. This would indicate that in classes in dance for adolescent and adult beginners, dance problems need to be presented in the concrete terms described in the section on concrete operations.

### **III. APPLICATIONS: LONGITUDINAL DEVELOPMENT OF SELECTED SKILLS**

Let us now look longitudinally at the development of selected cognitive skills and how this development is reflected in the learning process in dance. We must proceed with some caution, for, as Piaget noted (1962), development occurs earlier in the plane of action than in abstract thought. Without experimental support, it is not possible to establish given age levels for development of specific skills in dance. We can, however, expect a developmental sequence to occur over time.

One very significant skill is the child's ability to coordinate a number of dimensions at once. In studying this skill, Piaget looked at the child's performance on classification tasks—for example, classification of a red wooden ball into a category of red wooden spherical objects, as opposed to blue wooden spherical objects, red metal spherical objects, red wooden cubes, and so forth. The child must recognize that each object has several properties, all of which are used as a basis for classification. In dance it seems appropriate to examine how many aspects of a given movement a child may deal with at once. One common example is spatial dimension. At the pre-operational stage, a child can think about one dimension at a time—going forward/backward or up/down or widening/narrowing. At the next more advanced level, a child can coordinate two dimensions at once—first through trial and error and then immediately or automatically. Next the individual becomes able to coordinate all three spatial dimensions in order to, for example, rise, widen, and advance simultaneously. At the formal operational stage of this task, four or more dimensions could be included, adding perhaps a factor of time or weight. It is important to remember that use of a given image may allow us to “get at” a desired movement much earlier than would be possible using simply abstract terms. For example, the image of popping a soap bubble on the floor in front of a child can coordinate light, advancing, sinking movement without “thinking” about it.

A similar pattern would follow in solving a problem which involves use of effort qualities. At first a child can coordinate only one effort at a time, the first of which is flow. Over time, the child adds the ability to coordinate space, weight, and time; integration of all elements of effort in one action does not occur until adolescence (Kestenberg, 1967). It seems likely that cognitive development and psycho-motor development are related in determining this kind of pattern.

The ability to use transformation is another skill which is dependent upon cognitive development. In dance, one way we can look at transformation is in terms of the ability to use transition between movement and still shapes. When children are in the pre-operational stage of this task, they will tend to lack a smooth transition between previously established starting and ending shapes. They focus only on the shapes, and not on the movement as logical connector. If children at this stage are to demonstrate smooth transitions between shapes, the focus must be on the movement itself, rather than on an external shape to which they must accommodate. At the level of concrete operations, children will be able to find transitions but only through working out the problem in an exercise such as “Find out how you can get from shape A to shape B in one smooth action.” At the next level, children will be able to automatically sense within a given shape the movement which will become the next shape, and eventually they will be able to verbalize how they will make the transition.

#### **IV. LIMITATIONS OF PIAGETIAN THEORY FOR DANCE EDUCATION**

It is apparent from our discussion thus far that Piaget's work can make significant contributions to the understanding of educators in dance as well as in other fields. Yet the dance educator who attempts to apply Piagetian theory to teaching dance will likely discover some areas which seem inappropriate or limiting to an overall view of development in the arts. While critics of Piaget have pointed out errors or limitations which are relevant to cognitive development in general, it seems important at this point to point out several problems which occur in application of this theory to dance education.

One major limitation to the applicability of Piaget's work to dance relates to sensori-motor aspects of learning. Piaget acknowledges that the young child uses his or her body to learn cognitively, but indicates that as soon as one can use symbols, it becomes less necessary to use the body for thinking, and when one can think abstractly, concrete experiences become unnecessary for logical thought. Yet dance cannot be created purely through abstract thought. “Thinking with the body” is an apt description for the process in which dancers and choreographers solve problems. This does not imply that the intellect is not involved, but that the sensing body and the intellect remain intimately connected.

Other Piagetian researchers (Cowan, 1978) have modified Piaget's conclusions, noting from their own experience that, even once thinking becomes internalized, it retains its active, transformational character, and that active involvement in manipulation of materials should not be just for young children. Similarly, Werner

and Kaplan (1964) found evidence not only that all symbols develop from concrete action, but that many words retain “their intimate linkage to, or fusion with, organismic bodily activity” (p. 211). Without the appropriate postural set and internal gesture, a word does not have its full range of meaning.

