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Play and Intellectual Development

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For several decades there has been general acceptance among educators that play in early childhood has important educative functions. But there is by no means general agreement concerning the precise nature of the role of play in intellectual development, and differences can be found in educational practices and prescriptions which reflect sometimes a lack of clarity and sometimes a controversy.

Some nursery school teachers adopt a comparatively bland and passive role, intervening in children's play activities only to resolve social conflict, to offer comfort when things go wrong, and to provide materials children need. In contrast, other teachers adopt a highly active role in which they see play as richly exploitable for mathematics and language teaching. They intervene frequently and consistently in children's play activities requiring them, for example, to count the cups and saucers in their dramatic, familial play, or to measure the constructions they have built from blocks. Paradoxically both kinds of teacher may underestimate the role of play in cognition.

Among teachers of the first kind are many who have been influenced, directly or indirectly, by the psychoanalytic tradition. As Almy (1966, p. 6) points out, "a symptom of (their) preoccupation with the emotional is apparent lack of involvement in the intellectual life of the child". These teachers may pay lip-service to a notion that play is related to intellectual development, but an inability to explicate the relationship in precise terms is indicated by their practices: they seem to show a lack of awareness of the diagnostic information concerning a child's level of cognition revealed by his play; they do not provoke problems in the context of play by judicious questioning of children; and they are unlikely to pay sufficient attention to the sorts of potential that particular materials may have for problem-solving activities and conceptual development.

Teachers of the second kind undervalue the role of play in intellectual development in a different way. Unlike teachers of the first kind they provoke problems in the context of children's play activities, but the way that they do so involves prejudgment. They may ignore the problems with which a child is concerned in his play, so that the problems they provoke may well be extrinsic rather than intrinsic to a child's preoccupations. They are likely to value highly structured play materials which embody a specific problem or are meant to teach a particular concept more than less structured materials which can be used in a variety of ways. The former kind of teacher, by contrast, is likely to favour materials which lend themselves to a diversity of play activities.

Parallel with these differences among teachers are differences among theoreticians in their conceptions of the role of play in cognition. According to Biber (1959)[3], for example, a teacher should not structure a child's play. Reality and logic, she believes, are only secondary to play whose main function she conceives of as an outlet for emotional concerns. By contrast, Olson

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(1970, pp. 158-171)[9] has devised a highly structured educational toy to teach the concept of diagonality. Generalizing from research into the effects of this toy on the learning of the concept, Olson suggests that an educational toy should be unambiguous in the sense that it should lead to a construction embodying the concept the children are expected to learn and that it should provide constant informational feedback. The one thing an educational toy should do automatically, according to Olson, is to inform the child if he is using it in an appropriate way. What is appropriate is, of course, predetermined by the adult.

Before any conclusions can be reached as to whether Biber's and Olson's positions are complementary or incompatible two issues need to be clarified. Firstly, as Almy points out, a distinction needs to be made between spontaneous play and play structured by the adult. "Progress can only be made when a clearer differentiation is made between two forms of play, both holding legitimate places in the nursery school curriculum, but each having certain specific characteristics. The first form of play, the one so highly valued by the nursery educator, is activity that is self-initiated by the child. It is lacking in structure other than that given it by his interests and by his imagination. The second form is adult-prescribed activity, initiated and directed by the nature of the equipment", (Almy, 1966, p. 3). Secondly, it should be recognized that there is not one single relationship between play and cognition but several. Any attempt to describe play in unidimensional terms is bound to lead to spurious controversies. The recent exchange between Sutton-Smith (1971)[15] and Piaget (1971)[11] is an example of a controversy which to some extent dissolves when it is recognized that each emphasizes different but related functions of play in intellectual development. An examination of recent research into children's play therefore requires a prior appraisal of theoretical conceptualizations of play.

Piaget (1951)[10] conceptualizes play in terms of 'assimilation' and 'accommodation', the invariant, twin functions which account for intellectual development. Central to Piaget's concept of assimilation is the notion of 'schemes', the psychological organizations of an individual's past actions and experiences through which he selectively anticipates and filters events. Thus schemes (and post-operational concepts) constitute systems of meanings which determine what an individual pays attention to and how he interprets that to which he has selectively attended. Assimilation takes place when an individual interprets an aspect of external reality in terms of one of his existing systems of meanings or when he acts on an aspect of external reality in terms of one of his existing action patterns. Accommodation occurs when an individual modifies or elaborates a meaning or a pattern of action to tally with a segment of external reality. Intelligent adaptation takes place when assimilation and accommodation are in equilibrium. Play, however, "manifests the peculiarity of a primacy of assimilation over accommodation which permits it to transform reality in its own manner without submitting that transformation to the criterion of objective fact", (Piaget, 1971, p. 338). This is not to say that there is no accommodation in play, for assimilation is never pure.

There are three ways in which accommodative elements occur in play. Firstly, accommodation is involved in the imitative components of symbolic play: when a child pretends to be a bus driver and imitates what he conceives to be the characteristic actions of bus drivers, he adapts his actions to reality. Imitation, according to Piaget, represents the opposite pole to play - there is a primacy of accommodation over assimilation. Secondly, symbolic play evokes absent objects and events through images. But imagery, accord-

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ing to Piaget, is interiorized imitation and, therefore, again involves' a primacy of accommodation over assimilation. Thus, when a child upturns a cardboard box to sit in and pretends it is a bus and he the bus driver, he evokes the situation through images or interiorized imitation as well as through overt or gestural imitation. Thirdly, and most importantly for the educator, in the course of his play a child is likely to meet obstacles which require that he modifies his actions in some way. Other children with whom he plays will not always be willing to adjust to his desires or demands: his playmates may not wish continually to play the part of passengers while he plays the part of the bus driver. Material objects do not always meet his intentions: the cardboard box may not take his weight. To carry through the intentions that are part of his play a child must, perforce, accommodate to such aspects of external reality. This is incidental learning in play.

From the point of view of the educator there are three important interrelationships between play and intellectual development implicit in Piaget's conceptualization of play. Firstly, play reflects a child's schemes. A sensory-motor scheme or a symbolic meaning system only becomes ludic when it is firmly established: "when the child has overcome the difficulties inherent in the corresponding 'serious' action, the (ludic) assimilation is more concentrated on his own activity", (Piaget, 1951, p. 162). Secondly, play has the important function of consolidating the skills, actions and meanings a child has acquired. Through exercise it prevents the atrophy of schemes and enables the child to relive his past experiences. Since in early childhood experimental and logical thought has yet to be constructed and reality cannot therefore be assimilated to it, assimilation of reality to the ego (play) is a necessary transition. It is necessary not simply to fill a time gap but for the exercise and consolidation of existing schemes: "for the child assimilation of reality to the ego is a vital condition for continuity and development", (ibid. , p. 166). The implication is that without facilities for play a child's acquisition of concepts is likely to be founded on a narrow and inadequate base. Thirdly, there is incidental learning in play, referred to above, as a child accommodates to obstacles in the play context.

Sutton-Smith (1971)[15] has critized Piaget's theory of play on the grounds that it involves a "cognitive reductionism". He suggests that in describing play in terms of an intellectual disequilibrium Piaget gives it a "compensatory or infantile status rather than a constitutive role in thought", (Sutton-Smith, 1971, p. 340). Sutton-Smith proposes that play is disequilibrial on purpose, rather than by mistake, and, in this respect, is nearer to divergent thought processes than to convergent ones. He speculates that if divergent thinking functions are attributed to play it could be held that "rather than a decrease in the symbolic play function with age, what we actually find is a shift in the applications and the differentiation of this function", (ibid. , p. 333). Thus, he conceives that early childhood play might be directly related to and continuous with adult creative imagination.

Sutton-Smith's criticisms overlook some of Piaget's own statements concerning the relationship between play and adult imagination. "(Imagination) is one of the two poles of all thought, that of free combination and mutual assimmilation of schemes. In this sense, symbolic assimilation (play) is a source of creative imagination, i. e. of spontaneous constructive activity, as distinct from accommodation to reality and from both logical and experimental verification. It was in this sense that Baldwin had previously seen in play the beginning of deduction, i. e. free construction of thought. But we must again emphasize that symbolic play will only achieve its final form of creative imagination provided that it is as it were reintegrated in thought as a whole",

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(Piaget, 1951, p. 155). However, there is a grain of justification in Sutton-Smith's criticism, for Piaget's emphasis is certainly on play being "oriented in the opposite direction to logical and conceptual thought", (ibid., p. 155). On the other hand, Sutton-Smith himself produces a one-sided emphasis on play as functionally continuous with adult creative imagination in that both are forms of divergent thinking. For in creative imagination divergent thinking is never pure. Free association (or divergent thinking) in contexts of art, science etc. is rule-bound. It is constrained by publicly agreed rules of expression and communication in the arts and by verification in theoretical domains.