Rugg (1963) found not only that verbal symbols retain the nonverbal, motor-feeling factor, but that this factor is an important key in unlocking the process of discovery, in science as well as in the arts. Einstein noted that his scientific thinking did not occur in verbal images, but as optical and kinesthetic images of movement (North, 1973), stating, “A thought comes, and I may try to express it in words afterward” (Rugg, 1963, p. 291). Rugg described this stage of the thinking process as “felt-thought”; this is the same thing dancers mean when they speak of “thinking with the body.”

Further, this thinking is not only logical, but also, and even primarily, intuitive. Polanyi (1958) explains that, even in science, *knowing* is an intuitive process. Logical experiments that verify knowledge *follow* the initial intuitive understanding. As we educate children in any subject area, we must educate them to value thinking not only logically but intuitively, using not only their minds but also body-level feeling.

Yet while there are similarities between science and art in terms of the postural-affective linkage of symbol with its referent, we must also acknowledge that there are differences between science and art regarding the meaning of symbols. Reasoning in science relies on clear and precise symbolic coding—the number 2.75, for example, is assumed to be exactly the same each time it is used. The symbol and that for which it stands are considered to be equal. In the arts, symbols do not have a fixed referent, and they may mean something different each time they are used or have many meanings simultaneously. A given gesture means something entirely different in two different works. Rather than striving to be clear and precise, the experience represented by the arts is “ambiguous, contradictory, or not fully emergent in consciousness” (Czikszentmihalyi, 1978, p. 118). In traditional science, categories are mutually exclusive; quantity A may be either more than or less than quantity B, but not both. Categories in the arts are not mutually exclusive—the perfect hero has a fatal flaw; love and hate, pain and pleasure are often inseparable.

Silvers (1978) noted that some symbols (such as ones in science) are used to denote or label, to reiterate the external referent. Such repetition is not considered a virtue in the arts; “derivative” art is not considered to be cognitively significant. In the arts, symbols do not denote, but exemplify—they show, rather than tell. Examples are not the same as labels. While a label may be thought of as the equal of the referent, an example is in some respects narrower and in other respects broader than the referent. To the artist, a symbol does not stand for something which already exists; rather, the arts strive to create a new or transformed reality. Those who use only symbols which reiterate and denote can more readily be considered craftspersons than artists. This implies that it is important for dance educators to use images which have many possible meanings, and to encourage different interpretations of the same material. The goal of the dance educator is not for children to take on his or her reality, but to create their own.

Another area to which Piagetian theory seems limiting for dance education is its view of imagination, the process by which movement in dance takes on symbolic meaning. Piaget viewed symbolic imagination as incomplete or immature assimilation. The child imagines that the moon went to see the rain in the clouds only because of an inability to understand the *real* process (as scientists see it). He also noted that children imagine (pretend) to be something or someone else in order to cope with a difficult reality. He observed that imagination decreases as the child gets older, in favor of “representational tools more adapted to the real world” (Piaget, 1962, pp. 130-31). Piaget’s conclusions are based upon the traditional assumption that there is only one “real reality,” which is now being questioned even by many scientists; the conclusions seem to work much better in fields where there is ultimately one right answer than in fields where there are many.

In contrast to Piaget's views about imagination, arts educators note that artistic imagination involves not seeing less, but rather seeing more possibilities—using the cognitive skill of seeing multiple dimensions at the same time. According to Olson (1978), aesthetic perception begins not in merely perceiving a drawing as a cat, but

at the same time seeing the forms, lines, and colors that give the appearance of the cat. This implies that seeing meaning in movement does not qualify as aesthetic perception; at the same time one must sense the form which is developed to produce meaning.

Further, one must understand what is logical or expected—the way things are usually seen—in order to see the illogical or unexpected view which we appreciate as imaginative. One can appreciate the humor of a spoof on ballet only if one knows what the standard “rules” in ballet are (and if one is assured that the choreographer could follow them if he/she chose to do so). In this perspective, imaginative thinking in the encoding or decoding process (i.e., making art or interpreting it) can be seen as the highest level of cognitive development: one must fully understand the bounds of logic, and then decenter further to go outside of them. When we look at imagination in this way, at the process instead of the product, the child's explanation of what makes the night come looks less imaginative and more logical.