Vygotsky (1966)[16] has presented a conceptualization of play which to some extent marries the positions of Piaget and Sutton-Smith. Vygotsky argues that all play involves the creation of an imaginary situation, and that this is one of its two most significant criterial attributes. The second important characteristic of play is that it is rule-bound. Games with rules are essentially games involving an imaginary situation, he suggests. To play chess, for example, is to create an imaginary situation. And what is usually called 'symbolic' play involves rules, not rules formulated in advance, but rules stemming from the imaginary situation, for if a child engages in home-play she must obey the rules of maternal behaviour or of a baby's behaviour depending on whether she pretends to be a mother or a baby. Thus, "just as.... every imaginary situation contains rules in a concealed form.... the reverse (is true) that every game with rules contains an imaginary situation in concealed form", (Vygotsky, 1966, p. 10). Play is of great importance, Vygotsky suggests, in liberating the child from situational constraints. The very young child is bound by situational constraints in that things dictate to him what he must do: a table is to be eaten from, a chair to be sat on. But in play a child may impose his own meanings on material objects: the table may be sat under because it represents a house, a chair may be eaten from because it represents a table. Thus, "in play activity thought is separated from objects, and action arises from ideas rather than from things..... Action according to rules begins to be determined by ideas and not by objects themselves", (ibid., p. 12). When a child pretends that a piece of stick is a horse he crosses a critical threshold in his psychological development, for the stick "becomes a pivot for severing the meaning of horse from a real horse, one of the basic psychological structures determining the child's relationship to reality", (ibid.).

The implication of Vygotsky's thesis is that play has a leading role in the development of imagination. Adult imagination involves the organization and reorganization of meanings in the absence of concrete referents: thought is severed from the object. Play is a transitional stage in this direction: when the child creates an imaginary situation meanings are severed from situational constraints, but he cannot yet completely sever thought from objects. He needs things to act as pivots: "in order to imagine a horse, he needs to define his actions by means of using the horse in the stick as a pivot", (ibid.). However, in adult imagination there are also constraints. The organization and reorganization of meanings in thought are constrained by the public criterial rules of the relevant context. Vygotsky's thesis implies a continuity between childhood play and adult imagination in that both are rule-bound. Support for this notion of continuity comes from Vygotsky's analysis of the development of childhood play in terms of the development of rules. "Towards the end of development in play what had originally been embryonic now has a distinct form, finally emerging as purpose and rules", (ibid., p. 17).

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Some Recent Research on Play

Hutt (1966)[6] distinguishes between two concepts which are often used synonymously, exploration and play. She investigated two types of exploration, called by Berlyne (1960)[2] specific and diversive. The former is directional, i.e. it is elicited by or oriented toward certain environmental changes and its goal is getting to know the properties of the object. The particular responses in specific exploration are determined by the nature of the object. Thus in Piaget's terms this would not involve assimilation of the object to the ego and would not therefore constitute play. Diversive exploration, by contrast, is a form of play in which there is greater diversity and variability of activities with the object with the emphasis changing from "what does this object do?" to "what can I do with this object?" Hutt states, "while investigation (or specific exploration) is stimulus-referent, play (or diversive exploration) is response-referent", (Hutt, 1966, p. 246).

Hutt's subjects were thirty-five children between the ages of 3 and 5 years. They were left free to explore and to play with five familiar toys plus a novel object, a red metal box on four brass legs with a movable lever on the top. When the children entered the room they usually looked immediately at the novel object, then examined it manually or inspected it visually while holding the lever, and finally manipulated the lever. In other words they engaged initially in specific exploration of the object. Gradually, however, this gave way to diversive exploration or play involving repetitive motor movements and a sequence of activities incorporating both the novel object and other toys. One group of responses involved a transposition of function - "those responses which resulted in the novel object explicitly fulfilling another function, e.g. something to climb, a bridge, or a seat", (ibid., p. 240).

Significantly it was found that "in all children once active investigation had commenced, it generally proceeded vigorously, all aspects of the object being explored. It was only once the child had apparently learned all there was to know about the object that it was incorporated in play activities, and any further learning was purely incidental", (ibid., p. 241).

Hutt's findings seem to support aspects of Vygotsky's position on play. In specific exploration the child seems to be tied to 'situational constraints'. The meanings of the novel object are stimulus-bound. Only when these meanings are established does the child break free from situational constraints to impose on the object arbitrary meanings severed from situational constraints, so that in his play the object can mean something to climb on, to sit on, or to act as a bridge.

Olson's asides on some of his subjects' behaviour with the structured toy designed to teach diagonality suggest somewhat similar findings which also support aspects of Piaget's position on play. In relation to an early version of the toy Olson comments, "it appeared that the children who could already solve the puzzle were the ones who played with it", (Olson, 1970, p. 162). Later, of a modified version of the toy, he writes, "it was clear that, as in the first study, children who had mastered the diagonal tended to repeat their play patterns, while many of the younger children chose not to play with the toy at all", (ibid., p. 164). Unfortunately Olson gives no details of the nature of the children's play with the toy, and it is therefore impossible to say wheter this was another example of children who had learned about the object breaking free from situational constraints to impose arbitrary meanings on it. However, these findings would support the Piagetian position that play is primarily an assimilatory activity: when a scheme is established it is exercised and consolidated through play.

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Olson subsequently designed a third version of the toy elaborated with electrical circuitry which helped to give it'increased motivational proper- ties'. No information is given about the success of this version in teaching the concept of diagonality. If this toy were found to be more successful in that other children play with it besides those who had learned the concept, one is led to ask whether they do so by ignoring the diagonality attributes of the ap- paratus. From an investigation into concept development Wohlwill (1970)[17]dis- covered interesting incidental outcomes which suggest this as a possibility. His material included blocks containing picture exemplars of six familiar concepts. The children were required to arrange these blocks in a 3x3 matrix so as to reveal the extent and mode of their spontaneous classifications. Kin- dergarten children were typically unable to produce any systematic grouping of the blocks according to the pictures. In an incidental study with four year olds the grouping experience was followed by telling the children to do as they liked with the blocks.The children then built horizontal or vertical structures but ignored the pictures. They ignored the adult imposed structure of the ma- terial to which they were unable to respond conceptually.

Vygotsky's analysis of the development of play in terms of the develop- ment of rules is borne out to some extent by the findings of Kamp and Kessler (1970).[7] They gave 20 children aged between 6 and 9 years World Test Ma- terial (431 toys including indoor representations such as beds and teacups and outdoor representations such as houses and cars). The constructions the children made using this material were studied and it was found that they could be scored using a developmental scale of 4 stages. The configurations of the first of these stages are described as 'juxtapositional': elements are lined up and diffusely spread and there is an unconventional heterogeneity of elements, the conventional meaning of a toy being no apparent determinant of its place in the configuration. At the second stage the children's configura- tions are 'schematic': although the elements are still diffusely spread or lined up, the spatial arrangement expresses that they somehow belong togeth- er, and the unconventional heterogeneous mixture of elements does not occur. The third stage is characterized by 'depictive' configurations. In these the spatial arrangements express the specific interrelationships of elements to some extent. Houses and trees are placed together and cars and people are placed nearby, but the configuration is too diffuse to be considered realistic. It is at the fourth stage that 'realistic' configurations are found. In these the spatial arrangement is such that the objects could function if occurring in a similar configuration in reality.

This description of stages can be viewed as support for Vygotsky's con- tention that the development of play is marked by the development of in- creasingly defined rules, for the rules structuring a juxtapositional config- uration are clearly more labile and idiosyncratic than those governing a re- alistic configuration. The question arises of the extent to which the increasing constraints which describe the development of play reflect children's con- ceptual development. The Piagetian conceptualization of play would certainly suggest such a relationship. Borowitz, Hirsch and Costello (1970, pp.219-220)[4] contend that "from an educational perspective, the organization of a child's play is believed to reflect the degree to which he can impose his own sense of structure and sequence on the external environment. In turn this reflects not only the degree to which his cognitive structures have been developed but also the extent to which they have been integrated". It is interesting, there- fore that Kamp's and Kessler's descriptions of the stages in World Test Material configurations bear remarkable resemblances to Piaget's (1964)[12]and

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Bruner's (1966)[5] descriptions of the stages through which children proceed in the development of categorization.