If we see imagination in the artistic process as an advanced, rather than as an immature level of thinking, then we will assume, contrary to Piaget, that it is very appropriate for adults and is a process to be nurtured through education. Indeed, we can note recent increase in adult interest in uses of imagination for the purpose of improving functioning; such areas as meditation and ideo-kinesis (Sweigard, 1974) are clear examples. Far too often in the dance curriculum, stimulating the imagination is seen as significant for young children only: creative dance classes stop at age eight (or even earlier), when dance technique begins. As dance educators, we must encourage an integration of creative development with development of body skills throughout the educational process.

Yet at the same time we note that imagination in the arts requires advanced cognitive skills, it seems important to point out that, to the artist, the child's conception of the world is not something simply to be outgrown and discarded, but to be cherished and returned to on deeper levels. Piaget characterizes this “primitive” conception, in part, as follows:

Nature presents a continuum of life, such that every object possesses activity and awareness in some degree. This continuum is a network of purposive movements, more or less mutually dependent on one another and all tending toward the good of humanity. Gradually the child picks out certain centres of force within this *continuum* as being animated by a more spontaneous activity than the rest. (Piaget, 1929, p. 233.)

To the scientist, this represents primitive thinking; as long as the child experiences participation of him or herself in Nature, so that his or her actions influence, for example, the moon, the child will be unable to see the separations between things that are necessary for scientific thinking. Yet artists often attempt to “tune into” a deep level of connection with nature. While the scientist “knows” that inanimate objects cannot speak, the artist may confront a twisted piece of wood, or a seashell, or a mountain, and open himself or herself to the “language it speaks.” The dialogue that results may guide the creative process in the arts. The idea that one might communicate with an inanimate object is not part of a scientist's reality, but may be part of the child's and the artist's reality. Even if the motivation for a work is not an external object, a sense of oneness with the movement of the dance, the music, the space, and other dancers is often recognized as an essential ingredient of the dance experience. Without such transcendence, the dancer may feel as though he or she is moving, but not dancing.

Piaget (1929) notes that adults may return to more “primitive” states of consciousness in times of stress; the adult who bumps into a table may berate it as though it is a living being who intentionally inflicted pain. The artist may choose to return to such a state, valuing it as a source of artistic creation and aesthetic experience. In order to preserve such a source in his or her students, the dance educator must acknowledge that “reality” is not always the same in the arts as in science or the practical world.

## V. CONCLUSIONS

An understanding of Piagetian theory can make many contributions to dance educators. It is important to recognize that children have a different system for understanding reality than do adults, and they think differently at different stages of development. An understanding of the system at these different stages can help us explain children's behavior and guide us in teaching dance. Secondly, it is important that we understand disequilibrium as a basis for growing and learning. If we are to consider dance as educational and not just recreational, learning in dance is of great significance. We must provide opportunity for the dual aspects of *accommodation*—meeting new challenges, solving new problems—and *assimilation*—repetition, practice, “making it your own.”

Further, Piaget's theory can assist us in our answer to the “Back to Basics” movement, which tells us that the three R's are more important than the arts. It gives us a broader perspective in understanding what is basic to intellectual growth, and how movement fits in. As I have indicated, action is the basis for all knowing, and thinking is internalized acting. It is crucial to cultivate our bodies as instruments for sensing and acting. Once we see learning as deeper than just taking in information, we realize that dance educators can offer the so-called “Basics” much more than sensori-motor “tricks” to help children remember, such as teaching rhythm patterns to help children learn the names of cities in geography. We see that geography is about space—children must sense within their bodies the vertical and horizontal dimensions before they can read a map. They must sense their own place in relation to room space before they can understand what it means when they see a country on a map, or even tell someone their pencil is in the top right drawer of the desk.

At the same time that we recognize the contributions which Piagetian theory can make to our understanding, we must recognize its limitations. We must not let Piaget's interest in the view of reality necessary for logical thinking in science keep us from recognizing that there are other kinds of thinking and other views of reality. At a time when even many scientists are acknowledging that reality may be multi-dimensional (see Zukav, 1976), one of the greatest benefits of the arts may be this capacity to help individuals move readily from one reality to another, from the “primitive” source of creation to abstract thinking skills, combining intellect and body-level feeling. Further research exploring the full nature of the dance experience—its intuitive as well as its logical nature—is essential if we are to understand its possibilities in education.

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