A relationship of this sort between organization in play and cognitive structures is suggested by research into the play of underpriveleged children. Sigel and McBane (1966)[14] found that such children who revealed low representational powers in categorizing tasks also showed poor elaboration in their play activities. Murphy (1972, p. 120)[8] also comments on the failure of deprived children to show higher level structuring in their play. She remarks that "they do not project sequences which involve making a plan and carrying it out' Murphy accounts for the impoverished play of deprived children in terms of the absence of early experiences of efforts rewarded and of evocative gestures and actions responded to in the mother-child relationship. This may well be true, but a more rigorous formulation of stages of development in play and of their relationship to experience and cognitive structures might yield additional information concerning the nature of the children's 'deprivation'. Murphy remarks that the deprived children she observed indulged in sensory play with sand, water and clay, but that they did not impose new structures or new integrations on play materials. They did not "come into the day-care center with an idea of building a garage or a fire station", (ibid.). Now Vygotsky's formulation would suggest play which is constrained by pre-planning of this sort is a relatively late stage in the development of symbolic or constructional play. It would seem inappropriate to appraise the extent of elaboration of sensory-motor play in terms of the attributes of a late stage in the development of symbolic play, and if the material in the daycare centre was new to the children they would need to familiarize themselves with it before they could break free from situational constraints to engage in symbolic play. There can be no firm answers to such questions until there is more evidence on the stages in the development of play and their relationship to cognitive structures. Vygotsky's and Piaget's conceptualizations and Piaget's naturalistic observations suggest a close interrelationship.

Some Educational Implications

Although the state of theory and research into play in early childhood requires that one should be tentative in formulating precise interrelationships between play and intellectual development, certain broad implications have emerged which are of significance for education.

Clearly questions of whether a teacher should or should not intervene in children's play activities, and of whether nursery school provision should be in terms of unstructured play facilities or of activities virtually prescribed by the adult through highly structured materials, are much too polarized. Instead educationally significant questions would be concerned with what sort of learning is facilitated by specific sorts of teacher intervention and with what aspects of development are best served by unstructured play on the one hand, and by highly structured materials on the other hand.

Piaget's and Vygotsky's formulations would suggest two sorts of intervention by nursery school teachers in relation to children's play. Firstly, play, since it reflects a child's schemes, would seem to provide valuable diagnostic information for a teacher which should preamble the provision of appropriate material. Secondly, incidental learning which can occur in the play context would be enhanced by the provocative intervention of a teacher with judicious comments and questions. This is a more complex role than that

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conceived by the too simplistic question of whether nursery school teachers should or should not intervene in children's play.

Incidental learning within the play context is facilitated by appropriate materials as well as by judicious verbal intervention by a teacher. Materials which have a built-in diversity so that they can be structured and organized in many ways would seem to be particularly fruitful for incidental learning incidents. For when children initiate spontaneous play activities they generate intentions and hence problems within the play context. It would seem that such self-generated problems are more likely to provide incidental learning situations than problems extrinsically posed by the adult through highly structured materials. As Olson's work indicates highly structured materials are likely to be ignored by children for whom the extrinsic problem they present is too advanced. And when, on the other hand, they are played with by children who can solve the problem the very tightness of their structure may preclude a diversity of activities and may therefore result in poorly elaborated play. This is not to suggest that highly structured materials should not be included in nursery school provision, but rather they are better conceived of as fulfilling specific purposes for particular children to whom the extrinsic problem they embody is well matched.

If Vygotsky is correct in conceiving an important function of play to be the first severing of meanings from situational constraints, the provision of materials which can be organized in a variety of ways would have an additional value. Sears (1966)[13] compares the value of an old automobile versus that of a small pedal car as nursery school equipment. He favours the latter, for in it the child has to change speed and direction to avoid obstacles, whereas with the old automobile he tends simply to make engine-like noises and steering motions with his hands. Sears'preference is justified if one thinks in terms of incidental learning in the play context, for there is certainly more accommodative potential in the pedal car. However, Vygotsky's conceptualization of play would suggest other comparisons. Nursery school children frequently build make-believe cars from large blocks. They are apt to sit in these too and make engine-like noises and steering motions. But they also build other structures out of large blocks. In other words, blocks can be used in a variety of ways that allow a child to "sever the meaning from the object". Nursery school provision should include both sorts of material.

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